

1993 ARCHAEOLOGICAL EXCAVATIONS AND SURVEY OF THE SOUTHERN TEMPLE AT PETRA, JORDAN

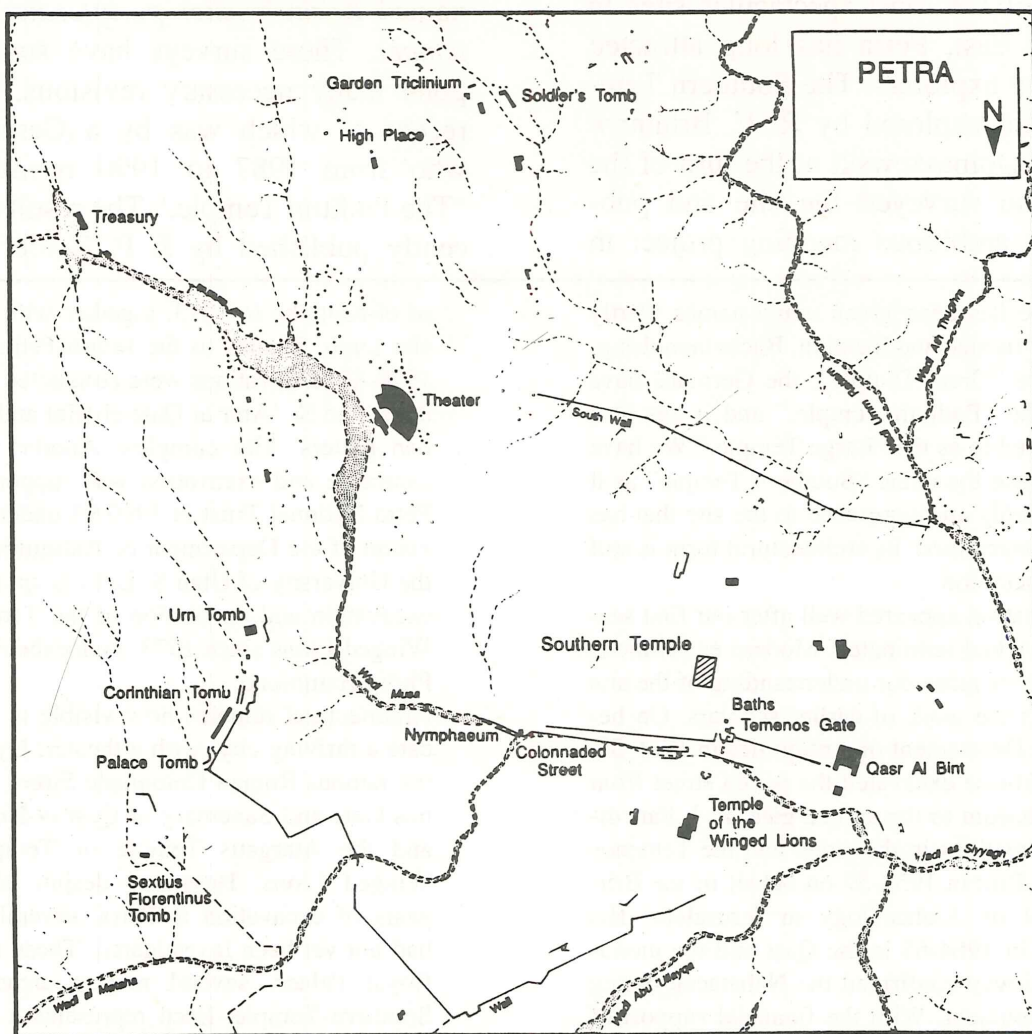
by
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Introduction

The Brown University Center for Old World Archaeology and Art is currently undertaking a five-year (1993 to 1997) program for the archaeological survey and excavation of the Southern Temple at Petra, conducted under the auspices of the Jordanian Department of Antiquities. Petra is perhaps the major tourist attraction of Jordan, and the Jordanian Government is dedicated to the preservation of its rich historic legacy. The Southern Temple complex, however, while noted in many publications, remained unexcavated until 1993, despite

the fact that it is one of the major archaeological, architectural and art historic components of the Nabataean city. Located in the center of the ancient city the site promises to expand our knowledge of the political, art historical, social, and religious history of Petra, and, further afield, to better understand the city's relations with the centers of the Hellenistic and Roman worlds. This project involves the limited excavation and study of the Southern Temple situated to the south of the main artery of the city, the Colonnaded Street (Fig. 1).

The excavation of the Southern Temple



1. Central Petra showing Southern Temple Complex area (A. E. Grey).

is a crucial link in the reconstruction of Nabataean classical ideas. Many of the monuments already excavated at the site beg for answers. The range of excavated material from the Petra Southern Temple should provide a clear understanding of the chronology of the structure, as well as its socio-political, economic, and cultural significance, which is critical to our understanding of both Petra itself and other contemporary sites in the early centuries AD. Beyond this, these archaeological investigations may provide the stratified evidence for cultural contact between Petra and other sites, during the period in which the city was at the height of its influence.

Past Research

As one of the most spectacular sites in the Middle East, Petra has long attracted travelers and explorers. The Southern Temple¹ was first explored by R. E. Brünnow and A. von Domaszewski at the turn of the century, who surveyed the site and published their ambitious mapping project in

1904. But of greater impact, it was W. Bachmann, C. Watzinger, and T. Wiegand in 1916-17, who re-surveyed the site and published their influential work in 1921. In Bachmann's Petra city plan, he postulated the existence of a "Great Temple," aligned with the Colonnaded Street, lying on the hillside to the south. He speculated that the Southern Temple was approached through a monumental Propylaea with a grand staircase leading into a colonnaded, terraced lower temenos, or sacred precinct. Another broad monumental stairway led to a second, upper, porticoed temenos with the Southern Temple at its center. Yet another flight of stairs accessed the Southern Temple proper. Due to the presence of the Corinthian capitals, the Southern Temple was named *Korinthischer peripteralet Podiumtempel*. These surveys have since undergone many necessary revisions, the most recent of which was by a German team who from 1987 to 1990 re-investigated "The Podium Temple." The results were recently published by J. P. Zeitler (1993).²

1. This temple has been given many names. Partly because of its size and location, Bachmann designated it the "Great Temple", the Germans have called it the "Podium Temple," and it has also been referred to as the "Large Temple." We have elected to use the name "Southern Temple" as it does not imply an importance to the site that has yet to be determined; its architectural form is still open to discussion.
2. This publication appeared well after our first season of work had terminated. Modern excavations continue to increase our understanding of the site and correct the work of earlier scholars. On behalf of the Department of Antiquities in 1955-56, Diana Kirkbride excavated the paved street from the Nymphaeum to the arched gate. P. J. Parr directed excavations in the street and the Temenos of Qaşr el-Bint in 1958-59 on behalf of the British School of Archaeology in Jerusalem. His soundings in 1964-65 in the Qaşr and the monumental stairway confirmed the Nabataean dating of this monument. With the financial support of the *Natürhistorische Gesellschaft* in Nürnberg, the Department of Antiquities excavated shaft tombs and a house complex on the western slope

of el-Khubtha in 1973, together with the 'Uneishu tomb. Thanks to the Jerash-Petra Project in 1979-80, excavations were conducted by F. Zayadine and K. 'Amr at Qaşr el-Bint and the Zurrahah potters' kiln complex. Another project of clearance and excavation was supported by the Petra National Trust in 1990-91 under the supervision of the Department of Antiquities. Finally, the University of Utah S. L. C. is sponsoring the excavation and restoration of the Temple of the Winged Lions since 1973, under the direction of Philip Hammond.

Architectural remains now visible at Petra indicate a thriving city, with a theater, Nymphaeum, the famous Roman Colonnade Street, the Temenos Gate and Sanctuary of Qaşr el-Bint Temple, and the Atargatis Temple or Temple of the Winged Lions. However, despite almost 100 years of excavation at Petra, several structures had not yet been investigated. These include the Royal Palace, several market areas, and the Southern Temple. Each represents a significant gap in our knowledge of this important city, and requires scientific investigation.

While no standing structures remain today, the site is littered with column fragments (Figs. 2-3), a few of which have bases *in situ*, probably toppled by one of the earthquakes, which rocked Petra either in 19 May, AD 363 or 9 July, AD 551. Given the promise of the Southern Temple complex and its importance in understanding Petra's chronology, architecture, and thriving inter-cultural history, it is remarkable that it had remained unexcavated until now.

1993 FIELD RESEARCH³

1. Historical Research

The first stage of the project involved documentary research whose principal goal was to identify all recorded structures, features, and activities located within or close to the Southern Temple. This led to the development of a comprehensive field strategy that provided broad coverage of the Southern Temple complex in a physical

sense and allowed the investigation of a range of potential research topics that could be addressed through archaeological excavation. Additional analysis of such documentation was provided both prior to and during field operations.

Because of the scale of its archaeological setting, identification of structures and activities that may have been part of the Southern Temple complex was necessary to suggest avenues for archaeological inquiry. Thus historical data was used to predict the nature and extent of archaeological remains within the Southern Temple complex, and to formulate an estimate of previous disturbance(s) to the area.

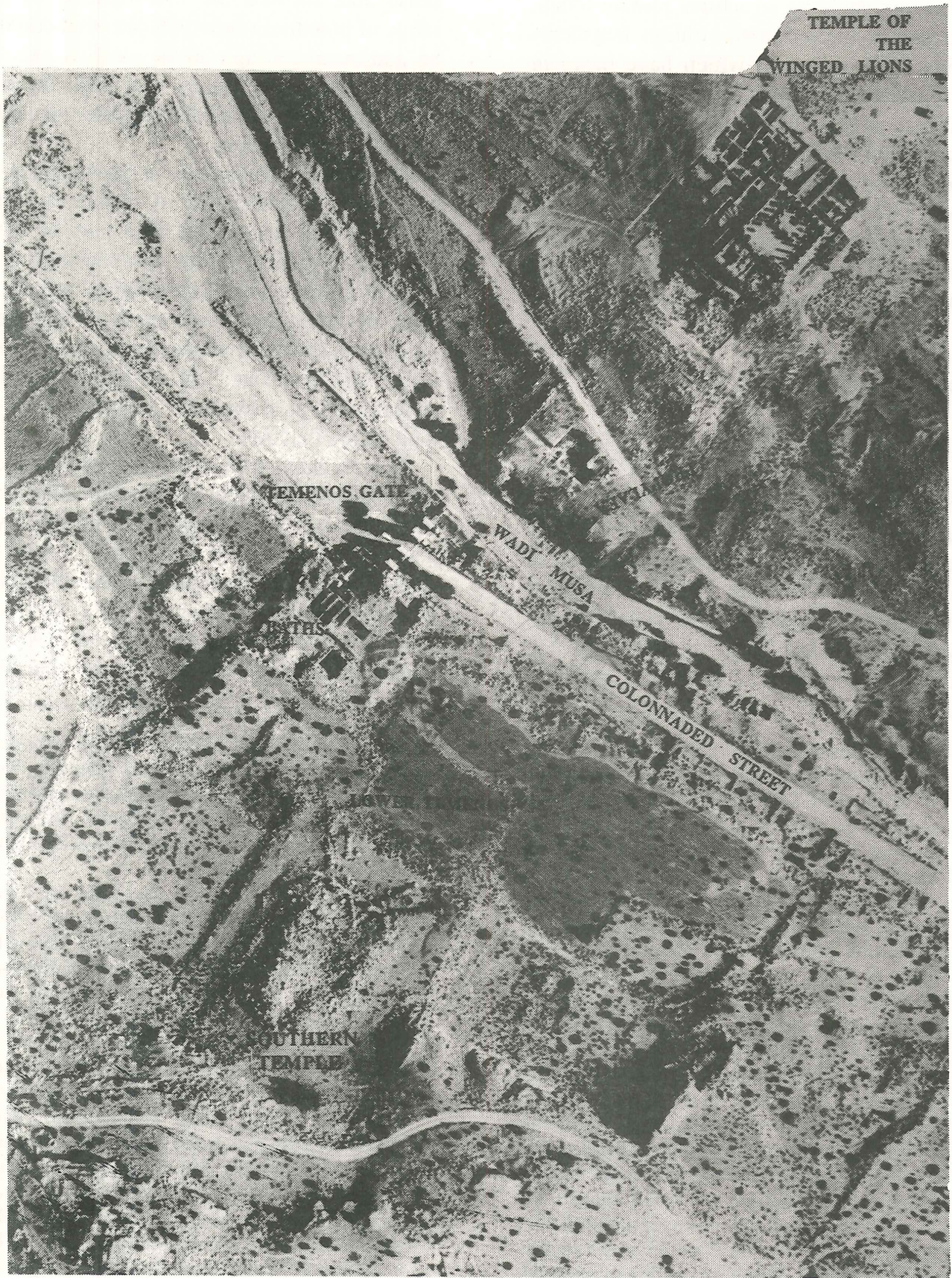
Several maps were reviewed prior to the archaeological survey. The Bachmann plan afforded what was presumed to be a fairly accurate depiction of the layout of structures along the Colonnaded Street, although in relation to the Southern Temple itself, it was proven to be based on conjecture. A revised city plan, published by Judith

3. I want to thank the Department of Antiquities of the Hashemite Kingdom of Jordan and particularly Dr. Safwan Tell, Director-General, for their generous cooperation and assistance. Thanks are also due to the Department Inspector, Suleiman Farajat.

The 1993 Project Staff of The Petra Southern Temple Excavation Project included: Martha S. Joukowsky, Archaeologist, Principal Investigator; Amy Grey, Archaeologist, Assistant Director, and Draftsperson; Erika Schluntz, Archaeologist, Architectural History — Ms. Schluntz is writing her dissertation on the architecture of the Southern Temple; Douglas P. Pitney, Engineer, Architect, Architectural Model Maker; Geoffrey Bilder, Computer Systems Analyst; Pia Ward, Photographer; Nadine Shubailat, Archaeologist, Trench Supervisor; Elizabeth Smolenski, Archaeologist, Trench Supervisor; David Thorpe, Archaeologist, Trench Supervisor; Elizabeth Payne, Assistant Archaeologist; Peter G. Lund, Computer Programmer, Surveying Assistant; Meredith Chesson, Archaeologist, Architectural Fragments Analyst; and Artemis A. W. Joukowsky, Admin-

istrator. Mohammad Mershed also accompanied us throughout our 1993 campaign. Zbigniew Fie-ma, on-site Director for the Petra Church Project, was also at Nazzal's Camp during our 1993 campaign, and he provided us with many helpful suggestions.

Several project consultants who serve the Petra Southern Temple Project include: Pierre Bikai, Director, American Center of Oriental Research; Patricia M. Bikai, American Center of Oriental Research; G. W. Bowersock, Institute for Advanced Study, Greek Inscriptions; Ricardo J. Elia, Cultural Resource Management; Nabil I. Khairy, Nabataean Ceramics; Peter J. Parr, History and Excavation at Petra; J. Wilson Myers and Eleanor E. Myers, Aerial Photography; Javier Teixidor, Aramaean Inscriptions; Peter J. Warr-nock, Archaeobotany, and Fawzi Zayadine, Historic and Architectural Analyses. Although not an official advisor, Dr. Stuart Fleming, Scientific Director of MASCA, The University Museum, The University of Pennsylvania, has been indispensable for his thoughtful recommendations in our research design.



2. Low altitude aerial photograph of the Colonnaded Street with the Lower Temenos and the Southern Temple complex, 1992 (J. Wilson Myers and Eleanor Emlen Myers).



3. Aerial photograph of the Southern Temple at the conclusion of the 1993 campaign (Jane Taylor).

McKenzie (1990, map 7),⁴ indicated that all the extant building elements (a total of nine or ten major structures) are located north and south of the Colonnaded Street and along the Temenos area of Qaşr el-Bint. Her building plan clearly indicated that the Southern Temple, lying to the south of the Colonnaded Street and southeast of the Temenos Gate, was considerably more fragmentary. We could only assume that accurate survey data was lacking, and that one of our missions would be to survey and accurately draw a new plan for the Southern Temple site.

Petra maps were supplemented by aerial photographs (Figs. 2-5). Once formal permission was granted to Brown University by the Jordanian Department of Antiquities, to investigate the Southern Temple complex for a five-year period beginning in 1993, I consulted with J. Wilson Myers and Eleanor Emlen Myers of The American School of Classical Studies, who in 1992 and 1993 conducted an aerial photographic survey of the site and extensively documented the area with low altitude aerial photographic and photogrammetric coverage.⁵

2. Archaeological Testing

Our first task was to survey the Southern Temple site, and to ascertain the location of its remains. The net result of map research, aerial photography, laser Electronic Distance Measuring System (EDM) surveys,

with the computer program, plus the use of CADD programming provided the most detailed and accurate Petra site maps yet produced, which was a significant research asset. This cartographic information has been stored in a state-of-the-art CADD mapping program. The 1993 archaeological survey consisted of the introduction of the laser EDM for a computerized topographical survey of the Southern Temple complex, the excavation of four trenches, the establishment of an artifact and materials database and a concise field methodology with the intent of presenting finds in a multi-media, and therefore more accessible, format, and the assessment of the site to provide recommendations for concurrent management preservation of cultural resources. The primary goals of the 1993 season were met and even exceeded. These included: (1) identifying the nature and extent of archaeological remains; (2) locating the extent of the Southern Temple and adjacent architectural features, many of which were previously undocumented; (3) determining an excavation strategy for the next four seasons; (4) interpreting the value of the Southern Temple complex in an archaeological, historical, and cultural context; and (5) creating a long-term plan for cultural resource management.

1. To identify of the nature and extent of archaeological remains.

Datum and sub-datum points were established using an EDM. The EDM, in con-

4. McKenzie 1990 is the most comprehensive study of the architecture. We quickly discovered that the McKenzie surveys and plans of the site were a mixed collection of work over the years; for example her figs. 6 and 8 appear to be based on accurate survey, but in fact she states (see her catalogue of sources on p. xxii) that they were a pastiche of various periods and teams, some more than 70 years old. We questioned which plans were based on the ground survey of the actual remains, and to what extent was hypothetical infor-

mation included. What is clear is that all these plans indicate that the Southern Temple was in a position of paramount importance, but each plan suggests different sets of information.

5. In addition, at the close of the 1993 season, a professional photographer documented the year-end excavations from the air (Fig. 3). Fig. 6 is a pre-excavation plan of the Southern Temple before the excavation drawn from the photogrammetric coverage.



4. Low altitude aerial photograph of the Propylaea and the Colonnaded Street with the Lower Temenos and the Southern Temple front, 1992 (J. Wilson Myers and Eleanor Emlen Myers).

junction with the COMPASS program developed by the Museum Applied Center for Archaeology (MASCA) at the University Museum of Archaeology and Anthropology, the University of Pennsylvania, allowed measurements to be downloaded onto a

computer on which a topographic site plan was established. After the grid system was superimposed on the site, excavations took place in accordance with it, and daily maps were then generated on scales of 1:300 (Fig. 7) and 1:50 (Fig. 8).⁶

6. Chrysanthos Kanellopoulos, historic architect and director of the restoration of the Great Temple of Amman (also known as the Temple of Hercules) was sought out for help. He visited the site and advised us as to what components should be record-

ed for the Southern Temple and how the architectural fragments should be organized and preserved, should reconstruction in the future be possible.



5. Aerial photograph of the Petra Southern Temple facing south before excavation. Low-altitude aerial photograph 1993 (J. Wilson Myers and Eleanor Emlen Myers).

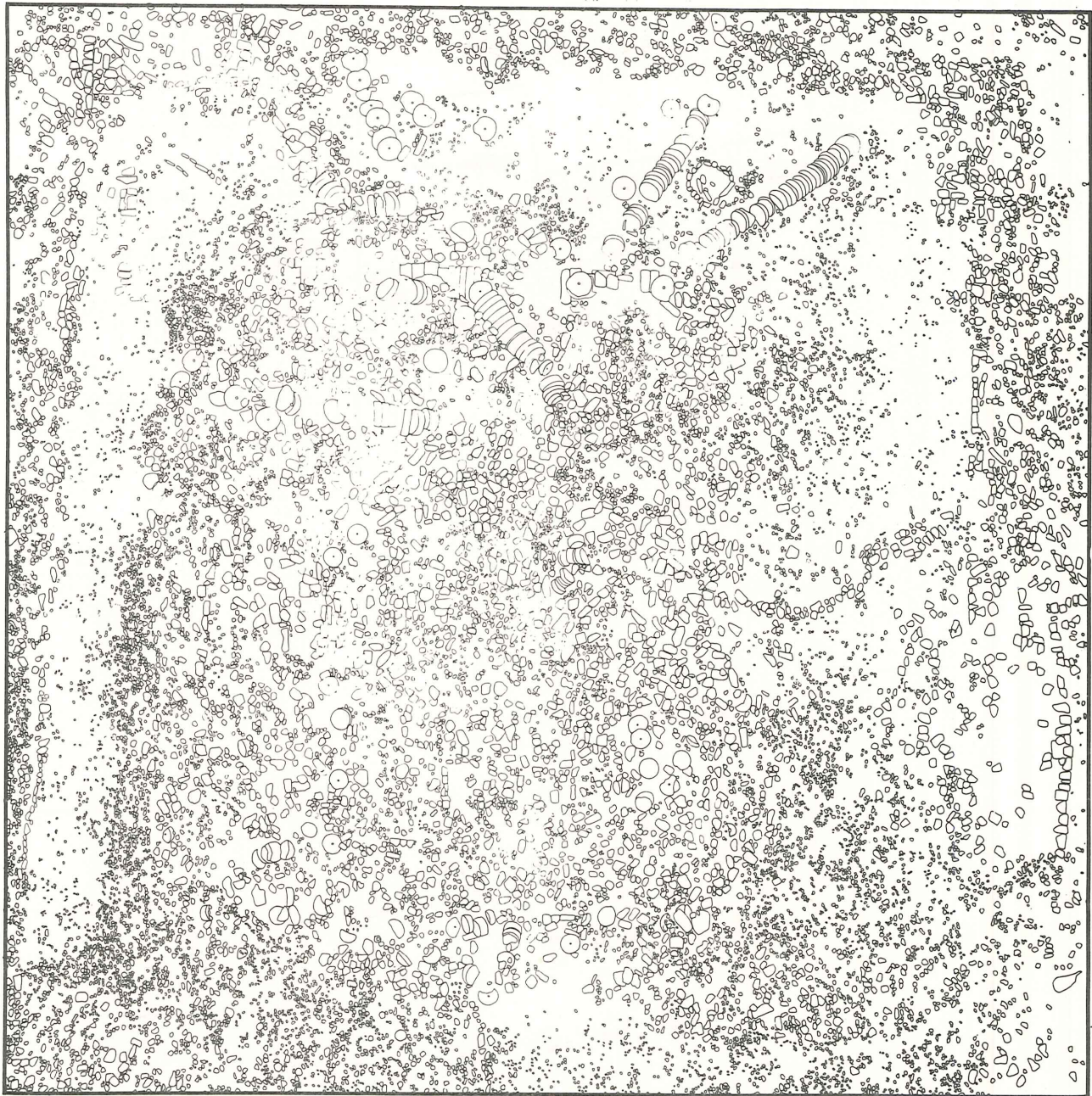
2. To identify specific areas of the Southern Temple complex.

Five main north-to-south areas were identified based on architectural features and surface remains: 1) the Propylaea Steps, leading from the Colonnaded Street; 2) the Lower Temenos, at the top of the Propylaea Steps to the south; 3) the Grand Stairway, connecting the Lower Temenos to the immediate Southern Temple precinct;

4) the Upper Temenos, on the second plateau of the hillside; and 5) the Southern Temple itself (see Fig. 7).

3. To recommend a multi-year excavation and research project at the Southern Temple complex.

From the results of the topographic survey and the four trenches excavated, a set of site-specific research problems were



Pre-Excavation Plan
Petra Southern Temple
1993

6. Plan of the Southern Temple before excavation (A. E. Grey).

identified for further study. The removal of debris and ashlar was not only time-consuming and labor-intensive, but also dangerous. For instance, the surface accumulation of debris and ashlar blocks was much greater than anticipated.

4. To provide excavation interpretation in

formats accessible both to scholars and the public.

Because the Southern Temple complex is located in the center of a major tourist attraction, the project is inherently public-oriented. The site's significance, openness, and high visibility offer enormous potential for bringing its archaeological exploration

5. To provide off-season and long-term recommendations for the management of cultural resources.

The most immediate concern was the sporadic heavy winter rainfall at Petra causing severe erosion. In order to preserve *in situ* features and the excavations, drainage canals were constructed on the eastern perimeter of the site, re-routing water downhill and away from the complex.⁸

3. 1993 Field Activities

A. Surveying

Field Survey during the 1993 field excavation season was conducted using a Topcon direct reading theodolite accompanied by a Corvallis MC-5 data collector. The data recording software provided with the MC-5, developed by MASCA, offered the user the ability to name and classify each point or object being located. Office software included Microsoft Excel 4.0, Microsoft Word 5.0, and MiniCad +4.0 v. 4.01. The software was installed on a Macintosh PowerBook 170. Printing was accomplished using an Apple StyleWriter.

Field activity began on July 26, 1993, with excavation and the locating of visible architectural features (*in situ* columns and wall lines) and concluded on August 20, 1993. A permanent survey marker was established on top of the Upper Temenos East Wall, tying our datum into the known bench marks at the Zibb Fir'awn to the south and the Temple of the Winged Lions to the north.

B. Excavation

Archaeological resources are non-renewable. It is therefore preferable to pre-

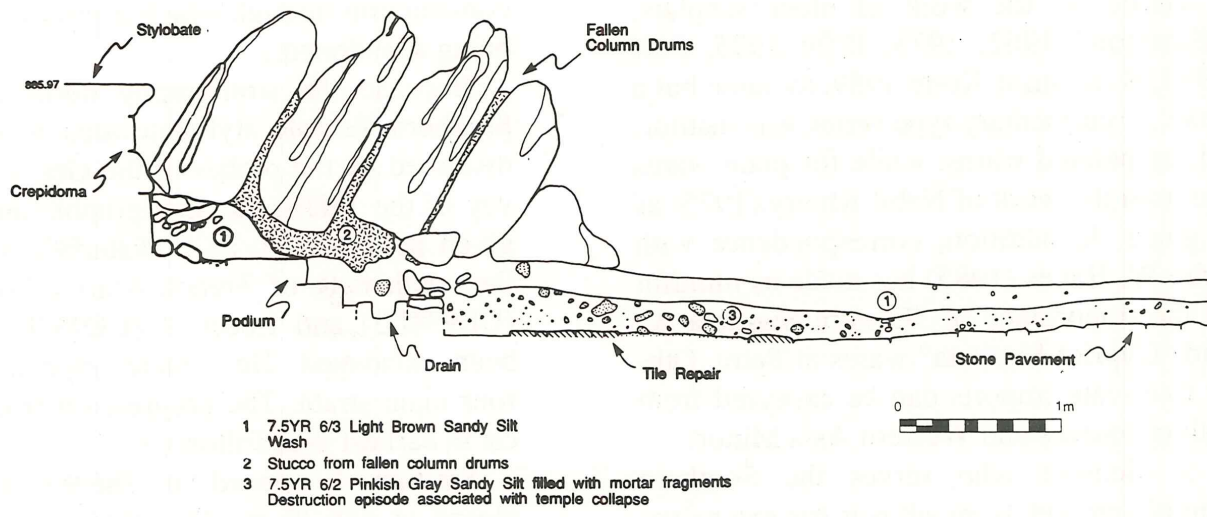
serve them in place if possible, in keeping with the "conservation ethic." Excavation is necessary, however, to obtain important research data for scholarly and public benefit. To reconcile these two aims, a field strategy has been put in place that considers that possibility for preservation and reversible consolidation.

The excavation was made very difficult by the intrusion of earthquake debris. Four trenches were excavated perpendicular to the Southern Temple stylobate. Trench 1 measured 9.00 by 9.00 m, with a 1.00 m balk, thus 8.00 by 8.00 m were excavated. To the far west of Trench 1, Trench 2 was established to define the Southern Temple west wall, 6.00 m north-south by 10.00 m east-west, and Trench 3 (which originally was labeled locus 4), was an irregularly-sized trench 5 m by 4.5 m positioned between Trenches 1 and 2. But this trench was delimited by the fall of column drums, so its excavation area was irregular in shape, measuring 3.17 m along the Southern Temple stylobate in the south, 1.28 m on its west, its east was delimited by the fall of the Southern Temple cella's eastern column, and only 0.50 m could be excavated on its north. The easternmost trench was Trench 4, established to define the eastern stylobate and the eastern Southern Temple wall. Trench 4 measured 10.00 m east-west by 6.00 m north-south. The general outline of these trenches can be seen in Figs. 7 and 15; Fig. 9 is a stratigraphic profile of the western balk of Trench 1.

Excavations were highly systematic, and as they progressed, field and artifact systems were refined and updated. All measurements were taken by the laser transit from an established sub-datum control

8. Ricardo J. Elia, Director of the Office of Public Archaeology, Boston University, participated in the first few weeks of excavation and made several recommendations regarding methods of preservation for the site. His field experience with re-

covery, restoration, and site management during excavation, and not after the fact, ensured that our excavation procedures were compatible with the most current methods of archaeological preservation.



PETRA
SOUTHERN TEMPLE
PROFILE OF WESTERN BAULK
TRENCH 1 1993

9. Trench 1, profile of the western baulk (A. E. Grey).

point outside the excavation area. These served as the base calculations for all calculations, including horizontal and vertical measurements for the elevations.⁹

C. Ceramics

Nabataean painted and plain pottery is known for its well-levigated fabrics of egg-shell thinness or sandy coarse wares that range in color from brick-red and pink to brown. It is technically distinct from Early Roman wares by its fabrication and stylized ornamentation. Painted wares are usually decorated with pink, dark red, brown, or mauve painting set on a decorative ground. The different styles of painting are most often found on the interior of open bowl forms. Dating for this pottery is presently

being established by the well stratified excavations of R. Stucky at ez-Zanţur, the site set high on the ridge behind the Southern Temple to its southeast.

Nabataean painted and plain wares (Khairy 1975) have been studied for many years. Some chemical analyses have been performed as well ('Amr 1978), but these results have yet to be confirmed. Before the 1993 season, a survey of all publications was undertaken, and it was clear that a tighter typological scheme had to be put into place that should be developed on site using sealed stratigraphic contexts. As far as Nabataean wares were concerned, it was thought that more of its "fingerprints" should be tested in the future by petrographic and chemical analyses.

9. Processing and Cataloging Data: Once processing records had been compiled in the field, they were edited and saved in the hard drive memory and backed up with floppy disks. An Ink Jet printer was used for all printing; we also will be utilizing an optical scanning devise, for adding photographs and drawings to our reports and catalogs. These field methods and recording systems included sections, plans, copious field notes, phas-

ing charts and computer systems which allowed for control over each unit of excavation, as well as the horizontal and stratigraphic position of individual artifacts. The result of utilizing this methodology has been the ability to coherently discuss the nature of these sites both in terms of loci, generally the smallest unit, or in terms of larger features and architectural components, their largest horizontal units.

Based on the work of other scholars, (Hammond 1962; 1973; Iliffe 1935; Parr 1970; K. Schmitt-Korte 1989; to name but a few), a rudimentary type series was instituted for painted wares, while for plain wares we used the work of Nabil Khairy (1975) as a guide. In addition, correspondence with John W. Hayes (1985) has made us mindful of the importance of "Eastern Sigillata A" and "Cypriot Sigillata" wares at Petra. Other fine-ware imports can be expected from Italian sources and Western Asia Minor.

S. Schmid who serves the Southern Temple project as an advisor has extensively studied these wares (1992). His evaluation of the Southern Temple ceramics excavated after the 1993 season is as follows:

"I had the impression that most of the units were more or less mixed...either from Nabataean to Late Roman or between early and later Nabataean. By far the most homogeneous unit was in a plastic bag "P/ST Propylaea Steps, Deposit of ash." Therein I found three painted rim sherds as well as 18 painted wall sherds of a phase I would approximately date from ca. 20 BC - ca. AD 50. Just one painted wall sherd seemed to be somewhat earlier (ca. 20 BC - ca. AD 20)."

While at least the parameters for such studies have been established, there were no sealed contexts for this analysis during the 1993 season; this research is anticipated for future work. A concrete demonstration of the integrity of these techniques and recording methods is contained in the chronological phasing of the Southern Temple site, to which we now turn.

D. Dating and Stratigraphy

Periodic stratigraphic examinations will be offered as our work continues. But the evidence from our 1993 excavations gives us a clear preliminary idea of the character of the buildings, the period of the temple's original foundation, and the phases of re-

construction through which it passed before being abandoned.

Because the stratigraphy north of the Southern Temple stylobate area had been disturbed by the probes of the German survey of the 1980s, the stratigraphic analysis given here is from an undisturbed area in the south balk of Trench 4 after Locus 3 (UE934L3) and Locus 9 (UE934L9) had been excavated. Here there appear to be four main strata. The progression from latest to earliest is as follows:

Stratum 1 opened at 886.99 m and closed at 886.39 m. This 0.60 m deposit was comprised of brown top soil 7.5YR 4/4, or humus, with a dense proliferation of rocks. Stratum 2 was characterized by compact reddish brown soil of sand and silt with pebbles and cobbles. It was approximately 0.25 m in thickness and extended from 886.39 m to 886.14 m. Stratum 3 extended from 886.14 to 885.89 m, and was comprised of a compact fine dark sandy soil with few pebbles. Its Munsell reading was brown or 7.5YR 5/3. Stratum 4, just above the eastern edge of the stylobate, was only 0.10 m thick. Consisting of very fine sand with no pebbles, and some streaks of decomposing mortar, it was light red in color, or 2.5YR 6/6. Virgin soil was not reached. More stratigraphic analysis will be undertaken in 1994 when undisturbed areas will be excavated. Fig. 9 is a profile of the Trench 1 western balk.

Our excavations, which are superficial at this point, determined that the Southern Temple underwent eight phases, which we have treated as discrete stages. These conclusions, however, and their chronological assignments may change as a result of further excavation. We have tentatively identified three cultural levels with several sub-phases in the excavated area, numbered from the lowest or earliest up to the latest deposit. The earliest Southern Temple level is Level I, which is sub-divided into three sub-periods or phases. The imposition of

the Southern Temple complex must have destroyed or obscured much of the site's earlier settlements, if there were any.

Level I - Construction and early use of the Southern Temple, which involved:

Phase 1 - Preparatory fill, artificial build-up, and grading of the Southern Temple area and construction of the north Lower Temenos retaining wall.

Phase 2 - Construction of the four-branched subterranean canalization system, extending under the Southern Temple forecourt, perhaps under the Southern Temple itself. It also extends under the Grand Stairway, and to the north, east, and west beyond the Southern Temple precinct.

Phase 3 - Construction and use of the Southern Temple, including construction of the forecourt with white hexagonal pavers. The Propylaea steps are built up to the northwest Lower Temenos retaining wall.

Level II - Southern Temple Precinct modifications:

Phase 4 - Reconstruction of the Southern Temple Podium Stairway, modifying the Phase 3 construction, for additional drainage for the area. Construction of the Colonnaded Street and reconstruction of curbing for the Propylaea Steps.

Level III - Later modification and use:

Phase 5 - Damage to the forecourt pavement, and the installation and further modification of drainage in the Southern Temple forecourt with the addition of ceramic pipes. Wall or partition construction between the columns to enclose (part of?) the temple.

Phase 6 - Leveling of the Southern Temple Forecourt pavement by the addition of ceramic tiles; this may be the last ancient phase.

Level IV - Destruction

Phase 7 - Devastation by earthquake, which rocked the Southern Temple to ruin and probable subsequent abandonment.

Phase 8 - Accumulation of overburden, alluvial deposits, and a modern garbage

dump excavated in the 1930s. The 1989 disturbance created by the German excavators along the Southern Temple stylobate is also to be included in this phase.

A preliminary dating scheme for these levels is: Level I from the beginning of the first century AD to the mid-second century AD; Level II from the mid-second to the first third of the fourth century or to the AD 331 earthquake; and Level III, tentatively assigned from AD 331 to the mid-sixth century, when we suggest the Southern Temple was destroyed by the earthquake of July 9, AD 551.

Our understanding of the stratigraphy has been hampered by the lack of datable materials. Due to the existence of differing accumulation and areas of use, it is clear that some of the stratigraphy can be debated. Thus our conclusions must remain tentative until they can be supported by sealed archaeological contexts. Bearing this scheme in mind, we now turn to a brief discussion of building materials, and to a description of our findings.

E. Building Materials

The essential constituents of the architecture at Petra were bound to a significant degree by the environment — the locally available sandstone and to a lesser extent, limestone. The principal sandstone quarries of the Petra Southern Temple are probably to be found nearby in the "Umm Ishrin Sandstone Formation" — the most common outcropping rock in Petra. Fig. 14 gives a general impression of the column attrition that has occurred over the years. Fig. 15 shows a plan view of the temple excavations.

The use of limestone by the Southern Temple architects was mainly decorative for carved elements such as column bases and capitals, the pediment and architrave, as well as for the Southern Temple stairs, stylobate and podia, and pavements such as the Southern Temple forecourt. Its source is

also nearby, but not as conveniently located as the sandstone sources.

Stucco was used as a decorative facing as well as a protection against the weather. Composed of lime and sand, it was used to cover the sandstone masonry, convey the detail of the moldings, and lend a unified effect to the overall building.

Ensuring the stability of the Southern Temple was crucial to its architects. Its core foundation and skeleton had to be well-graded and strong for they had to support the massive dressed masonry of the structure. The footing was comprised of irregularly cut limestones and sandstones set into a compact bedding of soil mixed with now decomposed mortar. This primitive mortared rubble was laid by hand in horizontal courses for the stairs, and was dependent on the skill and experience of the mason for its strength. Generally, it appears to be of inferior quality and is less durable than would be expected, and therefore may not have been effective in its role as a bonding agent. In some instances a very hard fine-grained pink mortar-cement was used (for example, in the laying of the Southern Temple forecourt), but it was not in general use as stairway bedding.

THE SOUTHERN TEMPLE COMPLEX

1. Introduction

The predilection of the Petra central city area appears to have been one for spatial composition and order. These architectural concepts descend from the Classical Greek tradition, but in Petra are found with alterations in the free use of lines, surfaces, masses and volumes. There were a number of local influences such as raw materials and cultural dicta which resulted in a modification of the Graeco-Roman architectural canon, including geography, climate, local stone, and probably even political, economic, and social factors. The inhabitants of Petra created a large Southern Temple pre-

inct that even today commands the scene over the city's political and architectural complexes. One of our research goals is to understand how the Southern Temple complex was designed and functioned as an independent unit, as well as an integral part of the city, within the Nabataean and successive periods, and how it served as an indicator of cross-cultural contacts evident in this region between the first century AD and the mid-sixth century AD.

The Southern Temple complex occupies a naturally eroded and yet artificially graded slope from the southern height of el-Katuta to the Colonnaded Street. Thus it is bounded by the el-Katuta and Zibb Fir'awn rock outcrops in the south and the Colonnaded Street in the north. Zibb Fir'awn lies at an approximate elevation of 908 m and the Colonnaded Street at approximately 871 m, thus there is a 37 m elevation difference between them. Between the Zibb Fir'awn and our datum point on the eastern wall of the Upper Temenos, Pt. 103, which has an elevation of 895.48 m, there is a differential of 12.5 m. Originally the site may have extended further up-hill to the south since the topography suggests that the deposits extended to the el-Katuta outcrop, which has been chiseled away and cut back. To the east lies the boundary wall between the Southern Temple precinct and what Bachmann and Wiegand identified as the Upper Market, and to the west, the higher elevation of the Southern Temple complex forms a topographic south to north boundary between the complex itself and the unexcavated sloping ground that ends in the Baths adjacent to the Colonnaded Street. There are three main levels, from north to south — lowest-to-highest, the Propylaea, the Lower Temenos, and the Upper Temenos. Centrally positioned stairways link each level to the other. The approximate overall dimensions of the complex are north-south 113 m by east-west 55.68 m.

In our discussion of specific Southern Temple areas, we will begin at the north with the Colonnaded Street and work our way south to the Southern Temple itself.

2. The Colonnaded Street and the Propylaea Steps

The Colonnaded Street was the connective tissue of the city. It linked the principal buildings and provided the city with its formal and definitive framework. Prior to our survey, it was assumed that the orientation of the Southern Temple was governed by the present-day Colonnaded Street, but this is now open to question. From the excavations of Peter Parr, it is known that the Colonnaded Street was constructed on the foundations of a Nabataean predecessor, and may have either been widened or realigned to accommodate the heavier traffic that came with increased activity after the Southern Temple was built. Parr has assigned the street a *terminus post quem* date of AD 76 and the Temenos Gate to a slightly later time; McKenzie (1990: 35-36) suggests a *terminus post quem* of AD 9 for the street.

At the Propylaea entrance to the Southern Temple from the Colonnaded Street, a two step curbing constructed of sandstone ashlar blocks rests directly on the Colonnaded Street, which is laid just under it. Thus the curbing is structurally later than the Colonnaded Street, and was constructed to accommodate it. The first step consists of wide horizontally set ashlar stretchers; the second step is laid with stretchers and headers. Then there is a landing comprised of a row of limestone slabs laid as headers, set perpendicular to the next course of sandstone stretchers, which was also laid at the same time. Yet a second row of sandstone stretchers was fitted in behind the stretchers in front to accommodate the lowest riser of the Propylaea Steps. This first riser is awkwardly positioned out of right angle alignment to the street. The evidence thus sug-

gests that the steps may have been earlier than either the Colonnaded Street or its curbing. There is a west to east oblique 15° slant to this landing, as if it were originally built on another alignment. Those curbing steps that had fallen out of place were lifted by our team, cleaned, consolidated, and re-laid (Fig. 11 is a view of the Propylaea Curbing after consolidation). Unfortunately no datable evidence rested below these blocks.

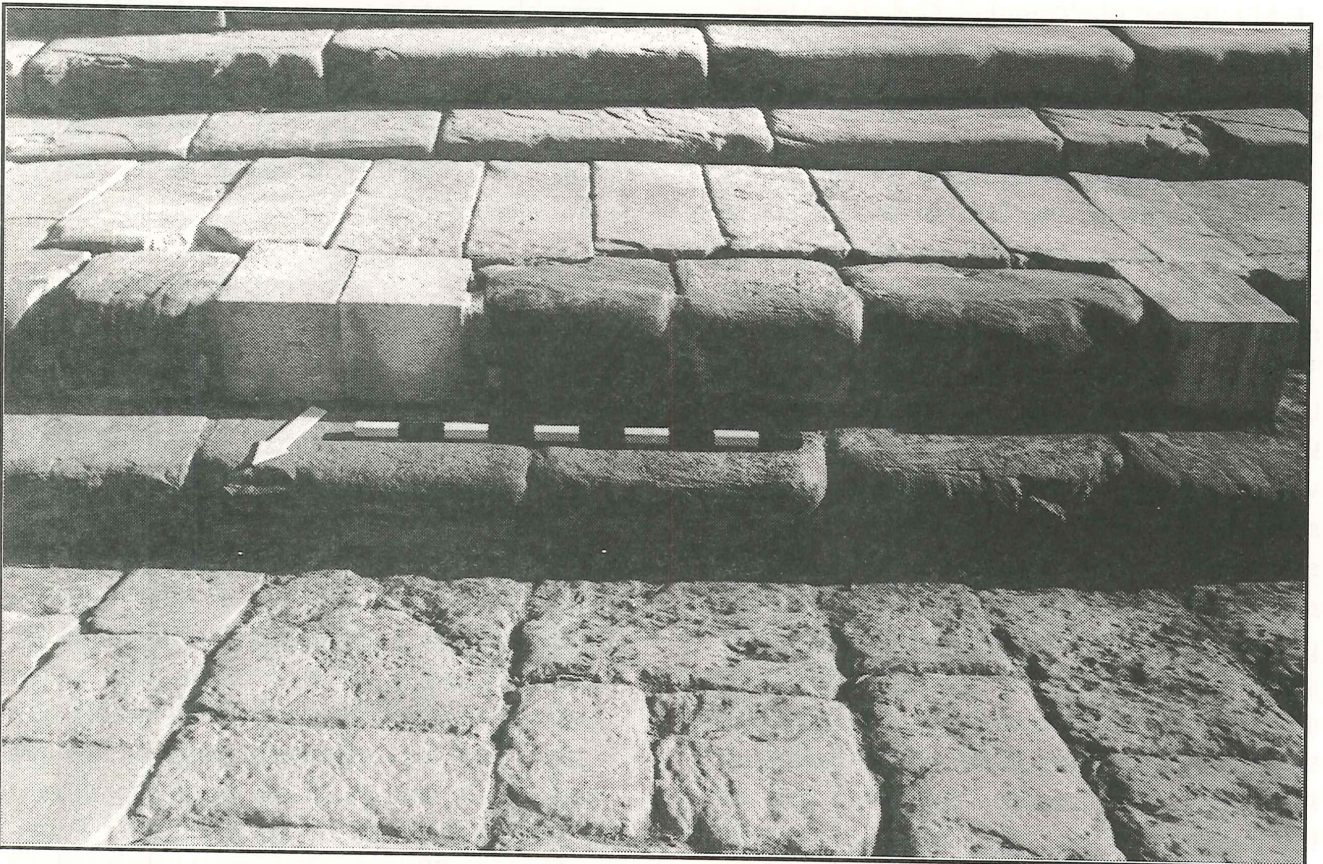
On the basis of this evidence, it would appear that the Propylaea Steps were in position before the sidewalk, and its curbing was re-designed to fit in with the new street configuration. Heavy traffic and the enhancement of Petra city precipitated changes and resulted in modifications to the Colonnaded Street and to the Propylaea Steps of the Southern Temple. The other excavated buildings along the Colonnaded Street, Qaşr el-Bint, the Temple of the Winged Lions, and the Baths, which we believe to be roughly contemporary with the Southern Temple, are also not in alignment with the Colonnaded Street, and the excavated evidence confirms they were erected earlier, and were probably designed as an ensemble.

3. Area A. The Propylaea Entrance (Figs. 10 and 11)

The curbing led to a stair access (which Bachmann labeled the Propylaea) to the elevated Lower Temenos. The Propylaea steps are approximately 12.8 m long north-south by 8.7 m wide east-west. These stairs are a two-part structure: in a better state of preservation are the lower nine courses, which access a disturbed landing platform at an elevation of 872.50 m. The upper courses of steps are a jumble of rubble collapse, and the uppermost step is missing completely, but its approximate elevation is at 878.30 m. Thus to gain the Lower Temenos, some 28 steps, if not more, had to be climbed. At the top of this upper flight is



10. Propylaea Stairway leading from Colonnaded Street to Lower Temenos; lower courses, before consolidation, facing south (P. Ward).



11. Propylaea Stairway, lower courses showing consolidation, facing south.

the level of the Lower Temenos with its weathered, very gentle south-to-north slope.

It is possible that some kind of altar stood on the landing platform, for a large amount of fine-grained ash was recovered from between the upper platform stones. A cache of Nabataean painted wares with surface ash deposits were also excavated here, which have been dated by S. Schmid (*supra*) to ca. 20 BC to AD 50. Fine dark gray ash deposits were also found from the interstices at the bottom of both the east and west stairway walls where they abut the east and west retaining walls.

To the west of the lowest flight of stairs at the platform level, there is a cut in the fine ashlar Lower Temenos retaining wall (this wall has well-fitted and well-dressed blocks). Thus the western wall facing the Colonnaded Street (this is the same as the Baths entrance wall) was breached and partially dismantled when the stairway was constructed (the stairway is not bonded to it). The upper portion of the eastern Lower Temenos retaining wall appears to be younger or later — its ashlar are dressed differently than those to the west of the steps, and some appear to have been reused. This east retaining wall may have been modified to serve a later purpose, for it is breached further to the east. The Lower Temenos west retaining wall is therefore older than the Propylaea Steps. From these initial observations, it can be suggested that the present-day Propylaea Steps were originally constructed (or re-constructed) earlier than the Colonnaded Street, but later than the western retaining wall, the Baths, and the Southern Temple.

4. Area B. The Lower Temenos

At the top of the Propylaea Steps is the Lower Temenos, which lies approximately 7.5 m above the Colonnaded Street. This appears to be a fairly flat area, but it gently slopes south to north, and its surface is covered with a silt and small stone overburden.

This *area sacra* is the link between the Propylaea Steps and the Southern Temple. The Southern Temple is not isolated for the Lower Temenos serves as an open square from which the temple would have been visible in all its splendor. While the Lower Temenos remains largely unexplored, it was surveyed, and its approximate measurements are north-south 40 m by east-west 55.68 m.

The Bachmann plan shows double north-south colonnaded porticoes on the east and west flanks of the Lower Temenos. As one walks the Lower Temenos, these cannot be easily seen today, but four columns were cleared and surveyed just below the surface *in situ* — two on the east, one on the west, and a fourth that was not in line with the others. Perhaps more were evident in the 1920s when Bachmann drafted his plan, or his plan is based on educated conjecture. It is also difficult to discern the east terrace and west terrace walls, if they did indeed exist. To the northwest is the backdirt pile for the excavations of the Baths, which can be seen in Fig. 4. There is also a rubble pile between the Upper and Lower Temenos, which is unclear both in origin and function, but appears to be modern. At the north of the Lower Temenos there also is a series of blocks *in situ*, extending north-south that may have served as a west terrace wall for the Lower Temenos. All of these areas must be fully documented and designated either as modern or ancient during our continued survey of the site.

Additionally, at the south or far end of the Lower Temenos, beside the transverse bulk of the Grand Stairway, Bachmann shows two U-shaped, curved recesses at ground level that open onto the Lower Temenos. These are neatly balanced structures, and we assume them to be *excedras*, one to the southeast and the other to the southwest aligned with and framing the Grand Stairway. The outline of the south-

western excedra is visible in the aerial photograph (Fig. 4), but the western excedra if it does in fact exist, is not clear either from the air or on the ground. The nature, construction, and design of these two architectural components will be reported on as soon as their areas are cleared. This area may require excavation for clarification of its layout as well as the plan, dimensions, and function.

5. Area C. The Grand Stairway

Bachmann shows a once stately Grand Stairway joining the Lower Temenos to the Upper Temenos. Constructed with a probable excedra flanking it to the west, this once formed the entrance to the sacred precinct of the Upper Temenos and served as a platform and retaining wall for the Upper Temenos. It thus provided the Southern Temple with an additional focus and was constructed as a controlled connective link to the Upper Temenos. The Grand Stairway appears to have been hardest hit by erosion and is in a terrible state of disrepair with well-cut sandstone ashlar jumbled up with uncut stones. It measures approximately east-west 38.28 m in width by 6.09 m north-south in length. The extent of the stairway was surveyed and mapped, but it will require some excavation to understand its original configuration.

6. Area D. The Upper Temenos - Southern Temple Enclosure

The Upper Temenos is an elevated terrace built to enhance the temple — it is elevated well above both the precincts to the east (the Lower Market) and the west (the so-called "Small Temple" and the Baths). But it is visually bound to both, for the Southern Temple could have been viewed from both these east and the west sectors. Its built-up height ensured the visibility of the temple and lent the structure its spatial and symbolic independence.

The dimensions of the Southern Temple

Upper Temenos have an east-west width of 55.68 m by an as yet undetermined north-south length of approximately 60 m (the southern boundary has not yet been identified). Shown in Fig. 5, the Upper Temenos lies some 7.5 m higher than the Lower Temenos, and it consists of the Southern Temple East and West Temple Courts, the Southern Temple Forecourt (excluding Southern Temple Podium Stairway, which is discussed with the Southern Temple), and the area of the Southern Temple itself.

If there was a rear colonnade to the Southern Temple as Bachmann posits, it would be here. The rear of the Southern Temple is only between 15 and 20 m from the el-Katuta cliff face. It is likely that there existed a rear retaining wall, but at present it is not in evidence. Many of these walls appear to be modern and were probably used by the Bdul, but their function and dates need to be established. In some sense they serve to protect the site from erosion, and their eventual removal will have to be weighed against their present day protective service to the site. However they need to be documented by survey, photography, and limited excavation, if necessary.

Since the 1993 excavations technically took place in the Upper Temenos in front of the temple, including its forecourt, we will turn our discussion to the forecourt and begin with the underground canalization system discovered underlying it.

7. The Subterranean Canalization System

Besides the rock cutting and terracing of the Southern Temple site, the earliest evidence of human activity excavated thus far at the Southern Temple consists of the construction of an impressive four-branched subterranean water system. What makes this discovery so unusual is that with limited excavation, we discovered the junction point of four channels. This most interesting feature was discovered by the excavation of a discolored soil disturbance in the

temple forecourt, where at an elevation of 883.2 m, these remains were found (Locus 14, UN931L14) lying approximately one meter below a disturbed area near the west center of the limestone hexagonal flagstone pavement (*infra*). After the excavation of a vertical shaft with an ashlar block resting at an oblique angle, the area opened onto the junction point of four tunnels leading north, south, east, and west. Due to the fact that this discovery was made in the last full day of excavation, and there was the potential risk of cave-ins and the lighting was poor, we were unable to investigate and document these tunnels, but they were given superficial examination.

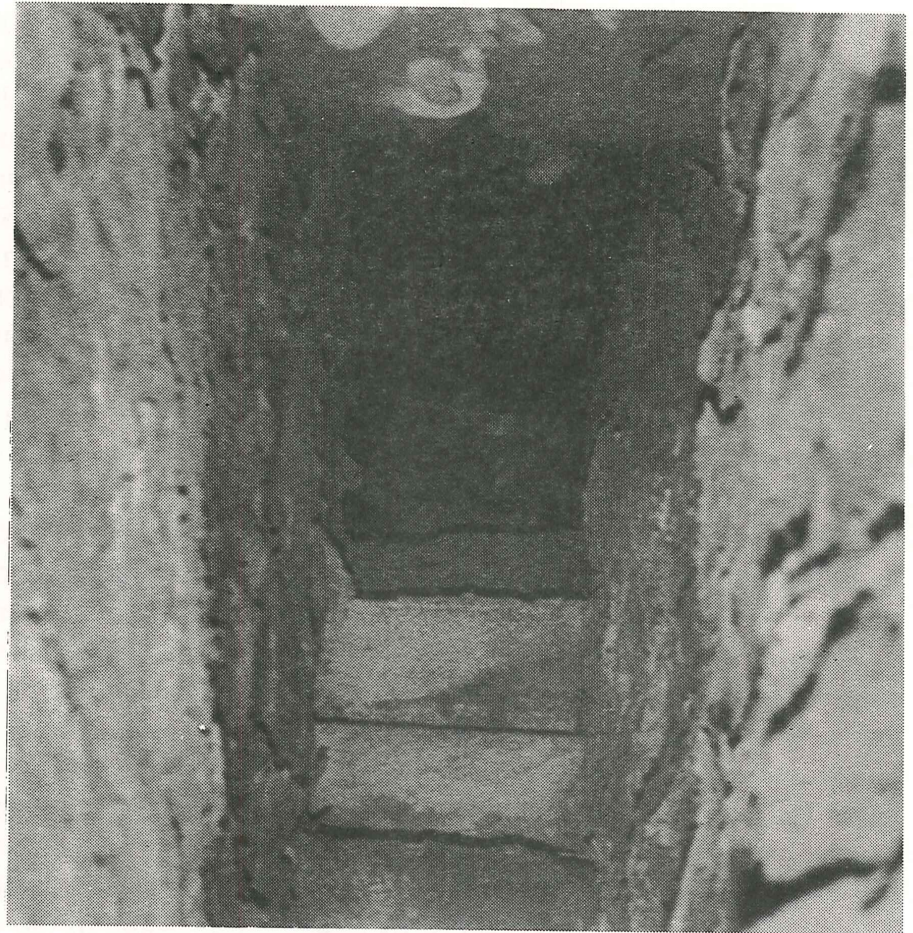
Cursory observation from the central junction gives the impression that the walls are of a well-planned and well-executed construction with uniform well-built corners. The average tunnel width ranges between 0.50 to 0.60 m, and the height from the extant ground level is 0.70 - 0.80 m. The tunnel's side walls and part of its roofing are constructed with what appears to be evenly carved sandstone ashlar, ca. 0.55 - 0.60 m in length and 0.35 - 0.40 m in width. Although some of the lower ashlar appear roughly dressed, the three-to-five wall courses that could be seen were dry-laid and closely-fitted. In some instances mud and small chinking or snecking stones were observed wedged between the blocks. Without closer examination, we cannot be sure if these were part of the ashlar bonding or were inserted as the result of use. Most of the well-dressed ceiling blocks appear to be of limestone (length 0.75 m, width 0.35 m, height 0.22 m). These ashlar are positioned to span the width of the tunnel, but because many were cracked in their centers, it was considered unsafe to investigate further.

From our cursory examination, at about 1.50 m, the east branch curves to the northeast, and at 3.5 m collapse is visible. The west tunnel extends to the west for approxi-

mately 1.50 m and then curves to the northwest, and beyond 5.00 m this passage curves too abruptly to see where it goes. The north tunnel sharply descends some 5.00 m at a dramatic angle to a point below the Grand Stairway. At this point it is stepped, with a height of about 1.80 - 2.00 m, where both in its ceiling and its floor three to four steps appear. No features could be discerned beyond approximately 10.00 m. The south, west, and east passages appear to be level, as is their roofing. The south tunnel extends straight to the south under the Southern Temple, ending in a collapse at approximately 8.00 m from the junction point. A photograph of one of its ashlar-constructed passageways can be seen in Fig. 12.

The water that flowed through here must have had a high calcium content for there are lime deposits coating the walls. As yet the tunnel bottom has not been explored, and no conclusions can be drawn as to the width of the walls, or if this system was set into bedrock or into the artificial el-Katuta slope that was graded for its construction. What is clear is that the water supply must have been plentiful, for this system was carefully planned to maximize either a sizable incoming supply or the evacuation of a significant amount of waste.

Judging from the architectural and depositional remains, we posit that this canalization system was constructed before the Southern Temple. But how it served the Southern Temple complex, and how long it continued in use cannot be judged until it is excavated. At this writing, we presume that it is part of a hydraulic engineering system dependent upon a gravity flow which supplied the Southern Temple itself; perhaps the excedra(s) in the Lower Temenos, and even the northeast Lower Market and the Bath System to the northwest. However, the nature and character of the canalization system is unclear and will require cleaning, charting, and excavation to permit a more



12. Trench 1, Canalization System below Southern Temple courtyard, north tunnel interior view (P. Ward).

definitive interpretation. Save for the reused inscribed ashlar (P/ST 776) blocking the tunnel mouth, no objects were located.

8. Southern Temple Forecourt

One of the first embellishments that seems to have occurred sometime after the water canalization system and the construction of the Southern Temple were completed was the construction of the forecourt with a limestone hexagonal pavement (UN931L2). This forecourt's excavated dimensions measured approximately 8 m east-west by 5 m north-south. The Forecourt lies approximately 1.50 m below the Southern Temple stylobate at an average elevation of 884.30/40 m.

This pavement¹⁰ served as a large open area setting off the main entrance to the

Southern Temple. The east, west, and north portions have not been fully investigated, thus, the size of the original complete pavement is unclear. In the Southern Temple Forecourt the soil accumulation was not thick and deep, and fortunately it was clear of fallen architectural elements. The earth cover ranged from approximately 0.18 m in the north to 0.75 m in the south to the upper level of the hexagonal pavement. Large amounts of molded stucco-plaster fragments were recovered as well as random white limestone tesserae and carved architectural fragments.

It is also not clear when this pavement was put into place — it may be part of the original construction, or could have been a significantly later addition. The removal of several “sealed” pavers in the eastern part

10. The pavers measure 0.35 by 0.35 by 0.06 m. Most of them were found broken.

of the trench we hoped would give us some indication of its construction date, but this was not to be the case, for even with meticulous excavation and sifting of the bedding, no datable diagnostics were found. What is clear is that the western portion of this pavement underwent repairs after it was laid, for ceramic pavers (UN931L5) measuring 0.30 by 0.30 m by 0.06 m located at 884.30 m elevation were laid to complete and level it out. The problem that the builders may have been trying to solve may have involved access to the canalization system (discussed *supra*).

9. The Podium Steps, Stylobate, and Crepidoma

Before our 1993 excavations, the Southern Temple stylobate crepidoma, and podium were not clearly defined,¹¹ and part of our focus was to chart walls and features that could be detected with minimal excavation. Fig. 13 is a pre-excavation view of the Podium Steps and the north stylobate, and Fig. 14 shows a post-excavation view of the central portion of this area. In the following discussion we will begin with the Southern Temple facade — its Podium Steps, the Temple stylobate, crepidoma, and podium, and then move on to the building's design.

A. The Podium Steps

The approach from the forecourt into the Southern Temple was by a stairway, which we refer to as the "Podium Steps." Cut into the center of the stylobate the remains of a poorly preserved stairway was uncovered between the Forecourt and the Southern

Temple stylobate. Nearly 5 m in width, the Podium Steps descend from the top of the stylobate down to the level of the Forecourt. Trench 1 Locus 6 (UN931L6) was assigned to the excavation of the crepidoma and podium steps, which were found in a very poor state of preservation. In Trench 1, the Podium Steps have been completely robbed of their blocks, and all that remains is the jumbled poorly executed bedding (UN931L15) of small limestones and fill. Based on the remains of the risers, five or seven steps approached the stylobate of the Southern Temple entrance.

B. The Stylobate

Because one of our main objectives was to define the occupational and architectural history of the porch stylobate and to determine its dimensions and foundation levels, four irregularly-sized east-west trenches, between fallen column drums, were opened on the Upper Temenos abutting the facade of the Southern Temple stylobate and the Southern Temple forecourt (Figs. 7 and 15). At the opening of these trenches the earth was up to and in most cases above the level of the stylobate (see the aerial view in Fig. 5). However, portions of the Southern Temple Stylobate had been exposed prior to our excavations, most probably by the German team in their efforts to survey the Southern Temple in the 1980s.

The ruins of the stylobate consisted of one course of well-smoothed limestone headers, which varied slightly in elevation from 885.96 m in the northeast, dipping in the center to 885.86 m, and rising slightly to 886.03 m in the northwest.¹² Measuring

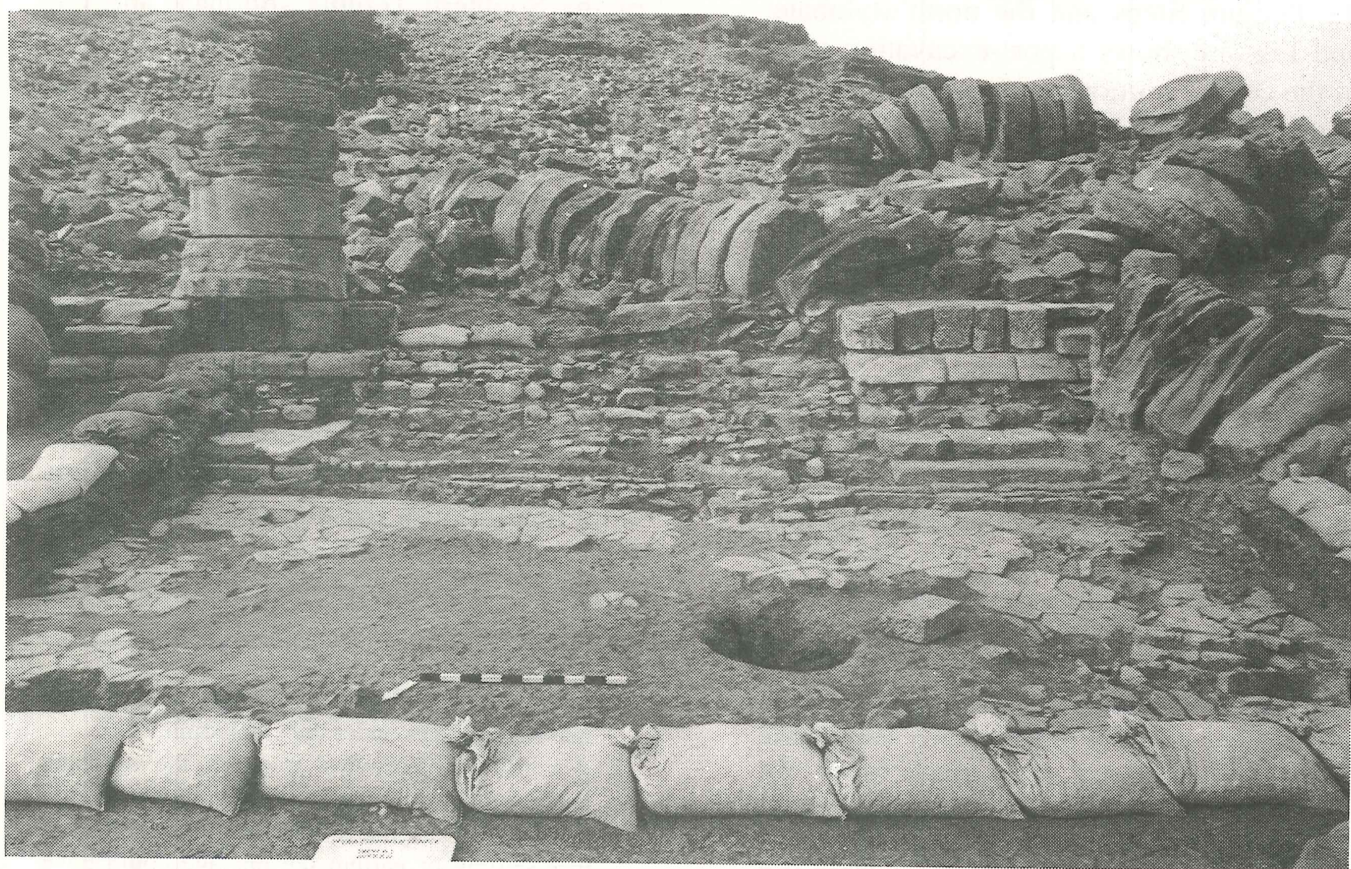
11. Together, the stylobate (upper level), crepidoma (middle level), and podium (lower level) make up the three courses of the temple facade. We use the term "stylobate" to mean the uppermost step of the platform holding the columns. The crepidoma, as we use it here, is the upper two courses of the podium (the two courses laid un-

der the stylobate) and the podium refers to the masonry courses under the crepidoma.

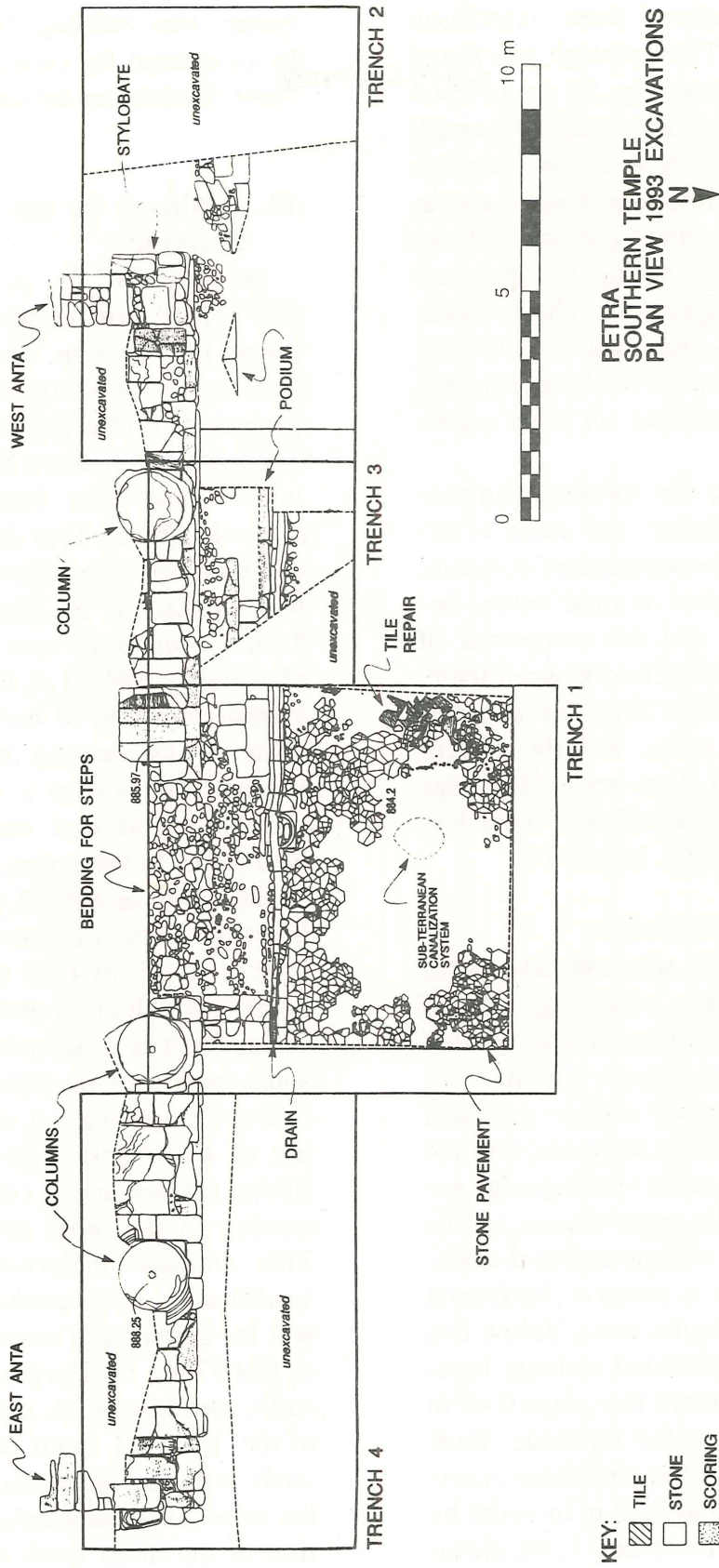
12. According to Vitruvius' tradition, the stylobate level should have been slightly higher in the middle, and originally it probably was; but either settling or earthquake damage could have altered it.



13. Petra Southern Temple, pre-excavation, North Stylobate, general view, facing south (P. Ward).



14. Trench 1, North Stylobate and Crepidoma, general view facing south (P. Ward).



15. Plan view of Southern Temple (A. E. Grey).

from ca. 0.60 to about 1 m in width and under 1 m in length, these were well-finished blocks that had suffered some exfoliation due to weathering. The stylobate was found to measure approximately 28 m in total width. Only its front portion was excavated, so its total width will have to await further excavation. These limestone blocks appear to have been closely-fitted and dry-laid, but there may have been mortar joining them that has since disappeared. Their visible surfaces were well-smoothed, and scoring was found on their sides, while scoring and pock marks were evident on their undersides.

Two antae frame the stylobate, emphasize the temple entrance, and serve to enclose the cella and its surround of columns. The east and west piers or antae extend beyond the stylobate and are comprised of two headers with a stretcher between them. These Southern Temple antae are approximately 1.20 m in width, and the eastern anta projects some 0.20 m beyond the edge of the stylobate. The elevation of these features can be seen in Figs. 16 and 17.

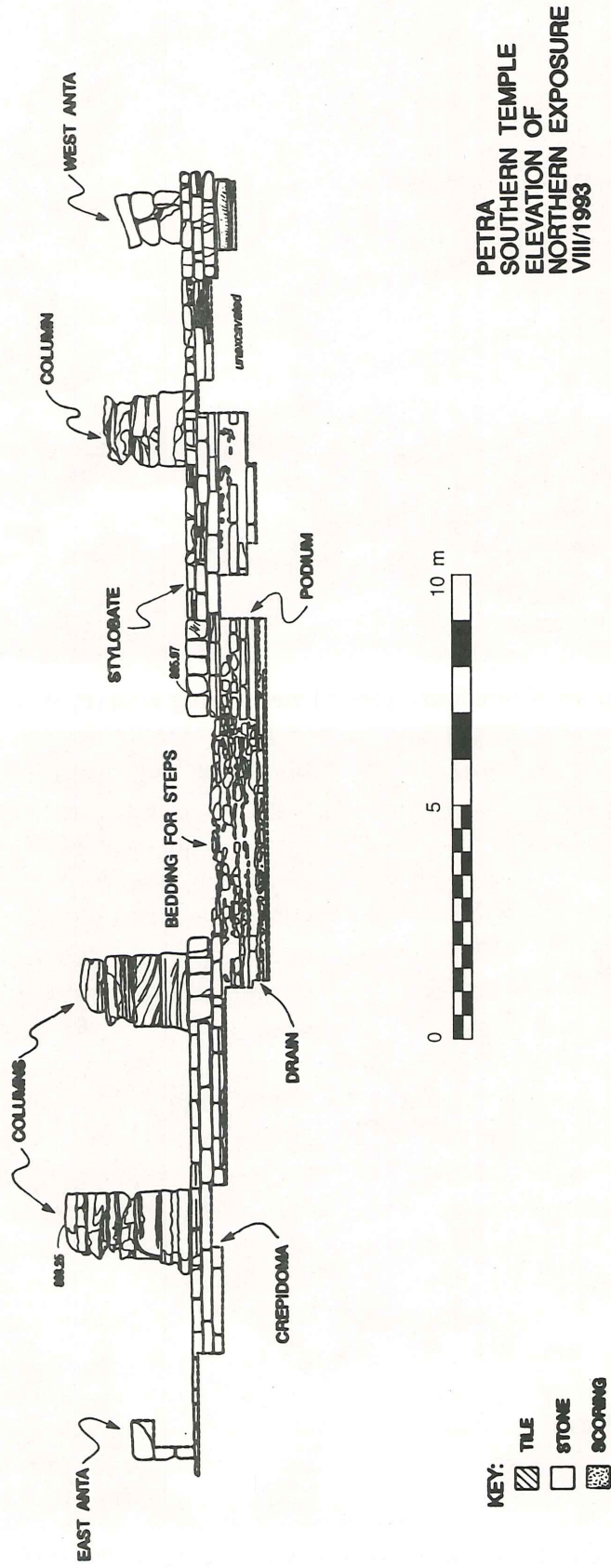
C. The Crepidoma and Podium

Below the stylobate was a broad-banded two-course crepidoma, consisting also of limestones set as stretchers. These courses provided the Southern Temple with its visual base line. The upper course extended some 0.10 m beyond the stylobate, and the lower course had its outer viewing edge extended just beyond the upper course, and its lower edge cut at an oblique outward angle. It was dressed with a concave horizontal groove, an inverted cyma recta. Below this course the podium consisted of large limestone slabs which formed two steps 0.40 m deep, which ascend to the stylobate. Each step was comprised of two limestone courses, varying from 0.50 to 1.20 m in width by 0.20 m in thickness. In Trench 1, the elevation for the lower step was at 884.88 m and the upper step was at 885.26 m. From the

Trench 2 excavation, it appears as if the bottom course of the podium rested on a paved floor bedding, but this will have to be confirmed by excavation. The detail of these features can be seen in Fig. 18.

10. Drainage in the Southern Temple Forecourt

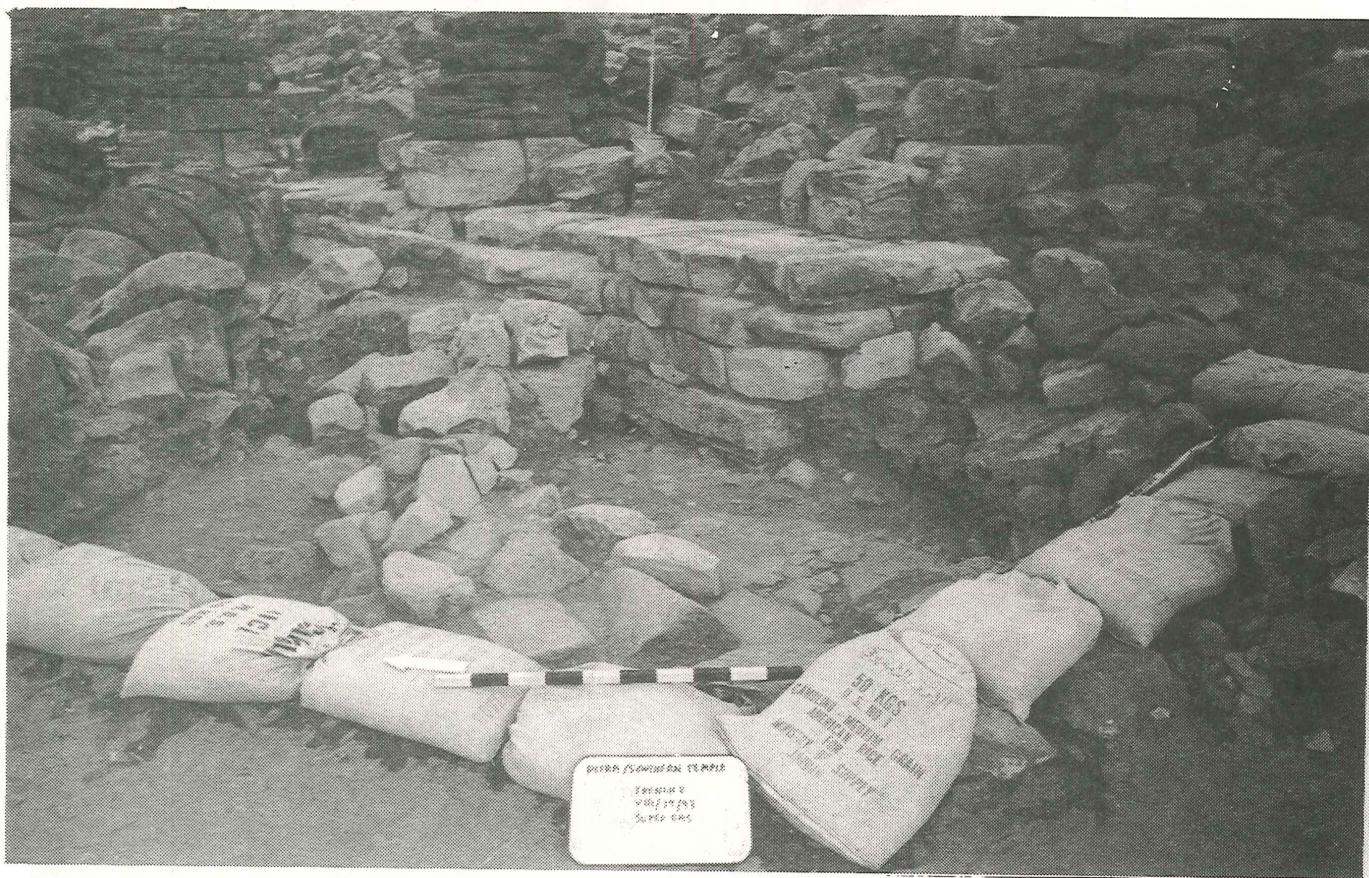
In Trench 1, a drainage system (UN931L9) was found extending along the lowest podium step, which was constructed directly on top of the forecourt hexagonal pavement; it thus post-dates the pavement. The lowest step of the Southern Temple entrance must have been re-set over this drain. In Trench 3, to the west of Trench 1, the drain was also located, but it is not clear if it is also to be found further west in Trench 2 or to the east in Trench 4. At an elevation of 884.59 m, the western drainage system consisted of horizontally laid limestone blocks, ranging from 0.35 to 0.65 m in length and 0.30 m in width; these blocks had been hollowed out and mortared at their joins. In the center, at the lowest point in the drain, at 884.52 m, was an unusual limestone carved re-used block (measuring 0.70 in length by 0.30 width by 0.25 m in height), which in all probability served as a drain, for it is positioned directly over the south branch of the subterranean canalization system described above. The original use of this block with its sloppy mortar-ridden surface and a curious semi-circular carving in its upper surface is unknown. This drainage underwent two stages of modification in its eastern section, the first was the insertion of ceramic pipe (elevation of 884.57 m), held in place by small stones, earth, and mortar. A second further repair to the Trench 1 drain occurred simultaneously with the reconstruction of the stairs, for stone slabs supporting the eastern portion of the drain were superimposed by a course of small flat limestones (0.15 by 0.10 by 0.03 m), which may have support-



16. Petra Southern Temple, north elevation (A. E. Grey).



17. Trench 4, Northeast Stylobate and Crepidoma, general view facing west (P. Ward).



18. Trench 2, Northwest Stylobate and Crepidoma, general view facing southeast (P. Ward).

ed the lowest step of the stairs.¹³

11. Area E. The Southern Temple

A. Introduction

The Southern Temple is a free-standing structure occupying the Upper Temenos terrace area that was artificially leveled by rock-cutting and fill. The Upper Temenos is roughly aligned on a north-south axis and measures approximately 60 m north-south by 55.68 m east-west. Because the Southern Temple was built to dominate the landscape, carry a succession of structures, and have full command of the Colonnaded Street, its form is monumental with towering columns, of which 14 in varying states of decay can be documented in their *in situ* positions — three of four on the front, one of two at the Southern Temple north cella, six of eight on the west flank, and four of six in the Southern Temple rear (see Fig. 7).

Across the Southern Temple entrance, aligned east-west, were four sandstone columns with limestone Attic bases, three of which are preserved to varying heights at an approximate maximum height of 1.00 m above the ground level of the Upper Temenos, and 8.5 m above the Lower Temenos, and in turn, over 14 m above Colonnaded Street (Fig. 19 provides a section). The two columns placed in the center at the Southern Temple entrance had a wider intercolumniation of approximately 7.00 m between their mid-points, and 5.00 m separated them from their twin that stood

on their east and west flanks, respectively.¹⁴ Their plan is represented in Figs. 7 and 15 and their elevation is shown in Fig. 16.

We will return to column specifics after a brief discussion of temple design.

B. Design of the Southern Temple

The Southern Temple was constructed for full exposure in the round. Our preliminary analysis is that the Southern Temple is *tetrastyle in antis*. Although little remains of the order, we believe it to be approximately 12 m in height. The superstructure lies in fragments, but based on rough calculations, the combined height of the entablature and the pediment would have been some 3 - 4 m, giving the overall facade a height of approximately 15 - 16 m.¹⁵ The entrance stairway leads into a broad pronaos, or vestibule, which may have been 7 m or more in depth. From the top of the stylobate level, there formed the main Southern Temple entrance — the sacred broad pronaos some 8 m in depth, which led into the naos or cella. This may have been at a higher elevation than the stylobate, so that the cella was raised on its own podium. The cella or naos has two columns positioned at its entrance which are larger than the six *in situ* (we posit that originally there were eight flanking the east and west cella walls), or the four *in situ* (here we posit there were originally six) positioned at the Southern Temple rear. Thus, on the north side or entrance to the naos, there are at

13. In the fill on top of the floor was found a small, 0.05 by 0.04 m, inscribed marble fragment, Catalog Number 93-S-2, with parts of letters that may have been a Latin inscription. The excavator mentioned that these letters have Byzantine traits with the straight elements ending in tails and the curved elements narrowing to pointed ends.

14. Three of these columns remain *in situ*, and the fourth — on the center west appears to have been completely toppled off the stylobate in the earthquake, for even its base is not *in situ*.

15. MacDonald (1986: 134) states: "A useful if rough rule of thumb is that the facade of an official temple of more or less traditional form will be about twice as high, ground level to peak, as the height of its order." By this reckoning, if the order is 12.60 m and the podium is 1.00 m from ground level, the Southern Temple superstructure would have stood some 11.60 m, bringing the edifice from ground level to peak to some 24 m, which we believe is too high, but it is possible.

least two columns (there may have been four), to the rear of the cella are six columns; and eight columns each line the eastern and western perimeters.¹⁶ The naos or cella measurements are approximate — it is 29 m in length and 18 m in width. In Fig. 20 is our hypothetical ground plan reconstructed from the surveyed elements.

To summarize, the Southern Temple is a building with a single row of four columns in the front, the building is enclosed by antae, and the entrance to the cella or naos had either four columns or two with east-west piers extending from the antae walls to the columns. Therefore, the interior columns of the cella are enclosed by the temple walls. The six columns at the temple rear may also have been enclosed and could have been engaged. Only excavations will clarify this. The interior of the Southern Temple remains unexcavated, and will remain so, until necessary machinery can be procured to remove the layer of ashlar blocks covering the surface. The Southern Temple has been partially surveyed, however, to ascertain accurate measurements, and we have a fairly good indication of an approximate Southern Temple plan and size.¹⁷

German investigations of the "Podium Temple," brought about a hypothetical plan published by Zeitler (1993: fig. 6 - redrawn here in Fig. 21). They posit the Southern Temple height to be 15.6 m. A reconstruction of the Southern Temple propylaea is given (Fig. 8); and as for the description of the ground plan (1993: 257-258), they write:

"Th. Wiegand [Wiegand and Bach-

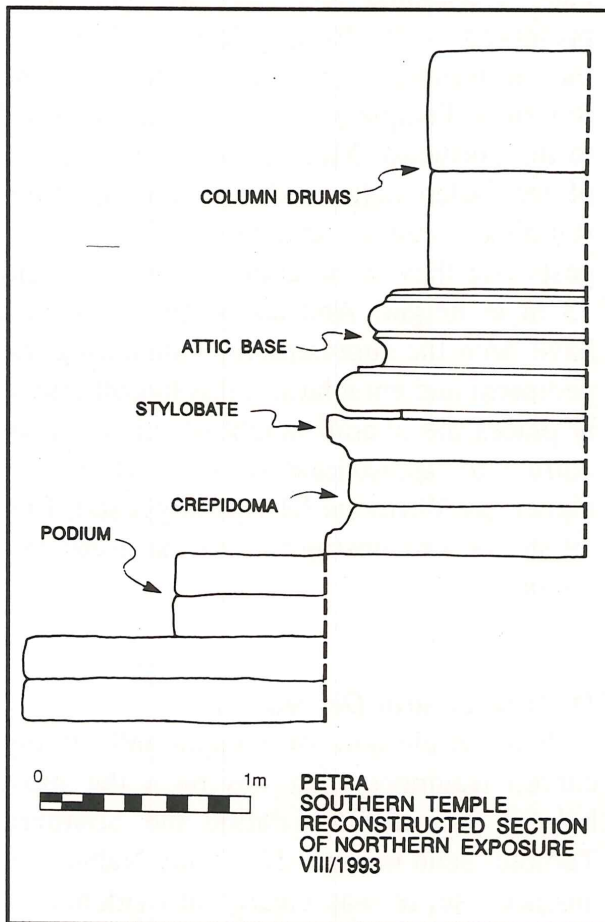
mann recorded the buildings in the Colonnaded Street at Petra during World War I] already noticed one peculiarity of the Southern Temple: The front consists only of four columns, larger in diameter than the six columns of the back. During our survey, two more columns of the larger type were found in situ, corresponding with the outer and inner western column of the front order and forming a second line parallel to the front. Also, a different layout of the inner walls of the Southern Temple could be recognized (Fig. 5). Bringing both Wiegand's and our observations together, the result is a major change in the reconstruction of the Southern Temple. As it seems without parallels in Nabataean or eastern late Hellenistic cities, the idea of a single building with a double row of four large columns at the front and smaller columns on the western, southern and eastern face, has to be given up. Therefore, two different buildings in a common context are suggested (Fig. 6): A front Propylaea-building, followed by a smaller Southern Temple, presumably a peripteros. The Propylaea is formed by the eight large columns (diameter 1,50 m), the peristyle by 6 columns on the southern and 7 columns on both the western and eastern face, all of them measuring 1,20 m in diameter. The northern face is still uncertain at the moment."

Both our and Zeitler's conclusions must remain tentative until further excavation

16. Only 11 columns in the cella were located in situ in 1993 (see Fig. 7).

17. At this point there is no evidence for an altar which may have been a simple stone block, possibly standing in the open air, making it a prime candidate for robbing or reuse in a later period. However, under the debris of ashlar blocks in the rear of the cella is a centrally positioned vaulted

structure, which extends some five meters to the southernmost wall. It is over 10 m in width, and its highest elevation is registered at 892.32, which is approximately 6.5 m above the stylobate elevation. It may well be that this is the adyton, or perhaps a supporting structure for an elevated adyton.

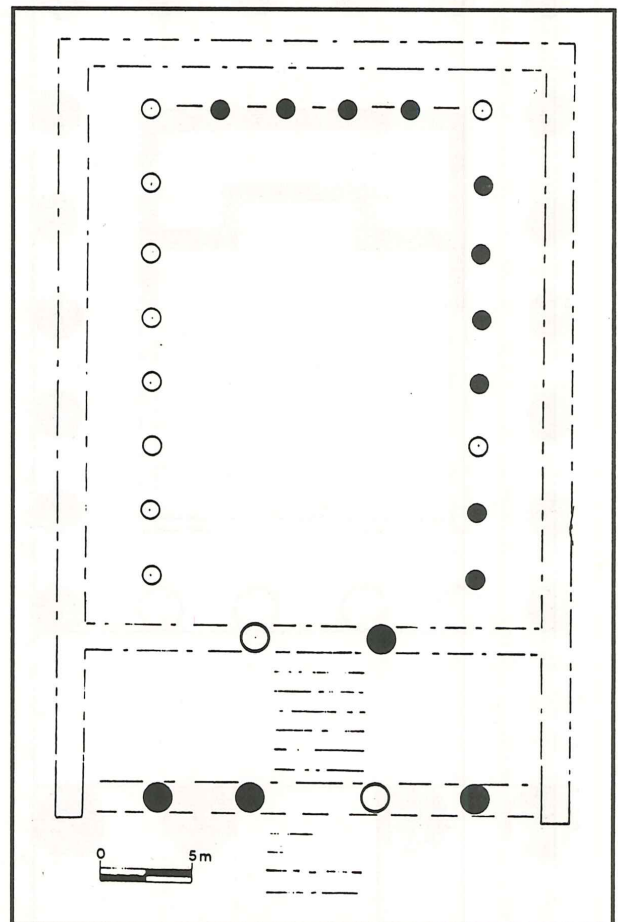


19. Reconstructed section of northern exposure (A. E. Grey).

can be carried out. At this point the evidence militates against this suggested reconstruction, and we do not believe that the formal architectural canon would have exhibited such individuality. There is no archaeological evidence for a second building, a separate propylaea, at the front.

C. The Southern Temple Order of Columns

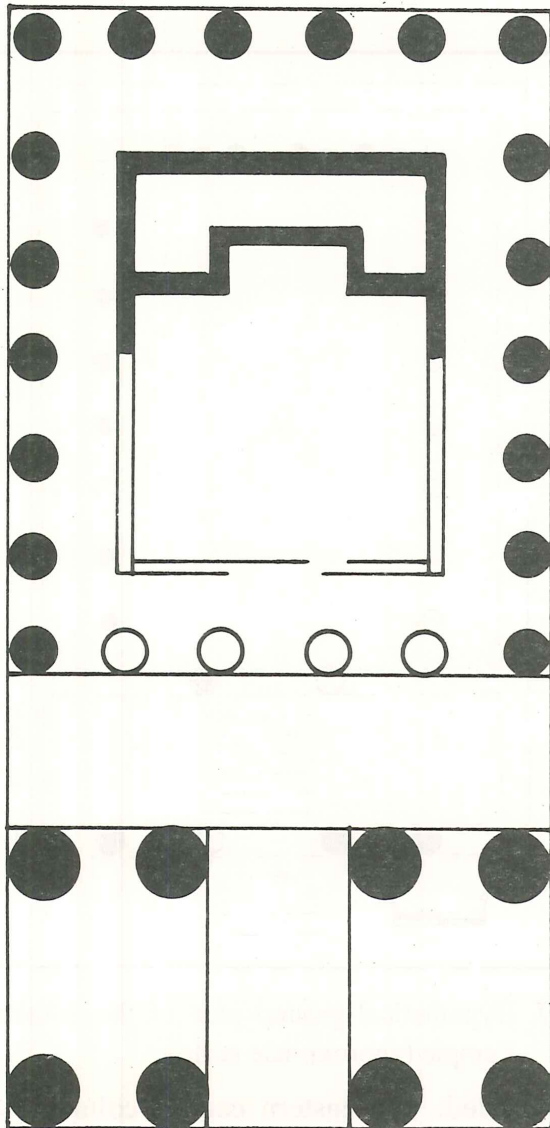
As previously noted, the front order of the Southern Temple was comprised of four columns resting on the stylobate between the two antae at either end of the temple. The condition of many of these columns is poor, for they have been dramatically weathered, and their surfaces are exfoliating and splitting from erosion. The center eastern cella column, for example, is extremely weathered, with drums split into small pieces and in some cases, completely



20. Hypothetical ground plan of the Southern Temple (approximate scale).

crumbled. The eastern central column has disappeared from its base on the stylobate, and we have had to guess what drums belonged to it in antiquity. Fallen column drums were not excavated; they were left *in situ*, measured, numbered, photographed, and drawn. On their sides are parallel diagonal striations, scoring is common on their flat surfaces, and many have lewis holes that range from 0.11 to 0.14 m, so they could be lifted in antiquity. Upper and lower edges were often found to be scored with parallel tool marks varying in size. In many cases, traces of mortar still adhered to their upper and lower surfaces.

The front columns range from 1.25 to 1.52 m in diameter (averaging 1.40 m), and the drums range from 0.24 to 0.60 m in height. From their differing dimensions we presume they show some entasis, but we



21. Ground Plan by J. P. Zeitler (1993 - redrawn from fig. 6, not to scale).

are not sure if the entasis is normal or double. Typically, these columns were left plain with a diagonal dressing. All sandstone surfaces above the base were stucco-finished. Presumably, there was a lavish use of molded plaster-stucco finish over the sandstone, so we can imagine that in antiquity they blended well with the limestone stylobate, pediment, and entablature, and the "whiteness" of the Southern Temple must have taken on a dramatic presence when set against its sandstone rose red environment. The Attic base is the preferred base for these columns. It can be seen in Fig. 19 along with the profile of the stylo-

bate, crepidoma and podium. The best-preserved of the front order of columns is the easternmost column located on the Southern Temple stylobate, which toppled to the northeast. Measurements were taken of the fallen column drums and the free-standing columns, and this evidence suggests that they stood approximately 12 and 13 m in height. And added to this would have been the superstructure, including the pediment and entablature; this hypothetically places the overall height of this colossal edifice to approximately 15 - 16 m (or higher, as Vitruvius III.v.iff suggests). Fig. 19 shows a reconstruction of the north elevation.

D. Architectural Decoration

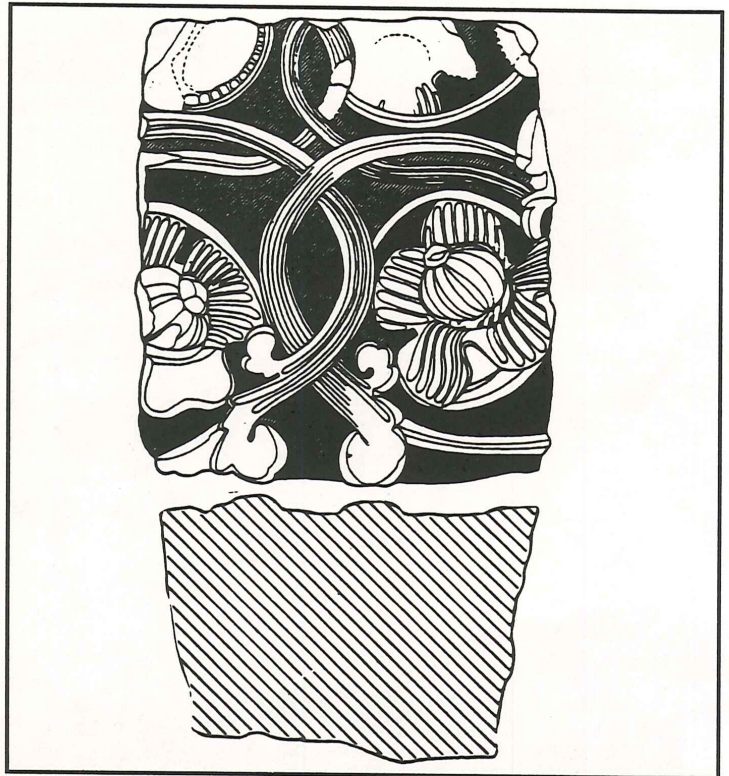
It is the plethora of exceptionally finely carved fragments that has been the most helpful indicator for dating the Southern Temple. Seen in Figs. 22-26, the Nabataean aesthetic sense was clearly in evidence as we recovered numbers of deeply carved floral fragments with rich and elaborate acanthus leaves, interspersed with vegetal elements, including pomegranates, pinecones, and grape clusters with vine motifs. There is a delicate ribbing evident, particularly on the floral elements. Identified by Judith McKenzie (1990: 40, diagram 14.f) as Floral Type 1, these column capitals reflect strong Hellenistic influence with traditional Nabataean modifications. To illustrate the point, Fig. 22 is a Floral Type 1 fragment, Figs. 23 and 24 are Floral Type 1 architrave fragments, Fig. 25 is a capital fragment displaying an acanthus leaf with rippled decoration, and Fig. 26 is the fragment of a large corner volute. Large numbers of molded plaster fragments used for decorative details were also recovered in Trench 1, some with beveled ovolo and shallow ovolo moldings presumably to embellish the Southern Temple entablature. (None of those excavated bore any traces of



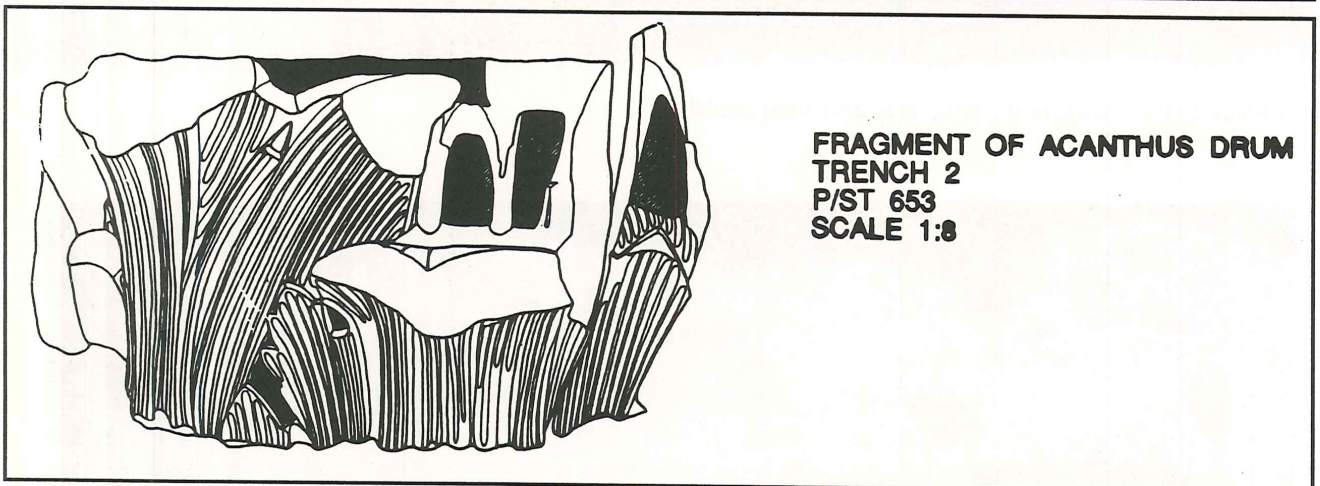
22. Floral Type 1 fragment, with leaf and vine motifs.



23. Floral Type 1 fragment, with pomegranate, flower, and vine motifs.

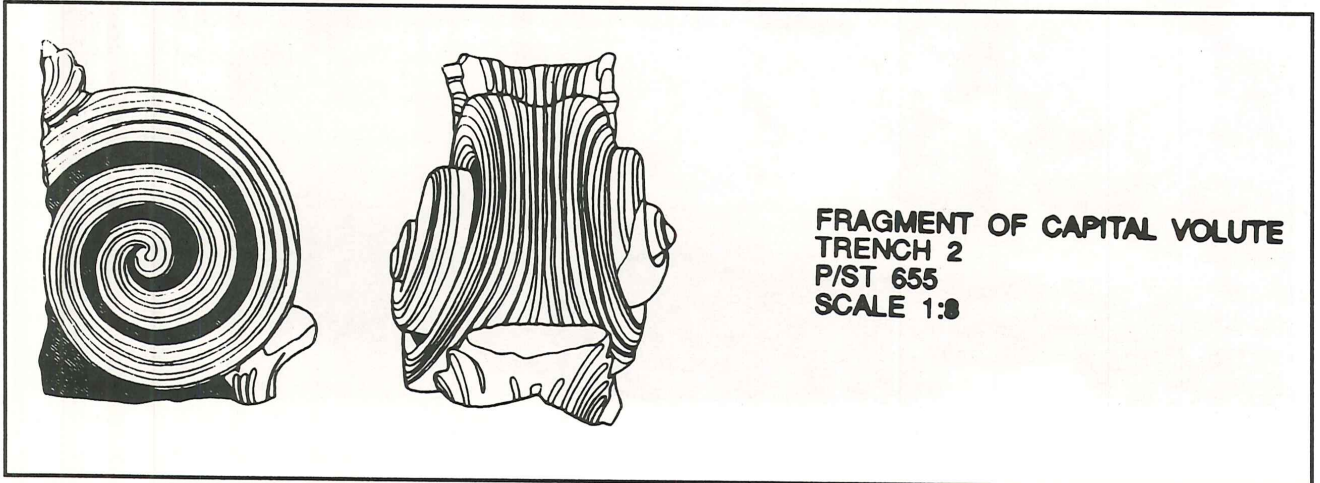


24. Floral Type 1 fragment, with pomegranate and vine motifs (A. E. Grey).



FRAGMENT OF ACANTHUS DRUM
TRENCH 2
P/ST 653
SCALE 1:8

25. Capital fragment with acanthus motif (A. E. Grey).



FRAGMENT OF CAPITAL VOLUTE
TRENCH 2
P/ST 655
SCALE 1:8

26. Volute fragment (A. E. Grey).

paint).¹⁸

Small Finds: Other cultural material included fine painted Nabataean pottery sherds dated to the late first century AD, as well as several mason's marks on the ashlar building blocks. One of these marks was identified as a Nabataean *alef* used prominently in the first and second centuries AD. Besides the pottery, the most interesting small finds discovered do not give us secure dates.

Discussion and Additional Considerations

The prevalence of Hellenistic influence on Nabataean architecture at the city's peak as a major trading center shows that Petra was receptive to the cultural influences that must have flowed daily into the city. The admixture of these essential constituents was predicated by native Petran ideas and materials and their adoption of classical Hellenistic styles. At first glance, given the proportions and style of the Southern Temple, it might be thought to date from the Roman period, after AD 106, when the city was brought under strict Trajanic control and made a part of the province of Arabia. To be sure, the Southern Temple is more "classical" in design than either the Qaşr el-Bint or the Temple of the Winged Lions, which suggests a later date for its construction in the Roman period — after AD 106. But we have dated the pottery and the iconography tentatively to the first century AD. These dates are consistent with the typologies set forth by Judith McKenzie (1990) and Peter Parr (1970), and also cor-

respond to the findings at adjacent excavations: the Qaşr el-Bint, the Khazneh (or Treasury), the Temple of the Winged Lions, and the Baths. The Southern Temple was one part of a massive building program with all these structures being constructed at approximately the same time. For the present, I posit that the Southern Temple was constructed at some point in the first century, probably at its beginning and I place it with other Group A Monuments that were also built in the first century Nabataean Classical tradition (McKenzie 1990: 51). McKenzie states that Qaşr el-Bint is earlier than the Temple of the Winged Lions, the Khazneh is closer in date to Qaşr el-Bint, and the Baths are slightly later than Qaşr el-Bint, but not as late as the Temple of the Winged Lions.¹⁹

From the decorative treatment of the architectural fragments — the acanthus leaves, the fruits, flowers, and stalks — the Southern Temple most closely resembles the Temple of the Winged Lions with the same serrated petals of the flowers of the abacus (McKenzie 1990: 41). So if this sculptural detail is to serve as the chronological indicator, the Southern Temple is closest in date to the Temple of the Winged Lions, and was probably constructed at the same time or later. To be sure, the Southern Temple is not aligned with Qaşr el-Bint, nor is it in alignment with the Baths or the Temple of the Winged Lions. It is neither perpendicular to the Colonnaded Street nor to the Temenos Gate. Moreover, construction at right angles was not adhered to by the ancient Nabataean planners, who prob-

18. The *in situ* positions of approximately 2000 components were recorded, and 1000 architectural fragments were numbered and tagged, cataloged, photographed and drawn. Many were extremely weathered, whilst others were still crisp in detail. Whenever possible, those large elements that interfered with our excavation were removed to prepared "lapidaries" (storage areas) beyond the Southern Temple to the

Upper Temenos itself in the east and beyond the Upper Temenos precinct to the west. The smaller elements were documented and re-buried on site.

19. It occurs to me that the Baths may have been part of the Southern Temple complex. They certainly were in use at the same time, and the evidence suggests that they are probably contemporary in their construction as well.

ably were precluded from building according to canon by topographic considerations. I believe that it was built as part of the building program that included Qaşr el-Bint, the Khazneh, the Baths, and the Temple of the Winged Lions and is synchronous with them.

Thus, the Southern Temple may have been in use through the Roman period and probably through the Byzantine period as well. If this assumption is correct, it was occupied from the beginning of the first century AD to the mid-sixth century AD. Between its original construction and final destruction, three main building and usage phases with a total of eight sub-phases are represented. Together these building phases broadly mark the most extensive series of constructions on the Southern Temple site, and reflect the history of 500 years in which the Southern Temple thrived, was altered, declined, and finally was destroyed by a massive earthquake or because of structural weakness. This conclusion was corroborated by the iconography of the sculptural elements of the Southern Temple decoration, particularly the capitals, and provides the best evidence for dating and chronology.

Interpretation and Conservation Program

In cooperation with the Jordanian Department of Antiquities, a comprehensive

interpretative plan has been formed outlining the various goals for reinterpretation, consolidation, and protection of the Southern Temple complex. This plan includes: 1) the potential impact of the program on significant archaeological remains, and 2) the priorities for future excavation seasons, which will facilitate implementation of the interpretative program.

Interpretation of archaeological remains or the results of archaeological excavations and research must necessarily take a variety of forms. Certain archaeological discoveries do not lend themselves to physical interpretation in the field; therefore, public interpretation will also involve publication with maps, plans, and artifacts. Collaborative decisions would have to be made on whether or not archaeological remains, such as the foundations of buildings that are discovered through excavation, are of sufficient integrity and durability to be left exposed. Structural remains too fragile to leave exposed will need to be reburied under sterile fill to protect them from deterioration;²⁰ on-site plans of the excavated features will illustrate such remains.

The results indicate that some areas of the Southern Temple, such as the Southern Temple itself, are of sufficient architectural and structural integrity to allow some form of consolidation of the building, even if reburial of the remains is opted for.²¹ Finally,

20. We did take this precaution this past season, burying architectural fragments and backfilling the trenches. As previously mentioned, a drainage canal was also constructed to divert damaging water runoff.

21. Any future restoration or reconstruction plans, and they are far in the future, will be designed in accordance with the Jordanian Department of Antiquities guidelines to provide an accurate portrayal of the architectural design, materials, styles, and workmanship of the building(s). International standards for the conservation and restoration of monuments and sites have been developed by the International Council on Monuments and Sites (ICOMOS, 1964) in the Venice Char-

ter. This document addresses issues such as restoring buildings of multiple periods of construction, whereby "all periods to a building of a monument must be respected," and reconstructing non-extant portions of buildings in a manner that is "distinguishable from the original so that restoration does not falsify the artistic or historic evidence." It is also imperative that all aspects and phases of the restorations be precisely documented with drawings, photographs, and a written record; these guidelines will be strictly followed by the Southern Temple project. All materials relating to reconstruction will become part of the Jordanian Department of Antiquities permanent records.

excavations will likely produce a variety of artifacts that are suitable for analysis and display. A majority of the artifacts recovered during the initial archaeological survey were fragmentary, but future excavations, particularly in the cella, promise the recovery of whole or nearly whole ceramics, glass vessels, and sculpture, such as *ex voto* offerings, that should be published and displayed. Over the next four years, the archaeological survey and excavation is designed to aid in our understanding of the following:

1. the pattern of development of the Southern Temple complex, including architectural changes and alterations of the ground slope;
2. how the Southern Temple was used (and reused), and to which deity(s) it was dedicated;
3. the living patterns of the Southern Temple personnel;
4. the social and religious dynamics of the Southern Temple congregation;
5. the effects of cultural changes on the Southern Temple and its hierarchy;
6. the socio-political and cultural roles of the Southern Temple within Petra itself; and
7. the establishment of artifact typologies, in particular ceramics, and their testing to determine how these types correspond to other Petra sites as well as to sites further afield.

Until now, the dating of the Southern Temple complex has been based on conjecture. While the initial archaeological investigations in 1993 were small-scale and designed to locate structural evidence, they did provide substantial evidence for material culture and suggest that future excavation will be successful in answering many of these questions. Specific research questions related to these general themes for the Southern Temple complex have been further developed for the five specific areas of the site, and will be addressed during its ex-

cavation from 1994 to 1997.

Conclusions

From preliminary documentary research, a framework for the continued archaeological survey and excavation has been developed. The initial survey and excavation, completed in August of 1993, consisted of five main activity areas with numerous subdivisions. Archaeological excavations within these areas addressed a range of research questions about the history of the Southern Temple complex and the living patterns of the people who worshipped at and served the Southern Temple, and promised successful evidence for answering these questions in subsequent excavations. Interdependently, specific questions, such as the dates of construction and architecture of the individual building areas, will be investigated while thematic research topics, such as architectural changes and/or religious life over time, may also be addressed. The exploratory archaeological surveys over the next four years are designed to identify the locations of the various components on the Southern Temple site and the archaeological and architectural integrity of the various areas. Combined with on-going documentary research, the archaeological information should provide corroborative physical evidence of Southern Temple developments and new information concerning the religious living patterns of Petra's inhabitants. Finally, the Southern Temple complex must have been used extensively for several hundred years and it is assumed that the various activities extended across most of the precinct; therefore, excavations in areas where construction is presumed, such as the Lower Temenos, should immeasurably increase the research potential of the site as a whole.

The potential of the Southern Temple site is self-evident. Long unexcavated, it represents a tremendous gap in the historical, social, and cultural record of this pivot-

al ancient city. Ancient Nabataea was an area of intense inter-cultural contacts — such contacts, and their effects on cultural aspects like architecture and religion, should be in evidence at the Southern Temple site. The planned excavations will be among the most scientific and interdisciplinary ever conducted at Petra, and will include intensive aerial photography, electronic survey, computer documentation, and consolidation and preservation of uncovered remains. The project itself has engendered excitement in the archaeological community, with every expectation that it will be successfully completed, see the production of first-class publications, and achieve important results justifying our five-year program. The questions to be answered, concerning the chronology, architectural history, and cultural role of the

Southern Temple, as well as its role within the greater contexts of the city of Petra, Nabataean Jordan, and the ancient Eastern Mediterranean — all centers of cross-cultural contacts and influences — are basic to the discipline of archaeology.

Petra, romantically referred to as the “rose-red city half as old as time,” occupies a special place in Western history. The importance of the city cannot be overestimated, yet an integral piece of the puzzle, the massive Southern Temple, has remained unexcavated during nearly a century of intensive archaeological investigation. While it remains unexplored, our understanding of Petra is incomplete.

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