THE SPATIAL ORGANIZATION MOUNTAIN COMPLEX OF PETRA

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Abstract

The natural-urban morphology of the landscape complex of Petra is characterized by material homogeneity and maximum use for the purposes of town planning and engineering support of natural geomorphology and hydrography, the regime of underground and surface waters, as well as the properties of natural geometry for its external and internal architectural processing.

The three-dimensional scheme of the landscape complex of Petra, the key of which is its the location, marked by the sacred heights of the mountain massifs peak, fits into the shapeof a diamond, where itssides coincide with the outer boundaries of the city, and the diagonal intersection t fix the main axis and the entrance to the city center.

The dynamics of specific fragments of the landscape complex of Petra on the main route and within the central part of the city, is based on a gradual increase in the angle of perception from a series of specific views,landscape and wide-angle panoramas - and a sharp narrowing of views into specific shots with a deep perspective; characterized by a constant presence in the field of view succeeding one another the most significant architectural objects of Petra. The article publishes materials of the author's graphical diagrams, photos and technical drawings of architectural graphic reconstruction of the Nabatean tombs of Petra.

Key Words

landscape complex, landscape structure, city-forming concept, landscape species fragments, Rock city of Petra

Introduction

Physical Nature and Morphology of the Urban Space of Petra

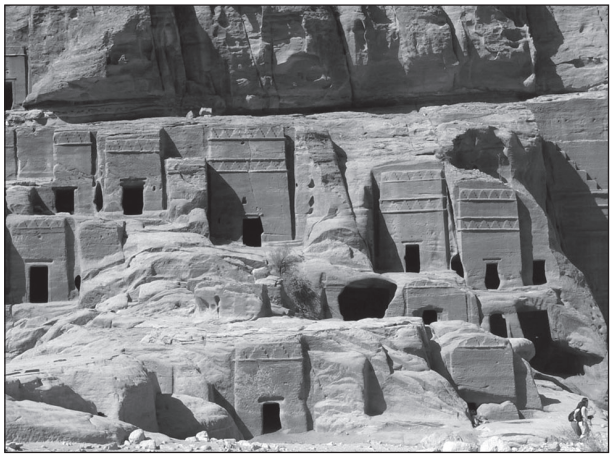
The capital of the Nabatean kingdom was hidden deep in the mountains, stretching along the red-pink ridges of the valley of Wādī ʻArabah, in the area between the Dead Sea and the Gulf of al-ʻAqabah in the Red Sea. In the naturally protected, water-rich valley of Wādī Mūsā where the city center was located, leads a narrow corridor of successively connected canyons. The gorge or commonly named as as-Sīq is winding of 1.5km in length, deep camber between the overhanging cliffs almost closing at a height of more than 90m, outer gorge or outer as-Sīq, which leads towards the exit to the city center.

According to its geological nature, the mountains of Petra are sandstone - a sedimentary rock of compacted sand. The ridge of such mountains, stretching along the entire eastern side of Jordan, the Dead Sea, and Wādī ʻArabah, transformed into a system of mountain massifs that have a granite formation at the base which gives their unusual red and pink color. Sandstone is formed mainly by mechanical movement of sand layers under the influence of natural forces - water and wind. A consequence of this geology was the characteristic pattern of mountains with sharp stepped stepsthat led towards the valley to the west and a more gentle slope and that lead towards the east. The western winds in this region are predominant, with clouds of dust coming from the desert, called *Khamasɪn*, which means fifty days a year. The unique natural specifics of the mountain rock, which is the main medium-forming the landscape of Petra, is present in

rock carved cavities, caverns, which allowed to "colonize" these cavities and caverns,,and use them tombs and palaces, houses and temples. This unique characteristic had a major role in in the processing of external facades (**Fig. 1**).

The main common space of the of Petra forms a number of structure mountain ranges, the main of which are *al-Khubthah*, *al-Madhbaḥ* and *al-Ḥabīs*, with a plateau between them, cut by a network of valleys, which arms diverging from the main water and communication artery, Wādī Mūsā. Mountain massifs close the city space with their slopes and creates, due to the outline and internal structure, the presence of voids, which form the basis of most of its infra infrastructure (**Fig. 2**).

According to its city-forming morphology, the mountain ensemble of Petra consists of two fundamentally opposite systems. The first system is the central flat area, which is a complex of urban center architecture, mainly built on a plateau made of sandstone using horizontal planning coordinates the central. The second system is the rock part which consists of the architecture built inside the rock, with external facades, terraces streets, platforms, ascents and descents towardsthem, chosen from the whole breed of natural slopes of mountains at different levels and vertical coordinates of space, the rock part. In general, Petra has about eight hundred unique monuments, carved into stone and erected in an open space, belonging to Edom and Nabataean-Roman times. In their appearance, the influence of two cultures was fundamentally affected: Eastern, Mesopotamian and Western, Ancient, and also combinations based on them.



1. Street of facades in Petra.

As mentioned before, Petra is located in the valley of Wādī Mūsā , which crosses the plateau from east to west. The center was formed entirely in the period that followed the annexation of Petra Rome (**Figs. 3, 6**). Modern excavations show that the only main street of the Roman center - *Decumanus-maximus*, is laid on the site of the gravel road that existed before, the main thoroughfare of the Early Nabataean center of the 3rd century BC. Decumanus, or Colonnaded Street, is the main compositional axis of the center (**Fig. 4**).

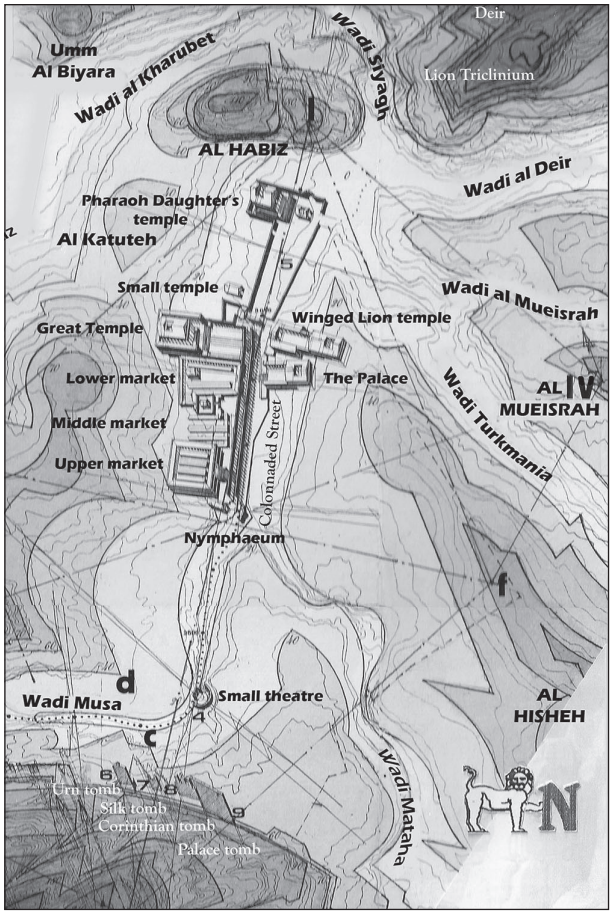
It runs along the valley of Wādī Mūsā and across the mountain corridor of the Petra basin, connecting the northern and southern parts of the caravan route into a single artery. City walls, 2m thick, serving defensive purposes in the period of greatest period of Petra, were it was still the capital of the independent Nabataean Kingdom in 1st century BC-1st century AD only fragmentarily defended the most vulnerable northern and southern directions, while from the west and east the city was impregnable. The large round, 25m in diameter, on a hill in the north-western part of the city wall and two small, rectangular, supposedly sentinel, in the south-west and south-east parts of the wall are preserved. A similar system of protective screens with rectangular bastions was typical of the Hellenistic military architecture (**Fig. 5**).

In 1904 Karl J. Trubner Publishing has issued a full research and documentation of Petra region. He documentation is included the contour and geographical site maps of Petra is included, along with location of all tombs and drawings of facades, plans and it details. The archaeological documentations were investigated by Brünnov R.E. and von Domaszewski, A. This unique book exists as main archaeological reference (**Fig. 6**).

The entire complex of monuments of the Roman center in Petra is located on both sides of the 6 meters wide Colonnade Street, , and is compositionally oriented to it. The carriageway was separated from the pedestrian by two steps and a colonnade. In one section of the paving was laid an inscription dedicated to the visit of the Emperor Diocletian to Petra in 283.

The first construction at the entrance to the city was the Nymphaeum complex, which was the link between the organized Roman center

2. Landscpe structure of Petra.



3. Petra city center plan.

and its picturesque surroundings. The complex consisted of the city drinking fountain, located on the north side of the street in the shadow of a huge tree, and southern Nymphaeum, erected on the opposite south side. The fountain consisted of three semicircular niches facing Decumanus. The southern Nymphaeum is a rectangular building with two columns at the entrance. Further, along the southern side of Decumanus, the Upper, Middle and Lower markets, which appeared on it, were connected in turn to each other. In the upper market, a staircase led from the street. Two monumental blocks indicate that the entrance was opened by

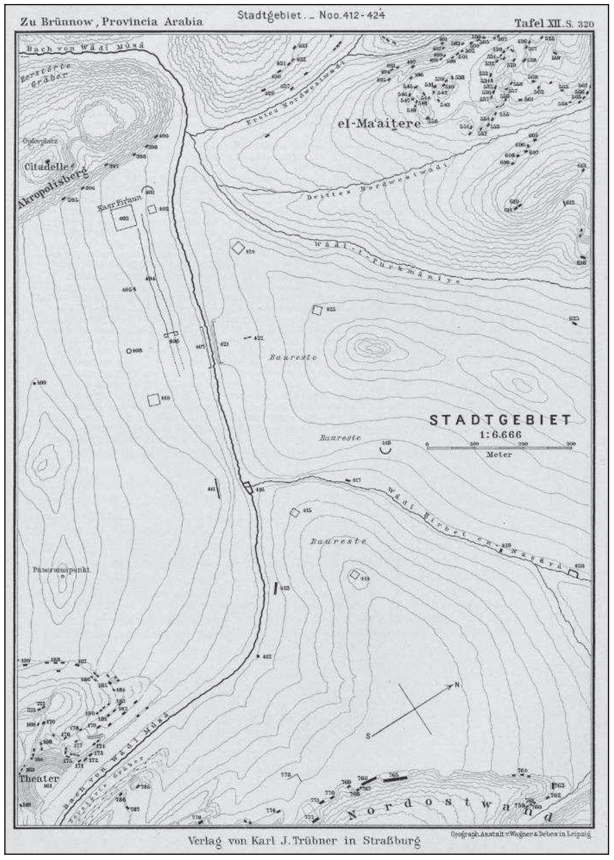
4. Decumanus-Maximum of Petra.

5. Ruins of city walls of Petra.

a separate arch. The inscription on the blocks is devoted to the visit of Emperor Trajan to Petra in 114BC. On the upper step of the stairs are the bases of two columns. On the opposite side of the street of the Procession, along the axis of the Lower Market was the so-called Royal Palace. This is one of the few structures of Petra, where archaeological excavations have not been conducted. The palace appeared in the form of a peripteros , with a square in front of it and a staircase descending to the Decumanus-maximus.

The next monument to the north of the central axis was, facing the Colonnaded Street, laid the Temple of the Winged Lion, built in 27BC. The temple, dedicated to the goddess Atargatis, was repeatedly rebuilt and was decorated from the inside with paintings and stucco decorations.

Its name was given to the temple thanks to the sculptures of winged lions crowning the pediment. The altar of the temple was surrounded by twelve columns with Corinthian capitals. The open Sanctuary in front of the temple was connected with the Street of the Procession by



6. The site mup of Wādī Mūsā (Brünnov, R.E. and von Domaszewski, A. 1904).

two symmetrical lateral ladders. In the middle of 4th century AD. the temple was rebuilt. Within this period, workshops: picturesque, marble processing, metal processing, located in several basements adjacent to the temple have emerged. In the beginning of the 2nd century AD. the temple lost its cult significance and was rebuilt into a residence that existed for the next 250 years.

Immediately after the Great Temple and the Temple of the Winged Lion, the Procession Street ended with the Monumental Gates leading to the open Temple Sanctuary of Qaṣr al-Bint. Triple arch arches were erected from pink limestone at the beginning of 4th century AD. in the end of the building Streets - the Colonnade. The width of the central passage of the gate coincided with the width of the street. Symmetrically located narrower side passages on one level rose above the pedestrian sidewalks. On the eastern side of the gate were four detached columns with zoomorphic capitals.

Opposite the Temple of the Winged Lion, adjacent to the Lower Market, was a Great Temple with an open Sanctuary and Propylaeum. The staircase led to the Sanctuary on the hill located at the side of the Procession Street. The unusual sculptural zoomorphic capitals of the Sanctuary columns in the form of the heads of African elephants were found in the excavations of 2002. Excavations show that during the period of the Roman legions in Petra, this complex served as a forum or agora. Due to its size and location, it was the center of the commercial and administrative life of the city. The same capitals depicting animals also found in pilasters of the central arch. The Monumental gates represent an outstanding example of the mixing of imported Greco-Roman ideas with local Arab practices (**Figs. 7, 8**).

On either side of the city center Gate were the North and South Towers. To the southern tower adjoined "Thermae", conventionally named because of the construction and ceramic pipes inside. In the immediate vicinity was the Small Temple. Unfortunately, these monuments have not yet been excavated and almost not studied. Only their general location and dimensions of plans are known.

The Open Temple Sanctuary of Qaṣr al-Bint

is 73m long and continued with a slight deviation from the direction of the Colonnaded Street and the Monumental Gate (**Fig. 9**). The northern front of the Sanctuary was turned the valley of Wādī Mūsā. it was fenced with a wall along which two levels of benches from fitted limestone blocks and a series of statues on pedestals stretched from inside. The wall approached the Temple of Qaṣr al-Bint, and surrounded it from all sides, forming an open square in front of the entrance with an altar. Monumental gate of the wall, located 20m from the temple, opened the way out from the Sanctuary to the southern part of the city. The complex of the temple with an open altar in front of it and further into the valley outside the city closes the general composition of the center of Petra, intersecting its longitudinal axis at right angles to the extended Sanctuary. In this case, the point of intersection is fixed by the location of the altar, and the completion of the central highway as a whole creates a semicircular niche in the western wall surrounding the temple (**Fig. 10**).

as-Sīq

Narrow and deep, with steep walls more than 90m high, and a broken line leading to Outer as-Sīq from the east entrance to Petra. The total length of this corridor is 1500m. The width in different places is from 4 to 12 meters. One of the most significant facades, cut out in the rock of al-Madhbaḥ mountain range, on Bāb as-Sīq left side, are the facade of the Obelisk Tomb and the facade of Bāb as-Sīq Triclinium (**Fig. 11**).

The first is a composition of four pyramidal volumes above the entrance and is a reflection of the strong influence of Egyptian architecture. The second monument was built some time later just under the Obelisk Tomb.

The axis of its doorway coincides with the axis of the middle right obelisk. Triclinium, means a room with two benches at the walls (*lat.*) was intended for special funeral ceremonies, above the entrance to as-Sīq at an altitude of 20m (**Figs. 12, 13**).

The arch of Bāb as-Sīq was abandoned. In the

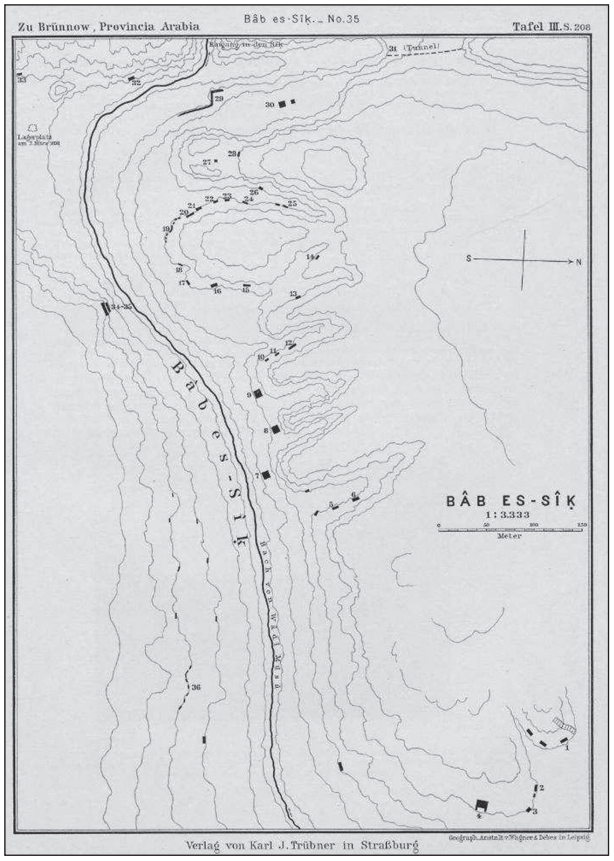
7, 8. Monumentl gates from front and rear sides.

9. The ruins on the left side of the colonnaded street.

10. Qaṣr al-Bint Temple.

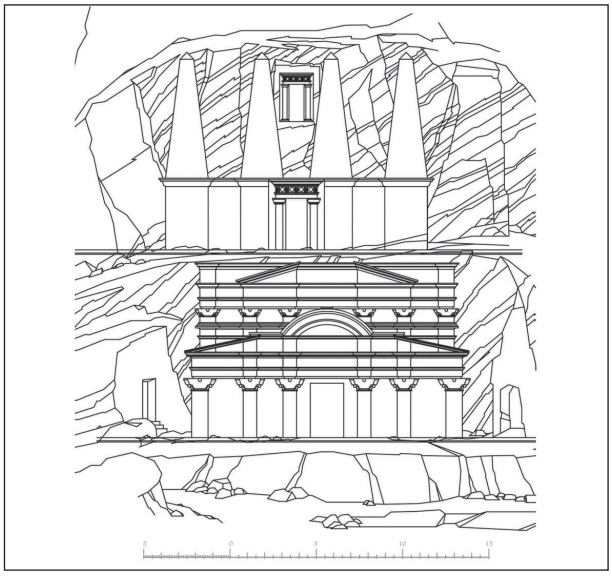
niches of the surviving pilasters, which served as its bases, statues could be placed. Proceeding further, the path to Petra began (**Figs. 14-16**).

After 1400m from the outer eastern entrance to as-Sīq gorge, the mountains of both massifs almost symmetrically break apart, and then again close, forming asquare across the gorge to which the famous façade of al-Khaznah (the Treasury) (**Fig. 17**). The facade of al-Khaznah down in the steep slope of the al-Madhbaḥ massif is the most outstanding rock facade of Petra, recognized in 2006 as one of the Wonders of the World (**Figs. 18, 19**). Until now, there is a legend state that in the urn, crowning the central half-ruble of al-Khaznah, the treasures of the pharaoh were hidden during its construction in the 2nd century. As for the dating of the monuments of Petra, is uncertain; only the estimated dates of the construction of al-Khaznah exist in twenty-five versions. The monumental tomb was built in honor of the Nabataean king, probably Aretas IV, and later was a temple for religious ceremonies, where the royal entitywas worshiped as a deity. The

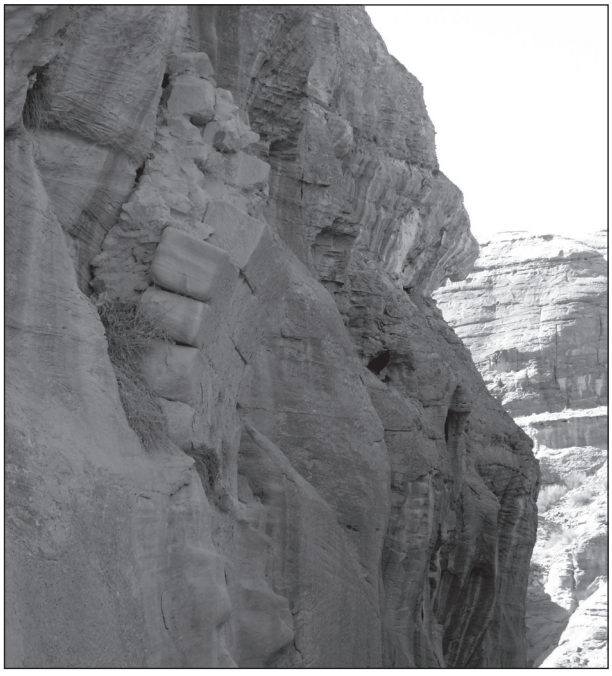


11. Bāb as-Sīq map (Brünnov, R.E. and von Domaszewski, A).

12. Obelisk Tomb, Bāb as-Sīq Triclinium.



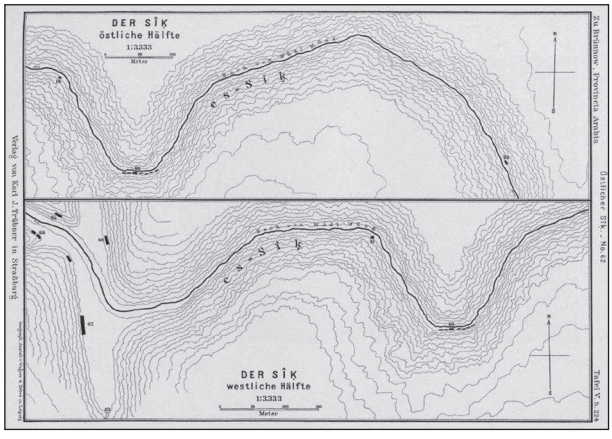
13. Obelisk Tomb, Bāb as-Sīq Triclinium. Architectural gra phic reconstruction 1904.



14. Bāb as-Sīq arch, left side.

15. Bāb as-Sīq arch (Brünnov, R.E. and von Domaszewski, A. 1904).

16. Bāb as-Sīq arch ,right side.

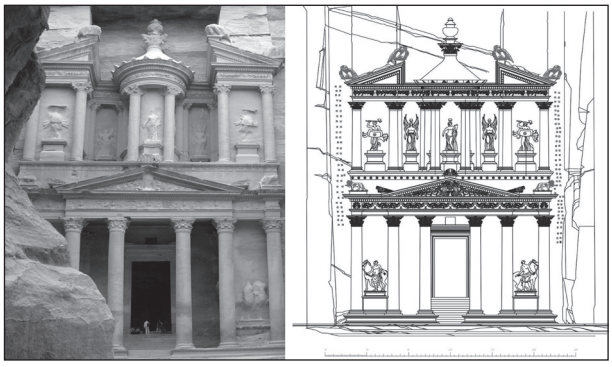


17. as-Sīq map (Brünnov, R.E. and von Domaszewski, A. 1904).

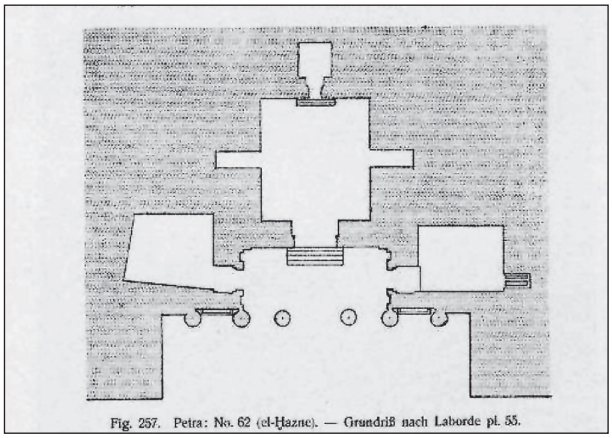
internal space of al-Khaznah includes a central rectangular hall 12×12m with three tombs adjoining it (**Fig. 20**).

In the slopes of al-Madhbaḥ, in addition to the above mentioned monuments, the order fronts of a number of tombs are located south of the exit from outer as-Sīq canyon. Together with the facades of al-Khubthah mountain massif, they form a changing panorama of the eastern wall of the mountain passage with caravan transit towards the north-south direction. The facade of Broken Pediment Tomb (**Figs. 21, 22**), followed by the facade of the Renaissance Tomb after 50m (**Figs. 23, 24**) and beyond that the facade of Roman Soldier Tomb, 50m to the south (**Figs. 25, 26**).

al-Madhbaḥ Heights, down Wādī Farasah, forms the southern part of the gorges from the rock part of Petra, al-Khubthah forms the northern gorge (**Figs. 27, 28**). Royal Tombs in the form four rock carvings adjoining almost closely to each other and forming a single front of order facades in the steep wall of al-Khubthah mountain range. From their entrance, the facades



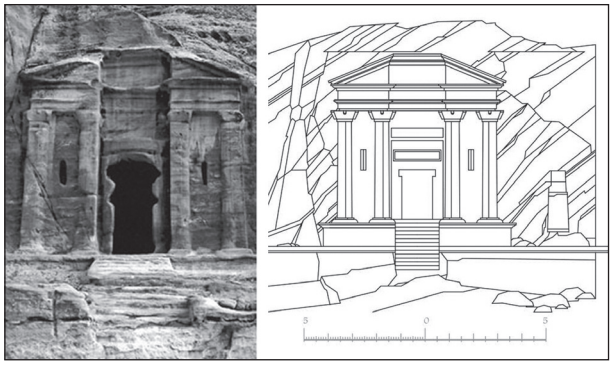
18, 19. al-Khaznah. Architectural graphic reconstruction.



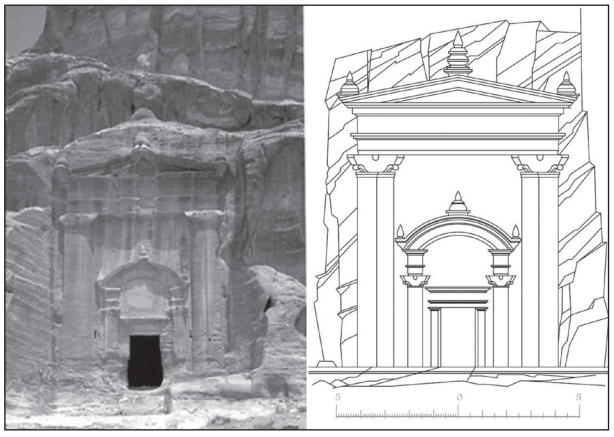
20. al-Khaznah plan (Brünnov, R.E. and von Domaszewski, A. 1904).

of the Royal Tombs turn from the east to the city center at a distance of 500m. Their panorama,. Their panorama, exactly perpendicular to the Decumanus of Petra, opens an unusual theatrical decoration and an arched gate in the form of a wings (**Figs. 29, 30**).

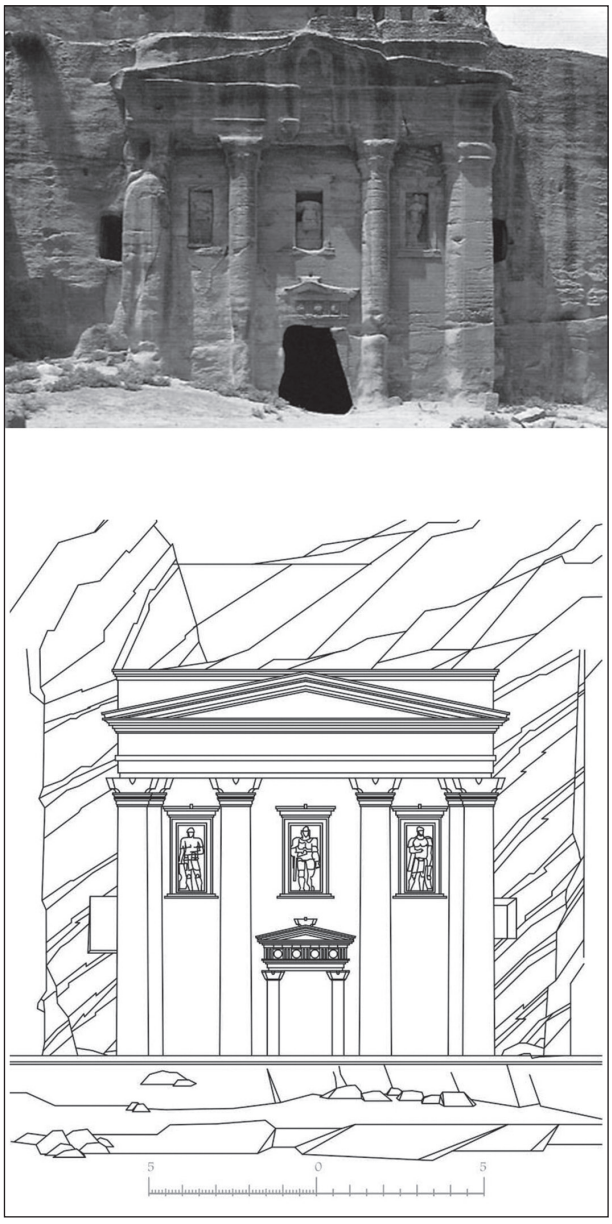
The southernmost facade of this front is the facade of Urn Tomb the tombs of one of the Nabataean kings who ruled in the 4th century AD. The monument, which got its name from



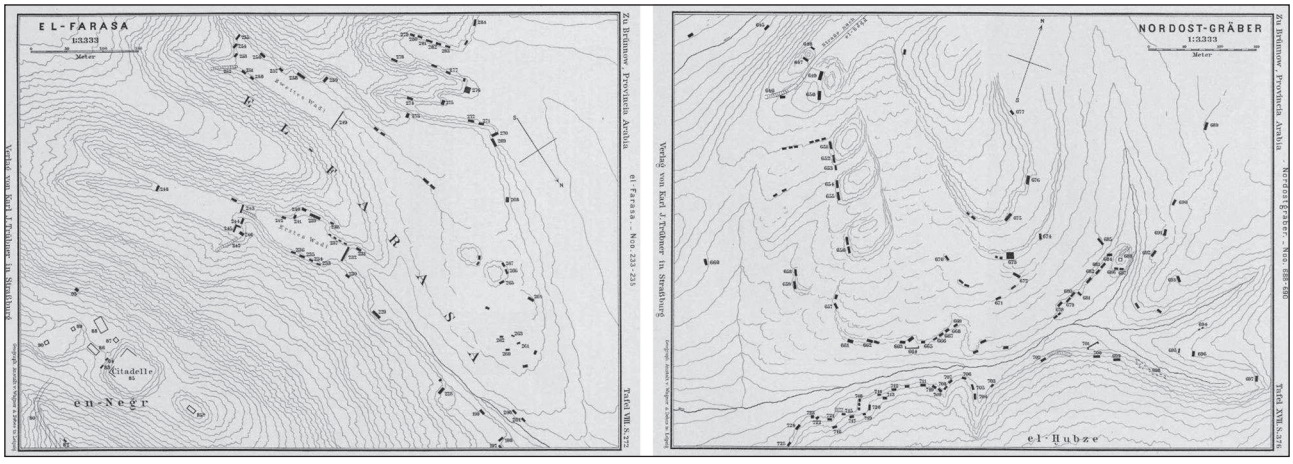
21, 22. Broken Pediment Tomb. Architectural graphic reconstruction.



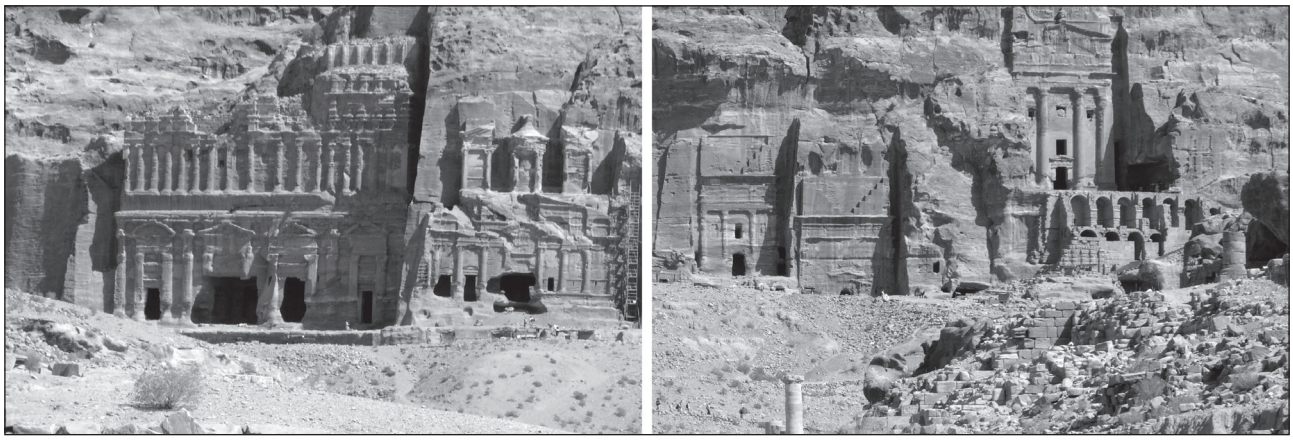
23, 24. Renaissance Tomb. Architectural graphic reconstruction.



25, 26. Roman Soldier Tomb. Architectural graphic reconstruction.



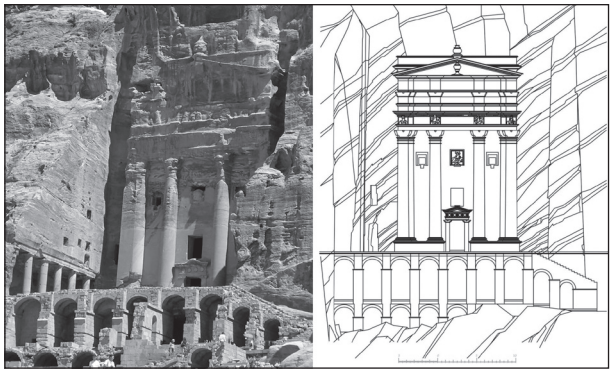
27,28. al-Madhbaḥ and al-Khubthah (Brünnov, R.E. and von Domaszewski, A. 1904).



29, 30. Royal Tombs.

two urns located along the axis on a tympanum and an attic, could also be a triclinium facade, as indicated by three niches inside. In the central niche there still , stands a statue of an unknown person dressed in toga. A large open courtyard in front of the entrance, at a later time intended for court hearings, has five sides, supporting the overhanging rocks and forming open galleries. The yard rests on a two-tiered arcade with a staircase leading to it (**Figs. 31, 32**).

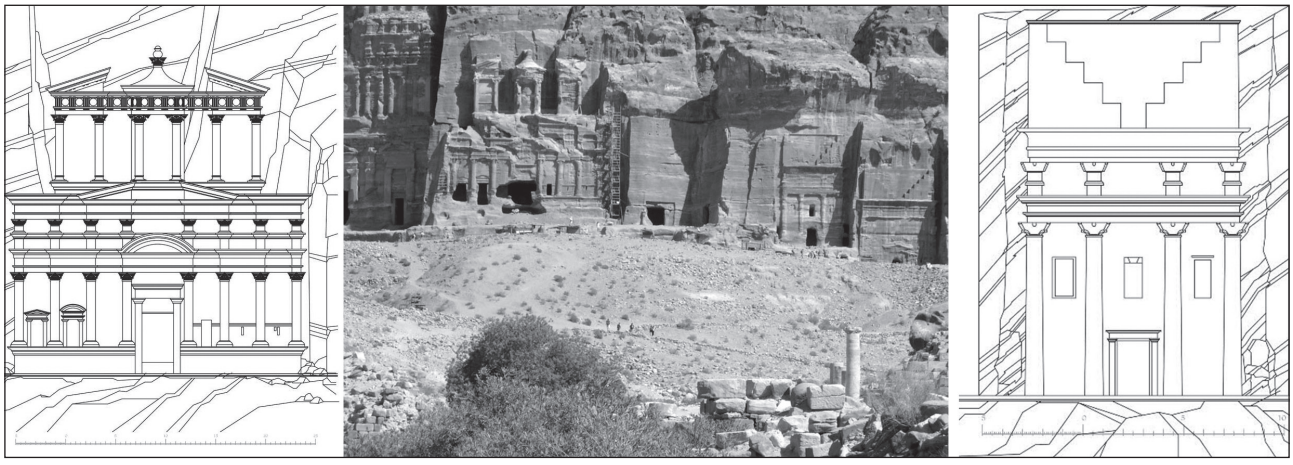
The next façade, behind several almost worn out facades, is the facade of the Silk Tomb, which shimmers with orange-red shades and named afterthe natural color of the rock layers from which it was cut. To the north of the Silk Tomb, is the facade of Corinthian Tomb, a ceremonial, rich in details, combining various Nabatean and classical architectural styles (**Figs.33-35**).



31, 32. Urn Tomb. Architectural graphic reconstruction.

The facade of the Palace Tomb located north, was erected in the 1st century BC. or 1st century AD. It was named after its analogy with the architectural scheme of the palaces of ancient Rome. In the immediate vicinity of the Palace, a little to the north, was a huge pool cut in the rock, where the water collected from the sources of Wādī Mūsā flows into a stone tank outside the entrance to as-Sīq canyon (**Figs. 36, 37**).

At a considerable distance to the north-east of the Royal tombs, the front of al-Khubthah massif continues to the facade of Sextius Florentinus Tomb. This volume was constructed parallel with a section of early Nabataean city



33-35. Silk and Corinthian Tombs. Architectural graphic reconstruction.

walls. This Tomb was built around 130AD (**Figs. 38, 39**).

Communication Arteries and the Water Supply System of Petra

The network of valleys crossing the plateau part of Petra and disappearing in deep mountain gorges converge to its main channel - the valley of Wādī Mūsā. The direction of the valley, as already mentioned, coincides with the axis of the urban center west-east. At al-Khubthah massif, Wādī Mūsā abruptly turns to the south, and then again follows the eastern direction to as-Sīq. The western direction of Wādī Mūsā continues to the valley of Wādī aṣ-Ṣuyyagh leaving the mountains. North, the valley of Wādī ad-Dayr, one of the four branches of which already lays deep in the mountains makes a turn to the west towards ad-Dayr Tomb. In the same bundle, the valleys of Wādī al-Mu'aysirah and Wādī at-Turkumāniyyah, which runs in the northeastern direction, coincide with the site of the city wall in the north of Petra. The southern part of the wall that passed along the valley of Wādī Farasah, runs southeast into the gorge of the massive al-Madhbaḥ. From the north, exactly to the location of Nymphaeum near the entrance to the city center, situated in the valley of Wādī Mūsā , adjoined another valley of al-Maṭāḥah, which is divided in the northern part of the plateau into several branches, one of which leaves for al-Khubthah array.

In the autumn-winter season the river valleys were filled with water, which was preserved in special stone water wells. Traces of them are found throughout the central plateau of Petra. The non-permeating springs of 'Ayn Mūsā outside the eastern entrance sent fresh water through as-Sīq to the city all year round through two canals: an open, carved out groove along the road, and a closed one consisting of flexibly connected ceramic sections.

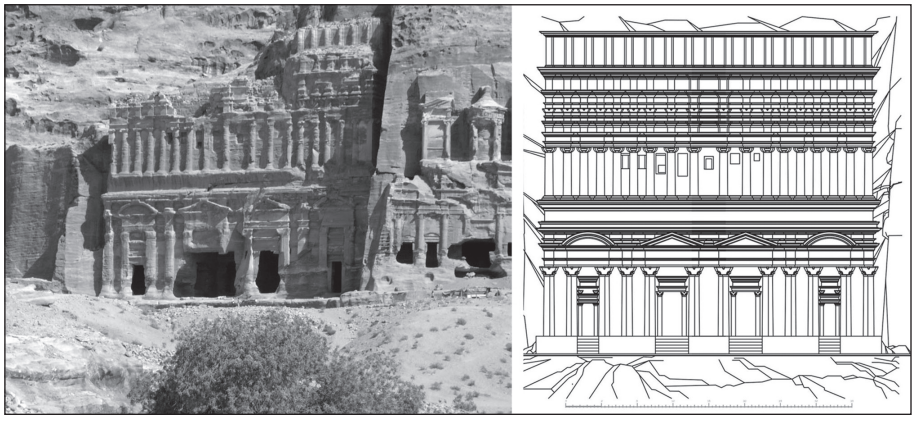
From these same sources, an external reservoir was filled, with a volume of 2500m^3. The water flowed from it in the north-western direction through a canal cut into al-Khubthah massif leading towards a vast pool in the center of the central area of the Palace Tomb.

At the end of it a dam was built to the north side of as-Sīq, entrance which contained Wādī Mūsā water in winter and protected the gorge from flooding. Stormy streams were directed through the tunnel of al-Maṭlab, which was cut down in the mountains of al-Khubthah, and spread through one of the branches of al-Maṭāḥah valley along all the riverbeds of central Petra, as in communicating vessels. One can only imagine the spring oasis of Petra, blossoming, fragrant, filled with the singing of birds, drowning in the giant bushes of azaleas and rhododendrons.

Mountain Peaks and the City-Forming Concept of Petra

The summit of the mountains surrounding the central plateau of Petra are marked by sacred heights, High Places (the places of main religious ceremonies dedicated to the ancient Nabatean deities; the god Dhushara and the goddess al-'Uzza).

One of the heights; al-Ḥabīs in the west, crowns one of the two peaks close to the city center of mountain al-Ḥabīs at 64m above the level of the city. This mountain is separated from the common mass by the two arms of Haroubet valley and Wādī aṣ-Ṣuyyagh (**Fig. 40**), which merge into one channel in the long western gorge. The sacred site of al-Ḥabīs



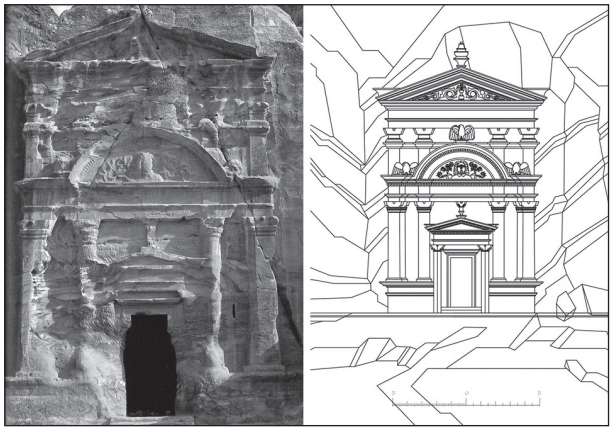
36, 37. Palace Tomb. Architectural graphic reconstruction.

is a sanctuary site of 4×5m with benches, platform of the altar and three steps leading to it. The altar of sacrifices was equipped with a drained pool with running water. This provision is characteristic of the religious ceremonies of the ancient Nabateans. The main sanctuary was associated with a whole complex of sites at different levels, connected by stone paths and steps that encircled the northern ledge of Mount al-Ḥabīs over aṣ-Ṣuyyagh valley (**Fig. 41**).

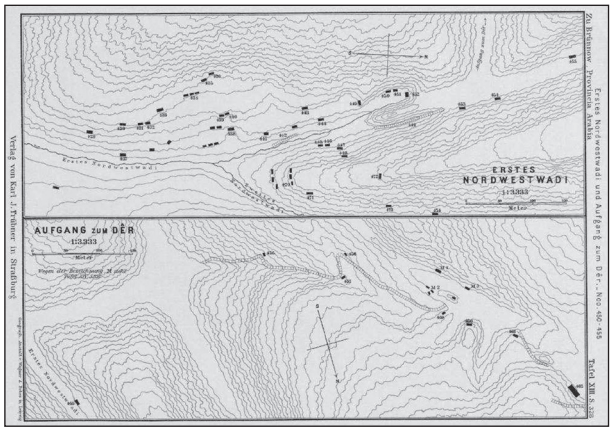
Directly opposite, in the direction exactly along the line coinciding with the longitudinal axis of the city center, at a level exceeding it by 250m, peak the Eastern Heights al-Khubthah. The group of heights of al-Khubthah mountain range, first discovered in May 1904, was known as a single complex of Three Heights.

In fact, five separate buildings can be considered as separate places for conducting religious ceremonies. There are four different approaches to al-Khubthah Heights: two from Sextius Florentinus Tomb from the north, the third from the steps going up to the Tomb Urn and the fourth from the valley to the north of al-Khaznah. The heights of al-Khubthah are the courtyards or sanctuaries taken out of the rock formation with three steps leading to them, and an altar, about 1m in height and 0.5m in width. Among other constructions of al-Khubthah closed courtyards, as well as an open area with an obelisk, about 1m high, also cut down from a solid massif.

The main height of the sacrifices is the southeast al-Madhbaḥ. It is located on the ridge of aṭ-Ṭaff mountain massif al-Madhbaḥ, towering above Petra at 214m. Two small plateaus, separated by a gorge, together form the main religious center of the ancient Nabataeans. On the southern plateau are two obelisks, about 6m height, at a distance of 30m along the line east to west. Cutting them, the Nabataeans had to level the whole mountain top a titanic work, almost definitely undertaken for the sake of the greatest deities; the god Dhushara and the goddess al-'Uzza. On the northern plateau, with a large massif that was lined up to an open courtyard with a low table in the middle and a high altar rising at its end the Nabataean Top of the sacrifices. Here, ritual sacrifices were made to the living blood



38, 39. Palace Tomb. Architectural graphic reconstruction.



40. Wādī Ṣiyaghah (Brünnov, R.E. and von Domaszewski, A. 1904).

41. City-forming concept of Petra.

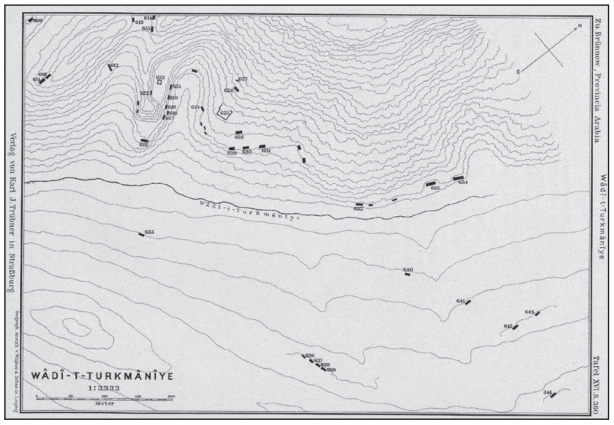
(presumably animals) in honor of Dhushara and al-ʻUzza, with a view of obelisks high above the breathtaking view of Petra in the valley and endless mountains around. The main height of the sacrifices may have been inherited from the Edomites who inhabited these places in the earlier Nabataean times and represents one of the best preserved religious places of this kind in the Ancient World. Following further north, the remaining walls and corner towers - are the fort of the sacred altitude al-Madhbaḥ. There is also a version that it was Propylaea, the main entrance to the sacred height of sacrifices.

The Height al-Muʻaysirah the fourth height of sacrifices, is at a level of 60m above the city center on one of the al-Muʻaysirah mountains in the north-western part of Petra (**Fig. 42**). Its altar with a staircase leading to it from the north is built on top of a lonely rock. The path of religious processions, carved in stone, passed along the eastern slope of the western ridge of al-Muʻaysirah mountains, crossed the valley of Wādī al-Muʻaysirah passing the catchment well, and connected to a common system with three communicating pools, rose to the sacred height along the western slope of eastern al-Muʻaysirah. On the way of the processions is a whole series of tombs, a small Triclinium that opens onto an open terrace with a solitary grave in its eastern part, and a quarry with a carved block of the god Dhushara.

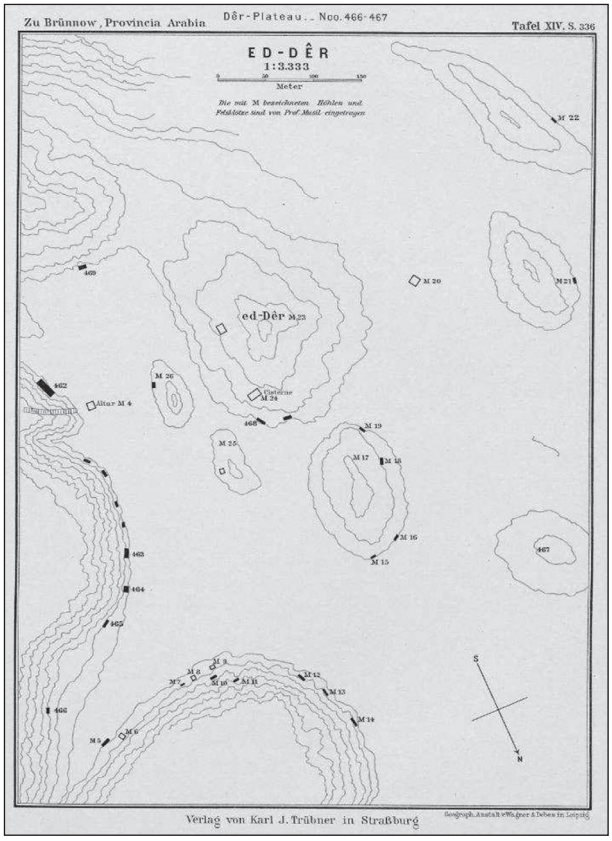
In addition to the four key groups of heights that fix the central Petra, there is one more height, deep in the mountains, ad-Dayr (**Fig. 43**). Religious processions to mountain ad-Dayr began from the Temple of Qaṣr al-Bint, descended to the valley of ad-Dayr, and then climbed a mountain path, passing the Lion Triclynium (**Figs. 44-45**), to a height of 220m above the center level (**Figs. 46-47**).

Thus, it remains to be assumed that the first four groups of Heights: al-Ḥabīs, al-Khubthah, al-Madhbaḥ and al-Muʻaysirah, together formed a virtual contour. The microcosm of Petra, its protection from external forces, while the fifth ad-Dayr demonstrated a macro-cosmic picture of the outside world. Already the ascent to the sacred Height forms the pictures of the conquered world to the stunning ad-Dayr and the view revealing new horizons could not but be a world view model of the interconnection and integrity of this world with its boundless surroundings.

The natural forms of mountains and valleys, the architectural volumes that make up the three-dimensional components of the natural-architectural complex of Petra, together represent a strictly defined formal system, the key of which was the location of the sacred heights. The prerequisite for reading the system was the plastic generalization of the terrain in the form of conditionally graphic “isophotes”,



42. Wādī at-Turkumāniyyah (Brünnov, R.E. and von Domaszewski, A. 1904).

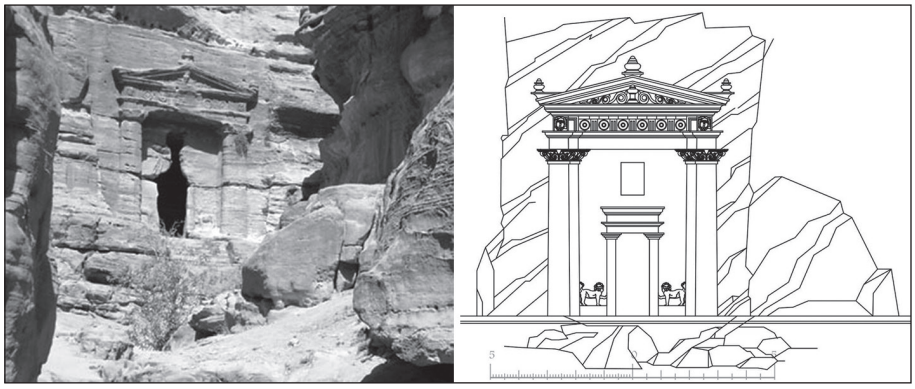


43. ad-Dayr mountain (Brünnov, R.E. and von Domaszewski, A. 1904).

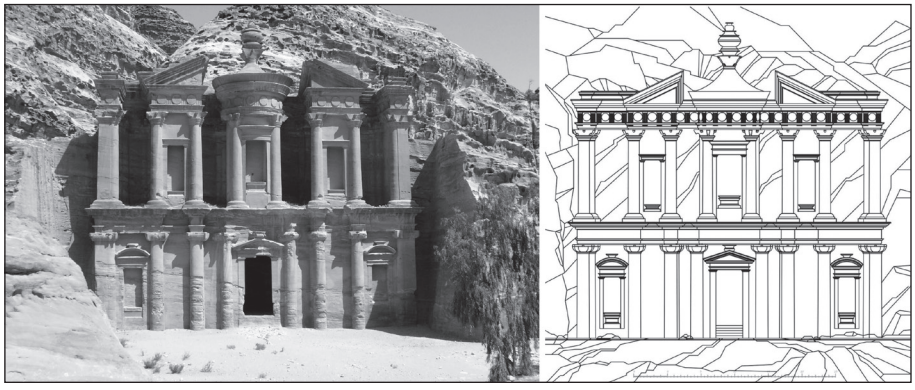
showing the general pattern, the preferred direction and steepness of the characteristically sections of the relief and, in addition, the conditional graphic reproduction of the volumes of the city center.

Straight lines connecting all four Heights consistently form a contour, coinciding with the boundaries of the central Petra. The straight line I-II, horizontally linking the Heights al-Ḥabīs and the al-Madhbaḥ sacrificial altitude, is superimposed on the line of the southern city wall, straight II-IV, al-Khubthah-al-Mu'aysirah on the north line. The height of the sacrifices visually connects with al-Khubthah heights of straight II-III, passing exactly across the Outer as-Sīq canyon in the area of its passage to as-Sīq, thus denoting the eastern boundary of the city. Direct I-IV, Heights al-Ḥabīs al-Mu'aysirah, limits Petra to the west. Moreover, the line I-III, connecting the heights of al-Ḥabīs and al-Khubthah along the diagonal, exactly coincides with the axis of the city center, and its intersection with the other diagonal of the quadrilateral II-IV, which connects al-Madhbaḥ High Altitude height with al-Mu'aysirah Height, and thus marks the entrance to City center with a near-by Nymphaeum.

Therefore, the sacred Heights al-Ḥabīs, al-Madhbaḥ, al-Khubthah and al-Mu'aysirah will fixes the western, southeastern, east and north-western coordinates of central Petra, the entrance to the city center and its main axis. One can reasonably assume the presence of a certain "Protective, security circuit" of the city. This version is confirmed by strong electromagnetic radiation in the area of Sacrificial Heights, which made it impossible before the advent of digital photography equipment and video shooting. Developing this idea, one can conclude in the assumptions that all the rock structures that are in the field of action of the "contour", almost literally within its borders, had a civil purpose: temples, residences (Palace Tomb, court), Urn Tomb, theater, residential quarters. This is also indicated by their appearance and size. The same is known about the appointment of a free-standing center: the city fountain, markets, thermae, temples, and palaces. As already mentioned, the forerunner of this, later Roman city center, was the early Nabataean city center of the 3rd century BC. It is obvious that the tombs were located outside the symbolic quadrangle and it was probably not by chance that their location was somehow connected with the ways of following religious processions to the sacred Heights of the city.



44, 45. Lion Triclinum. Architectural graphic reconstruction.



46,47. ad-Dayr. Architectural graphic reconstruction.

Landscapes and Dynamics of the Review of Architectural Species Fragments of Petra

Along the major base route, a number of Petra landscapes follow each other one by one, strung together on one thread of the pedestrian (horse) path (**Fig. 48**).

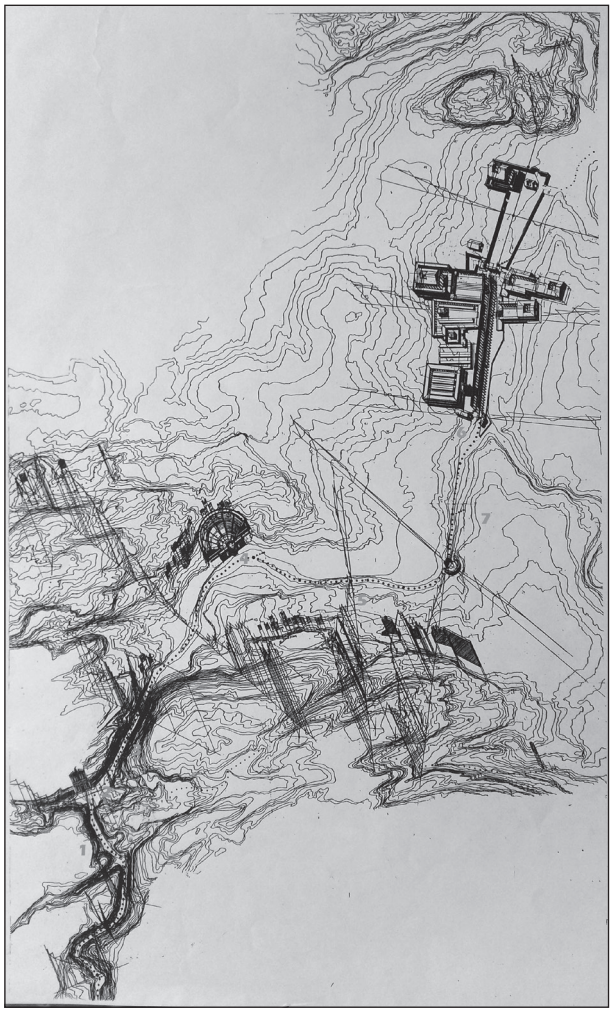
Under the landscape space is meant to be a separately acquired territorial unit of landscape composition, which has a relative integrity and specific volume-spatial characteristics that refer it to a certain type. In mountain Petra such signs are primarily determined by the nature of the relief, its pattern, steepness, and the proximity of the bulk masses (**Fig. 49**).

1. as-Sīq gorge is the first trail along the pathtowards the center of Petra's space, where a man enters, to the site, passing a wide exteriorroad before as-Sīq. Lies complex among the rocks in the slopes of the southern arm of Wādī Mūsā valley. this complex, with impressions precedes the entrance to the gorge: reveals therock carvings of the Obelisks Tomb and Bāb as-Sīq Triclinium are the main elements of the landscape picture, which unexpectedly appears to the left and to the left of the path and as single pylon on the right, leading the way towards to the beginning of the mountain corridor (**Figs. 50, 51**).

Unexpectedly, appearsa frame on theentrance to the gorge (**Fig. 52**). Until the middle of the 19th century. it was fixed by the arch of Bāb as-Sīq thrown over the narrowed entrance from one mountain wall to another. The total length of the line of as-Sīq corridor is 1400m. The width of the gorge in different areas ranges from 4 to 12m. the height exceeds 90m. Numerous bends of the gorge divide it into a series of tribes, representing visually isolated or partially communicating subspaces. The steep walls, which in height exceed its average width in a ratio of 10:1, visually closes above the head, creating the effect of an enclosed space, excluding visual connections with the external environment.

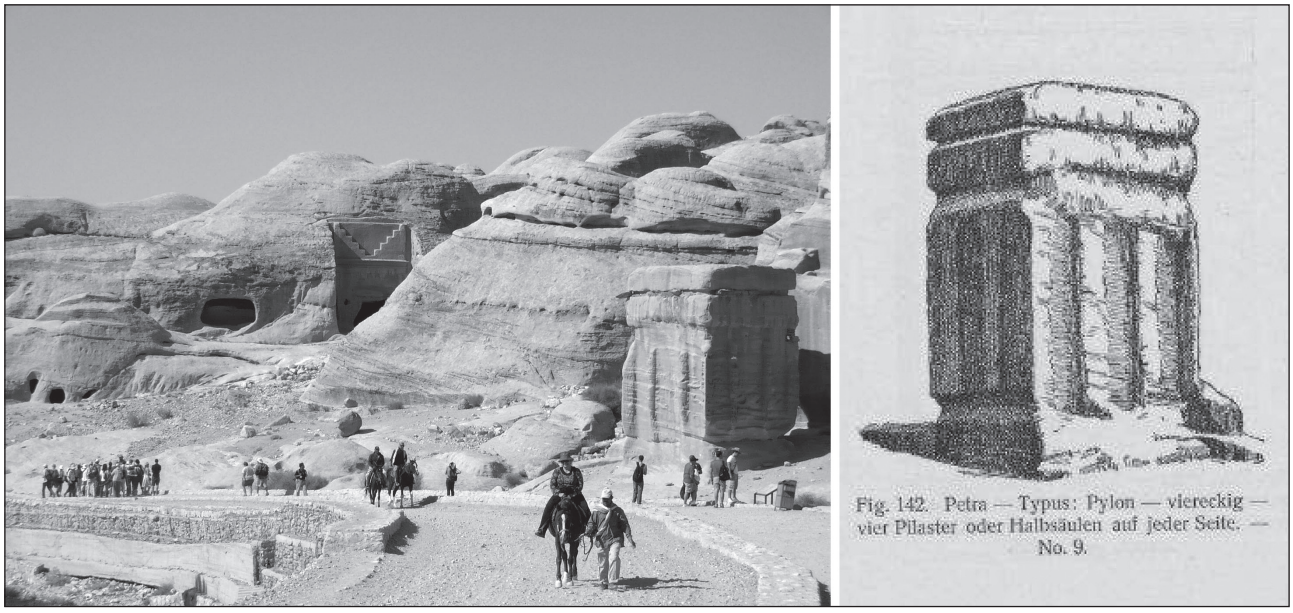
From the beginning of the ravine, walking for 40-45 minutes with a fantastic variety of views, limited in the field of view by closely approaching rocky walls of a narrow corridor. In such gap between the bizarrely protruding forms of rock , are one or several perspectives that are that are moving forward to the right or to the left, sharply breaking with a turn of the gorge.

The limited width of the corridor contributes to close consideration of close-up picturesque fragments of rock, and rock paintings of local



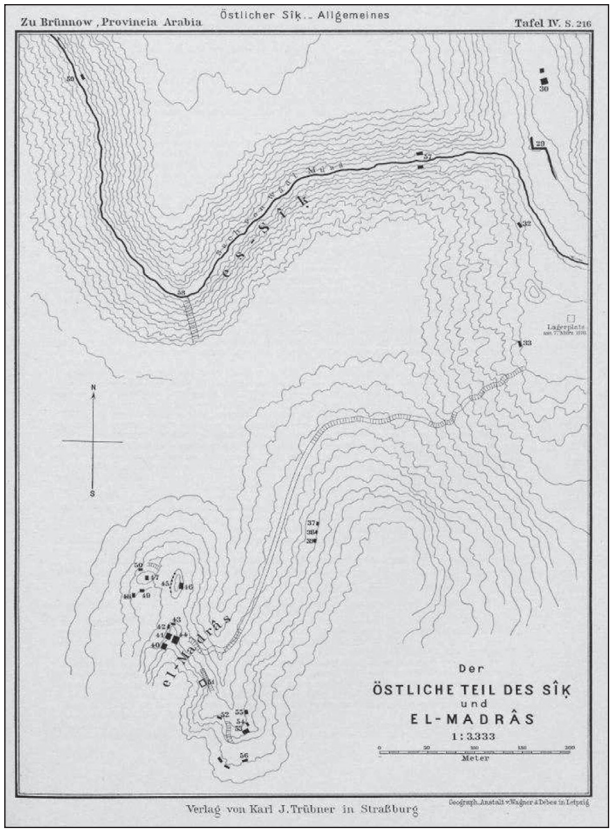
48. Dynamics and review of architectural species fragments of Petra.

49. Bāb as-Sīq path way.



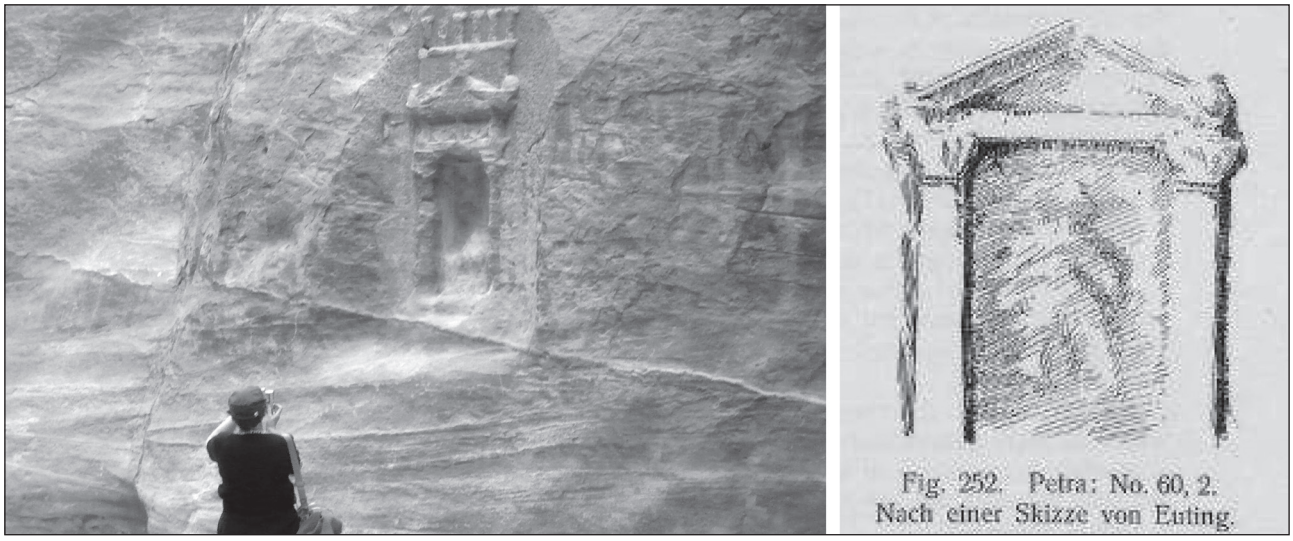
50-51. Pylon on the Bāb as-Sīq path way.

deities (**Figs. 53-58**). The gorge is oriented from east to west, but even its overlapping subspaces, because of their depth, do not receive direct morning and evening light. Direct light falls into the gorge only from the midday sun, which at the latitude of this region shines directly, giving no shadows. At other times of the day, each of the gorge spaces, depending on its orientation, has a different direction of shadows and a different degree of illumination. Consequently, the gorge is a long pulsating space, connecting as links in chains closed communal subspaces, different orientations, proportions, illumination and degrees of visual isolation. A sign of the approaching transition from one subspace to another, following it, is only a gradual or sudden change in illumination or a few flashes of light in individual places of expansion of the corridor. In such beam of bright sunlight, which initially appears as a narrow strip at the end of the gorge, and then wider and wider, appears before the travelers in a sequence of specific frames and then close-up Facade of al-Khaznah (**Figs. 59-60**).



52. as-Sīq (Brünnov, R.E. and von Domaszewski, A. 1904).

2. The square flooded by the sun in front of al-Khaznah is stretched in the direction transverse to the gorge. The area next to this walking space, is 35×100m, Closed along the perimeter, with high steep walls in the east, with the facade of al-Khaznah in the west and the more gentle slopes of the gorges that go north and south.
3. To the right of the facade of al-Khaznah is an exit to a narrow corridor which serves as the beginning of the thorough passage of the Outer as-Sīq gorge. The corridor with steep walls, as in as-Sīq gorge, but with architecturally processed facades of



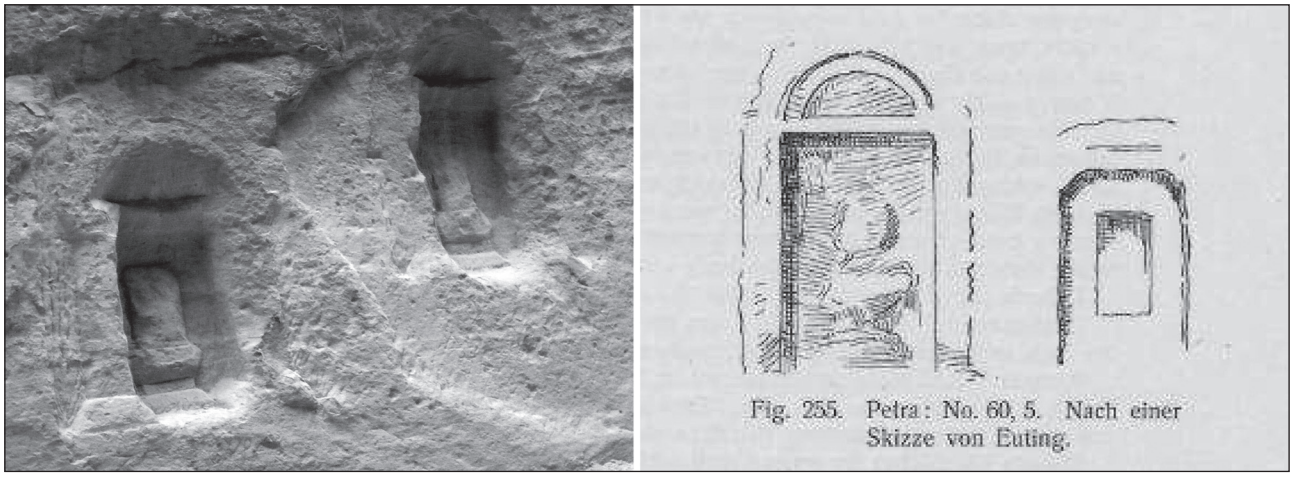
53, 54. The niche at as-Sīq, and documentation by Brünnov, R.E. and von Domaszewski, A. 1904.

tombs, stretches a series of specific frames strictly in a straight line, oriented precisely to the Amphitheater in the background, in a direction close to the north-west, and then expanding sharply, entering an open wide space with rock scenes left and right. During the 12-15 minut journey to the Amphitheater, the views change, , bringing it closer and including the field of view to the Street of the Facades (**Figs. 61-66**).

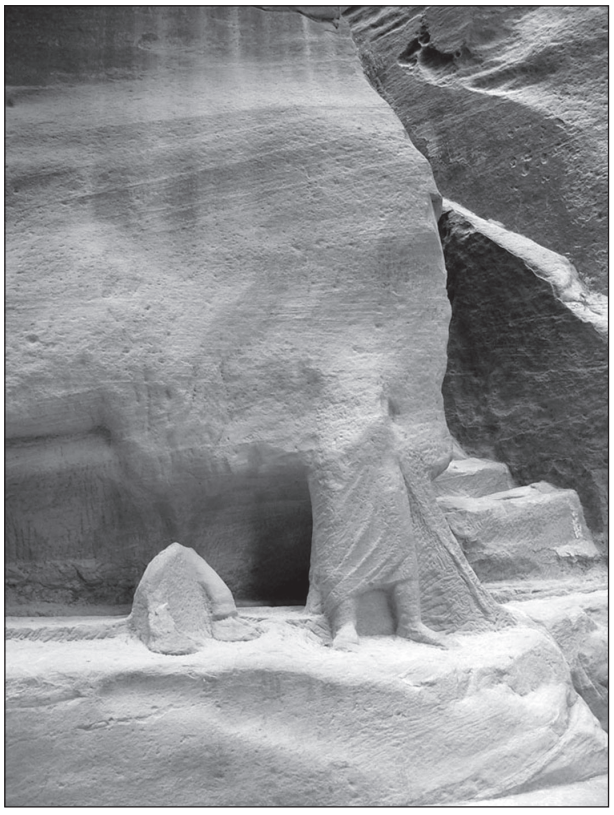
55. The niche at as-Sīq.

4. From the Amphitheater the gorge turns to the north, opening the next 400m long, landscape space that spreads into the central Petra. The western boundary of this space - slopes of al-Madhbaḥ ledges lower their height to 20m. The close-up of the Amphitheater remains to the left of the smoothly turning road. On the right is a view of the opposite stepped slope with the apertures of the tombs on different levels (**Figs. 67, 68**).

   From this place a scene is created; an exit into the open space with a view to the sky, the distant view of the surrounding mountains, and the sharp perspective of the Royal



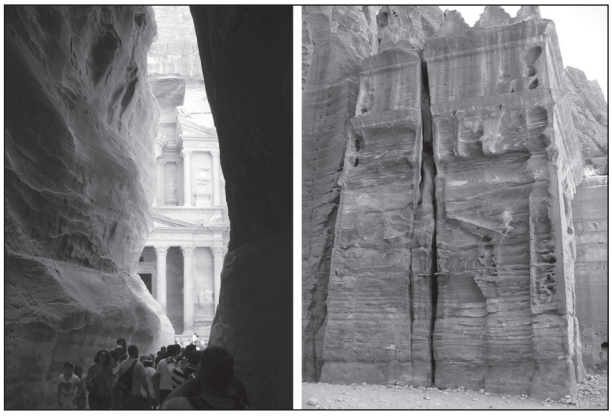
56,57. The deities in the niche at as-Sīq, and the documentation by Brünnov, R.E. and von Domaszewski, A. 1904.



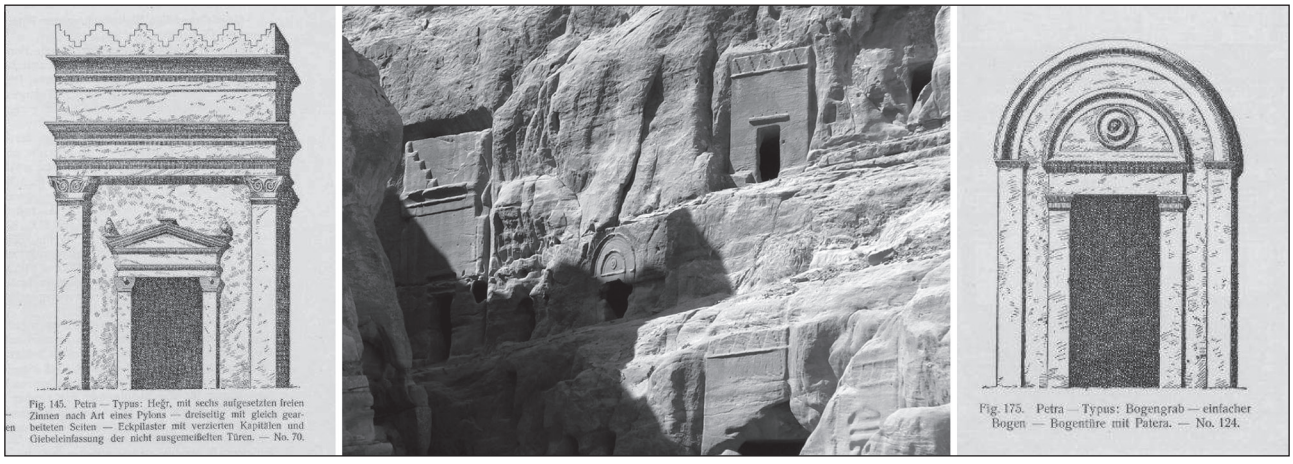
58. Tyche sculpture at as-Sīq.

Tombs on the right. In this scene, there is no doubt of its compositional center, which undoubtedly was in its time the volume of the Small Amphitheater. Now only its ruins testify its previous glory (**Fig. 69**).

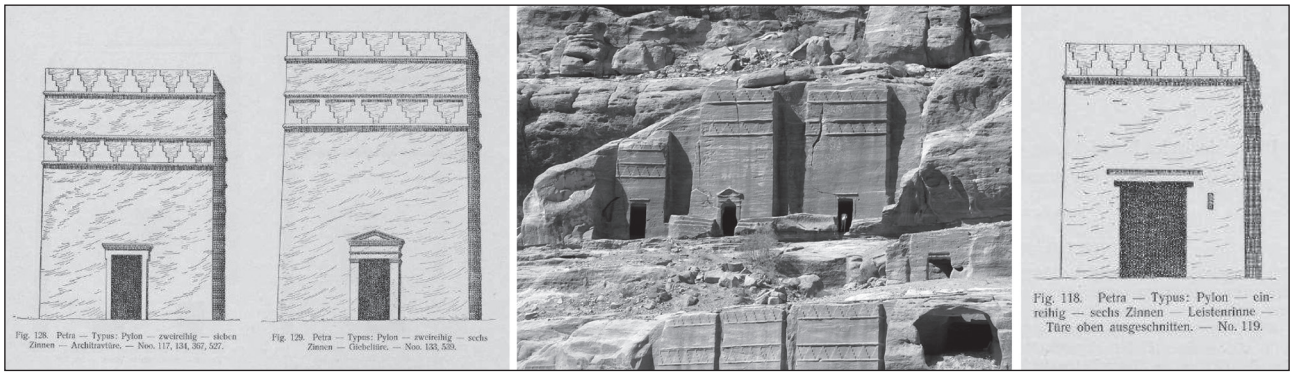
5. Another ten minutes, and the panorama is replaced by a deep central perspective of the thorough space of the Colonnade Street with the Monumental Gate in the background (**Fig. 70**).
6. The next ten minutes of the way brings the



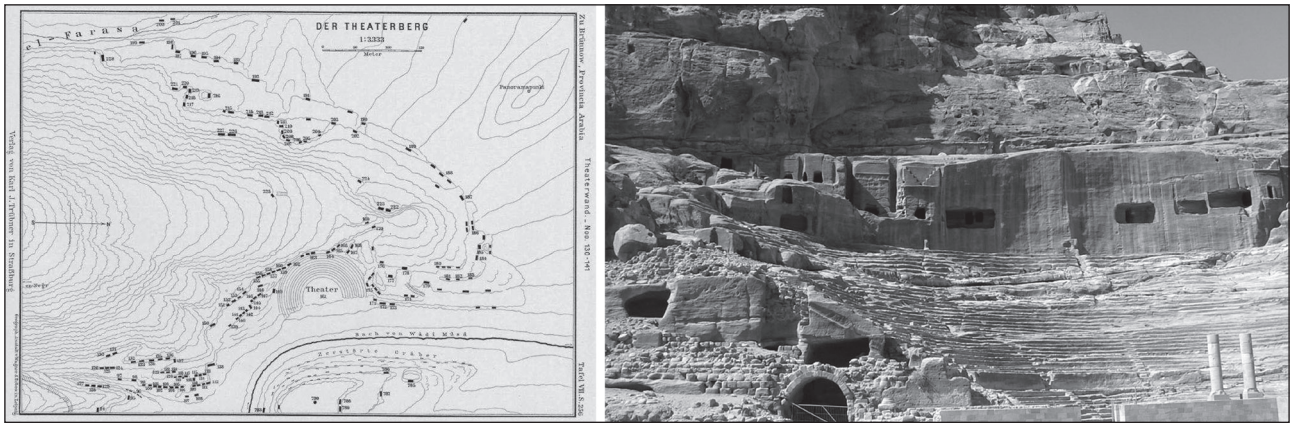
59, 60. as-Sīq, and al-Khaznah from as-Sīq.



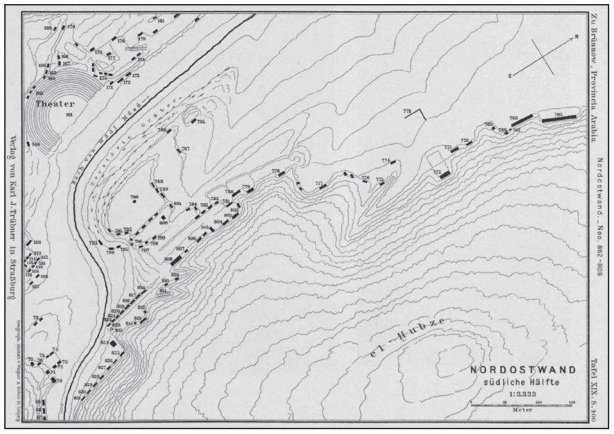
61-63. Outer as-Sīq, Tomb 70 and documentation by Brünnov, R.E. and von Domaszewski, A. 1904.



64-66. Outer as-Sīq, Tombs 124 and 119 and documentation by Brünnov, R.E. and von Domaszewski, A. 1904.

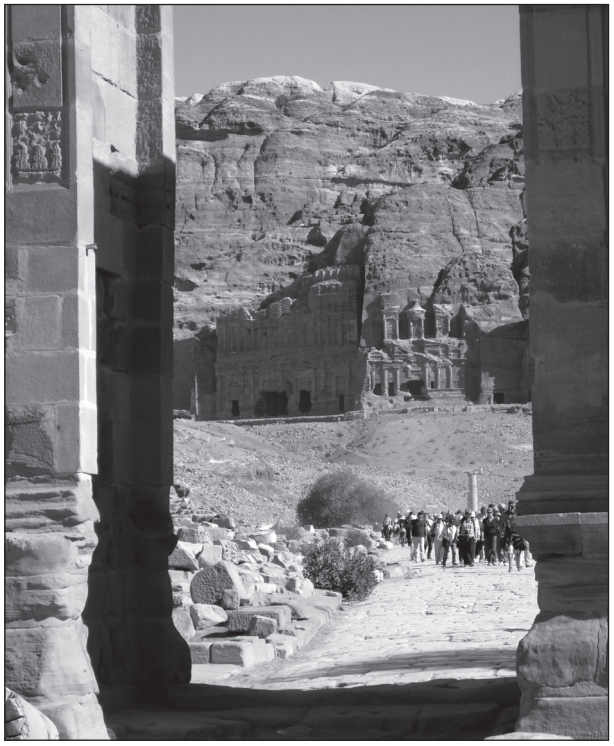


67, 68. *Outer as-Sīq, Tombs 133 and 134 and documentation by Brünnov, R.E. and von Domaszewski, A. 1904.*



69. *Outer as-Sīq (Brünnov, R.E. and von Domaszewski, A. 1904).*

70. *View from Palace tomb to Wādī Mūsā.*



71. *View to the Monumental Gates and Qaṣr al-Bint Temple from the Colonnaded Street.*

72. *View to the Royal Tombs from the Monumental Gates.*

73. The Royal Tombs. Architectural graphic reconstruction.

Monumental Gate closer. Their supports limit the view frame with the perspective of the Open Sanctuary and the Temple of Qaṣr al-Bint in the background of Mount al-Ḥabīs (**Fig. 71**).

7. Looking towards the opposite direction of the opening of the Monumental Gate is an imaginary central perspective of the little-preserved Colonnade Street with the Corinthian tomb along its axis in the background. The next few steps along the Colonnade Street open an extraordinary panorama of the Royal Tombs and their mesmerizing beauty (**Figs. 72, 73**).

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ORNAMENTAL AND PLASTICITY STRUCTURE OF CORNICES OF PETRA ARCHITECTURE AND GRAPHIC RECONSTRUCTION

Anna K. Kudriasheva

Abstract

The plastic expressiveness of the restrictive form synthesizes the aggregate sum of its artistic, structural-tectonic, rhythmic or spatial-deep concepts and is divided into structural and ornamental plasticity, plasticity of volume and surface, and plasticity of the parts of the order system.

Plasticity of volume, surface and shapes with spatial elements are consistent with the concepts of the types of space, frontal and deep-spatial compositions; the plastic expressiveness of a volume is associated with the perception of its parts from all possible directions. Plastic expressiveness of the surface is associated with the perception of the frontal composition, *i.e*. from the front side of the surface. The plastic expressiveness of the form depends on the complexity of deep perception of forms and spaces.

The facades of Petra, carved from solid rock massifs and constituting the processed part of the natural mountain landscape, are called rock carvings in the presented work. Rock carvings in their majority are defined by the concepts of surface plastics, which relate them to the texture level of the landscape structure of Petra.

The individual uniqueness of each rock carvings is different in proportions to the main structural plastic elements and the character of their details cornices, capitals and ornaments of relief images.

Each rock facade is perceived in the context of a general landscape-architectural ensemble, the components of which are facade compositions of neighboring structures and the surrounding array of natural mountain landscapes.

Key Words

Petra rock facades, Nabataean tombs, Nabataeans cornices, Nabataean portals, Nabatean porticoes.

Introduction

Structural Plasticity

Structural plasticity is a concept that denotes a clear separation of boundaries of the various structural elements that are different in function. In architectural order, the entablature consists of horizontal blocks of architrave, frieze and cornice. The cornice lines restrict the plane of the tympanum, the vertical lines delineate the dimensions of antae, pilasters and columns. Structural plastics also include micro Structural plastics, which denote the miniature details of large plastic elements, such as triglyphs and metopes in friezes of the Doric order, echinus and abaca of Doric capitals, echinus, volutes and balusters of Ionic capitals, figured abaca, twin bundles of volutes and tiers of acanthus leaves in Corinthian capitals. The complexity of such details qualitatively enriches the elements of the general structural plasticity.

Ornamental Plasticity

Ornamental plasticity is an architectural decor, which includes cornice details, echinus and balusters, curly details of Ionic and Corinthian capitals, as well as thematic decor such as sculptures of people and animals.

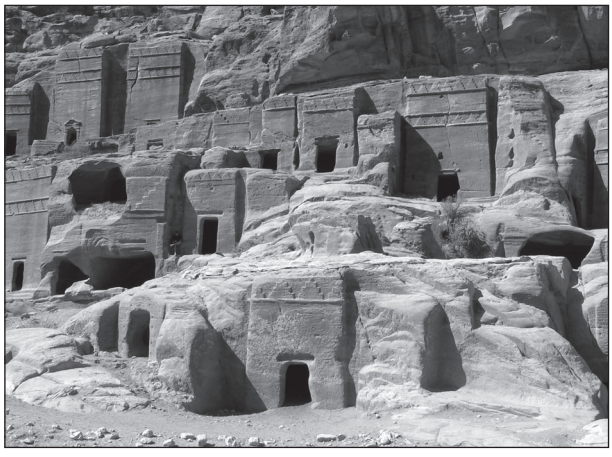
Typology of Petra Rock Carved Facades

The structural and micro-structural plasticity of the facades of Petra varies depending on the

types of cultures of different regions, under the influence of which the Nabataean kingdom was in that period. Many structures of the Facades Street are named tomb-pylons, which researchers refer to during the conquest period of the region of Petra by Assyria. It is quite possible, that the trade relations of the Nabataeans with the Arab states of North Africa, in particular Egypt, led to the fact that on pylon tombs Appears the details of Egyptian plastics. The influence of cultures of ancient Greece and Rome on the Petra region strongly affected the Nabatean architecture; the facades of pylon tombs eventually evolved into whole order compositions. The structures acquired new forms of Nabataean portals and Nabataean classic porticos.

The earlier tomb-pylons of Petra refer to the earliest type of architectural facades of Petra, approximately dating from the 7th-4th centuries BC. These facades have a flat surface, the upper part of which is occupied by a primitive cornice with a torus and an attic with a strip of flat pyramid-stepped ornament or "crow's steps" and an entrance opening to the tomb in the lower part of the facade, with a cornice board above. In later portals of the Assyrian type, the cornice traction becomes more complicated, representing an ovolo and a wide fillet above it. The metric series of stepped pyramids becomes six and seven-part with semi-pyramid at the beginning and end of the series. Structural plasticity of the Assyrian-type facades is built on the contrast between the plane wall and relief edges of cornices and rows of ornaments (**Fig**. **1**).

The "Egyptian" tomb-pylons of Petra is referred back to the period *c*. the 3rd century BC. and 1st century AD, and are characterized by the appearance of a cornice with an Egyptian fillet or the *Cavetto*. The facade has a cornice in the form of a cavetto and a flat fillet while an attic has a relief of two stepped semi-pyramids diverging in the center. The Egyptian cavetto with fillet plays the role of a cornice, which supports the attic with relief of two stepped semi-pyramids. A flat high fillet is part of an architrave beam supported by a pair of pilasters with The Nabataean Reverse-frustum Capital Type I and II. The framing of the entrance apertures mostly has a pair of pilasters with Nabataean Doric Capitals and an entablature with one or two profiled cornices. The Egyptian type of rock facades is characterized not only by the cornice with the cavetto, but primarily by the appearance of the classic order (**Fig**. **2**).



1. The earlier tomb pylons of Petra.

The Nabataean tomb-portals with a double cornice is referred back to the period from the 2nd century BC to the 1st century AD. The order composition of the facades ends as an attic with "crow's steps" pyramids, supported by an entablature consisting of a cornice with a fillet, a smooth strip of frieze, and an architrave. The architrave is divided into one or more complex detailed cornices. The lower cornice with a large number of classical profiled details is supported by two pilasters with Nabataean Reverse-frustum Capital Type I and II. The lower part of the facade between the pilasters has a profiled entrance portal with complex order compositions, pediment with acroteria, and an attic with classical order details (**Fig**. **3**).

Nabataean tomb-portals consist of double entablatures on its surface. The upper one has a cornice with a cavetto, and an attic above it. The lower one has a profiled cornice, resting on two pilasters and other cornices above, which consists of a flat strip of stone and four Nabataean Corinthian capitals. Two external capitals continue the axis of pilasters with Nabataean Corinthian capitals, while the two middle capitals are located at the same distance from the main axis of whole facade. The composition of the two entrance portals occupies almost the whole plane of the facade between the pilasters.

The other composition of facades has an entablature Which is supported by four pilasters with scrolls in between, and an image of Atargatis, the deity of Fertility. The axis of lower

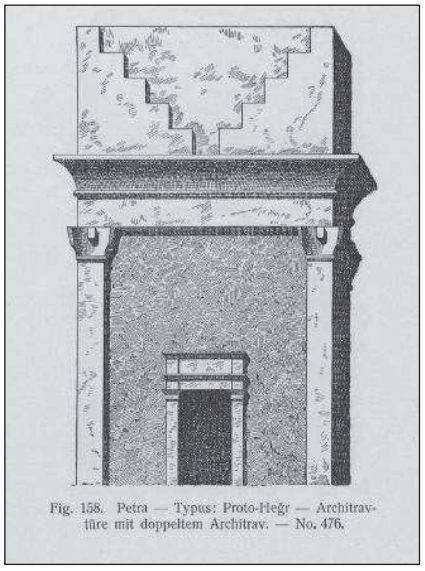
tier pilasters match with capitals of dwarf pilasters on the upper entablature (**Fig**. **4**).

Nabataean classic type of portals and porticos of Petra, which include twelve objects with the most expressive order compositions, can be conditionally divided into three groups:

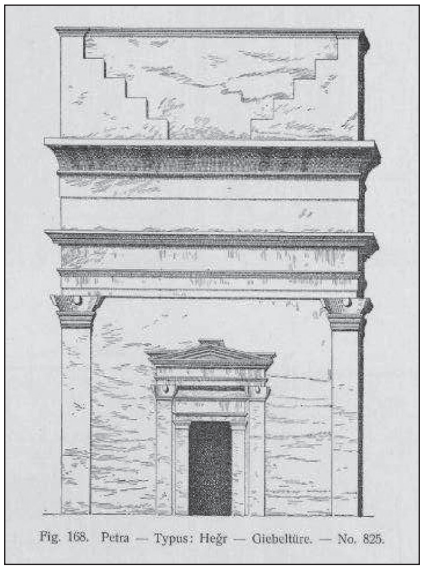
The first group includes portals built during 1st century BC. and 1st century AD such as the Broken Pediment Tomb, Roman Soldier Tomb, Lion Triclinium (**FIG**. **5**) and Renaissance Tomb.

The second group consists of rock carved façades, erected during 1st century BC. and 1st century AD such as The Sextius Florentinus, Silk and Urn Tombs (**Fig**. **6**).

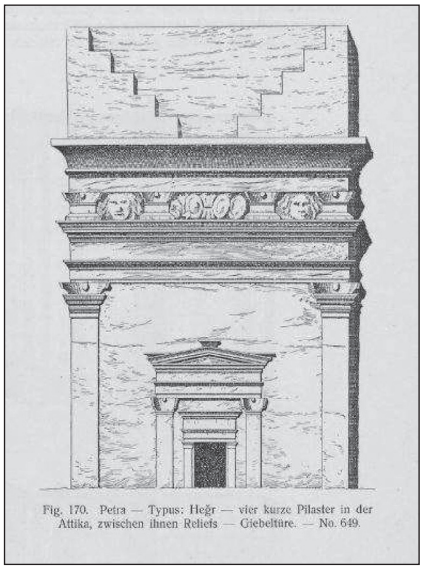
The third group includes five façades, which magnitude and plastic personality puts them in the most significant rock carved façades of Petra: Bāb as-Sīq Triklinium (**Fig**. **7**), Palace Tomb, Corinthian Tomb (**Fig**. **8**), ad-Dayr (**Fig**. **9**) and al-Khaznah (**Fig**. **10**) These structures date back to 1st century AD (**Fig**. **11**).



2. The Tomb No 476 with Cavetto cornice (Brünnow and von Domaszewski I. 1904, fig. 158).



3. The Tomb No 825 with Double cornice (Brünnow and von Domaszewski I. 1904, fig. 168).

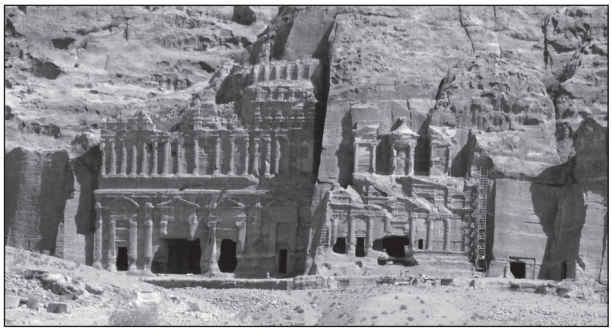


4. TheTomb No 649 with Double entablature (Brünnow and von Domaszewski I. 1904, fig. 170).

5. The Lion Triclinium.

6. The Urn Tomb and Silk Tomb.

7. Bāb as-Sīq Triclinium.



8. The Palace Tomb and Corinthian Tomb.

The Cornices of Petra Facades

In the architectural order, the cornice is the crowning part of the entablature, located above the frieze and architrave. The ordered cornice sharply comes forward and hangs over the remaining parts of the entablature, protecting them from precipitation. The cornices are the most beautiful and significant detail of the facades of Petra. The cornice in classical architecture is the crown part of the horizontal beam in a structure. On the facades of Petra, the cornice is a horizontal ornamental detail of plastic décor in the rock order system.

The Cornice of the Broken Pediment Tomb

The composition of the facade consists of a flat portal with four pilasters, the entablature and the pediment with a clear division of the central segment and the two entablatures (**Fig**. **12**).

The cornice of the broken pediment itself consists of the following ornamental plastic details starting from top to bottom: Top fillet, cyma recta, fillet and fascia. The Broken Pediment is supported by two leveled cornices and an architrave with the following elements in between: fillet, cyma recta, fascia, architrave, taenia, cyma reversa, fillet and fascia. Nabataean "pyramidal" capitals supports the composition of the cornice (**Figs. 13, 14**).

The Cornice of the Roman Soldier Tomb

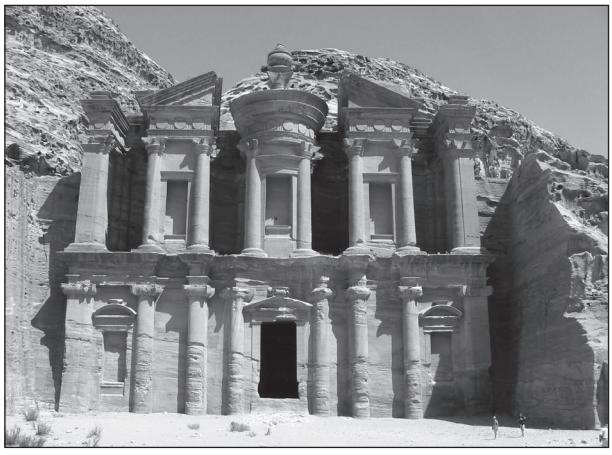
The façade composition consists of two portals, a small portal with an entrance framed by a larger portal. The outer portal represents a composition of four pilasters with an entablature and a pediment based at the attic. Each "double" column with a rectangular section from the outside and a quarter of the circle section from the inside, crowns the Nabataean Reverse-frustum Capital Type II. The upper parts of the Intercolumniation occupy three niches with a high relief figures of Hellenistic armors (**Fig**. **15**).

The cornice of the upper part of the attic consists of four fillets of different heights. The pediment cornice has a fillet, a cavetto and five fillets of different heights in its structure. The lower part of the attic, which is plays the role of the architrave, consists of the following ornamental detail from top to bottom: fillet, cyma recta, two fillets of different heights, cyma recta and a fillet. The height of taenia divides the fascia into two parts (**Fig**. **16a**). The cornice of the entrance portal consists of ornamental details of classical Doric. Five fillets of different heights define the plane tympanum. The cornice has the following details in its structure from top to bottom: three fillets, an entablature with triglyphes and round metopes, three fillets and two fascias (**Fig**. **16b**).

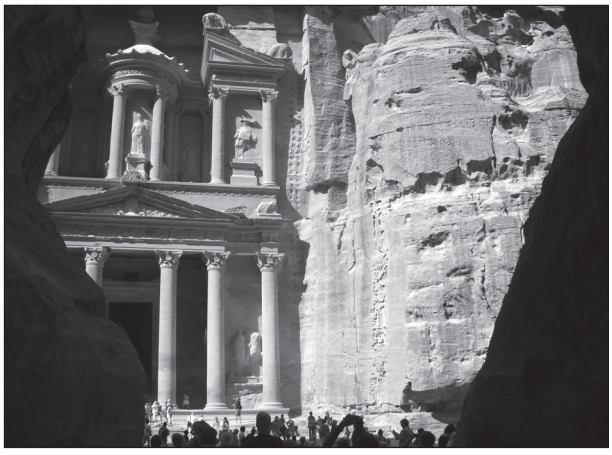
The Cornices of the Lion Triclinium

The facade composition consists of a portal with expressive structural and ornamental plasticity. Two "twin" pilasters with a rectangular cross-section from the outside and a quarter of a circle section on the inside, supports a triangular pediment, and are crowned by Nabataean plant capitals. The entrance portal in the center of the façade composition has a triangular pediment at the top and two reliefs of lions on the sides (**Fig**. **17**).

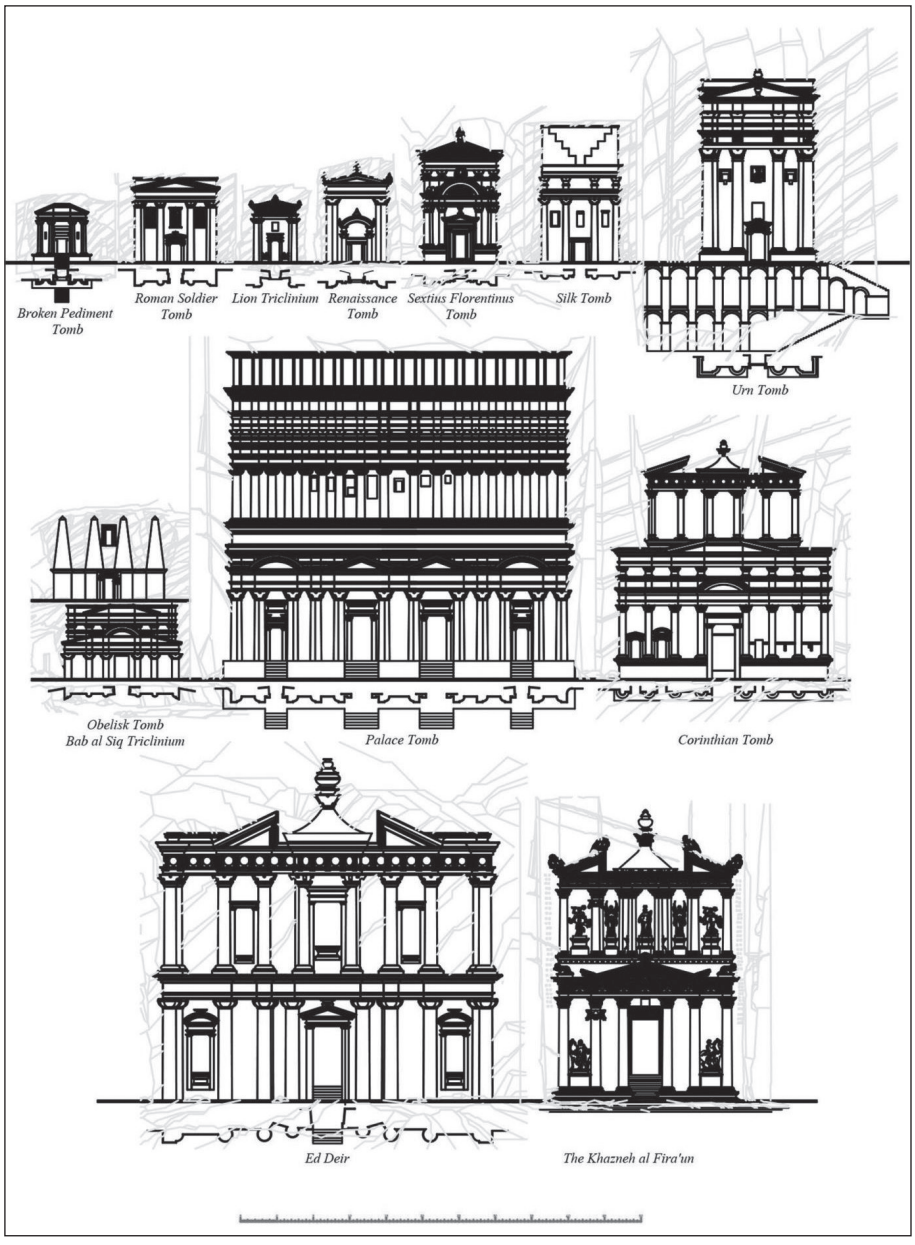
The pediment cornice consists of a fillet, cyma recta, two fillets of different heights and



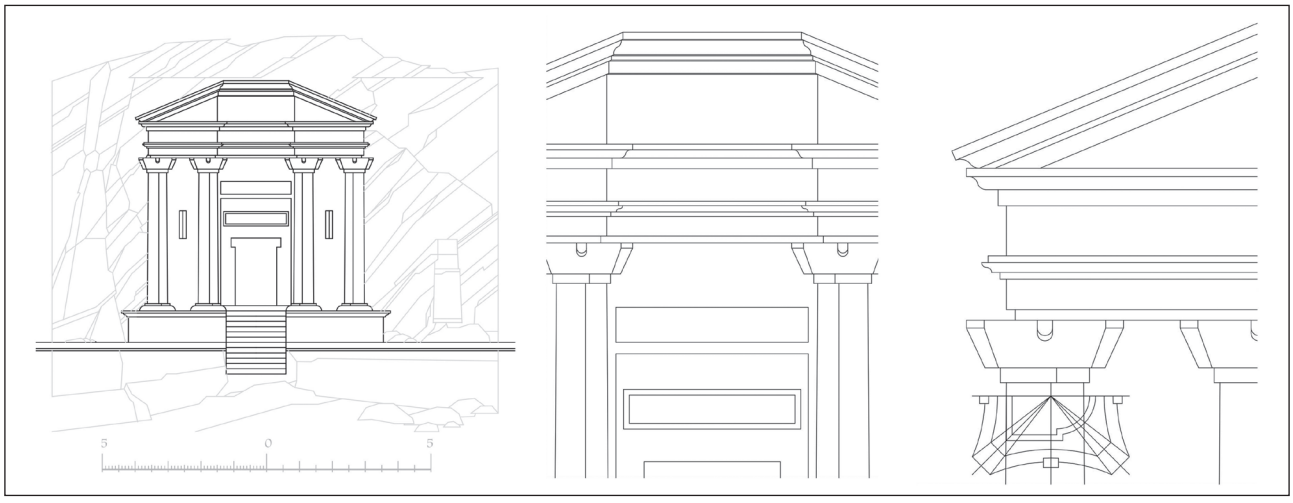
9. ad-Dayr.



10. al-Khaznah.



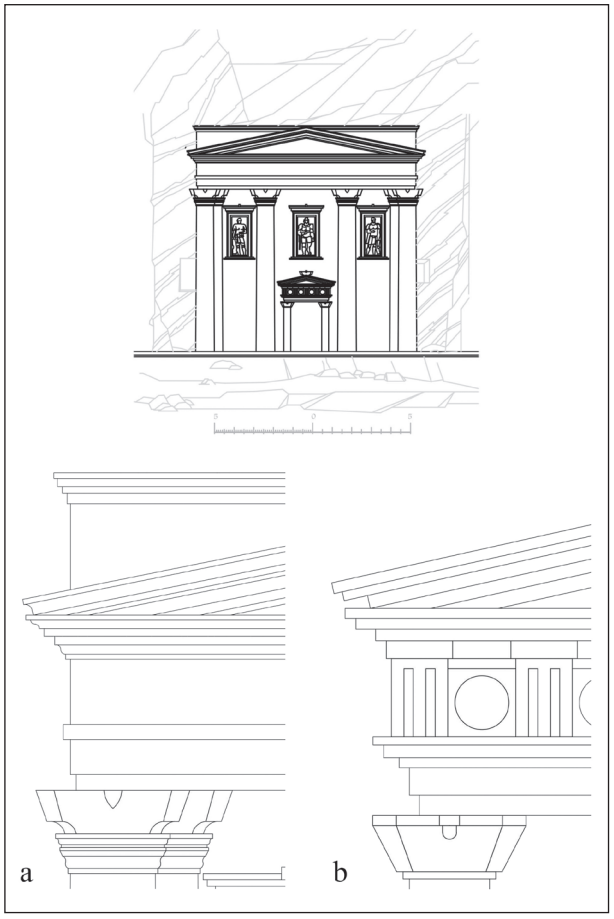
11. The 12 most significant facades of Petra.



12-14. The Broken Peiment Tomb and its details.

a fascia. The tympanum of the pediment is adorned by relief ornaments of local plants. The entablature of the façade has Ornamental details of classical Doric order such as triglyphes, and round shape metopes. Two Theatre masks are based on the entablature directly above the Nabataean Corinthian Capital, Type I, which supports the whole composition above. The upper cornice, which crowns the entablature, consists of fillet, ovolo, fillet, cyma recta, fillet, ovolo and a fillet. The middle cornice, above the architrave, consists of fillet, cyma recta and two fillets of different heights (**Fig**. **18**).

The entrance portal consists of double cornice ornamental structures at the top and includes the following details from top to bottom: fillet, cyma recta, two fillets, upper architrave, fillet, cyma reversa, fillet and a lower architrave. Two pilasters with Nabataean Doric capitals support the whole composition (**Figs**. **19, 20**).

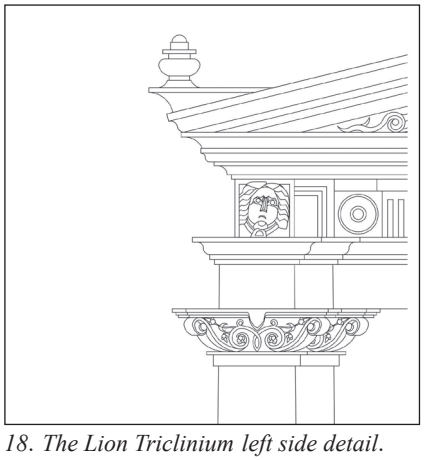


15, 16. The Roman Soldiers Tomb and its details.

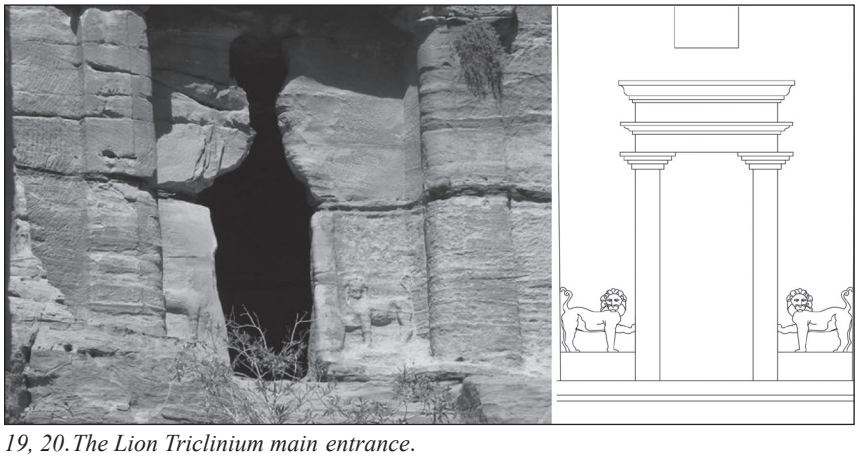
The Cornices of the Renaissance Tomb

The portal with its massive pilasters and an architrave is completed by a pediment with three acroterias in the corners and reliefs of urns. Each "twin" pilaster is completed by a Nabataean Corinthian Capital, Type III. The central portal of the façade consists of round shape arch with acroterias on the top and sides. The acroterias are adorned by reliefs of urns. The arch is supported by dwarf pilaster with double cornices and a pilaster with the Nabataean Corinthian Capital, Type III. Two cornices

17. The Lion Triclinium pediment and entablature.



18. The Lion Triclinium left side detail.



19, 20. The Lion Triclinium main entrance.

without an architrave and two simple pilasters represent the entrance (**Fig**. **21**).

The main pediment cornice consists of the following: 2 fillets, cavetto, fascia and fillet. The entablature cornice is similar to the cornice of the Broken Pediment Tomb in Structure and has the following details from top to bottom: 2 beveled ovolos, fillet, a beveled ovolo, fascia, architrave, three fillets of different heights and a fascia (**Fig**. **22**).

The round shape arch of the central portal consists of the following ornamental details from top to bottom: 4 fillets of different heights, small cavetto, fascia and a fillet. The cornice of the dwarf pilaster consists of a fillet, cyma reversa, two fillets of different heights, architrave, 2 fillets of different heights and a fascia.

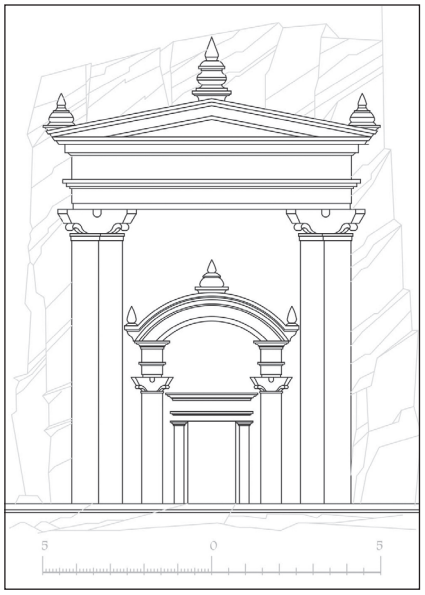
The entrance portal cornice is divided into two parts and it is inserted directly to the wall, without structural details such as architraves and fascia. The upper part of the entrance portal consists of: a fillet, cyma reversa and 2 fillets of different heights. In the lower part are 3 fillets of different heights (**Fig**. **23**).

The Cornices of the Sextius Florentinus Tomb

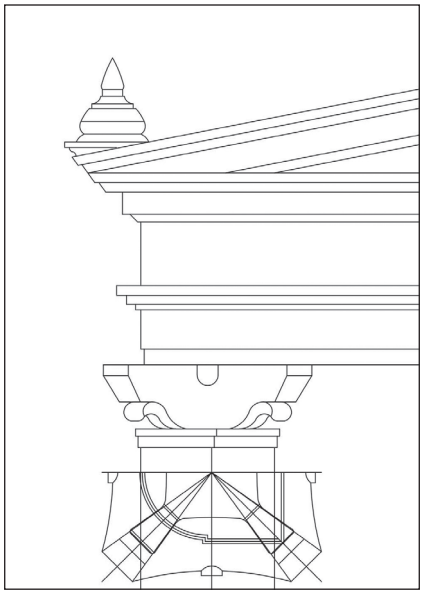
The composition of the facade is a two-level portal, based on a high plinth. The four pilasters at the first level, the last two from each side of which are "twin" pilasters with different section profiles, are crowned by the Nabataean Reverse-frustum Capital Type II. The pilasters are based on a high pedestal with a detailed cornice, and supports the semicircular pediment with Atargatis, the deity of Fertility, with scrolls in the center and a relief plant ornament. Three acroterias with eagles are at the top of the first level façade composition. The central part of the entablature has a semicircular pediment with a tympanum filled with relief plant ornaments. The central portal composition consist of a triangular pediment and Nabataean pyramidal capitals on top, supported by two pilasters with the Nabataean Reverse-frustum Capital Type III and a rectangular entrance portal with a cornice. The upper level of the portal has four dwarf pilasters and an attic, crowned by the Nabataean Reverse-frustum Capital Type I, and a triangular pediment with reliefs of local vegetation inthe tympanum and acroteria, with an urn based at the top (**Fig**. **24**).

The main pediment cornice consists of: a fillet, cyma recta, three fillets of different heights and dentils (**Fig**. **25**). The cornice of the upper entablature consists of The following ornamental plastic details, from top to bottom: a fillet, cyma recta, five fillets of different heights, fascia, fillet, cyma reversa, fillet and a fascia, upper architrave with dwarf pilasters, a fillet, cyma recta, a fillet and a lower architrave with plain pilasters.

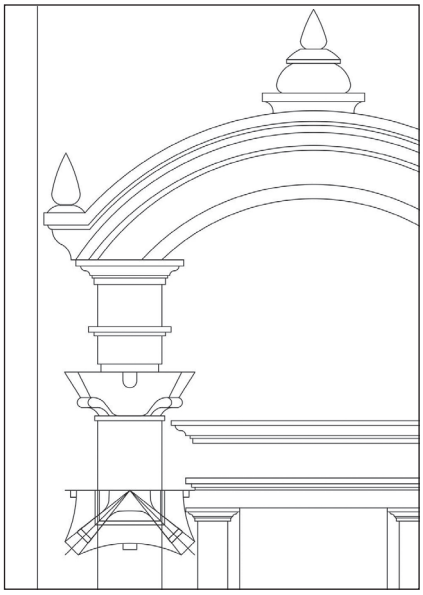
The cornice of the round shape arch consists of: a fillet, cyma reversa, fillet, dentils, fillet, fascia and a fillet.



21. The Renaissance Tomb.



22. The Renaissance Tomb left side detail.

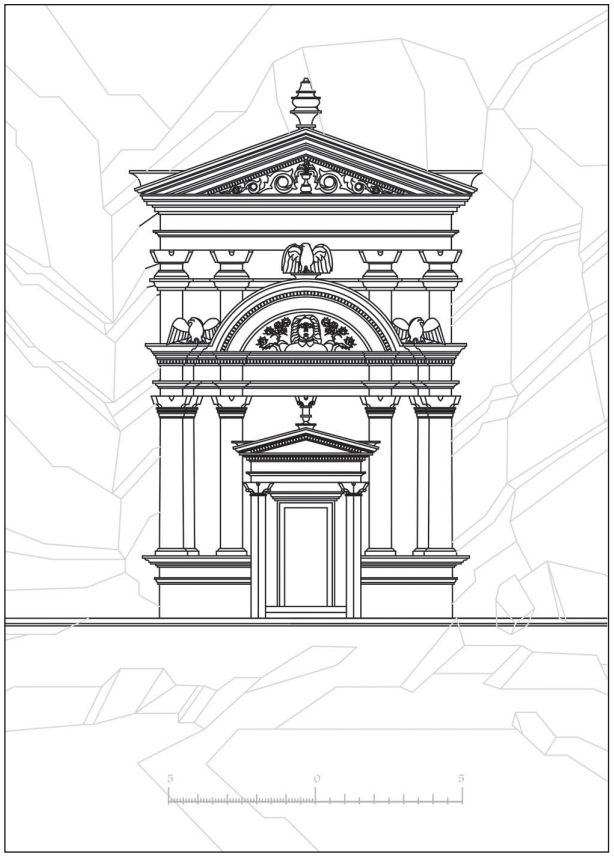


23. The Renaissance Tomb main entrance left side detail.

The cornice of the lower entablature consists of the following details, from top to bottom: a fillet, cyma reversa, three fillets of different heights, cyma recta, dentils, fillet, fascia, fillet, cyma reversa, fillet and a fascia (**Fig**.**26**).

The entrance pediment cornice consists of: a fillet, cyma recta, two fillets of different heights, dentils and a fillet. The plastic structure of the entrance entablature consists of three fillets of different heights, dentils, fillet, fascia, fillet, cyma reversa, fillet and a fascia. The entrance frame consists of a fillet, cyma recta and 2 fillets (**Fig**. **27**).

The cornice of the pedestal has the following details from top to bottom: a fillet, cyma reversa, three fillets of different heights, fascia, fillet, cyma reversa, and a fillet (**Fig**. **28**).

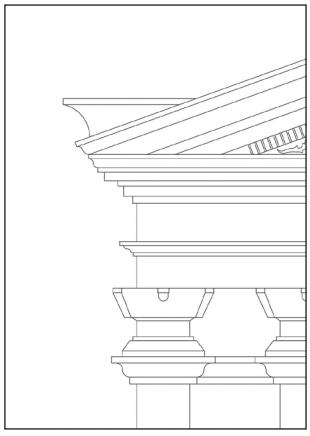


24. Sextius Florentinus Tomb.

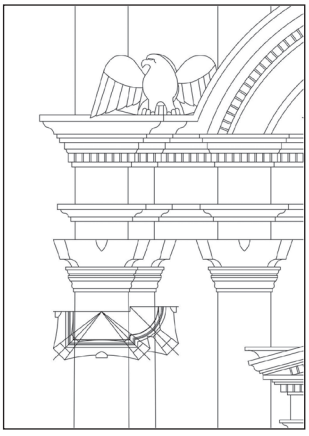
The Cornices of the Silk Tomb

The composition of the facade is typical for portals with a double entablature, but the size and location gives it a special significance in the range of Royal Tombs of Petra (**Fig**. **29**). It is divided into three structural parts. In the first level, four semicircular pilasters with The Nabataean Reverse-frustum Capital Type III support an entablature with a double cornice and an attic. The main entrance has a simple cornice and an architrave, which is supported by two simple pilasters with Nabataean Doric capitals. The second level consists of four dwarf pilaster with the Nabataean Reverse-frustum Capital Type I. The Nabataean Reverse-frustum Capital Type III supports a massive cornice, which refers to the Egyptian style of tombs-pylons. The third upper level consists of a huge attic with Assyrian "crow's steps" and a simple cornice on the top of the portal (**Fig**. **30**).

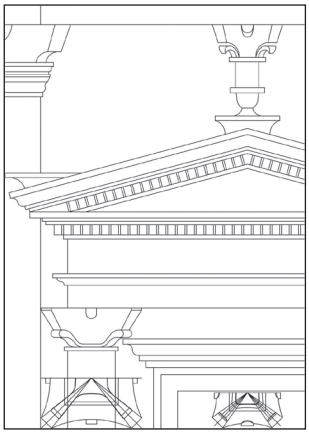
The cornice of the attic consists of the following ornamental details from top to bottom: an ovolo, cavetto, torus, two fascias of different heights, architrave with the dwarf pilaster, fillet, cyma recta, three fillets of different height, fascia, fillet, cyma reversa, fillet and a fascia. (**Figs**. **31, 32**).



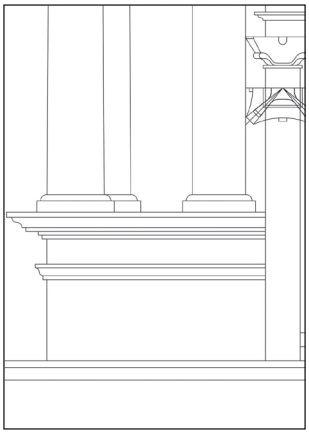
25. Sextius Florentinus Tomb pediment and upper entablature cornices.



26. Sextius Florentinus Tomb lower entablature cornices.



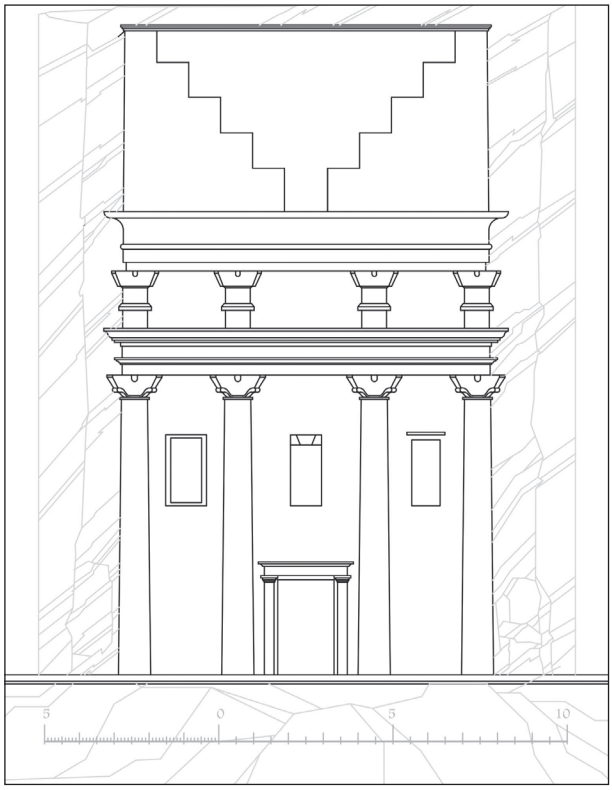
27. Sextius Florentinus Tomb entrance pediment cornices.



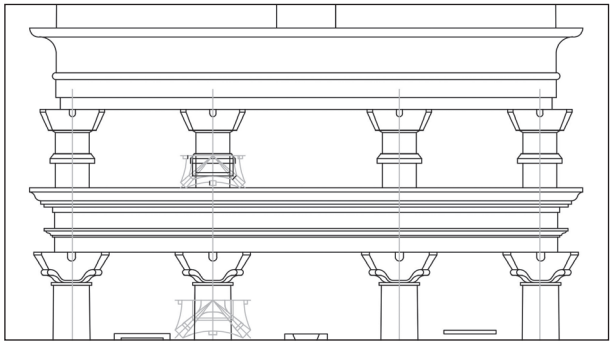
28. Sextius Florentinus Tomb pedestal cornice.

The Cornices of the Urn Tomb

The composition of the facade is a two-level portal on a high plinth. The first order level consists of a pair of "twin" pilasters with a rectangular outer section and a quarter of a circle inner section, with pairs of medium half-columns, crowned by the Nabataean Reverse-frustum Capital Type II, which are supporting the entablature, and divided in four parts by ornamental cornices and an attic with a triangular pediment. Four pilasters are based on a high plinth. The lower frieze of the entablature has, coaxially with the main pilasters, four dwarf pilasters, adorned by reliefs of draped figures. The third level of entablature consists of four dwarf pilasters, crowned by the Nabataean Reverse-frustum Capital Type I. The attic with triangular pediment on top of the portal is adorned by two urns in the center of a tympanum. The main entrance represents a small portal with two pilasters, crowned by the Nabataean Reverse-frustum Capital Type III, an entablature and a triangular pediment. The base of the tomb is located on an arcade construction, according to many scholars, dating to the period of the Byzantine Empire 446-447AD. (**Fig**. **33**).



29. The Silk Tomb. Architectural graphic reconstruction.



30. The Silk Tomb double entablature cornices.

31, 32. The Silk Tomb and Urn Tomb.

The cornice of the attic in the upper level has the following ornamental details in its structure: four fillets of different heights, fascia, three taenias of different heights, fillet, cyma reversa, two fillets and a cavetto. The pediment consists of a fillet, cyma recta and four fillets (**Figs**. **34, 35**).

The cornice of the entablature presents multi leveled ornamental structure. The upper level consists of a fillet, cyma recta, two fillets

33. Urn Tomb. Architectural graphic reconstruction.

and a fascia. The third level consists of three fillets, an attic with dwarf capitals, taenia, fillet, cyma recta, fillet and a fascia. The second level contains a fillet, cyma recta, two fillets, cyma reversa, fillet, dentils fillet and attic with reliefs of draped figures. And the lower level is made up of a fillet, cyma reversa, fillet and a fascia (**Figs**. **36, 37**). The cornice of the pedestal has only five fillets of different heights. The cornice at the entrance pediment has ornamental composition of following details: a fillet, cyma recta, three fillets of different heights, cyma reversa and a fillet. The entablature consist of a fillet, cyma reversa, two fillets of different heights, frieze with triglyphes and round metopes, fillet, cyma recta, fillet and two fascias of different heights (**Fig**. **38**).

The Cornices of the Bāb as-Sīq Triclinium

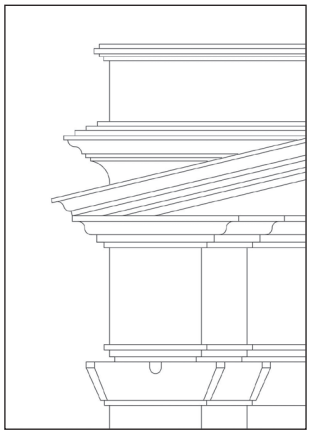
The composition of the portal has two "broken" pediments. Six pilasters with the Nabataean Reverse-frustum Capital Type III support an entablature, large "broken" pediment and an arch in the first level. The top cornice of the "broken" pediment represents a border between lower and upper parts of the portal. The attic of the upper level could be divided in two parts. The lower entablature with six pilasters, crowned by the Nabataean Reverse-frustum Capital Type III, supports an upper entablature with small "broken" pediment and an attic with two pilasters. Each vertical segment of the façade is divided by ornamental detailed cornices (**Figs**. **39, 40**).

The cornice of an attic consists following ornamental detail from top to bottom: a fillet, ovolo, fillet, fascia and attic with a pilaster, fillet, cyma recta, fillet, fascia, fillet, cyma recta, fillet and two fascias of different heights, attic with the dwarf pilasters, four fillets, beveled ovolo, fascia, fillet, cyma recta, fillet and a fascia (**Fig**. **41**).

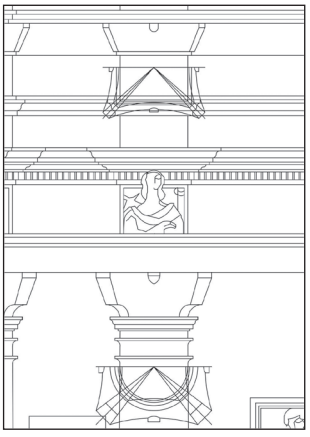
The cornice of the arch shape pediment consists of two fillets of different heights, fascia, fillet and a fascia. The cornice of the "broken" pediment at the upper level has four different heights in its structure. The lower "broken" pediment consists of following details: a fillet, cyma recta, two fillets, beveled ovolo, fascia, fillet, cyma recta, fillet and two fascias of different heights (**Fig**. **42**).

The cornice of the "broken" pediment of the upper level contains two fillets of different heights, cyma reversa, fillet and a fascia (**Fig**. **43**).

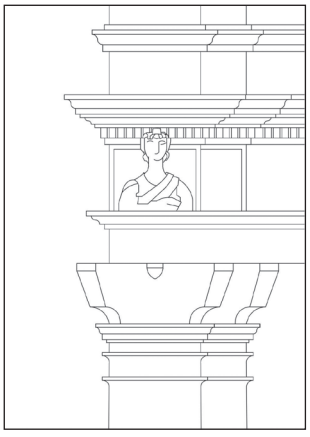
34. Urn Tomb upper tier.



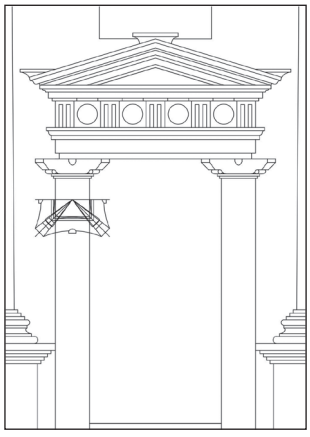
35. Urn Tomb upper storey left detail.



36. Urn Tomb entablature detail.



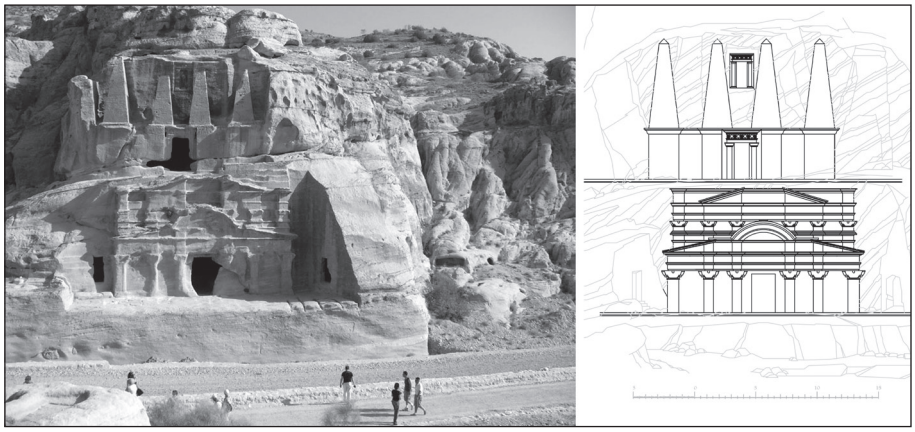
37. Urn Tomb entablature left detail.



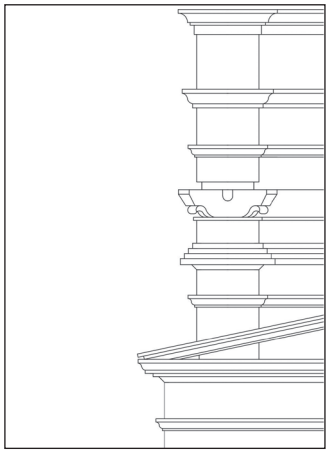
38. Urn Tomb main entrance.

The Cornices of the Palace Tomb

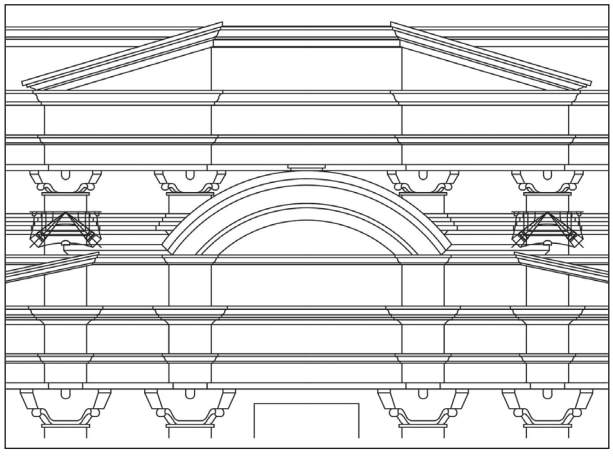
Three-part composition of the Palace Tomb portico consists of two order levels and a huge multi-profile attic (**Fig**. **44**). Twelve pilasters based on high pedestals in the lower level, are crowned by the Nabataean Reverse-frustum Capital Type IV, and support high entablature with triangular pediments in the middle and round shape pediments on the sides. The pediments are on top of the four entrance portals. The entrance portals have their own complex structural and ornamental compositions. The central portals with triangular pediments are broader than the external portals and consist of



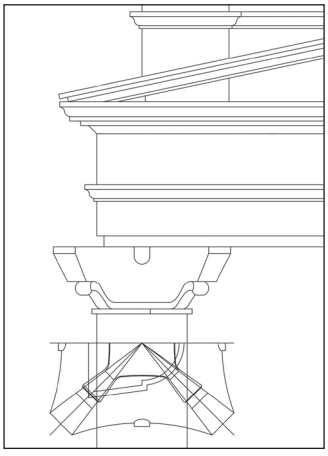
39, 40. Obelisk Tomb (*left*) *and Bāb as-Sīq Triclinium* (*right*).



41. Bāb as-Sīq Triclinium left detail.



42. Bāb as-Sīq Triclinium arch shape pediment.



43. Bāb as-Sīq Triclinium lower storey detail.

44. The Panorama of Royal Tombs from left to right: Palace Tomb, Corinthian Tomb, Silk Tomb, Urn Tomb.

the Nabataean Reverse-frustum Capital Type II. On top of two pilasters with Nabataean pyramidal capitals and an entablature above it. The external round shape portals are narrower than the triangle in the middle, have two pilasters with the Nabataean Reverse-frustum Capital Type I and a double entablature above it. The attic in the middle of the composition is adorned by dwarf pilasters with Nabataean Reverse-frustum Capital Type I.

The second level of the portico has twelve pilasters with half a circle in its cross section, crowned by Nabataean Cupped Capitals, Type I. Each pair of pilasters support one six-leveled entablature with dwarf pilasters on each level. The dwarf pilasters with the Nabataean Reverse-frustum Capital Type I in the attic are coaxial with the higher pilasters. Each horizontal level is bordered by complex ornamentally detailed cornice. The upper third level of the portico consists of seventeen pilasters in the huge attic at the top (**Figs**. **45, 52**).

The top cornice on the third level of the Palace Tomb consists of the following ornamental details from top to bottom: a fillet, cyma reversa, fillet, fascia, two fillets, cyma recta, fillet, and the attic with seventeen plane pilasters.

The composition of the entablature of the upper level consists of four fillets of different heights, cyma recta, four fillets of different height, cyma recta, five fillets of different height, the attic with plain pilasters, taenia, two fillets of different heights, cyma reversa, three fillets, cyma reversa, fillet, fascia, fillet, cyma reversa, fillet and two fascias of different heights.

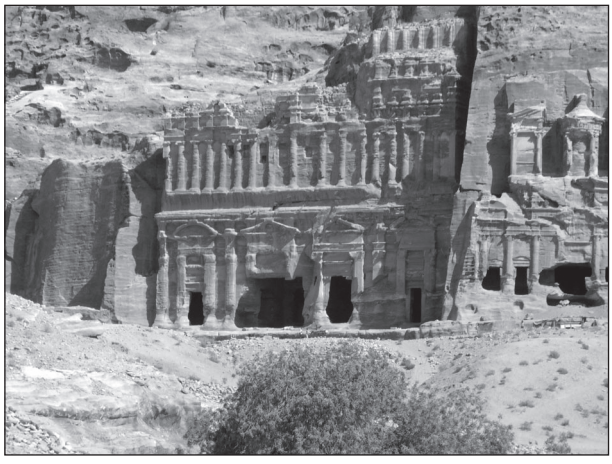
The next lower cornice composition on the third level of the portico has the following details from top to bottom: the attic with dwarf pilasters, crowned by the Nabataean Reverse-frustum Capital Type I, taenia, three fillets, fascia, fillet, cyma recta, two fillets, cyma, reversa, fillet, fascia and the attic with plane pilasters (**Fig**. **46**).

The cornices of the second level entablature consists of the following ornamental details: a fillet, cyma recta, four fillets of different heights, fascia, fillet, cyma recta, two fillets, two fascias and the attic with pilasters, crowned by Nabatean Cupped Capitals (**Fig**. **47**).

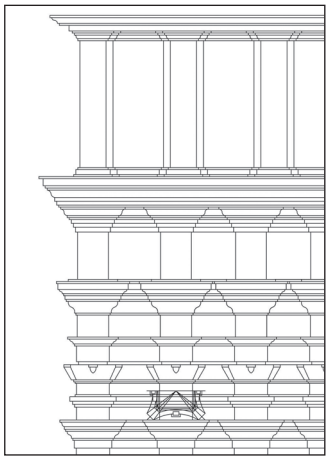
The cornice of the first level entablature consists of a taenia, fillet, cyma recta, fillet, cyma reversa, three fillets of different heights, dentils, fillet, attic, fillet, cyma recta, two fillets, and two fascias. The cornice of the round shape pediment contains the following ornamental details: a fillet, cyma recta, fillet, cyma reversa, fillet, dentils and a fascia (**Fig**. **48**).

The composition of the external entrance portals has a ery complex ornamental structure; fillet, cavetto, cyma recta, four fillets of different heights, beveled ovolo, the upper attic, fillet, cyma recta, fillet, the attic with dwarf pilasters, fillet, cyma recta, three fillets of different heights, beveled ovolo, fascia, fillet, cavetto, cyma reversa and two fascias (**Fig**. **49**).

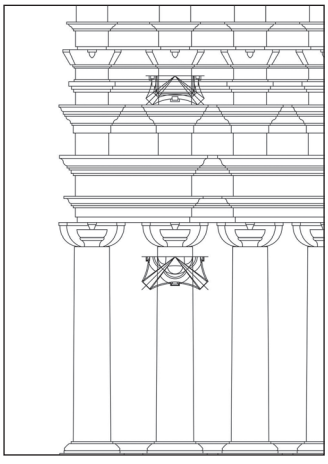
The cornice of the triangular pediment has the following details: a fillet, cyma recta, three fillets, dentils and a fascia (**Fig**. **50**). The portals of central entrances consist of the following details in their structure: a fillet, cavetto,



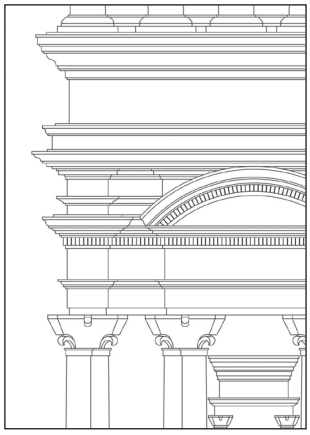
45. Palace Tomb.



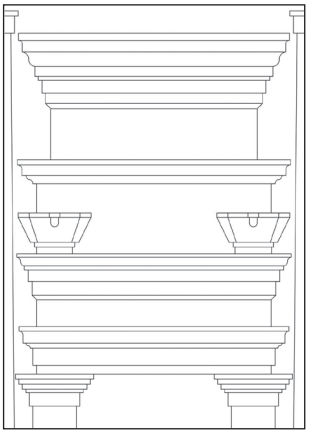
46. Palace Tomb cornices of the attic, upper, third and second entablatures.



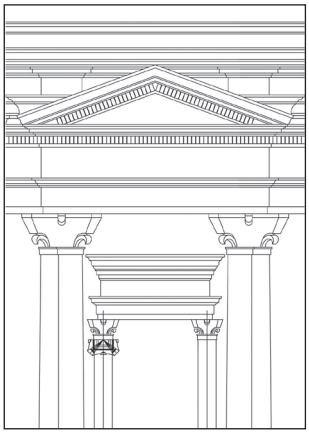
47. Palace Tomb cornices of the third and second entablatures.



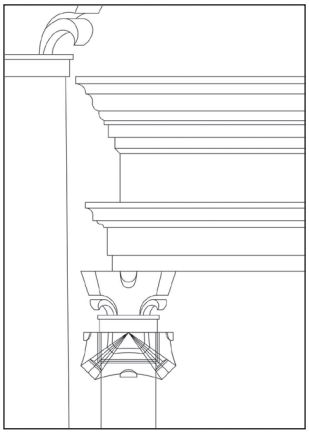
48. Palace Tomb first level cornice.



49. Palace Tomb external left portal cornice.

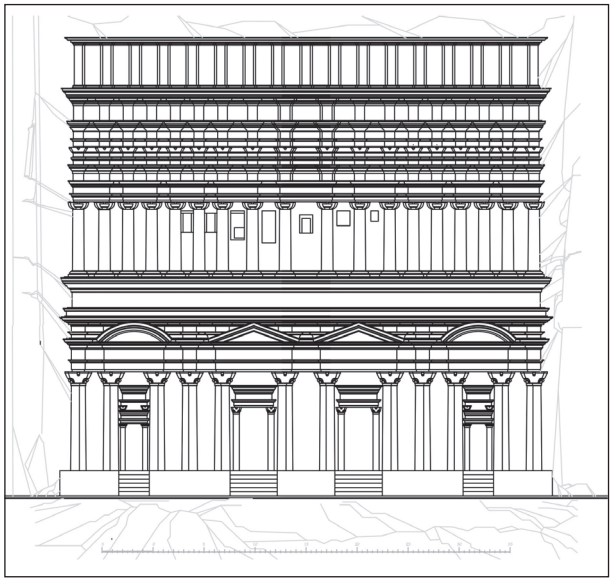


50. Palace Tomb central pediment cornice.

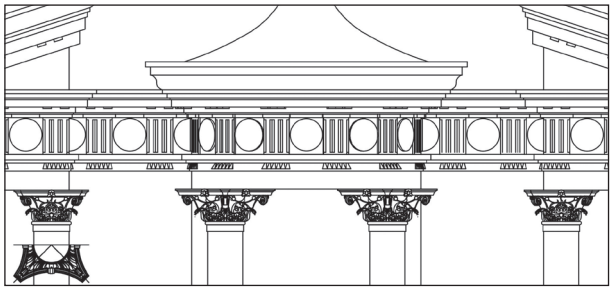


51. Palace Tomb central portal cornice.

cyma recta, ovolo, three fillets of different heights, beveled ovolo, fascia, fillet, cavetto, cyma reversa and two fascias (**Fig**. **51**). The next three porticoes are part of the Corinthian Tomb, ad-Dayr and the Khazneh al Fir'un, and have a unique structural and ornamental composition in their facades that is not only rare in Petra, but in the whole world of rock carved architecture (**Fig**. **54**).



52. Palace Tomb. Architectural and graphic reconstruction.



53. Corinthian Tomb frieze of "broken" pediment and tholos.

The Cornices of the Corinthian Tomb

The portico of the Two-part composition of the Corinthian Tomb consists of a lower order level with six pilasters and an entablature with a "broken" pediment on top, and an upper order level with two pilasters and a "broken" pediment on the sides and around the tholos in the center (**Fig**. **53**). Eight pilasters of the lower level have a cross section of a semicircle, crowned by the Nabataean Corinthian Capitals, Type II, which are based on a high pedestal and support a three-part entablature. The external pilasters have coaxial dwarf pilasters on the upper attic. The two inner pilasters support one entablature and the two central pilasters support another entablature with a round shaped pediment on top. The middle level attic consist of eight dwarf pilasters with the Nabataean Corinthian Capitals, Type I, of which the central four support a "broken" pediment, and external pairs support one attic with an ornamentally detailed cornice. Two niches from the left sides have triangular

54. Palace Tomb and Corinthian Tomb.

and round shaped pediments, based on pilasters with the Nabataean Doric capitals. The main entrance portal has a composition of two pilasters with the Nabataean Doric capitals and an entablature with a cornice in its structure.

The two pilasters with the Nabataean Corinthian Capitals, Type II of the second order level support an entablature with triglyphs and metopes on the frieze and a "broken" pediment

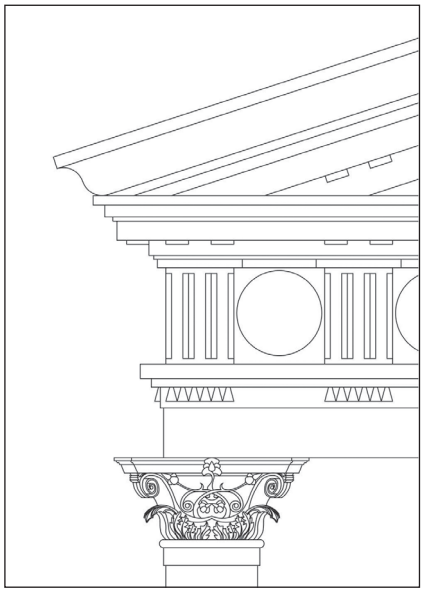
55. Corinthian Tomb. Architectural and graphic reconstruction.

from both sides of the portico. The four pilasters of the round tholos consist of of Nabataean Corinthian Capitals, Type II, Support an entablature, similar to the external ones. The single Nabataean Corinthian Capitals, Type II with the urn on top, crowns the round roof of rotunda (**Figs**. **55, 61**).

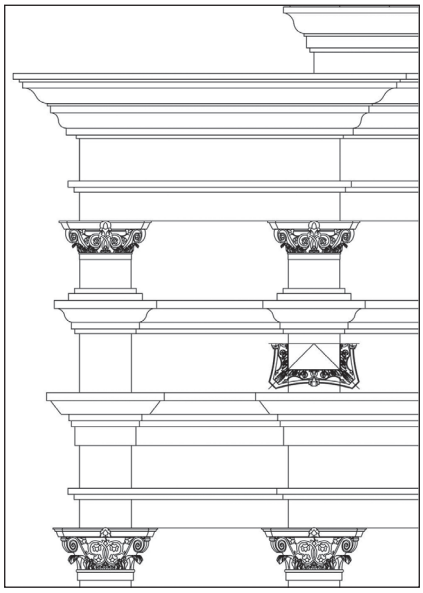
The cornice of the upper "broken" pediment consists of the following details: a fillet, cyma recta, two fillets of different heights, fascia with mutules and a fascia. The composition of the entablature on the upper level has the following ornamental details in its structure: three fillets of different heights, fascia with mutules, fillet, frieze with triglyphes and round metopes, taenia, regula with guttae and a fascia (**Fig**. **56**).

The cornice of the attic on the lower level consists of a fillet, cyma recta and three fillets of different heights. The composition of cornices at the lower level has the following ornamental details from top to bottom: three fillets of different heights, cyma recta, two fillets, cyma recta, two fillets, fascia, two fillets, fascia, an attic, with dwarf pilasters, crowned by Nabataean plant capitals, two taenias, fillet, cyma recta, two fillets, fascia, fillet, beveled ovolo, three fillets of different heights, fascia, two fillets and a fascia (**Fig**. **57**).

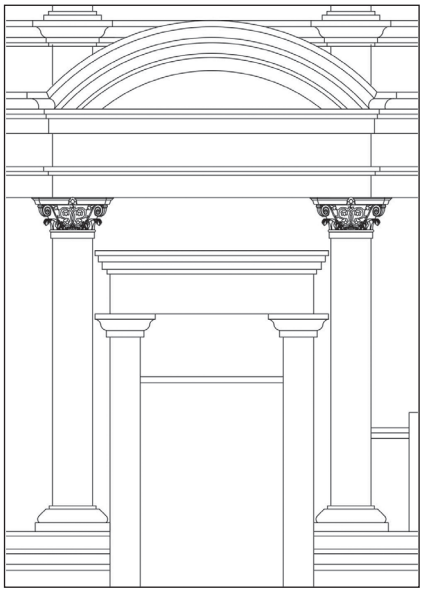
The cornice of the arch shaped pediment is made up of a fillet, cavetto, fillet, cyma reversa, fillet and a fascia. The entablature of the main entrance portal composition consists of four



56. Corinthian Tomb "broken" pediment cornices.



57. Corinthian Tomb lower tier cornices.



58. Corinthian Tomb main entrance.

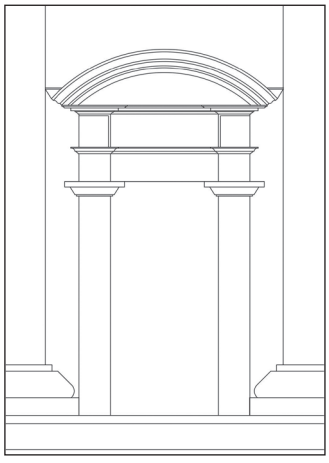
fillets of different heights and an attic (**Fig**. **58**).

The cornice of the pedestal has a fillet, cyma reversa and three fillet of different heights in its structure. The triangular pediment cornice of the external niche portal composition consist of a fillet, cyma recta and four fillets of different heights (**Fig**. **59**).

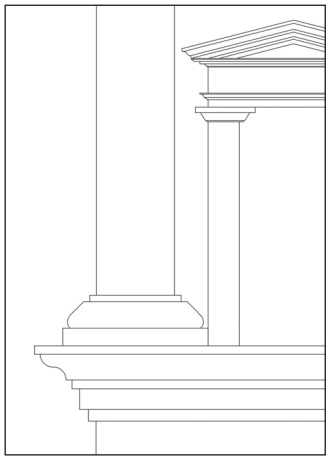
The entablature is divided into the following ornamental details from top to bottom: a fillet, cyma reversa, fillet, syma reversa, fillet, attic, fillet, ovolo, cyma reversa and a fascia (**Fig**. **60**).

The Cornices of ad-Dayr

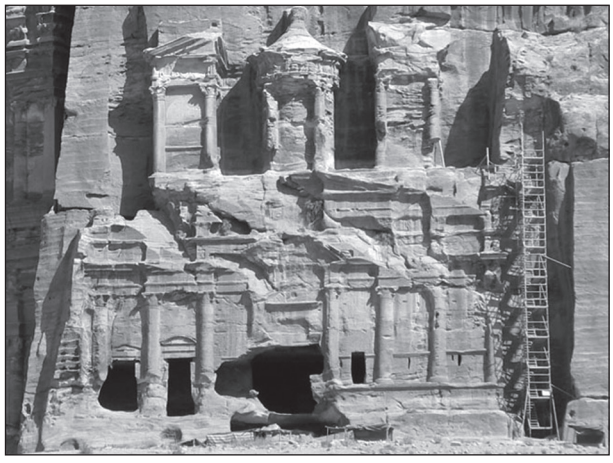
The Two-part composition of ad-Dayr portico is similar to the Corinthian Tomb façade. The lower order level has eight pilasters and an entablature. The upper order level has three pilasters and "broken" pediment on the sides and a round tholos in the center. In the lower level, the first and third pilasters from the sides have a rectangular outer section and an inner section in the form of a quarter of a circle and crowned by Nabataean twin Cupped Capitals, however the second and forth pilasters are semicircular in cross section and crowned by a single Nabataean Cupped Capital (**Figs**. **62, 63**). The external two pilasters and two pilasters in the middle support one entablature. The other two single pilasters have coaxial dwarf pilasters and together with the entablatures are crowned by one detailed cornice. There are niches with pairs of pilasters crowned by Nabataean Doric capitals, which support the round shape pediments between two external pilasters of the first level. The main entrance portal consists of two pilasters with Nabataean Doric capitals, entablature and a triangular pediment with an urn on top.



59. Corinthian Tomb arch pediment entrance.

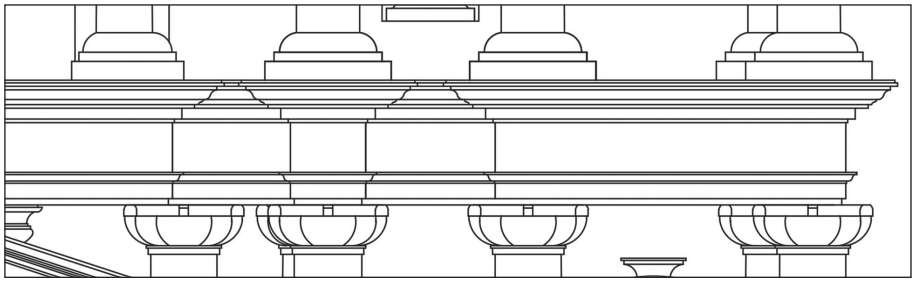


60. Corinthian Tomb pedestal cornice.



61. Corinthian Tomb.

62. ad-Dayr lower tier cornice.



63. ad-Dayr lower tier cornice. Architectural graphic reconstruction.

In the upper level of the external single pilaster, crowned by the Nabataean Reverse-frustum Capital Type II, sits coaxial dwarf pilasters with an attic and a cornice on top. The next two pilasters support an entablature and a "broken" pediment. A round tholos is based in the center of the composition, crowned by single Nabataean Reverse-frustum Capital Type IV with an urn on top. The frieze of the dwarf pilasters, entablature of the "broken" pediments, and the tholos, are adorned by trygliphs and round metopes. The two external niches of the upper level consist of pilasters with Nabataean Doric capitals and a cornice. The two pilasters of the central niche support an entablature with double cornices (**Figs**. **64, 65**).

The cornice of the "broken" pediment of the Deir portico consists of a fillet, cyma recta, three fillets of different heights, fascia and a fillet. The cornice of the attic has the following details: two fillets, cyma recta, three fillets, cavetto and a taenia. The entablature of the upper level consists of the following ornamental details from top to bottom: a fillet, cyma recta, cyma reversa, two fillets of different heights, fascia, frieze with triglyphes and round metopes, fillet, cyma reversa, regula with guttae, an architrave and a fascia (**Figs**. **66, 69**).

The central niche cornice of the upper order contains a fillet, cyma recta, two fillets of different heights, fascia, fillet, cyma recta and a fascia (**Figs**. **67, 70**).

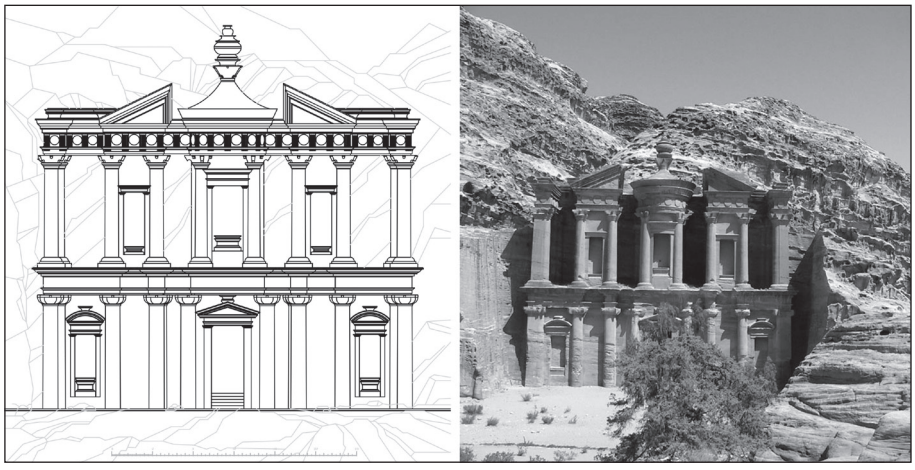
The cornice of the lower level consists of the following ornamental details from top to bottom: three fillets, cyma recta, cyma reversa, three fillets of Different heights, architrave, fillet, cyma recta, fillet and two fascias (**Fig**. **71**).

The external niche cornice of the round shape pediment consists of a fillet, cyma recta and five fillets of different heights. The entablature consists of two fillets, cyma recta, two fillets, architrave, fillet, cyma recta, fillet and two fascias. The cornice of the triangular pediment of the main entrance contains a fillet, cyma recta and five fillets of different heights.

The entablature consists of the following ornamental details: a fillet, cyma recta, two fillets, architrave, fillet, cyma recta, fillet and two fascias (**Figs**. **68, 72**).

The Cornices of al-Khaznah

The lower part of the two-part composition of al-Khaznah portico is similar to the classical Greek order structure of the Hexastyle. The



64, 65. ad-Dayr. Site view and architectural and graphic reconstruction.

66. ad-Dayr upper detail.

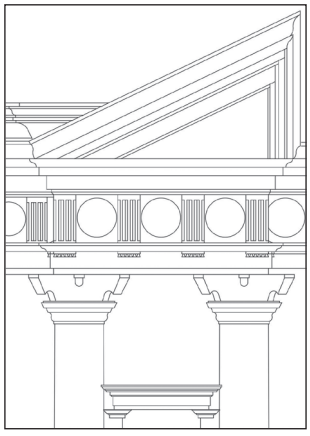
67. ad-Dayr upper part.

68. ad-Dayr main entrance.

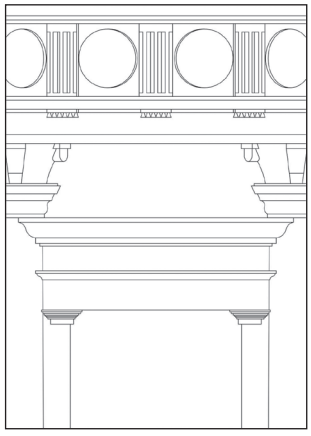
space between the two round external pilasters, crowned by the Nabataean Corinthian Capitals, Type III, is filled bz bridles of horses (Castor and Pollux). The two central columns with the Nabataean Corinthian Capitals, Type III denote the entrance to the tomb. Both, the pilasters and the columns, are based on a pedestal with a cornice and supports an entablature with triangular pediment on top. The frieze of the first level is decorated with sirens, local Fig tree plants and calyxes portrayed as examples of ornamental plastic details. The side pilasters are coaxial to the main pilasters and portrays a head of a Gorgon in the attic, crowned by acroterias with lions. The tympanum of the pediment has a relief of an eagle in the center and Iris flowers around it. The pediment has an acroterias with a plant relief on the sides and the symbol of the Goddess Isis on top.

The upper order level consists of a "broken" pediment on the sides and a tholos in the center, supported by pilasters with Nabataean Corinthian Capitals, Type II. The two external pilasters of the upper level are crowned by Nabataean plant capitals and support an entablature and "broken" pediments. The six round pilasters in the center support the round roof of the tholos with Nabataean Corinthian Capitals, Type II with an urn on top. The frieze of the "broken" pediments and tholos consists of a relief of local oak acorns, grapes and figs. Six sculptures of Amazons between the pilasters and acroterias, with eagles on the "broken" pediment edges, complete the whole ornamental and plasticity composition of the portico (**Figs**. **73, 74**).

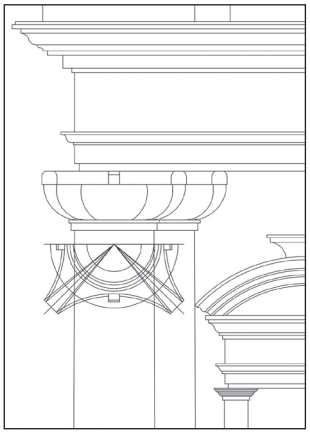
The cornice of the "broken" pediment consists of two fillets, cyma recta, seven fillets of different heights, dentils and a fillet (**Figs**. **75, 76**). The entablature of the "broken" pediment and tholos consists of the following ornamental



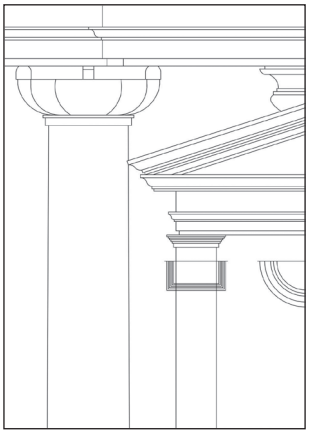
69. ad-Dayr "broken" pediment cornice.



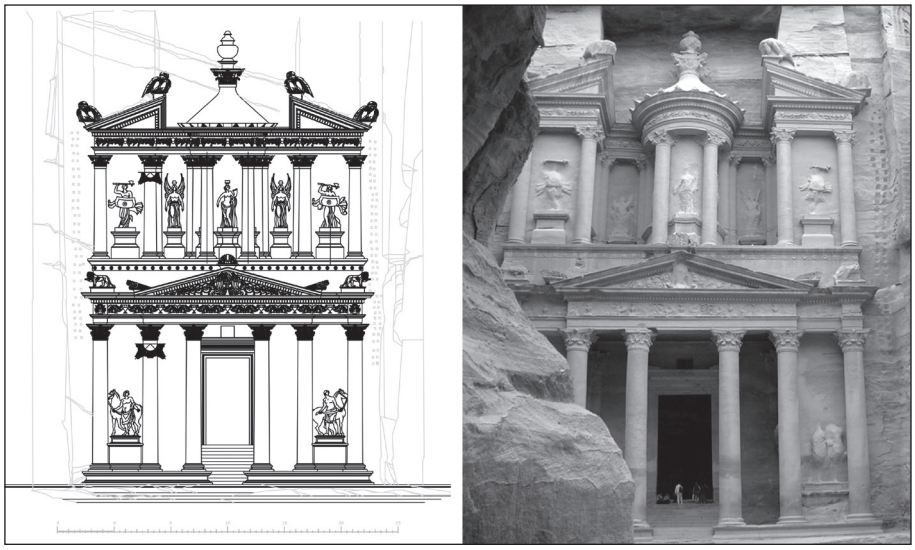
70. ad-Dayr upper tier central niche cornice.



71. ad-Dayr lower tier cornice.



72. ad-Dayr main entrance.

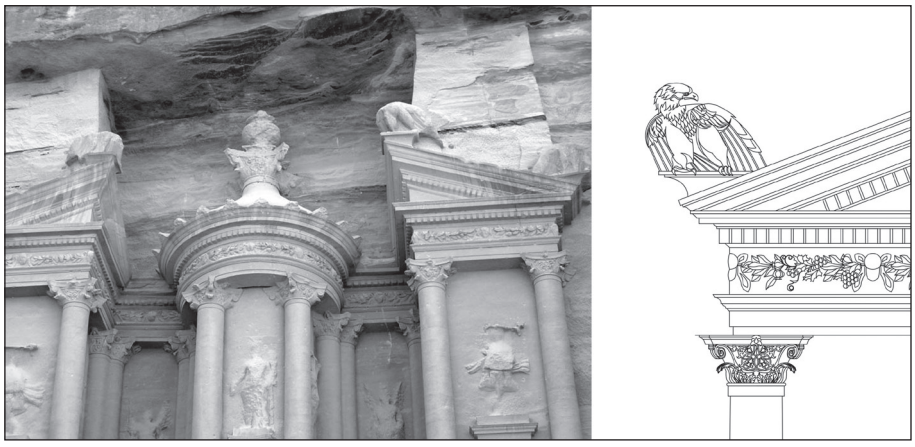


73, 74.al-Khaznah .

details from top to bottom: a Fillet, syma recta, fillet, ovolo, fillet, dentils, beveled ovolo, frieze with local plant ornaments, fillet, cavetto, cyma recta, fillet and two fascias (**Figs**. **77-79**).

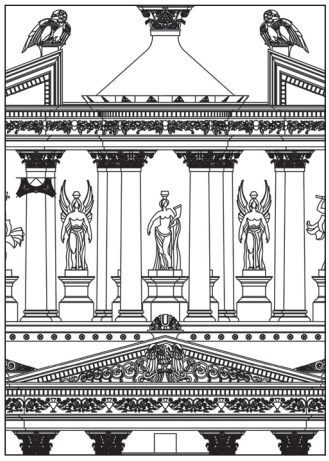
The entablature of the lower level has the following ornamental details from top to bottom: a fillet, cyma recta, four fillets of different heights, cyma reversa, fillet, dentils, fillet frieze with Gorgon heads, griffins and figs, fillet, cyma recta, fillet, cyma reversa, an architrave and a fascia.

The cornice of the main triangular pediment consists of a fillet, cyma recta, three fillets of different heights, dentils and a fillet (**Figs**. **80, 81**).



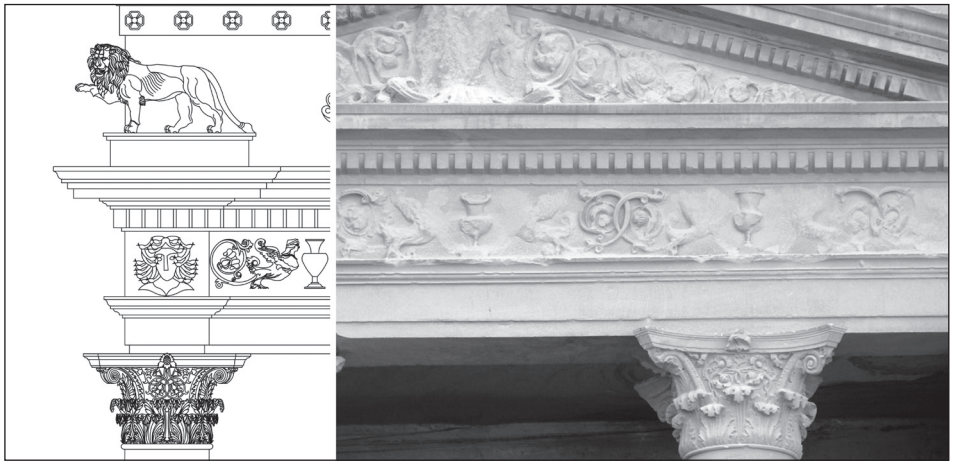
75, 76. al-Khaznah. The "broken pediment" cornice and upper level entablature.

77. al-Khaznah. Upper entablature.

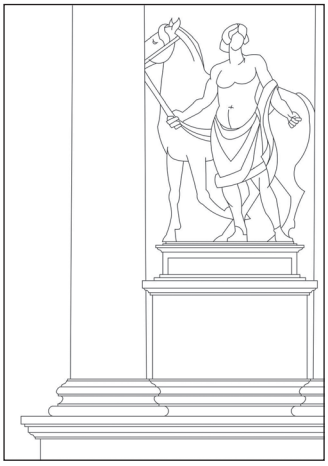


78. al-Khaznah. Upper level detail.

79. al-Khaznah. Tholos and lower pediment cornices.



80, 81. al-Khaznah. Lower tier entablature.



82. al-Khaznah. Pedestal cornice.

The cornice of the pedestal consists of three fillets of different heights, cyma reversa and a fillet (**Fig**. **82**).

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THE CLASSICAL ORDERS IN THE ROCK FAÇADES OF PETRA ARCHITECTURE AND GRAPHIC RECONSTRUCTION

Anna K. Kudriasheva

Abstract

Tomb façades, carved into solid rock massifs, represent an architecturally processed part of the natural mountain landscape of Petra. Its specific composition is accentuated by the scale of the entire Petra ensemble. On the other hand, as an ornamental texture cut into a virgin rock surface, the façades of this monumental gallery provide valuable compositions in plasticity. The present article discusses this subject matter.

Graphic reconstruction was carried out in 1994-95 by the author using existing photogrammetric documentation of monuments. She surveyed façades *in situ* taking new measurements on the spot and included separately preserved architectural fragments.

The architectural graphic reconstruction aims at recreating the original view of the Petra rock carvings, now destroyed by erosion and earthquakes, on large-scale orthogonal drawings. The replenishment of missing fragments in accordance to the theory of the restoration of architectural monuments and the requirement for graphic reconstruction was carried out in analogy to existing material.

Architectural drawings of twelve monuments were made in congruent scale, with all the details of structural and ornamental order plasticity and, for the first time, represent a single series of their dimensional, typological, proportional, and new terminology ratio.

Key Words

Petra, Nabataean classical façades, architectural reconstruction, architectural ornamental plasticity, Nabataean order.

The Typology of Petra Rock Carved Façades.

The plasticity typology of Petra rock carvings varies depending on the cultural influences under which the Nabataean kingdom was at different periods. Their unique pattern as a whole can be generalized into a phenomenon such as the local Nabataean style.

Most of the rock pre-classical order structures are called tomb-pylons, the origin of which researchers refer to the period of conquest of the region of Petra by Assyrians. The earliest pylon tombs dating around the 7th-4th centuries BC are of a smooth surface, the upper part of which is decorated by a primitive cornice with a hemisphere profile and an attic with a strip of flat pyramid-stepped ornament, or "crow's steps". In the lower part of the pylon is an entrance opening into the space.

The trade relations of the Nabataeans with the North states of Africa, in particular Egypt, also left their mark in the plasticity of rock carvings. There was Egyptian type of pylon tombs, which is characterized by a cornice with the Egyptian cavetto fretwork. The period of construction ranges between 3rd century BC and 1st century AD.

The influence of ancient Greek and Roman cultures on the Petra region had an effect on the character of Nabataean architecture. The rock carvings of this time are the most vivid and a perfect phenomenon of the Nabataean style. The following examples of Nabataean portals and Classic Nabataean portals and porticos, more precisely façades, representing varying degrees of rock carving compositions.

Nabataean portals are the frontal compositions with elements based on the classical order,

and marks the only central entrance to the tombs due to the ritual and sacred purposes (**Fig. 1**).

Nabataean portals with a double cornice supposedly dated to the period from the 2nd century BC to the 4th century AD. Portals with an attic supported by an entablature, consists of a cornice with a fillet, and a smooth strip of frieze and an architrave. The lower cornice, being richer in composition due to classical profiles, than the upper one, is supported by two pilasters with Nabataean Reverse-frustum Capitals. As for the processing of the lower part of the façade, due to certain time periods, the main space between the pilasters consists of an entrance composed of a pediment and acroteria on top. There were examples of a second smaller portal inside a portal, where a simple cornice rested on two pilasters framing the doorway with pyramidal capitals. This type of rock carvings is distinguished by the appearance of the pilaster base and the façade attic, decorated with a narrow cornice with classical profile details (**Fig. 2**).

Nabataean Portals with a Double Entablature

In earlier portals of this type, the upper entablature, completed by a cornice with a cavetto, supports the attic, The lower one, with a complex profiled cornice, rests on two pilasters with four capitals, clearly reminiscent of the Doric order, in the form of inverted flat truncated pyramids, and a developed neck. In the next level, the entablature of the lower order tier is supported by four pillars, of which two external ones exist as double pillars, with a rectangular ross-section on the outside and a quarter of a circle on the inner side, and end with double capitals. Unlike the previous types of façades, the period of construction of the portals with a double entablature are known.; 40 to 70 decades AD and coincides with the construction of the Corinthian Tomb and the Bāb as-Sīq Triclinium, which are vivid examples of the discussed type of Petra rock carving façades (**Fig. 3**).

Nabataean classical portals, are the frontal ordered structural compositions, with a single central entrance. A type of rock carving that is witnessed in a large number of order compositions in Petra.

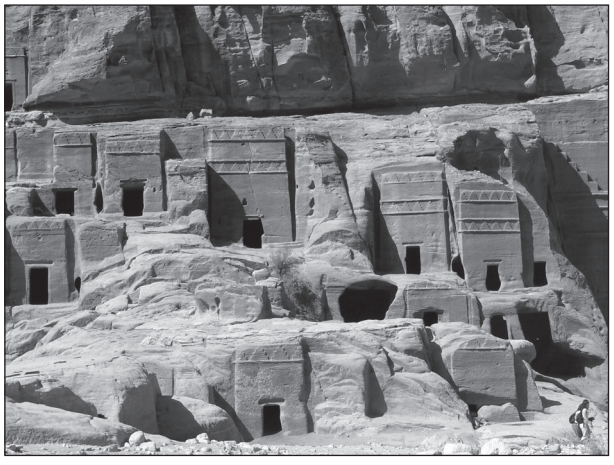
Nabataean classical porticos are the frontal ordered structural compositions with one or several ordered levels topped either with a pediment, or a "broken" pediment and a circular Tholos in the middle. In rare cases, the pediment of the portico is replaced by a multi-leveled ordered attic. In the lower part of the façade is one more entrance to the tombs, related to ritual and sacred purposes.

Nabataean classic type of portals and porticos, which includes twelve objects with the most expressive order compositions, can be conditionally divided into three groups:

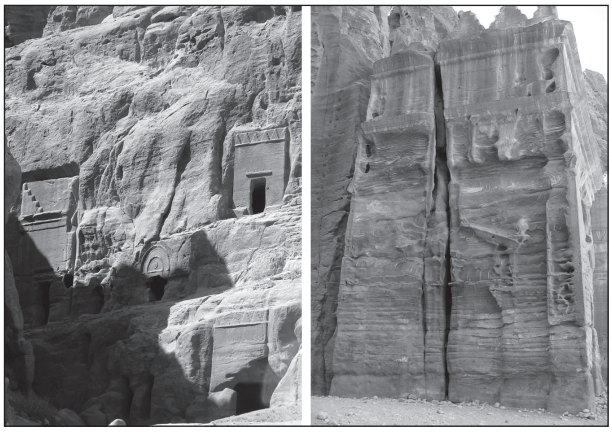
The first group consists of portals with the most expressive order of ordered elements built during the 1st century BC to the 1st century AD. This group includes the Broken Pediment Tomb, Roman Soldier Tomb, Lion Triclinium and Renaissance Tomb.

The second group consists of rock carved façades, erected during the 1st century BC to the 1st century AD and includes The Sextius Florentinus, Silk and Urn Tombs.

The third group consists of five façades, whose magnitude and plastic personality puts



1. Nabataean portals.



2, 3. Nabataean portals with double cornice and double entablature.

them in the most significant rock carved façades of Petra. This group includes Bāb as-Sīq Triklinium, Palace Tomb, Corinthian Tomb, the ad-Dayr and al-Khaznah. These structures date back to 1st century AD.

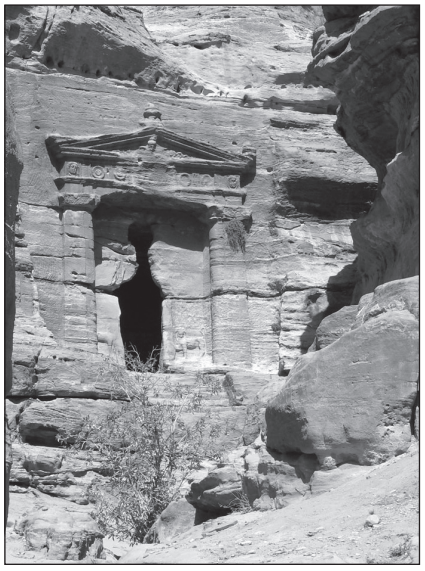
Twelve of the most significant rock order portals and façades of the Petra mountain range according to their distribution along the Wādī Mūsā and its branches are represented by drawings of the author's graphic reconstruction and are analyzed to illustrate the element features of their structural, ornamental plasticity, thematic decoration, and order composition as a whole. These include the Bāb as-Sīq Triklinium, al-Khaznah (al-Khaznah), the Broken Pediment, the Renaissance, the Roman Soldier and the Sextius Florentinus Tombs, the Lion Triclynium (**Fig. 4**), the Urn (**Fig. 5**), Silk, Corinthian (**Fig. 6**), and the Palace Tombs (**Fig. 7**). The ad-Dayr and al-Khaznah are presented through drawings of the author's graphic reconstruction and are analyzed according to the element features of their structural, ornamental plasticity, thematic decoration, and order composition as a whole (**Figs. 8-13**).

The System of Carving Petra Rock Façades

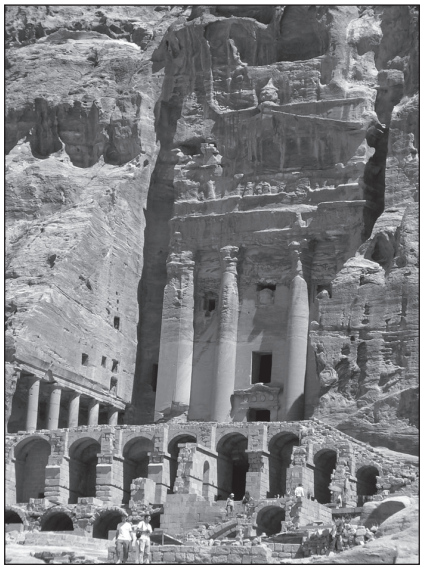
In general, the plasticity features of the order façades of Petra are connected to the technique of their rock carving in the direction starting from top and reaching the bottom. There could not be any analogies to construction machines of the ancient time, Their construction requires a large number of high-altitude forest, which in this region did not exist. The idea of a system for cutting down the rock façades of Petra leads to the examination of several types of unfinished tombs, which facades clearly show two methods for processing rock massifs.

Stepwise Rock Carving

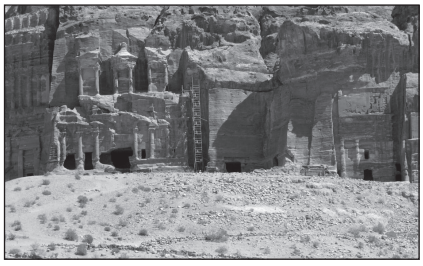
On a selected section of the rock, the surface of the highest horizontal division of the future façade was cleaned and leveled. The lower untreated part of the natural rock massif represented working platform of the levels above.



4. Lion Triclinium.

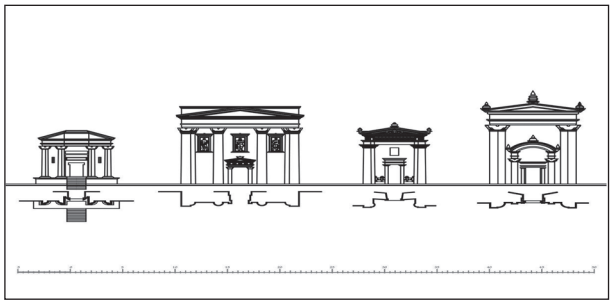


5. Urn Tomb.

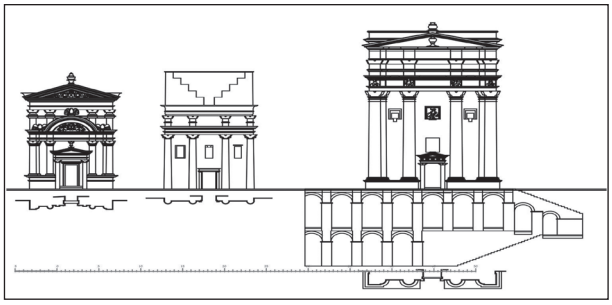


6. Corinthian and Silk Tombs.

7. Palace Tomb.



8. Broken Pediment, Roman Soldier Tombs, Lion Triclinium Renaissance Tomb.

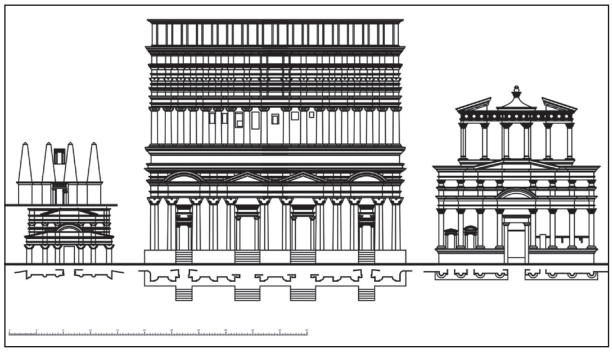


9. Sextius Florentinus, Silk and Urn Tombs.

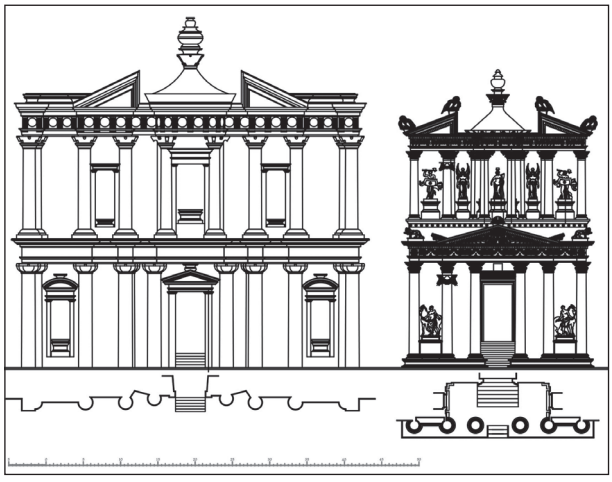
The next stage was the vertical and horizontal marking of parts and elements, presumably with the use of a plumb, and directly stone cutting from top to bottom. The process of "bringing down" of subsequent lower levels, two or several horizontal divisions occurred in reverse to the previously mentioned erection sequence. Presumably, this method was used to create the façades of the Silk, Urn and the Palace tombs. The consequence of such non-simultaneous step-by-step surface treatment was a violation in the alignment of vertical parts, which is especially evident on the façade of the Palace Tomb. The Unfinished Tomb in Petra is a unique example and evidence of stepwise rock carving (**Fig. 14**).

Levels Rock Carving

This technique required a previous cleaning and leveling of the rock geological layer to the height of the future façade or the height of the upper order level in a multi-leveled composition of the façade. On the lower untreated part of the natural mass, a construction platform was built with monolithic masonry work. On the upper levels a vertical and horizontal marking of large elements of the order was made. When the stone-cutting work is finished, abiding by the top to bottom method, the monolithic masonry of the construction platform was disassembled. When building a multi-leveled façade, this operation was repeated as many times as required for processing each tier. This method



10. Bāb as-Sīq Triklinium, Palace and Corinthian Tombs.



11. ad-Dayr and al-Khaznah.

12. ad-Dayr.

13. al-Khaznah (the Treasury).

14. Stepwise rock carving.

of operation is typical for rock carvings with a relatively developed order composition and a complex structural and ornamental plasticity. It can be assumed that the façades of the Sextius Florentinus, Roman Soldier and Broken Pediment tombs, as well as the Lion Triklinium, the multi-tier compositions of al-Khaznah, Corinthian Tomb, the ad-Dayr and Bāb as-Sīq Triclinium, were carved from top to bottom by this method. An example of this method are markings of an unrealized façade in the rock mass opposite to al-Khaznah (**Fig. 15**).

The dimensional proportions of the major parts and the overall dimensions of the Nabataean classical portals and façades of Petra, gives a reason to assume that during their cutting a certain system of proportionality was used. A system that, by unknown means, is integrated in masonry work from top to bottom, only possible with the help of a hemp dimensional rope and nodes. This led to multiplicity in all façade dimensions along the vertical and horizontal directions, based on a single module which is the diameter of a column or a semi column in the lower order level. Unlike the invariable canonical order systems, the system of proportional ordering of Petra's façades was flexible. The composition of each façade was clearly proportioned directly „in place", and was determined by the outline and size of the mountain fragment intended for architectural processing. Such freedom from the proportional ratio of elements established by the canonical orders and the classical system, led to numerous variations in the order allowed for the manipulation of façade compositions, processed on any size of a rock massif. This however, depends on the selected area of a landscape.

15. Levels rock carving.

The methods of non-synchronous processing of the levels of Petra rock carvings inevitably led to the transformation of stylistic and plasticity of their details. When processing the surfaces of a structure, its details were made in parts, from the upper tier of the architectural composition to its lower tier.

At the beginning and middle of the work, most of the dimensions of the future structure were a rough rock massif. For a long period of work on the porticoes of the Urn or the Palace Tomb, the style and plasticity drawing of architectural details inevitably changed from the upper zones of the general composition to the lower ones.

It is possible that during the time of processing one façade, ideas, traditions, masters, and schools changed, which resulted in the distinctive principle of the Nabataean style: the principle of collateral combinations of order elements, free of tectonic logic.

And strangely enough, such logical inconsistency of asynchronous plasticity elements of different levels, a possible disruption of alignment, coarseness of the details as a whole, impart improvisational spontaneity to the rock carved façades of Petra, ornaments inspired by classical orders, and at the same time, the monumentality and timeless character, are all part of the unique Nabataean style.

Elements of Structural and Ornamental Plasticity of the Rock Portals and Porticos of Petra

Structural plasticity of Petra's rock fronts play a major role in their order composition, which in the canonical architectural order exist as an entablature array, horizontal blocks of architrave, frieze and cornices, cornice rods that limit the tympanum, pilasters and columns. The array of concepts of structural plasticity includes order details such as triglyphes and metopes in the friezes of the Doric order, echinus and abacus of Doric capitals, echinus, volutes and balusters of ionic capitals, figured abacus, twin beams of volutes and tiers of acanthus leaves of Corinthian capitals.

Ornamental Plasticity

Ornamental plasticity consists of decorations such as moldings of cornice rods and balusters, echinus and scroll details of Corinthian capitals

The motifs of traditional Greek and Roman ornaments, such as ionics and palmettes, are limited in the ornamental plots of the façades of Petra. Typical plant motifs are images of Arab acanthus, or *Onopordum Anisacanthum*, which differs from the Mediterranean one by more articulated leaf shape, and the symbol of this region, the black iris or *Iris Petrana* in the form of a blossoming flower or bud. The acanthus leaf is present in all types of Corinthian capitals, garlands, as well as stylized branches of trees and fruits such as figs and grapes on the friezes and *tympana* of al-Khaznah, along with large scaly acanthus that takes the place of a flower rosette in the capitals of the lower tier of its portico. The blossoming irises play the role of rosettes on the *abaci of* Corinthian plant capitals and, together with the buds and twirled stems, represent the elements of their relief ornaments.

The Capital

The capital is the most distinct part of an architectural order. The characteristic plasticity forms of the Doric, Ionic and Corinthian capitals of Greece and Rome are the symbols of each order system. The geometric capitals of façade compositions of Petra are generally simple and expressive, reflecting the density and texture of local rocks of loose and coarse-grained sandstone. Their coarsened style, having a specific regional character, was defined as Nabataean.

The Nabataean Doric Capital

The Nabataean Doric capital is the upper plastic element of a pilaster with no base, serves as a major part of the stone frames on entrance apertures and niches of rock portals and porticos of Petra. The *abacus* is a rectangular plate that supports an architrave and the *echinus* represented as a multi-layer of fillets. Examples of this are found at the Lion Triclinium central entrance (**Fig. 16**)**,** at the Renaissance Tomb central entrance (**Fig. 17**)**,** at the Palace Tomb external entrances (**Fig. 18**)**,** and at the ad-Dayr central niches (**Figs. 19, 20**).

The Nabataean Cupped Capitals

There are two other varieties of Nabataean capitals that do not have any analogies with any other order and can only be associated with abstract forms. They are referred to as:

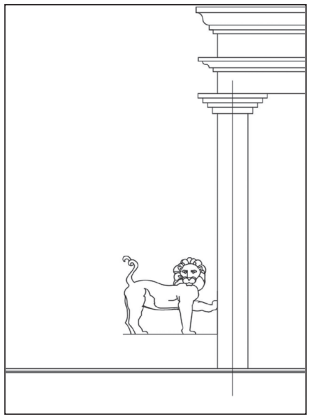
- Nabataean Cupped Capital Type I, which occurs in the lower level of the Palace Tomb (**Fig. 21**)
- Nabataean Cupped Capital Type II, occurs in the first levels of the ad-Dayr façade (**Figs. 22, 23**).

The Nabataean Reverse-Frustum Capital Type I

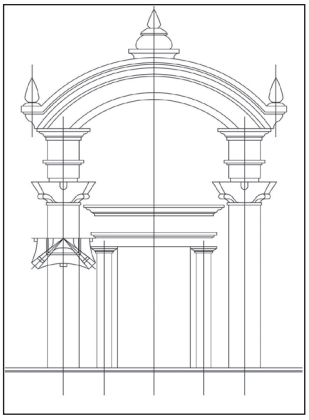
Nabataean Reverse-frustum Capitals appear in the form of a truncated pyramid, or *frustum*, with slightly concave faces, which is flipped upside down. Such pyramidal capitals can be found on the façades of the Broken Pediment Tomb (**Fig. 24**)**,** and the upper tier of the Silk Tomb (**Fig. 25**)

The Nabataean Reverse-frustum Capital Type II

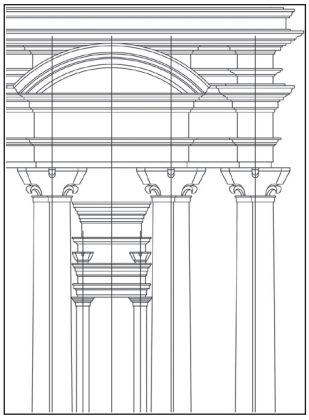
These Capitals can be found in the Sextius Florentinus Tomb (**Fig. 26**), the second level of the ad-Dayr (**Figs. 27, 28**). the Urn Tomb (**Fig. 29**) as well as the Roman Soldier Tomb (**Fig. 30**).



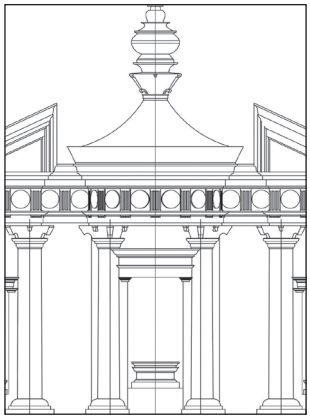
16. The Lion Triclinium central entrance (detail left side).



17. The Renaissance Tomb central entrance.

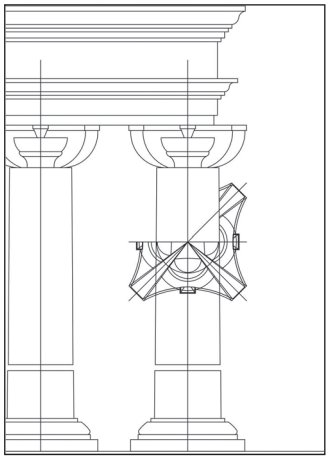


18. The Palace Tomb side entrance.

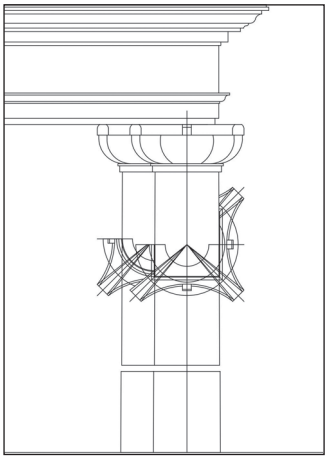


19. Detail of the ad-Dayr central niche of the upper storey.

20. ad-Dayr Nabataean Cupped Capital.



21. The Palace Tomb Nabataean Cupped Capital.



22. ad-Dayr Nabataean Cupped Capital.

The Nabataean Reverse-Frustum Capital Type III

A more slanted variant of the Nabataean Reverse-frustum capital imitates curved plates along the diagonal axes of a pyramid. This gave rise to individual researchers of Petra to draw parallels with the form of the Corinthian capital and call this type *Pseudo-Corinthian*. It seems more correct to keep this type of capital, widespread in the region of Petra, its originality and call this derivation of frustum capital the 'The Nabataean Reverse-frustum Capitals Types III and IV.

This variation can be found in each of the lower tiers of the Bāb as-Sīq Triclinium(**Fig. 31**), The Renaissance Tomb (**Fig. 32**)**,** and the Silk Tomb (**Fig. 33**).

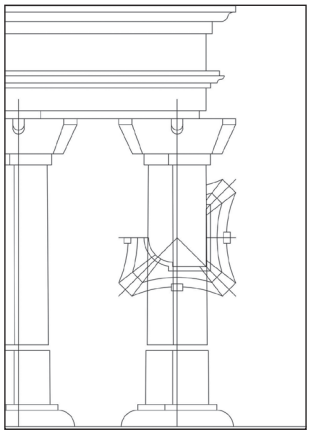
23. ad-Dayr Nabataean Cupped Capital.

The Nabataean Reverse-Frustum Capital Type IV

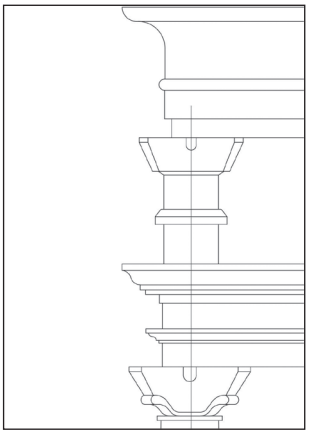
Is Shown in the Details of the Palace Tombs (**Fig. 34**).

The Nabataean Corinthian Capitals

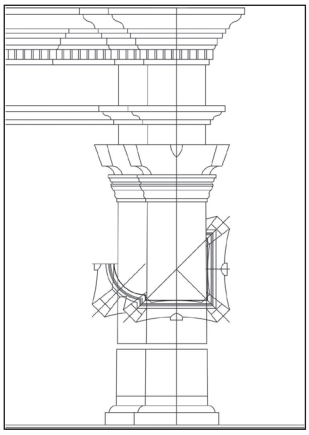
The Nabataean Corinthian capital is the result of a local artistic development originating from Corinthian classical capitals. This quite successful architectural column head decor is assigned as an invention of the 5th century BC by Vitruvius to the Greek architect and artist



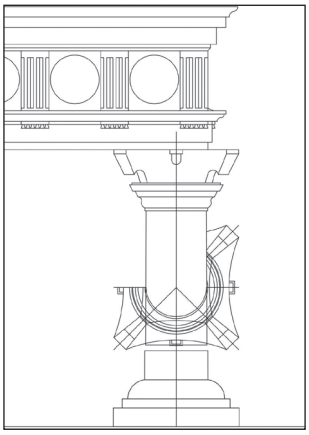
24. The Broken Pediment Tomb Reverse-frustum capital.



25. The Silk Tomb Reverse-frustum capitals.



26. The Sextius Florentinus Tomb Reverse-frustum capital.



27. ad-Dayr Reverse-frustum capital.

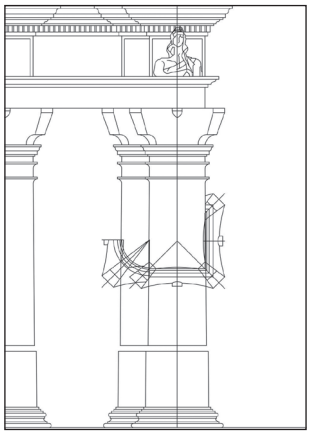
Callimachus. It occurs for the first time as an element of interior architecture, found on fluted columns in the cellar rear wall of the peripteral temple of Apollon Parnopius at Basse-Phigaleia in western Arcadia, Greece. It was adopted in Greek architecture, an element of exterior colonnade, later in the 4th century BC, to become the signature of the canonic Corinthian order dominating during Hellenism and Roman imperial times.

28. ad-Dayr Reverse-frustum capital.

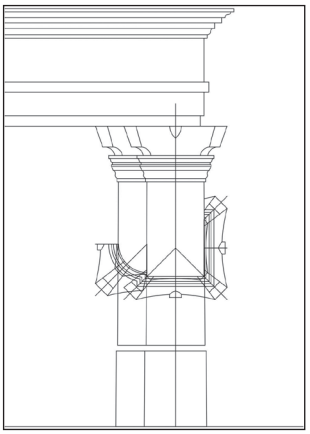
The classical Corinthian capital consists of one or two superimposed acanthus rows, eight leaves in each. Behind the belts of the acanthus leaves are four torches, from which the stems of four double scrolls and four bundles of paired central small volutes (*cauliculi*) rise upward. Above them rests the abacus, which forms a square plate with cut off corners and concave sides to support the horizontal architrave of the entablature. Forms of Greek and Roman capitals differ in the height of their capitals, the proportions of volutes and rosettes, and the pattern of acanthus leaves.

The Nabataean Corinthian Capital, Type I

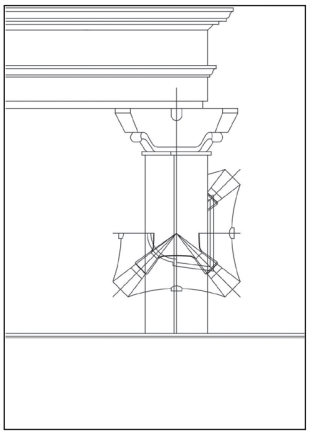
The *abaci* of capitals has a fillet with *cyma reversa* on the top and a large rosette in the form of a blossoming Black iris, or *Iris Petrana,* which is a noble flower of the spring in



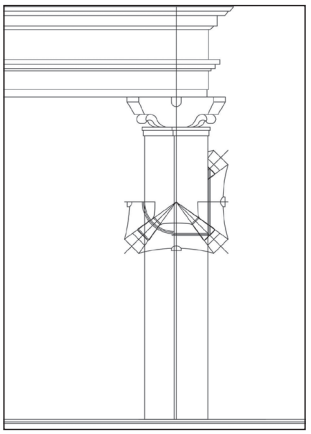
29. The Urn Tomb Reversefrustum capital.



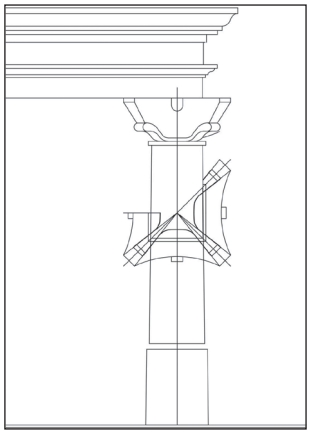
30. The The Roman Soldier Tomb Reverse-frustum capital.



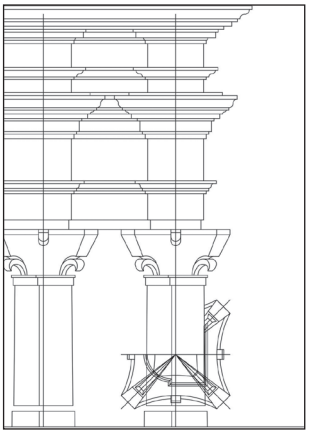
31. Bāb as-Sīq Triclinium Reverse-frustum capital.



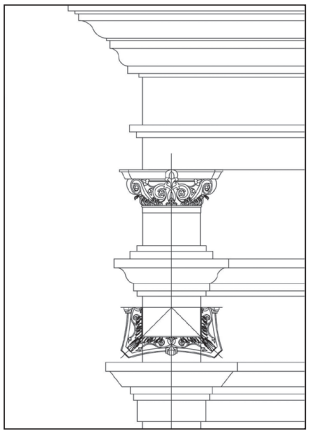
32. The Rainessance Reverse-frustum capital.



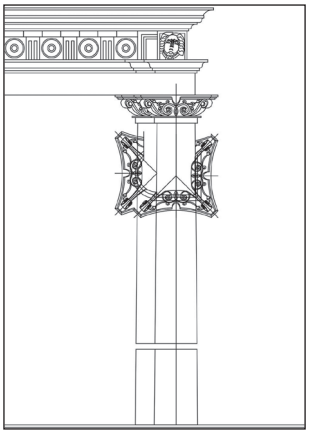
33. The Silk Tomb Reverse-frustum capital.



34. The Palace Tomb Reverse-frustum capital.



35. The Corinthian Tomb Nabataean Corinthian capital, Type II.



36. The Lion Triclinium Nabataean Corinthian capital, Type I.

Nabataean highlands. In the center two large volutes smoothly pass into a pair of *cauliculi*, between which is a composition of vertically standing seven-edged acanthus and two open arrows above it with buds of irises at the ends and a trefoil in the center. Massive angular volutes are supported by leaves of sharp-pointed acanthus. The lower part of the capital is treated in the form of a low astragal and a flat wide band, which acts as the neck of a rectangular pilaster. This is a common detail in two façades, the Corinthian Tomb central capital (**Fig. 35**) and the Lion Triclinium capitals (**Figs. 36, 37**).

The Nabataean Corinthian Capital, Type II

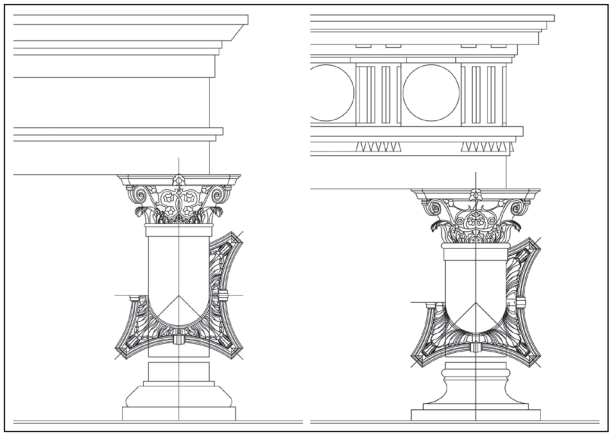
The shape of the round capital is a plastic version of the Alexandrian plant capitals. The lower angular volutes, rounded not in the form of two *cauliculi*, but by a pair of symmetrically intertwined stub rings with two flowers of irises in each. The rosette in the form of a large iris grows from a thin stem, and massive angular volutes, forming the ends of their lower coils in the center of a facet triangle, that are supported by two steeply curled acanthus. It's a common detail in the façades of the Corinthian Tomb lower tier capital (**Fig. 38**), Corinthian Tomb upper tier capital (**Fig. 39**), and al-Khaznah upper tier capital (**Figs. 40, 41**).

Nabataean Corinthian Capital, Type III

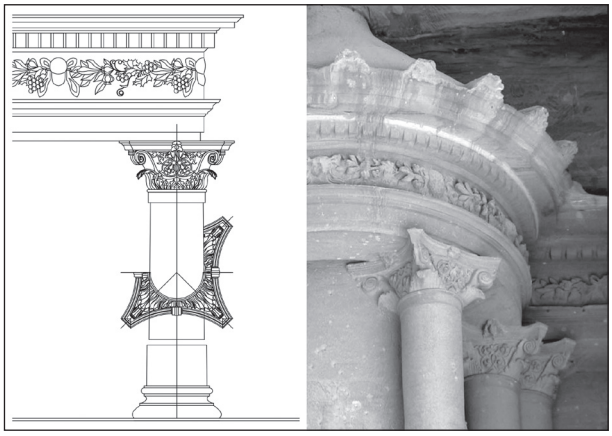
A detail of the upper level of al-Khaznah only shows a composition in detail that is derived from templates of late Republican and Alexandrian plant capitals. The proportions and the plasticity pattern in the double bands of acanthus leaves in the lower part of the capitals, as well as the shape of angular volutes and the supporting acanthus leaves reminds of Greek capitals. The relief of a complex interlacing of stems with iris flowers instead of traditional *cauliculi* bears the features of Alexandrian plant capitals. A large rosette is made in the form of a scaly cone of local oak, bordered by four sharp-toothed leaves. The profile of astragal and abaca resembles the details of Italian capitals. A portico with six of such capitals in the lower order level of al-Khaznah meets every traveler entering Nabataean Petra (**Figs. 42, 43**).

A major feature of Petra rock carvings is the diversity of architectural details within a single order system, where Corinthian capitals are combined with a base, of which the profiling is typical for Tuscan orders. The Capitals and bases are perceived as details of arbitrary style combinations far from a single order in each of the canonical orders. Typical for Petra collage combination of structural details.

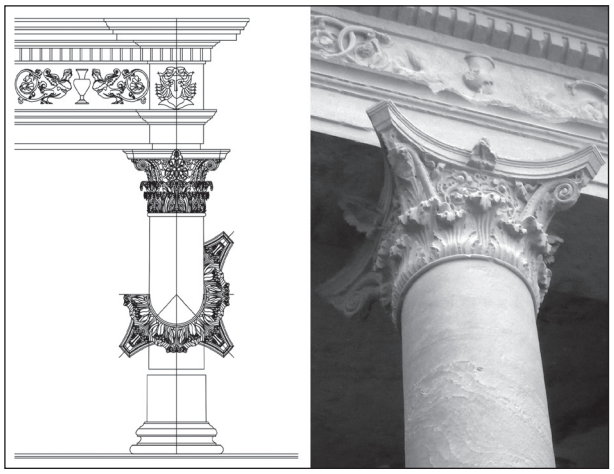
37. The Lion Triclinium Nabataean Corinthian capital, Type I.



38, 39. The Corinthian Tomb Nabataean Corinthian capital, Type II.



40, 41. al-Khaznah, upper storey, tholos, Nabataean Corinthian capital, Type II.



42, 43. al-Khaznah, lower storey, porch, Nabataean Corinthian capital, Type III.

The Figural Decoration of the Rock Portals and Façades of Petra

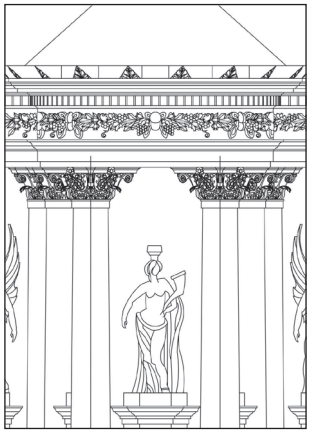
The figural decor means the relief of sculptural images of deities, human figures, birds, animals and plants. In the animalistic motifs of the decorative plasticity of Petra, representations of the local fauna are depicted, and relief images of deities and human figures are borrowed from Greek and Roman subjects. In the rock carved façade structures of Petra, certain definite compositions of thematic decorations were formed.

Ornamental Plasticity Decor of al-Khaznah

The Friezes of both levels of al-Khaznah are richly ornamented. On the frieze of the upper order level, complex garlands of fig tree branches, intertwined with groups of round fruits, such as figs and grapes, are framed by leaves. The center of such composition is indicated by a large acorn of local oak.

In the upper level central *intercolumnium* of the *Tholos*, a standing statue of the half-naked Aphrodite is depicted in her syncretistic aspects of Isis, as the head gear of the *calathos* testifies, and of the tutelary urban patron Tyche, evident by the horn of plenty in her left arm (**Fig. 44**). The remaining spaces between the columns of both the round temple as well as the framed colonnade are filled by statues representing Victories or Amazons, the latter wielding double-axes over their heads.

The *tympanon* of the pediment crowning the tetra-style entrance porch of the lower level is filled with a delicate vegetal scroll on both sides of a ruined object (**Fig. 45**), resting on a narrow base of acanthus leaves. In his famous corpus of lithographs, the artist David Roberts (1849) restituted this detail, totally destroyed today, as a squatting sideward faced eagle, which inspired the presented reconstruction (**Fig. 44**). Many modern scholars, however, recognize a human bust of Atargatis, or fertility diety, as shown in the famous relief from Khirbat at-Tannūr. The same motif also occurs in funeral art of Palestine and Arabia, with relief pattern on the frieze and the plane of the tympanum of the lower level represents large spirals wrapped acanthus stems with a cone in the center. These depictions alternate on the frieze, along with paired images of sirens with a calyx along the axis between them (**Figs**. **46-48**).



44. al-Khaznah, upper storey, tholos, representation of Isis-Aphrodite-Tyche.

45. al-Khaznah, lower storey, pediment with Isis crown and eagle (according to lithography by David Roberts).

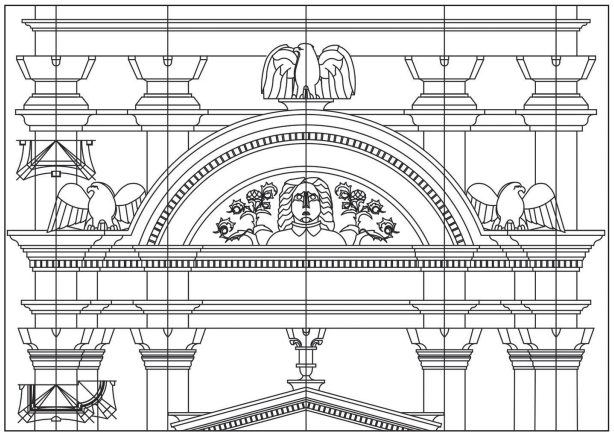
46. al-Khaznah, lower storey, pediment with bust in scrolls as most modern scholars understand the theme).

47. al-Khaznah, lower storey, frieze with heraldic sirens with a calyx, framed by vegetal scrolls.

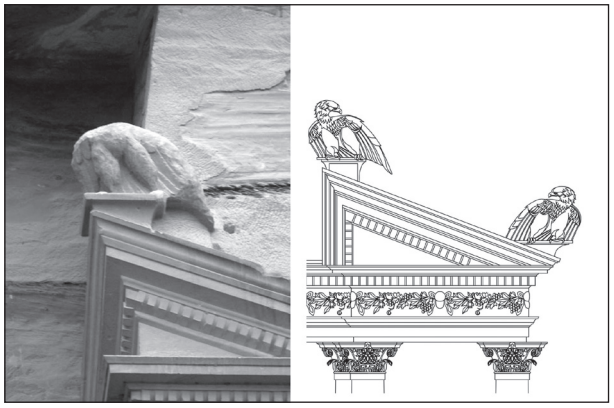
48. al-Khaznah, lower storey, frieze with heraldic sirens with a calyx, framed by vegetal scrolls.

*Acroteria in the Shape of Eagles (***Figs. 49-54***)*

The greatest number of sculptural figures adorn al-Khaznah. In the space between the external columns of the first order level, two compositions with male figures (**Fig. 56b, c**) leading the bridles of horses (Castor and Pollux) are created on a scale of 2.5:1. In the five piers of the upper level of al-Khaznah, are five figures of Amazons holding axes on a scale of 2:1 (**Fig. 55**). In the central *intercolumnium* of the *tholos,* the relief statue of Isis, the goddess of motherhood, is depicted (**Figs. 44**, **56a**) and the planes of the friezes along the axis of the external pilasters adorn the heads of Gorgons.

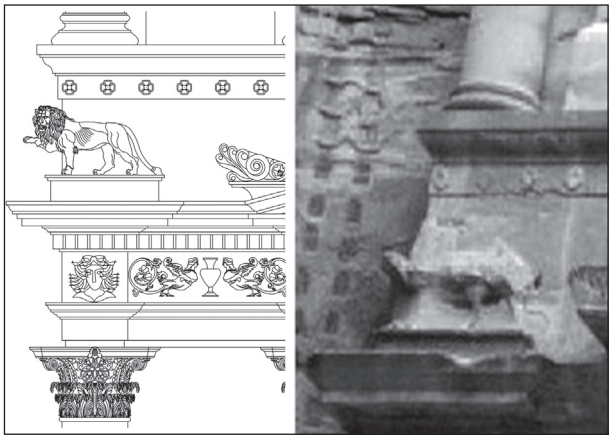


49. The Sextius Florentinus Tomb with acroteria in the shape of eagles on top and both sides of the segmental pediment.



50, 51. al-Khaznah, eagle acroteria on the broken pediment of the framing colonnades in the upper storey.

The lateral pilasters of the Lion Triclinium display Theatre mask (**Fig. 57**). Sculptural images of Hellenistic Armors, occupy the space between the columns in the Roman Soldier Tomb. A drapery bust is located along the axis of the entrance portal of Urn Tomb, and the frieze plane coaxial to the pilasters, is filled with human bust reliefs.(**Fig. 58**). The Atargatis, or fertility deity with scrolls, appear as the central image of the segmental arch in Sextius Florentinus Tomb.



52, 53. al-Khaznah, acroterion of the attic on the left side in the shape of a sculpture of a lion.

54. Lion Triclinium wall decoration.

55. al-Khaznah, representation of Amazon.

56. |a. al-Khaznah, representation of Aphrodite-Isis. |b, c. The two Dioscuri Castor and Pollux, identified by the Nabataeans with the astral gods Azizos and Monimos.

Order Compositions of the Nabataean Classical Rock Carved Façades of Petra

The goal of Architectural and graphical reconstruction is the reconstruction of original species of Petra rock fronts preserved in varying degrees of Fragmentation, and presented in large-scale orthogonal drawings, in order to analyze the plastic patterns of typology and the proportional system.

57. Lion Triclinium frieze with Theatre masks, wreaths and paterae, in the pediment bust with vegetal scrolls.

58. Human draped bust in the window of the central intercolumnium of the Urn tomb.

Bāb as-Sīq Triclinium

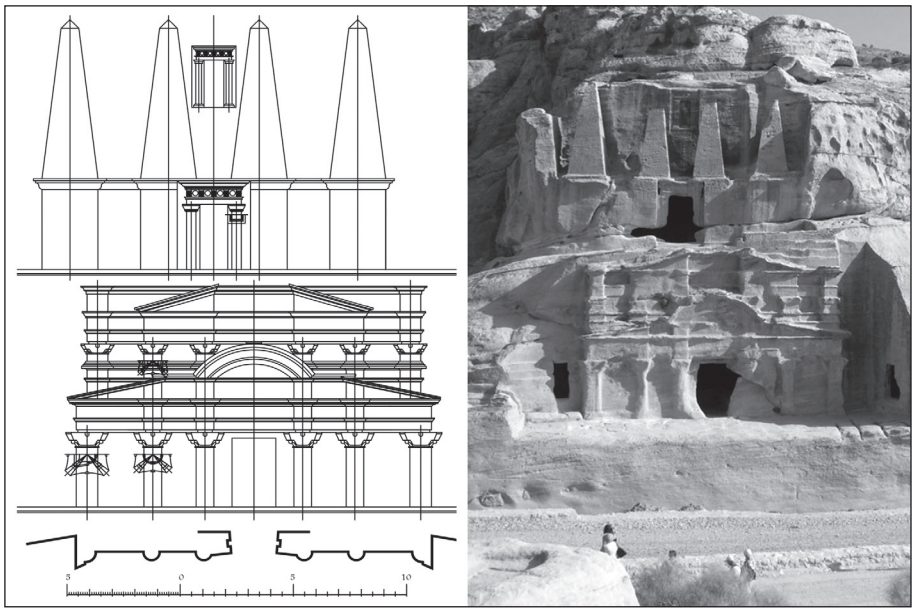
The height of the facade is 12.0m, and has a width of 18.50m. The composition of the façade consists of two levels. The six pilasters of the lower level carry a massive entablature that supports a „broken“ pediment. The second level is perceived as a detailed attic with dwarf pilasters, crowned with the Nabataean Reverse-frustum Capital Type III, multi-molded entablature and a “broken” pediment on the top.

The massive half-columns of the lower level are crowned by the Nabataean Reverse-frustum Capital Type III, between which a rectangular entrance opening with an entablature on a top of the broken pediment is located. Bāb as-Sīq Triclinium has a unique façade in its plasticity detailing and original proportional system. (**Figs. 59, 60**).

al-Khaznah

The height of the façade is 42.0m, and has a width of 28.0m. The façade of al-Khaznah is characteristic to Nabataean two-leveled compositions, Completed with a „broken“ pediment, of which the central part is occupied by a circular rotunda or a *tholos*. The first order level represents a six-columned portico with Nabataean Corinthian Capitals, Type III, and an entablature, a pediment and an attic.

Two middle freestanding columns and four extreme semicircular pilasters are crowned by Nabataean Corinthian Capitals, Type II. These columns have bases with classical moldings. In the depths of the portico between the central columns, there is an entrance with an aperture of 8m in height, to which a staircase with twelve steps leads. The second order level is a three-part portico, with an external “broken” pediment and

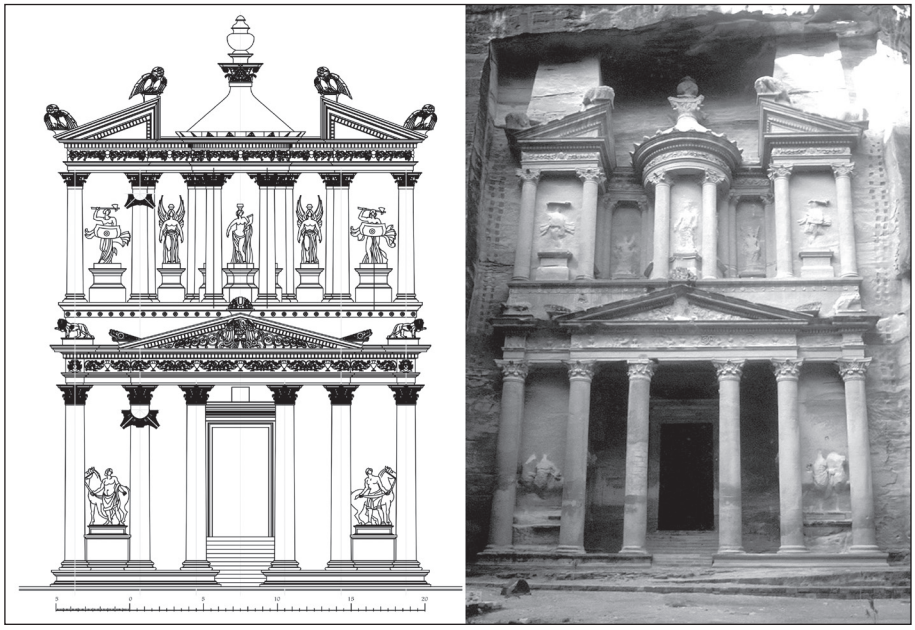


59, 60. Bāb as-Sīq Triclinium architectural and graphic reconstruction.

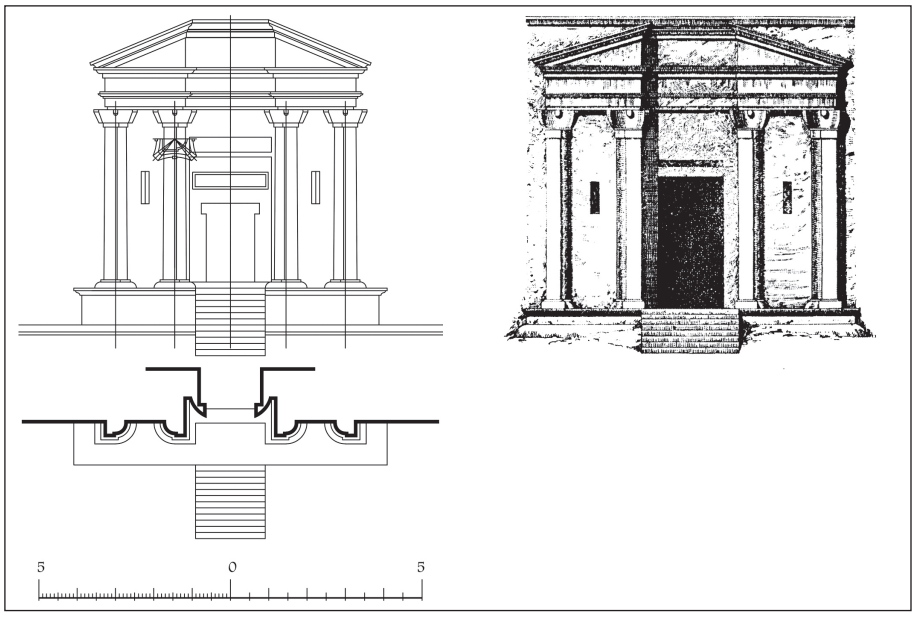
a Tholos in the center. Sculptures depicting male figures and figures of the Amazons are placed on high profiled pedestals. The Treasury is the most famous and significant construction of Petra, meeting travelers at the end of the Siq gorge. A plasticity complex, harmonious composition, with specific beauty of order details, and elements of ornamental décor, makes al-Khaznah the climax of art in the Nabataean architecture front piece, (**Fig. 61a-b**).

The Broken Pediment-Tomb (*BD 228*)

The height of the structure is 8.0m, and a width of 7.0m. The composition is a flat portal with four pilasters, an entablature and a pediment, with a clear division into the central part and two entablatures on the side. Pilasters are complicated in section, rectangular from the outside and semicircular from the inside, and a base without a plinth, and crowned by the Nabataean Reverse-frustum Capital Type I. The central plane of the portal occupies an entrance aperture, above which are three cut horizontal niches, where ornamental plates were apparently mounted. The side planes between the pair of external pilasters, with smaller intercolumnium than the central ones, have narrow slits for windows. The entire structure rests on a plinth, with a staircase in the center consisting of thirteen steps (**Fig. 62 a, b**).



61. |a. al-Khaznah architectural and graphic reconstruction. |b. al-Khaznah.



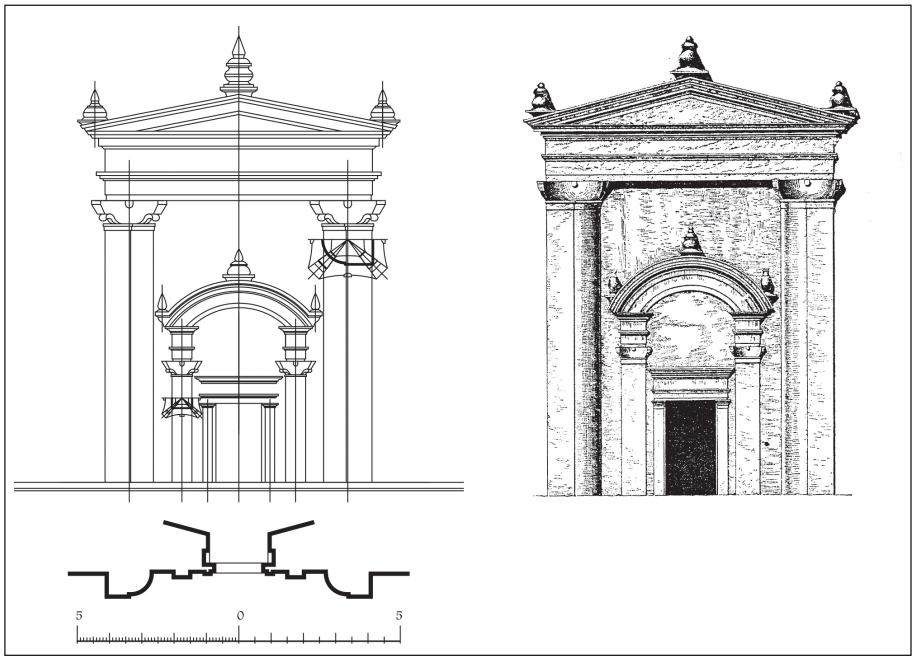
62. |a. The 'broken pediment'-Tomb, architectural and graphic reconstruction. |b. Elevation prospect (Brünnow and von Domaszewski I. 1904: 158, fig. 179 [no. 228]).

The Renaissance-Tomb (*BD 229*)

The height of the structure is 14.0m, and the width is 8.25m. The composition of the façade according to the formal schemes (see **Fig. 18**) is similar to the façade structure of Lion Triclinium, but differs in the order of details. The external double pilaster portal, crowned with the Nabataean Reverse-frustum Capital Type III and an architrave, is completed by a pediment with multi-profiled cornices and three *acroteria* with urns. Its pilasters with the Nabataean Reverse-frustum Capital Type III support two entablatures, With a facetted segmental archivolte. The central and side *acroteria* in the shape of small urns complete the composition. The entrance frame consists of a pair of pilasters with the Nabataean Doric capitals and an entablature (**Figs. 63a, b**).

The 'Roman Soldier' Tomb (*BD 239*)

The so-called Tomb of the Roman soldier is a vast architectural complex consisting of a rock-cut tomb connected with a *triclinium* by a colonnaded piazza. It is located east Wādī Farasa, underneath the so called Garden-triclinium, and accessible via monumentalized gates on both long sides of the enclosed piazza (**Figs. 64a, b**). This funeral complex has been intensively



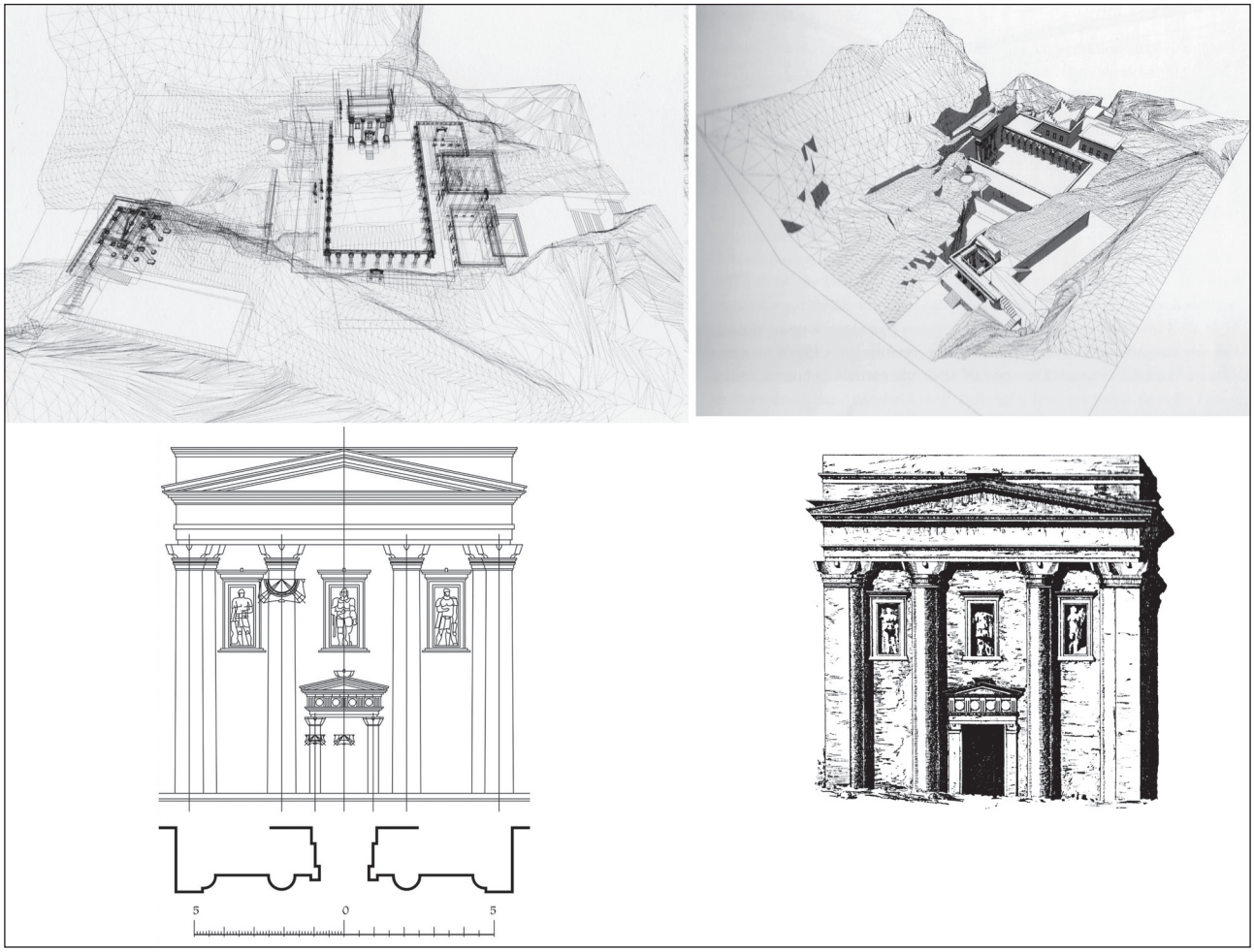
63. |a. The 'Renaissance''-Tomb, architectural and graphic reconstruction. |b. Elevation prospect (Brünnow and von Domaszewski I. 1904: 159, fig. 180 [no. 229]).

explored by an international team (IWPF) directed by Stephan Schmid (Humboldt-University, Berlin) between 2001 and 2010.

The height of the rock-cut tomb façade (**Figs. 64c, d**) is 11.75m, and the width is 11.25m. The outer portal, with a small door inside, represents a composition of four pilasters carrying an entablature and a flat triangular pediment attached to an attic. The external complex cross-section of pilasters and medium semi-columns are completed by the Nabataean Reverse-frustum Capital Type II. The upper segments of the intercolumnium are occupied by three niches with relief figures of Hellenistic Armors. Only one Armor figure is preserved today, meanwhile the IWPF-mission found fragments of the rest during their excavations. The central entrance frame consists of two rectangular pilasters with The Nabataean Reverse-frustum Capital Type III, supporting the entablature decorated with a frieze of *triglyphes* and *metopes*. The front is crowned by the Nabataean Reverse-frustum Capital Type III.

The Sextius Florentinus Tomb (*BD 763*)

Titus Aninius Sextius Florentinus was a Roman official of senatorial rank with a profound military career in different parts of the Empire. In the reign of Hadrian, he was promoted as a governor (*legatus Augusti propraetore*) of *Provincia Arabia*, a position which he held from AD 127 until his death shortly after AD 130. His ownership of the tomb during BD 763 is testified by a Latin inscription, which triggered a long controversy on the date of its architecture. As Klaus Stephan Freyberger demonstrated in a comparative study (*Zur Datierung des Grabmals des Sextius Florentinus in Petra, in: Damaszener Mitteilungen 5, 1991:1-8*), the tomb originated in the days of the Nabataean



64. |a-b. The 'Roman Soldier'-Tomb, volumetric view on the Wadi Farasa East complex (including the so-called garden triclinium) from south and east (Pascal Wirth, Exhib. Cat. Basel 2013: 200 figs. 8-9). |c. Architectural and graphic reconstruction. |d. Elevation prospect (Brünnow and von Domaszewski I. 1904: 160, fig. 182 [no. 239]).

Kingdom and it has been usurped for a secondary burial of the governor after 130AD. The inscription has been incised at this later stage of use. The usurpation of older tomb was obviously a common practice as it is evidenced by various Nabataean inscriptions on the tomb façades at Hegra / Mada'in Salih.

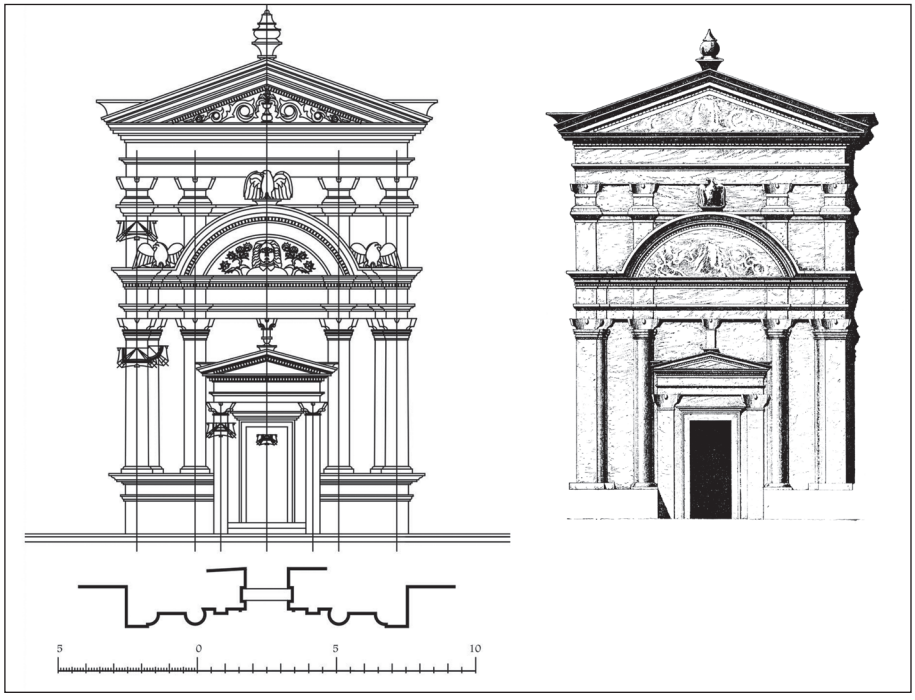
The hight of the façade is 18.5m, and width of10.0m The composition on two-levels consists of a small portal inside of a large portal on a high pediment. Four pilasters of the first level are crowned by the Nabataean Reverse-frustum Capital Type III. A segmental pediment displays the bust of Atargatis, the deity of Fertility, with scrolls in the center and relief plant ornament on the top and side *acroteria* adorned by sculptures of eagles. The latter, however, are not shown on the elevation prospect published by Brünnow and von Domaszewski (**Fig. 64b**). In the second level, dwarf pilasters with The Nabataean Reverse-frustum Capital Type I support a detailed entablature crowned by a triangular pediment, which displays a delicate vegetal scroll in the plane of the *tympanon*. The overall composition of the portal is completed by an *acroterion* in the shape of a massive urn. The inner portal has a pair of pilasters with The Nabataean Doric Capitals, a massive entablature and a flat triangular pediment. An *acroterion* with a capital of the same type completes the composition of the façade (**Figs. 65a, b**).

The Palace Tomb (*BD 765*)

The height of the double-storied façade measures at 45.0m, with a width of 56.0m. It shows four portals in the lower level and a colossal multi-profiled attic on top. The lower level sits on a massive pedestal, which has twelve twin-pilasters terminating in the The Nabataean Reverse-frustum Capital Type III, a detailed entablature and a two-part attic. Four large entablature compositions represents the upper parts of the two-portals, two of which are external ones completed by semicircular pediments, and two central ones completed by pediments of triangular shape. In the center of the portals are entrance openings, with relief frames of a pair of pilasters and multi-leveled attics.

The pilasters of the lower level are crowned by Nabataean Cupped capitals. Vertical divisions of the lower and upper levels do not coincide with their axes, except for the side pairs. The space between the semi-columns occupy a variety of window openings and niches. A massive multi-leveled attic above the entablature of the second façade level has vertical divisions that continues its axis. Its semicircular pilasters are decorated with The Nabataean Reverse-frustum Capital Type I.

The name of this façade is by no means accidental; it is distinguished from all other tombs by its giant dimensions and its exaggerated multiplication of horizontal architectural



65. |a. The Tomb of Sextius Florentinus, architectural and graphic reconstruction. |b. Elevation prospect (Brünnow and von Domaszewski I. 1904: 170, fig. 194 [no. 763]).

bands. Waterfall channels fed by a large basin on top of it frame the architecture on both sides. Recent geological studies and limited excavations directed by Stephan Schmid (Humboldt-University, Berlin) located the urban *basileia*, or the residence of the Nabataean kings in Petra down-town. This fancy setting on the north-western cliff of the al-Khubthah massif testifies the extravagance of its aristocratic and wealthy planner (**Figs. 66a, b**).

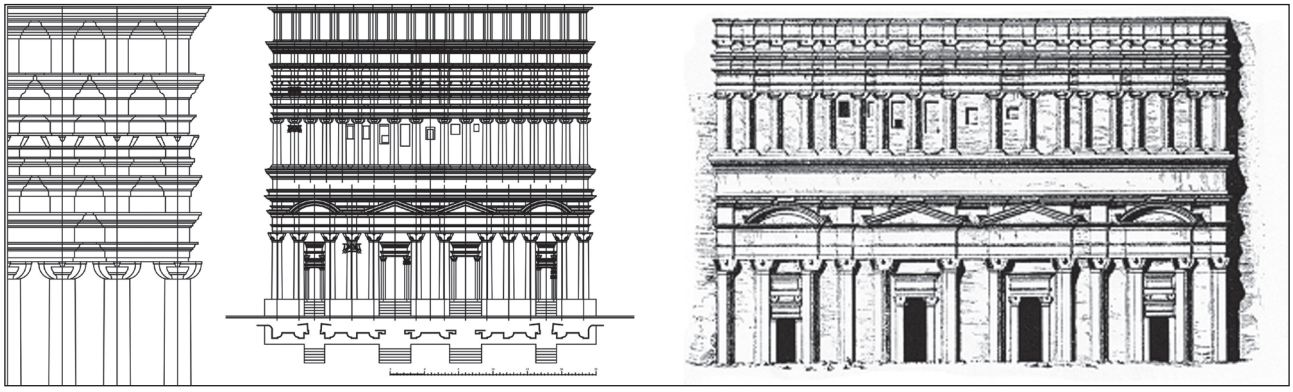
The Corinthian Tomb (*BD 766*)

The height of the building is 32.5m, and the width is 29.0m. The scheme of the façade is similar to al-Khaznah. The two-leveled composition has a "broken" pediment and a central Tholos. Eight semi-columns on a high base are crowned by the Nabataean Corinthian capitals, Type II. They support an entablature in the lower order level. Its center consists of a semicircular pediment. The entrance opening is decorated with two Nabataean Doric pilasters and an entablature with a cornice. The entablature of the first level is vertically divided into two parts; the upper one is completed by the attic with a „broken" pediment and an entablature supported by dwarf pilasters with the Nabataean Corinthian capitals, Type I.

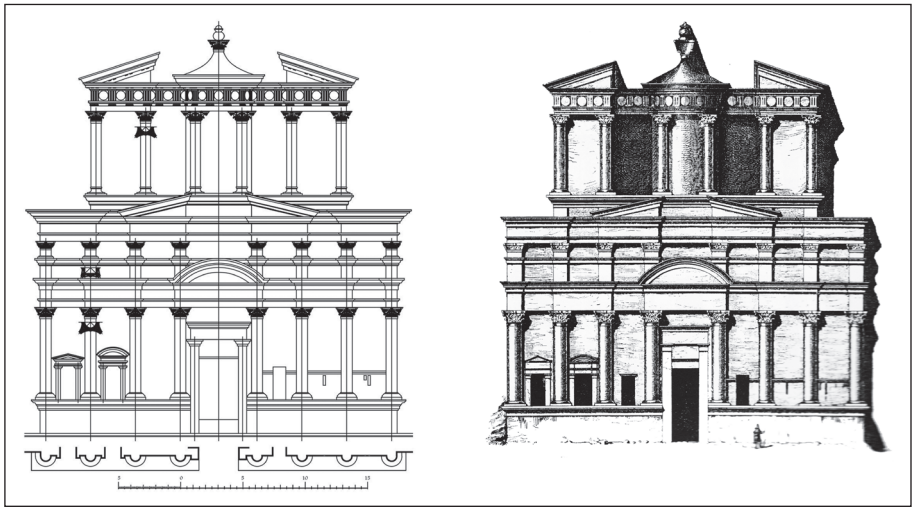
The upper order level consists of a „broken" pediment and six semi-columns which are not coaxial with the lower half columns. They carry the Nabataean Corinthian capitals, Type II. A Doric frieze is adorned by alternating *triglyphs* and *metopes*, the latter being filled with round smooth discs. The central part is occupied by a round rotunda with a crowning of a complex shaped urn. The two-columned segments are the sides of the "broken" gable (**Figs. 67a, b**).

The Silk Tomb (*BD 770*)

The height of the façade is 18.5m. The width is 11.0m. The composition of the façade is typical for portals with a double entablature, but the special natural texture and the silk-tinged color of the rock, from which it is carved, gives it significance in the series of Royal tombs of



66. |a, b. The Palace tomb, architectural and graphic reconstruction (a), prospect of the same tomb limited to the lower two storeys and omitting the high multiplied entablature zones by Brünnow and von Domaszewski (1904) 169 fig. 193 (no. 765).



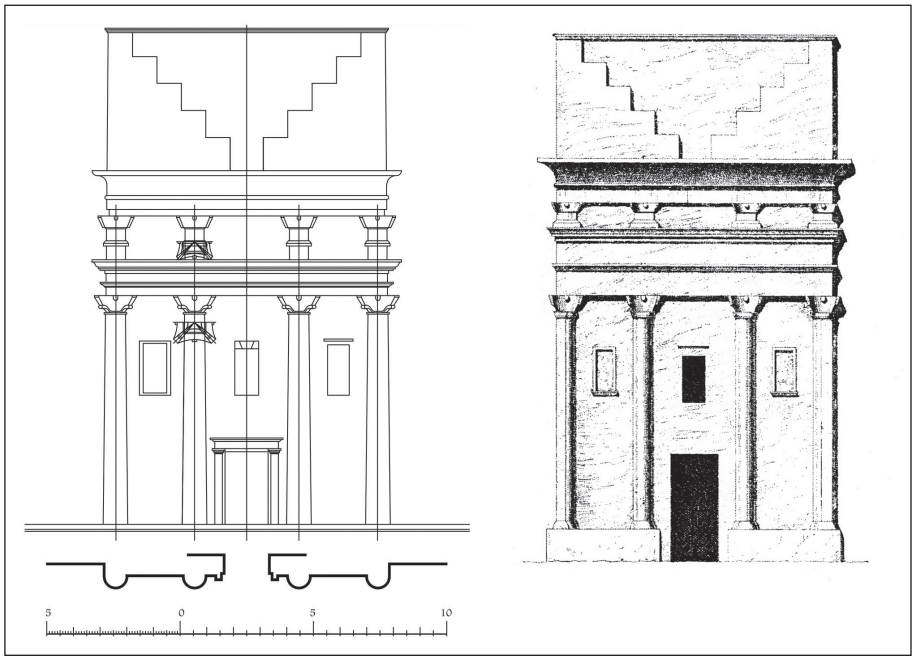
67. |a. The Corinthian Tomb, architectural and graphic reconstruction. |b. Elevation prospect (Brünnow and von Domaszewski I. 1904: 168, fig. 192 [no. 766]).

PetraThe plane of the façade is divided vertically into three structural parts. In the lower order tier are four semicircular pilasters with the Nabataean Reverse-frustum capitals, Type III and a detailed entablature. There are four dwarf rectangular pilasters on the second tier with the Nabataean Reverse-frustum Capital Type I and an attic. The entablature consists of a cornice with Egyptian *cavetto* and fillet. The upper level consists of an attic with „crow's steps", a rectangular niche above the frame of the entrance portal, with two Nabataean Doric pilasters and an entablature (**Fig. 68**).

The Urn Tomb (*BD 772*)

Another important tomb within the royal necropolis along the western cliff of the al-Khubta massive is the Urn tomb, styled by the middle *acroterion* executed in relief and raising from the gable top at the attic tier. Due to its open forecourt lined by porticos, and its monumental appearance on a landscape-dominating terrace, it points out several analogies with the Forum of Augustus in Rome. In consequence, it was hypothetically assigned to Aretas IV Philopatris (ruled *ca*. 9 BC to 40 AD) as the proprietor of the tomb. This king was very well acquainted with the actual building projects in the Roman capital, since he traveled a number of times to Italy to hold audience with his clientele lord, Emperor Augustus, especially in his diplomatic clash with the usurping minister Syllaios.

The height of the building is 28.5m, and has a width of 18.5m. According to Andreas Schmidt-Colinet (*loc*. *cit*.), the Urn tomb was executed by the official mason workshop of 'Abd 'Obodat and Sons from Hegra. The façade is the central part of the deep spatial composition cut down from the massif of the rock slope. Two covered galleries in the sides have five round columns supporting overhanging rocks. The base of the tomb is located on the arcade constructions, according to many scholars, dating to the period of the Byzantine Empire 446-447AD. The façade structure is formally similar to the type of rock Portals with a double entablature. However, the order plasticity of the first level is so monumental that the entire abovementioned part of the building is perceived as a single surface of a detailed attic consisting of reliefs on the upper level and a pediment with a plane of smaller attics. The first order level has a pair of external "twin" pilasters with a rectangular outer section and a quarter of a circle inner section, and a pair of medium half-columns completed by the Nabataean Reverse-frustum Capital Type II. The frieze of the entablature is adorned by sculptural bust reliefs. The entrance structure supports a pediment with a profiled cornice, with a central entrance portal embedded in it. A pair of the Nabataean Reverse-frustum Capital Type II supports an entablature with a Doric frieze and a triangular pediment with *aroteria*. The upper

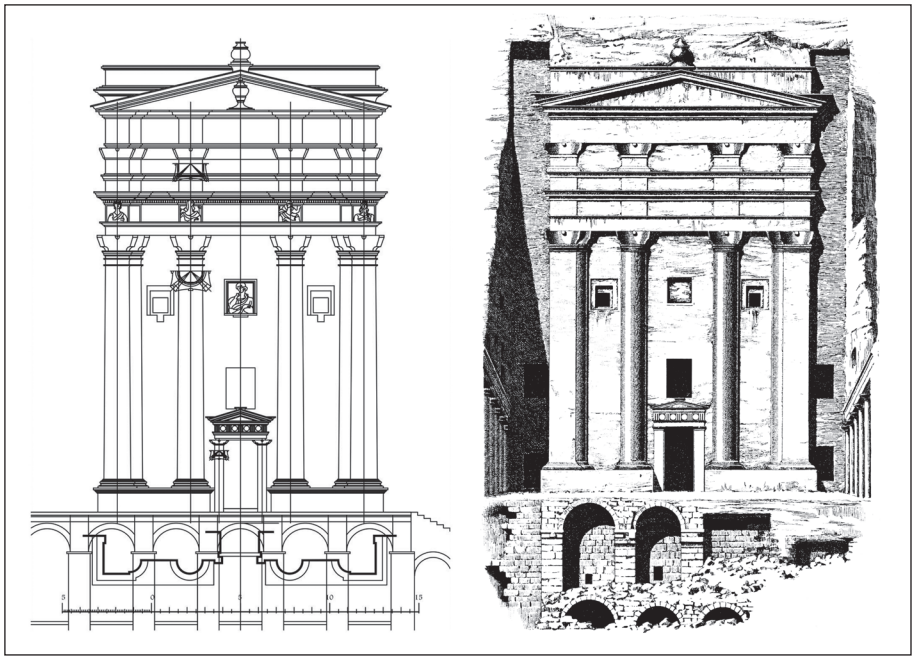


68. |a. The Silk Tomb, architectural and graphic reconstruction. |b. Elevation prospect (Brünnow and von Domaszewski I. 1904: 155, fig. 173 [no. 700]).

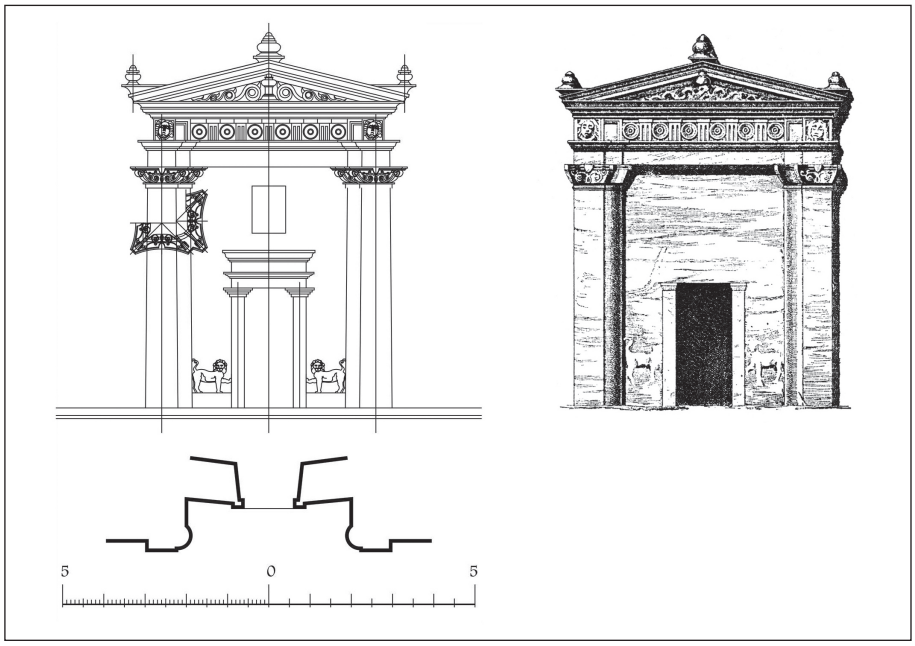
part of the *intercolumnia* is occupied by three profiled niches, of which the central one is a relief bust. The dwarf pilasters of the upper order level are crowned by the Nabataean Reverse-frustum Capital Type I, relief of the urn in the center and a central acroteria with a larger urn on the top (**Figs. 69a, b**).

The Lion Triclinium (*BD 452*)

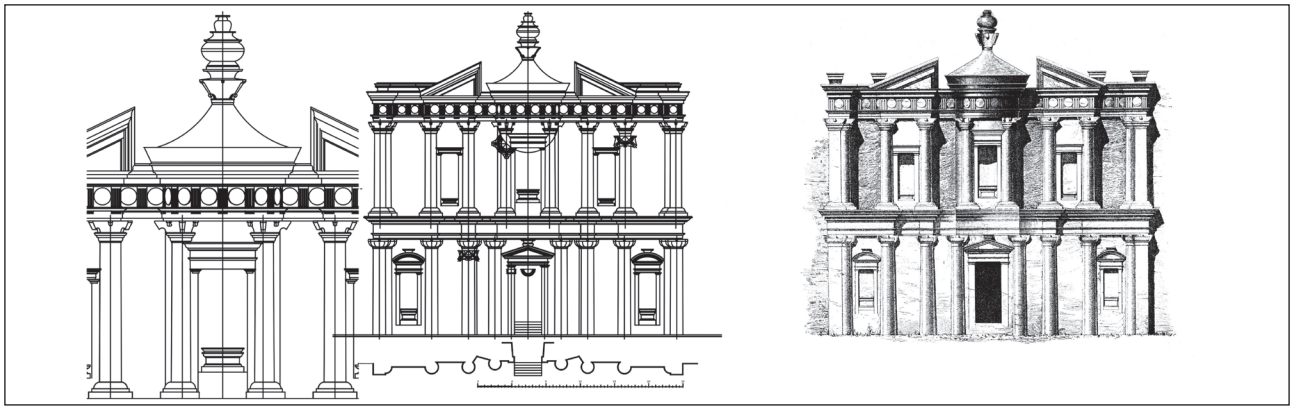
The height is 9.0m, and the width is 6.0m. The portal has an elegant composition of a small portal inside a large portal (see **Fig. 17**). Two twin pilasters of the external portal are completed by „double" Nabataean Corinthian capitals, Type I. Doric frieze is adorned by the heads of Gorgons. Large acroteries with urns are based on each edge of rich ornamented triangular pediment. There are relief images of two lions, the holy animals of the goddess Al 'Uzza, on both sides of the central portal with an entrance opening. An analogue of the plastic structure of this composition is undoubtedly the Doric order, in spite of its incompatible combination with the Corinthian capitals, which is a typical sign of the Nabataean mixing of differently ordered ornamental elements (**Figs. 70a, b**).



69. |a. The Urn Tomb, architectural and graphic reconstruction. |b. Prospect of the same tomb (Brünnow and von Domaszewski I. 1904: 167, fig. 191 [no. 772]).



70. |a. The Lion Triclinum, architectural and graphic reconstruction. |b. Elevation prospect (Brünnow and von Domaszewski I. 1904: 164, fig. 190 [no. 452]).



71. |a. ad-Dayr, architectural and graphic reconstruction. |b. Elevation prospect (Brünnow and von Domaszewski I. 1904: 187, fig. 220 [no. 462]).

ad-Dayr (*BD 462*)

The height of the structure is 47.0m, and the width is 46.0m. The scheme of the façade is similar to the schemes of al-Khaznah and the Corinthian Tomb. Due to its monumental size and its similarity to the named royal tomb, ad-Dayr has been associated with the burial of a Nabataean king Rab'el II, the last king prior to the adoption of the Kingdom by the Roman empire. Two levels consists of a "broken" pediment and a central *Tholos*. The semi-circular pilasters of the lower level are crowned by the Nabataean Cupped capitals, Type II. Two deep niches with segmental pediments are placed in the external *intercolumnia*, along with a central entrance on a triangular pediment. The upper level consists of a Doric frieze and eight half-columns with their axes coinciding the half-columns of the lower level, crowned by Nabatean Reverse-frustum capitals. The i*ntercolumnia* of the half-columns occupy deep niches with pedestals, probably prepared for statues. The round shape rotunda is crowned by the Nabataean Reverse-frustum Capital Type II and a free standing giant urn raised on top of the conical roof. The ad-Dayr is the most monumental building of Petra. The proportions of its elements and impressive plasticity details express the characteristic features of Nabataean architecture (**Figs. 71a, b**).

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THE "COMMODUS GATE" AT UMM AL-JIMĀL, EXCAVATION IN PREPARATION FOR PRESERVATION: UMM AL-JIMĀL PROJECT FIELD SEASON, MAY 28-JUNE 20, 2015

Elizabeth Osinga and Bert de Vries

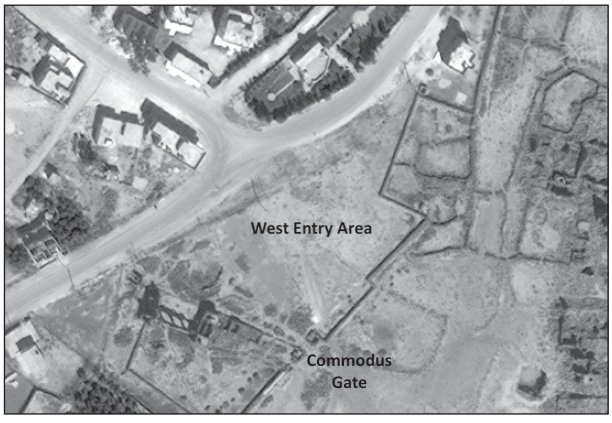
Introduction

The excavation and documentation of the 'Commodus Gate' at Umm al-Jimāl is part of a larger scheme: the development of the West Entry Area, a triangle that comprises the Commodus Gate, West Church and an open piece of land between the ancient Roman-Byzantine wall and the modern community. These three features combined will be developed as a landscaped park that will serve as a two-way gateway: an entrance from the community into the ancient site and from the ancient site into the community. The Commodus Gate itself will serve as the doorway onto an interpretive trail that will lead visitors on a signed tour of the antiquities, with a stop at the Interpretive and Hospitality Center that is being created at House 119 in the SSE sector of the antiquities.

The Commodus Gate excavation and conservation was carried out by the Umm al-Jimāl Project Team (Appendix A) in cooperation with Open Hand Studios and the people of Umm al-Jimāl, with funding from the USAID through the ACOR-SCHEP [The Sustainable Cultural Heritage through Engagement of local communities Project (usaidschep.org)] and Calvin College Archaeology Field School. [The Umm al-Jimāl Project staff is grateful to USAID, ACOR and the SCHEP organization for funding the West Gate Area and Eastern Trail preservation, presentation, and development program as a medium for preparing members of the Umm al-Jimāl community for careers in archaeological site management. We appreciate the helpful cooperation of the Department of Antiquities of Jordan staff in 'Ammān and al-Mafraq. We thank the local staff, their community and the municipality for their warm and secure hosting of our team].

A Purposeful Preservation of the West Entry Area

The West Entry Area includes the open space immediately north of the West Church and east of modern Umm al-Jimāl's main business intersection (*Midan*). On the east this space is bordered by the ancient Roman-Byzantine town wall, in which a 2nd century Roman gate, known as the Commodus Gate, provides entrance into the antiquities (**Fig. 1**). The area serves community members who pass from the *Midan* through the gate to sections of the community that lie on either side of the ancient site. It is therefore a natural location for the development of a formal entrance from the community onto the ancient site. A major goal of the work itself was the training of 15 site managers in the theory and practice of archaeological conservation to qualify them for long-term employment in managing and maintaining the site grounds. These trainees joined seven students enrolled in the Calvin College Field School. Archaeologically, this study of one of the few surviving pieces of Roman imperial architecture at Umm al-Jimāl brings understand-



1. West Entry Area showing the Commodus Gate and Umm al-Jimāl business center.

ing to the radical transition from imperial Roman to Late Antique culture at Umm al-Jimāl.

Previous Exploration: What H.C. Butler Saw

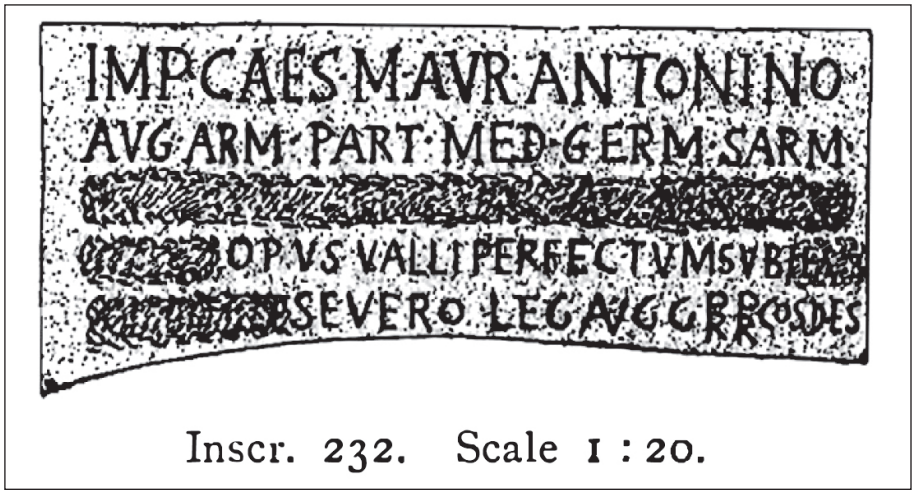
A photograph taken in 1905 (**Fig. 2**) shows the North Tower with walls surviving up to 13 courses high. We, however, found the west façade of this tower preserved only two courses high, with very few of the stones remaining in the collapse debris. The same is true of the piers, of which only the two imposts and two arch springers can presently be located. The West Tower, on the other hand, was already badly collapsed during the Princeton expeditions: the west façade survived only two courses higher than we found it. The *voussoirs* of the collapsed arches visible in the picture were no longer there in 2015.

The gate's dedication inscription (**Fig. 3**) was lying among the arch collapse in the middle of the gateway when Butler and his team visited in 1905. Today this basalt stone has also disappeared, and rumors that it has reappeared in the archaeological museum at as-Suwayda, Syria cannot be verified at this time. Littman's transliteration and restoration (Littman *et al*. 1913: 131) of the abbreviations is as follows:

1. Imp(eratore) Caes(are) M(arco) Aur(elio) Antonino
2. Aug(usto) Arm(eniaco) Part(hico) Med(ico) Germ(anico) Sarm(atico)
3. ret Imp(eratore) Caes(are) L(ucio) Aur(elio) Commodo Aug(usto) Germ(anico)
4. Sarm(atico)] Opus valli perfectum sub…
5. …Severo leg(ato) Aug(ustorum) pr(o) pr(aetore) co(n)s(ule) des(ignato)

The text clearly puts the dedication of the gate's construction during the father-son co-regency of Emperors Marcus Aurelius and Lucius

2. View of Commodus Gate from the west, 1905. From the archive of the H.C. Butler led Princeton University Expedition to South Syria in 1905 and 1909 (courtesy of the Princeton University Archive).



3. The Commodus Inscription (Littman et al. 1913: 131).

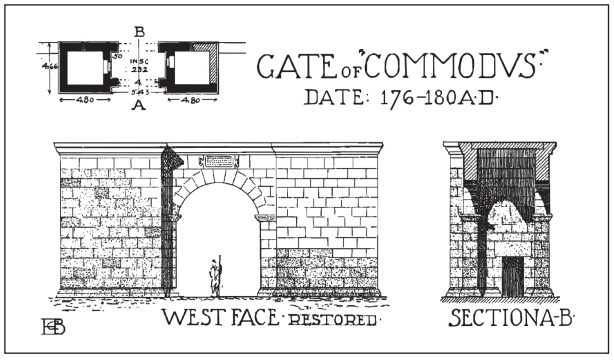
Aurelius Commodus, dated to 176-180AD. From this we derive the popular designation of the structure as "The Gate of Commodus."

Butler's restoration drawing is extremely helpful for our preservation planning, especially because his shading of the surviving masonry matches that of his photograph. Two small corrections result from our documentation. The base molding shown in the elevation drawings is not present, and the perimeter wall Butler shows attached to the east corners of the towers was in fact bonded into the centers of the north wall of the North Tower and the south wall of the South Tower, respectively.

From 1905 to 2015: What Remains after 110 Years of Collapse and Spoilage

The already damaged façade in the North Tower likely collapsed in the earthquake of 1926, turning the entire gate area into a *rujm* of collapsed building materials. A local informant who visited Umm ar-Rumman, located *ca* 20km northeast in Syria, learned from a local there that the beautiful basalt facades on the main street of the village consisted of stone taken from Umm al-Jimāl. The story is that from 1940 to 1942, two caravans commuted regularly between Umm al-Jimāl and Umm ar-Rumman, one going north loaded with stones and the other headed south to pick up more stones. The looted stones were the beautifully finished blocks from the west façade of the Commodus Gate and the exterior face of the north wall of the West Church (**Fig. 5**). This anecdotal evidence 'explains' the fact that the good building blocks from both buildings disappeared from the site, including the famous dedicatory inscription and the *voussoirs* of the arches.

This story punctuates the unfortunate scarcity of original building blocks. There are not enough stones available to complete the extensive rebuilding necessary in order to replace the surviving imposts and springers in their original positions, according to Butler's photograph. Such interesting architectural fragments will therefore have to be displayed on the ground and explained with illustrated signs.



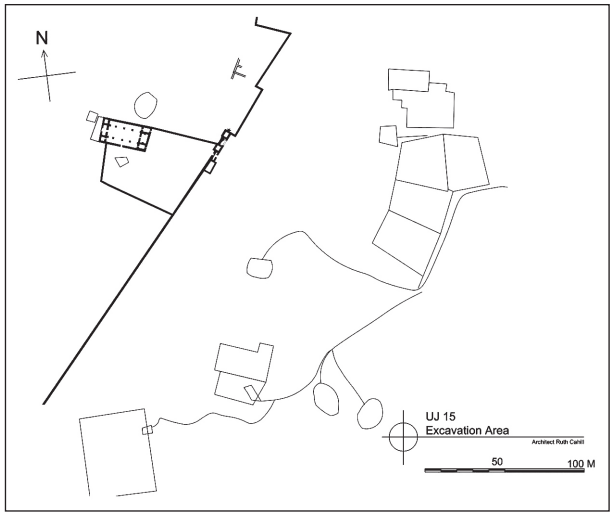
4. H.C. Butler's restoration of the Commodus Gate (Butler 1913: 57, Ill. 133).

5. West façade of North Tower with only remnants of the lower two courses remaining. 17 June 2015. (photo: Bert de Vries).

Documentation and Excavation of the Commodus Gate and West Entry Area

Mapping of the West Entry Area and Documentation of the Commodus Gate

The Commodus Gate was the central element of a substantial segment of Roman wall shown as the dark line at **Fig. 6**. Later, in the sixth century, the South Tower of the gate became part of a new doorway on the south side, which gave access to the West Church compound - constructed *extra muros* (see also **Figs. 14** and **15**). The structures to the east, shown in outline at **Fig. 6**, include Byzantine houses straight to the east, six reservoirs, and the Cathedral and



6 West Entry Area in relation to structures to the east (map and drawing: R. Linnaea Cahill).

Praetorium to the south.

The Commodus Gate itself (**Fig. 7**) consisted of a central gate chamber flanked by two guard-tower rooms, entered from inside the chamber. The north tower remained intact, but the south tower had its original door blocked and a window added on the west side as part of its incorporation into the West Church Complex entry.

Excavation of the Commodus Gate and Environs (Area EE)

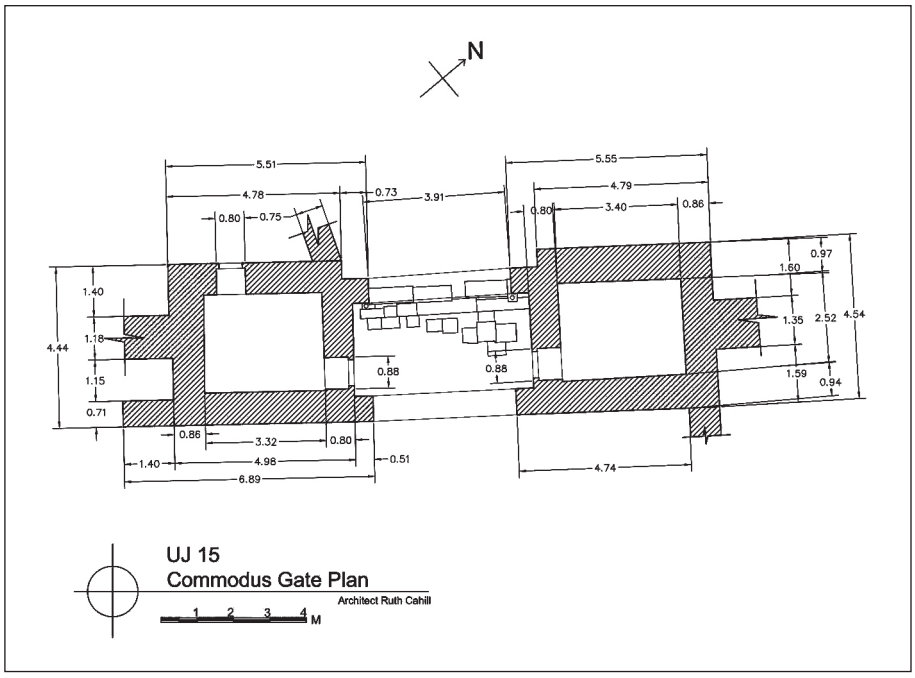
Six trenches were laid out in the Commodus Gate area (**Fig. 8**). The stratigraphic summary of each is presented below.

EE.1. North Half of the Commodus Gate Entry Chamber (**Fig. 9**)

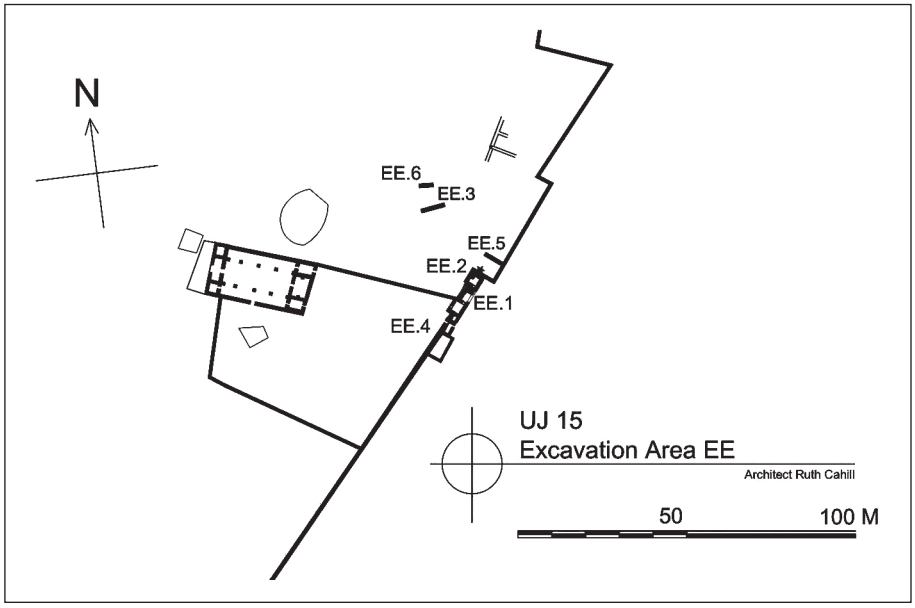
Excavation revealed that the bedrock was near to the surface in the gateway; therefore, no stratified occupation reflecting the traffic through the gate survived.

EE.2. Interior of the North Tower of the Commodus Gate

Beneath the topsoil [L:001] lay a fine cobble floor, constructed on an imported soil layer [L:005] which yielded only six undiagnostic sherds (**Fig. 10**). An ashy levelling layer beneath this soil and floor contained fragments



7. Commodus Gate (map: R. Linnaea Cahill).



8. Excavation Area EE (Commodus Gate), Trenches 1-6 (map: R. Linnaea Cahill).

of plaster and brick, as well as several tesserae [L:006]. The pottery in this layer was sparse and there were no diagnostics; however, none of the wares had a certain post-Early Byzantine date. Beneath was more ashy soil [L:007] and two firepits [L:008, 011]. Fourteen body sherds were associated with this activity, which is probably Late Roman in date. Below was the original cobble floor of the tower [L:009], which lay over a few foundation stones and undisturbed soil.

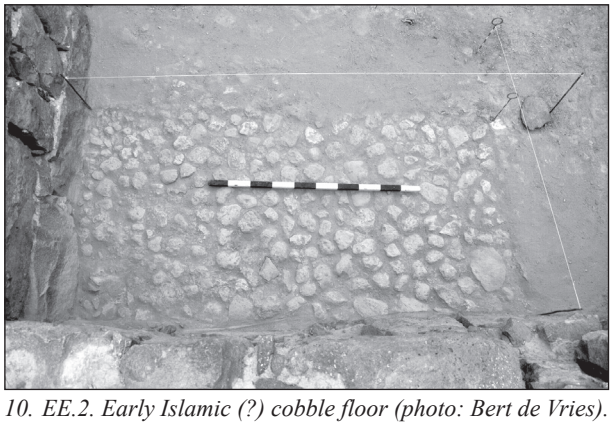
The later cobble floor cannot be dated by the finds within Locus 005; however, based on similar cobble floors set in soil at the site, such as one in the Praetorium dated to the Umayyad period, an Early Islamic date is possible.

EE.3. Probe Trench to Locate the Roadway Leading West from the Gate

The loose, ashy topsoil ranged 20-27cm thick across the trench [L:002]. Below, a hard-packed sub-pavement was revealed, consisting of basalt chips, soil and pottery fragments [L:005]. Curbstones and a few stones of a cobble pavement survived on the west end of the packed underlayment (**Fig. 11**). This sub-pavement was constructed on top of another loose, ashy layer (20cm thick) containing many small pebbles and pottery fragments [L:007]. The latest date for the ceramic finds in both Locus 005 and 007 was the Late Byzantine period (mid 6th to early 7th century), though given the small number of diagnostics the date could possibly extend into the Early Umayyad period.

A second packed sub-pavement of similar composition [L:008], slightly thinner by 3cm, was found below the ashy deposit. There were fewer ceramics in this layer, and no diagnostic sherds; the wares, however, are Late Roman in date, and include Hauran ware (see Section C below) and Eastern Sigillata A. This sub-pavement was constructed on top of a 72cm-deep dark, ashy layer [L:009] containing Nabataean/Early Roman to Late Roman pottery, the deposit of which is dated to the late 3rd/early 4th century AD (*ca* 300). Hauran ware dominated the finds from this ashy layer by count (58%) and weight (61%). Directly beneath lay undisturbed soil and bedrock.

9. Entry gate paving stone on the left, bedrock under the scale stick (photo: Bert de Vries).



10. EE.2. Early Islamic (?) cobble floor (photo: Bert de Vries).

EE.4. Trench Across the Gate into the West Church Courtyard Immediately South of the Commodus Gate South Tower

The gate was created by dismantling the Roman wall running south from the Commodus Gate down to its founding course, which was used as the foundation for a wide doorstep (**Fig. 12**). Most of the soil layers were topsoil [L:001, 003, 004, 006, 008] and subsoil [L:010,

11. EE.3. Road curb with adjacent paving stones in foreground; clay underlayment in background from paving stones to far (east) balk (photo: Bert de Vries).

12. Fallen lintel from doorway into West Church courtyard. Shown upside down, as it appeared when installed above the door. Note the 'hand-drawn' nature of the Byzantine crosses (photo: Bert de Vries).

011, 013]. The exterior doorstep of the church courtyard gate was founded on a layer containing mostly undiagnostic body sherds of Roman through Byzantine date [L:014]. Therefore, its construction is likely contemporary with that of the West Church itself in the sixth century. Perhaps also at this time the south tower of the Commodus Gate was converted into a guardhouse for the church: the previous main entrance into the tower from the gateway was blocked off and a door was added that opened into the churchyard (**Figs. 13-15**).

EE.5. Trench North of the North Gate to Locate the 'Roman' Wall Running from the Center of the North Wall of the North Tower

The founding course of this perimeter wall was discovered under topsoil [L:002, 003]. The wall itself was laid on undisturbed soil and bedrock. Accumulated soil layers adjacent to the wall contained mostly Roman to Early Byzantine pottery, with few diagnostics [L:005, 006]. Therefore, it is probable that this wall was constructed in the Roman period, perhaps contemporary with the construction of the Commodus Gate. At the east end of the trench there was a heavily reconstructed wall that abuts the east wall of the Commodus Gate's North Tower. The accumulated soil against this later wall [L:004] contained a small number of sherds of Byzantine date (*ca* 5th-6th? century). This later wall was also built on bedrock.

EE.6. Probe Trench Five Meters North of EE.3 to Test the Roadway's Extension

Removal of the topsoil revealed the presence of the packed upper roadway sub-pavement (as seen in Trench EE.3, L:005), whereupon excavation was discontinued. This result confirmed the hypothesis that the Roman-period road continues north towards the modern town and the bridge across Wādī az-Za'tarī.

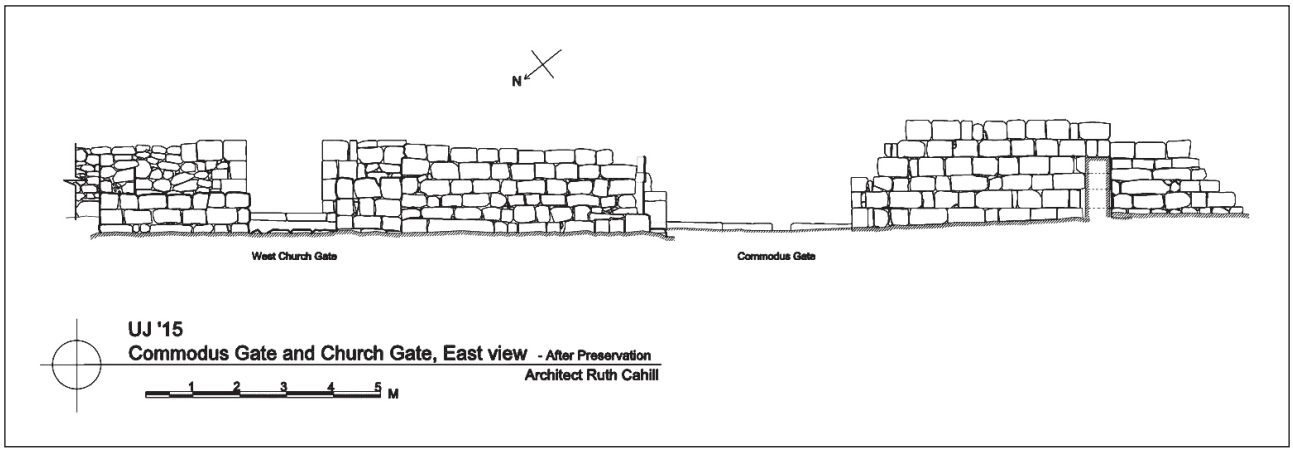
The Ceramic Corpus

Methodology and Quantification

During the excavation season, each sherd - regardless of size - was recorded by ware and fabric and weighed. [The ware and fabric system was developed by Elizabeth Osinga (2017) during doctoral research at the University of Southampton, and is supported by preliminary petrographic analysis by the groups. For the

13. EE.4. Pre-excavation photo showing Byzantine doorway from inside West Church courtyard. Doorway enabled entry to the churchyard from inside the Byzantine town. 28 May 2015, view to the east (photo: Bert de Vries).

14. West façade of the Commodus Gate South Tower before preservation. The wall in the bottom left corner of the photo is the West Church courtyard wall constructed in the 6th century. The doorway to the right of the scale stick was also inserted in the Byzantine remodeling to adapt this tower room as a churchyard outbuilding. 17 June 2015 (photo: Bert de Vries).



15. View of church enclosure gate in relation to the Commodus Gate (drawing: R. Linnaea Cahill).

purpose of this report, only the groups relevant to this publication are briefly presented]. The results show that the corpus is overwhelmingly Nabataean/Roman to Early Islamic in date: only one Middle/Late Islamic sherd was found (**Fig. 16**).

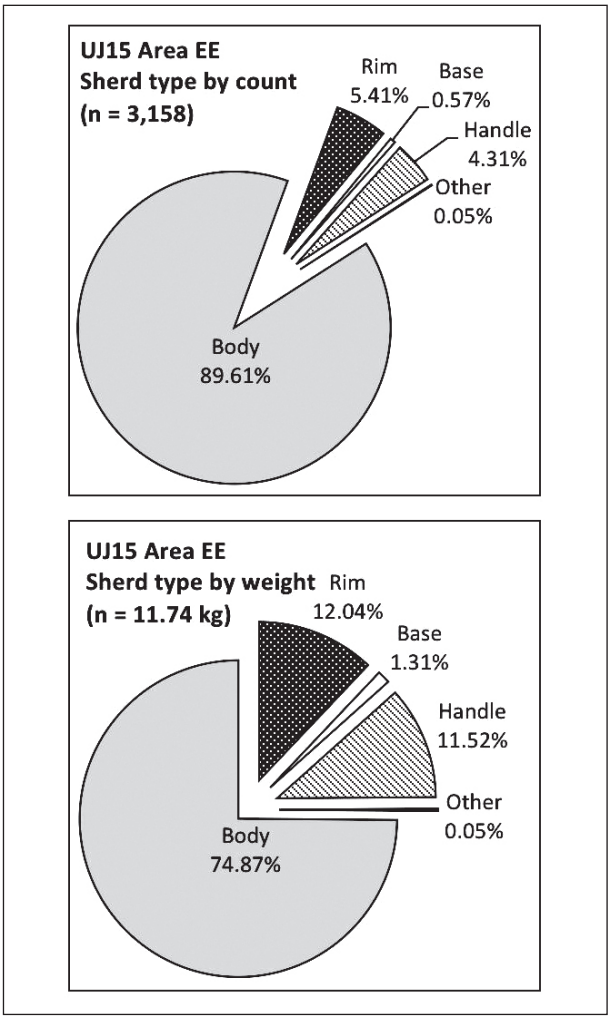
Information about sherd type (rim, base, handle *etc.*) was also included in the database, and the specific form (cooking pot, casserole *etc*.) was recorded when known. By a large margin, the majority of sherds by count and weight were body fragments (**Fig. 17**). Thus, it was not always possible to distinguish between, for example, thinner-walled table and cooking wares in the absence of usewear evidence. The small size of the average sherd further compounded identification; as shown in **Fig. 16**, the average sherd weight for the corpus is less than four grams. Furthermore, of the rims and bases, less than 1% (20 sherds) could be assigned a diameter.

Of the trenches, EE.3 yielded the most pottery by a large margin (**Fig. 18**). However, many of these sherds were in very poor condition, particularly those within the packed sub-surfaces [L:005, 008] and in the ashy layer above bedrock [L:009].

With so many undistinguishable body sherds, owing to size and/or wear, it was not possible to quantify the corpus by specific forms, particularly in terms of the common terracotta wares. Thus, the pottery has been divided into five broader formal groups (**Fig. 19**): (1) cooking, table and thin-walled storage wares; (2) thick-walled storage wares (*e.g.* dolia and basins); (3a) amphorae and (3b) bag-shaped jars; (4) finewares; (5) lamps and lanterns.

Period	Sherds	Weight (g)	% Sherds	% Weight	AVG sherd weight (g)
NAB/R–EIS	3157	11711.75	99.97%	99.76%	3.71
MIS/LIS	1	28	0.03%	0.24%	28
TOTAL	**3158**	**11739.75**	**100%**	**100%**	**3.72**

16. Area EE ceramic periodization.



17. Area EE sherd types by count and weight.

Pottery Production and Trade

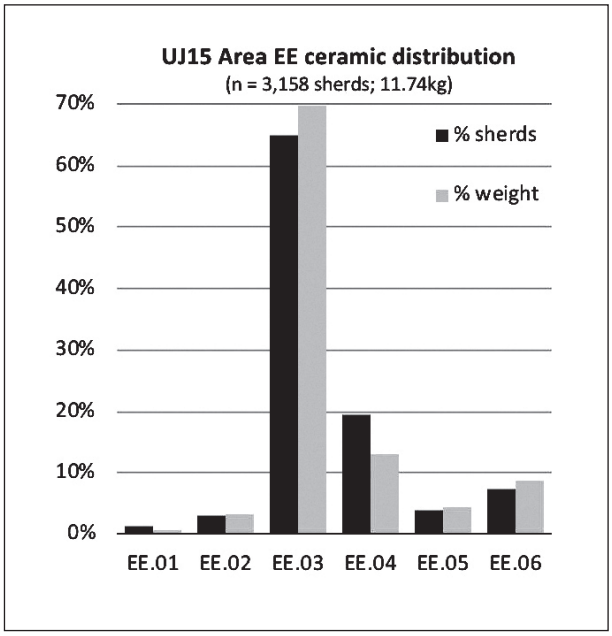
With no evidence of local pottery production at Umm al-Jimāl or at other settlements in northeastern Jordan (particularly for the Nabataean/Roman to Early Islamic period), everyday pottery was imported from production centers in other regions of Jordan, Syria and Palestine, and of course amphorae and finewares could come from more distant production sites.

In terms of a general quantification of pottery import, the corpus can be broken down into three categories: (1) local, in which the ceramics are made from basaltic clay [This group is distinguished from pottery which contains the occasional secondary basalt fragments that are sometimes found, for example, in wadi sand]; (2) regional, where the clay is non-basaltic and the pottery was imported from up to *ca* 150km away, though generally within about 60-100km; (3) supra-regional, which includes all wares imported from distances over 150km. Despite its location on the basaltic plateau, the majority of Umm al-Jimāl's pottery, when considering all periods, is overwhelmingly regional in origin (**Fig. 20**).

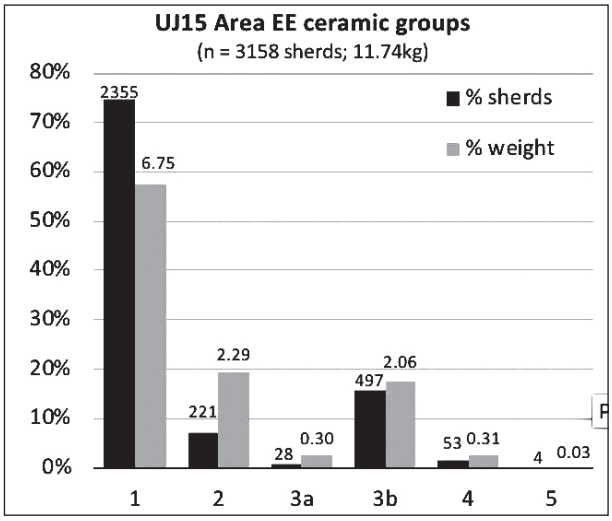
This methodology can also be applied, for example, to each of the pottery groups in **Fig. 19** (broken down into wares and/or smaller periods when possible), or can be used to compare the Nabataean/Roman to Early Islamic and Middle/Late Islamic corpora. [The sole MIS/LIS sherd from Area EE is local in origin. When comparing the two periods in House XVII-XVIII, where more MIS/LIS pottery was available for study, the local pottery dominates the MIS/LIS period by a large margin in count and weight. It was produced in a number of fabrics, and both hand-/mold-made and wheel-made vessels were present (Osinga 2017)].

Pottery Wares

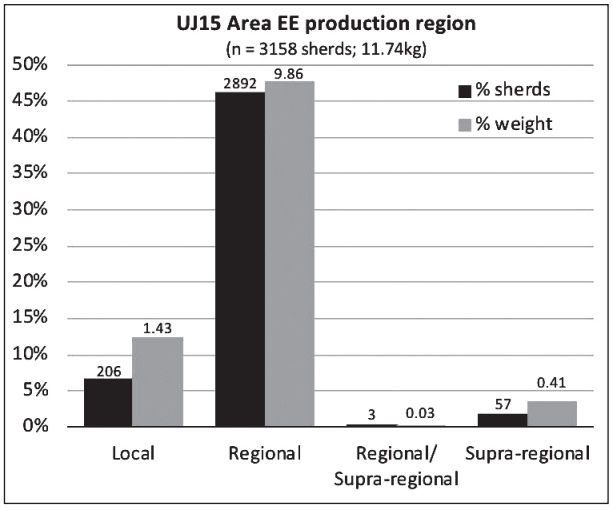
In addition to the well-published finewares and transport vessels, there are several other wares illustrated in the pottery plates that require brief explanation. These are presented here in simplified form, often amalgamated into one ware/fabric for the purpose of this publication. More detailed ware information, including petrological analysis, is available in a recent thesis (Osinga 2017) and article (Osinga, 2020).



18. Distribution of pottery per trench.



19. Distribution of pottery per formal group.



20. Umm al-Jimāl's pottery provenance.

Hauran Ware

[Published parallels come from Si‘: Groupe A (Villeneuve *et al.* 1981: 47-9), Catégorie A (Barret *et al.* 1985b: 224-6), Pâte A (Orssaud *et al.* 2003); Bostra: Pâte 1 (Joly and Blanc 1995: 112); southern Syria: Pâte basaltique claire (Renel 2010: 524); Umm al-Quttayn and environs: Hauran Ware (Kennedy *et al.* 1995: 63)].

This pottery is made of basaltic clay and is commonly reddish, brownish or purplish in color. It is nearly always oxidized, though dark cores are not uncommon. The generally well-sorted fabric ranges from very well-levigated and fine to medium-coarse, depending on the size of the basalt. The grey or black rock fragments are often visible by eye or with a hand lens. In rare cases, there are inclusions of rounded (probably ferrous) red/dark nodules, including probable magnetite. Most sherds are self-slipped.

Several types of decoration occur: most common is line burnishing on the inside of bowls or the outside of jars/jugs, but finger-pinched decoration also appears frequently, particularly along or under the rim of jars and bowls.

One production site, identified by kiln furniture and soil studies, was at Si‘ in southern Syria (Barret *et al.* 1985a: 225; Renel 2010: 524). The ware dates from the Nabataean/Roman to Early Byzantine period at Umm al-Jimāl (*ca* 1st-5th century). Current evidence suggests that it probably declined during or slightly before the Early Byzantine period (Osinga 2020).

Jarash Terracotta

[Principal published parallels are from Jarash: Type C (Clark and Falkner 1986: 251),Type δ (Uscatescu 1996: 46), Reddish/Red brown ware (Lichtenberger *et al.* 2015: 15); Pella: Ware C (Watson 1992: 236-7), Ware 11 and 11A (Walmsley 1995: 661, 664)].

In Jordan, Gerasa/Jarash was the closest urban center and known pottery production site to Umm al-Jimāl at around 60km away via known routes - about the same distance to Sī‘. The presence of pottery from Jarash at sites in the basaltic plateau was first noted by R. Falkner during the Southern Hauran Survey (Kennedy *et al.* 1995: 63, “Metallic Ware” and “Jarash White-on-Red ware”).

This slipped pottery ranges a great deal in color, from red to brown, grey or sometimes orangey hues, depending it seems primarily on firing. Table and cooking wares were typically oxidized, except in the Early Islamic period, where reduced cooking wares become common. The clay is quite distinct in that it is usually well levigated and contains few visible elements, typically only bits of limestone, quartz and sometimes small, rounded clay nodules (most <0.5mm in size). Larger limestone fragments can spall on the exterior surface. Particularly in the Early Islamic period, quartz grains are larger and more abundant and can be easily seen macroscopically. Petrologically, no additional elements were observed in our samples; however, recent analysis of the clay and its components identified feldspar inclusions in a minority of examples (Merkel 2019).

Coarse Reduced Storage Ware

[Selected published parallels come from Jarash: Type ζ (Uscatescu 1996: 46), Grey ware (Lichtenberger *et al.* 2015: 15); Pella: Ware D (Watson 1992: 237); Bostra: Pâte 5, 1-2 (Joly and Blanc 1995: 112)].

These reduction-fired large bowls/basins and dolia were produced at Jarash using the same base clay as described above. [The addition of a grog fragment was found during petrological examination of one of the basins]. The bodies of the vessels were usually coil-made, and the rims were added on the wheel. At Umm al-Jimāl, only one dolia rim and one certain dolia body sherd have been found since 2012, and thus it appears that the open forms were considerably more common at the site.

Pellet Ware

This is a medium-fine to coarse ware that ranges broadly in terms of inclusion size (<0.05-2mm) and sorting (poorly to moderately well). The fabric is striking to the eye due to the common and generally rounded or subrounded clay pellets, either dark or reddish in color. The other primary inclusion is limestone, which can be 1mm or larger. The vessels can be oxidized or reduced, with the latter being more common; in addition, darkened cores and/or interior margins on oxidized sherds are typical. The ware is slipped, typically rather thickly, and the color tends to be pinkish, grey, or brown.

The most common form in this ware is the bag-shaped jar, usually Roman to Early Byzantine in date. Rare cooking and tableware fragments have been found, along with a larger number of thick, coil-made body sherds and a few dolia rims. There is no exact published parallel for this ware, but it is probably a northern Palestinian import. [The forms are consistent with the general corpus of Palestinian-produced bag-shaped jars, and the microscopic composition of the fabric has affinities with that of a Roman fabric from the Galilee, to which nodules of terra rossa soil were added to calcareous clay (Wieder and Adan-Bayewitz 2002: 404-6, Fig. 10)].

Miscellaneous Terracotta

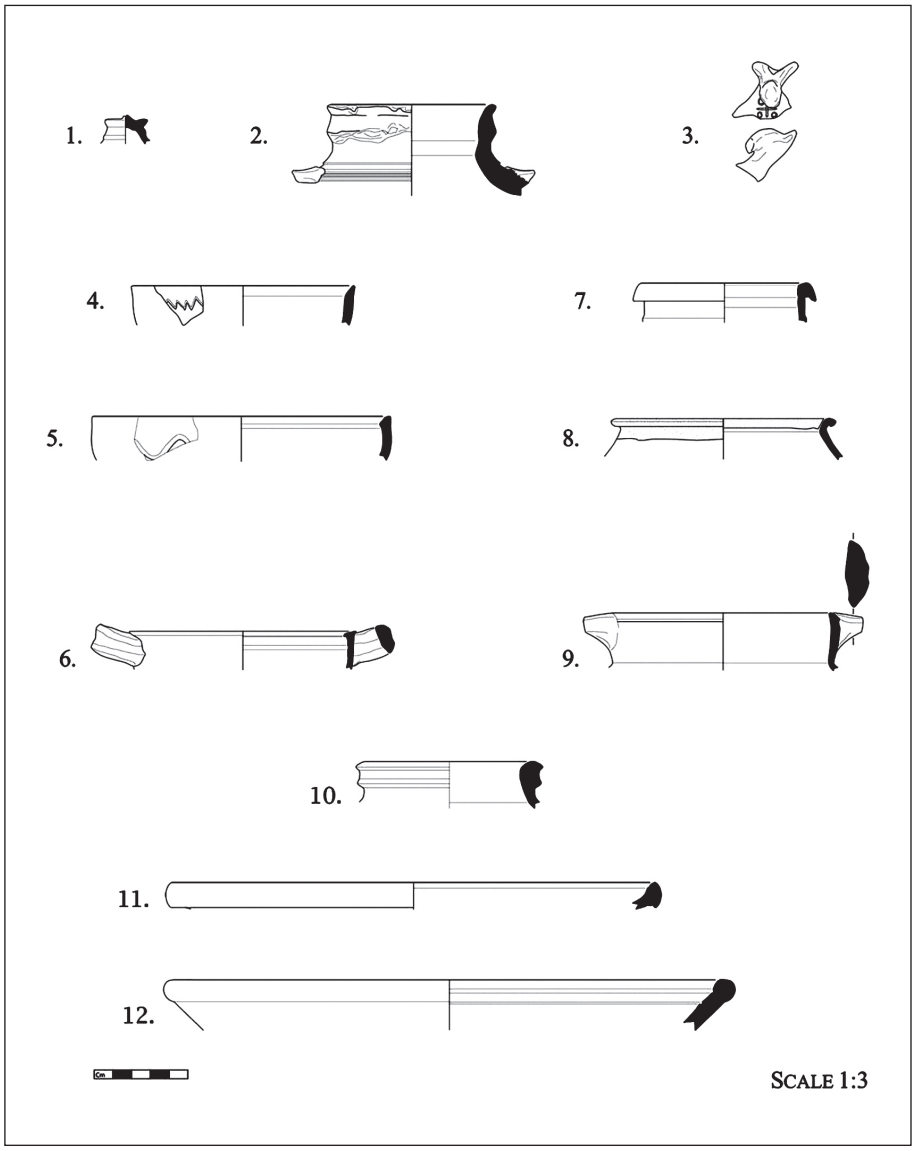
This is a catch-all category for cooking, table and thin-walled storage wares that are not consistent with fabrics from Jarash. The fabrics of this ware are generally, but not always coarser. The typical elements seen microscopically, apart from limestone and quartz, are rock fragments, such as siltstone and sandstone, and in rare cases shell.

*Pottery Drawings (***Figs. 21-23***;* **Tables 1-3***)*

A guide to the pottery tables is available in Appendix B.

Interpretation of the West Gate Area Excavations

The construction date of the Commodus Gate in the late 2nd century was confirmed by the excavations. This gate survived the wider destruction at Roman Umm al-Jimāl in the late 3rd century (at the time of the wars of Zenobia,

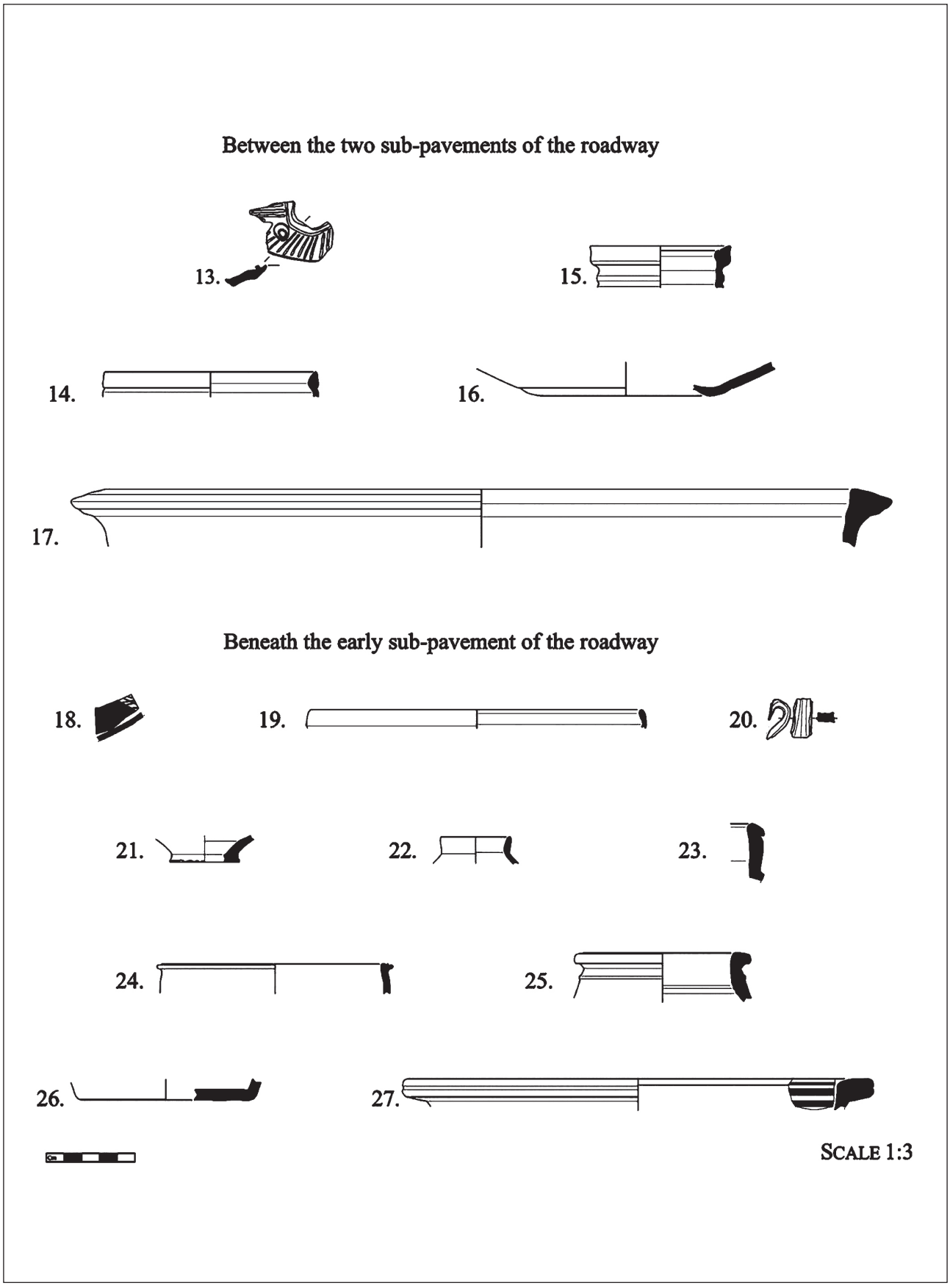


21. Ceramics from the topsoil.

Table 1: Description of ceramics in **Fig. 21**.

No.	Context	Form	Ware	Munsell	Date	Selected parallels
1	EE.2:001.9.1	Lid knob	Jerash tc.	*Ext S*: 2.5YR 6/6 *Int*: 10YR 6/2 *Fab*: 2.5YR 5/4	LBYZ (or later)	**Jerash** (Uscatescu 1996: Fig. 76, nos. 408, 410).
2	EE.2:001.9.2	BSJ	LRA 5	*Ext S*: 10YR 8/3 *Int, Fab*: 7.5YR 7/4	c. 7th–8th cen.	**Piéri Type 4C** (Piéri 2005: Fig. 79); **Pella** (Watson 1992: Fig. 10, no. 83).
3	EE.3:002.4.3	Lamp	Jerash lamp	*Ext/int S:* 5YR 7/4 *Fab*: 7.5YR 5/3	LBYZ–UM	Selected parallels: **Jerash** (Scholl 1986: Fig, 1, no. 4; Kehrberg 1989: Fig. 5, nos. 25–6); **Bostra** (Guidoni 1990: nos. 23–4); **Pella** (da Costa 2010: Fig. 25); **Umm el-Jimal** (Lapp 1995: Figs. 1–2).
4	EE.3:002.4.2	Cup/ bowl	Jerash tc.	*Ext S*: 10R 5/6 *Int S?*: 2.5YR 6/6 *Fab*: 10R 6/6	LBYZ–EUM	**Jerash** (Uscatescu 1996: Fig. 68, no. 338; Fig. 100, no. 687). Form, not fabric, as FBW 1A (below).
5	EE.3:002.4.4	Bowl	FBW	*Ext S/B*: 10YR 5/1, 5/2 *Int S*: 10YR 5/1 *Fab*: 5YR 4/1		**Jerusalem** FBW Form 1A (Magness 1993: 193–4).
6	EE.4:008.10.3	CASS	Misc. tc.	*Ext S*: 5YR 6/3 *Int S*: 5YR 6/6 *Fab*: 5YR 6/4, 6/6	R/BYZ	A long-lived form with numerous variants (discussed by Parker 2006).
7	EE.4:008.10.4	BSJ	Jerash tc.	*Ext, Int*: 2.5Y 5/1 *Fab*: GLEY N5	LBYZ	Probably a variant of **Jerash** (Uscatescu 1996: Fig. 94, no. 612). Several examples were found in House XVII-XVIII, and one at the "Barracks" (Parker 1998: Fig. 16)
8	EE.4:006.7.3	Jar	Jerash tc.	*Burned and worn* *Ext S*: 10YR 5/1 *P*: 5Y 8/2 *Fab*: 5YR 6/6, 7.5YR 6/1		**Jerash** (Uscatescu 1996: Fig. 84, no. 522).
9	EE.4:008.10.2	CP	Misc. tc.	*Ext S*: 5YR 6/6 *Int*: 5YR 7/6 *Fab*: 5YR 5,6/6	EBYZ–early LBYZ	**Jerash** (Falkner 1985: no. 355).
10	EE3:010.21.4	Jar	Hauran ware	*Ext S*: 2.5YR 4/1,2; 5/2 *Int*: 2.5YR 4,5/2 *Fab*: 2.5YR 4/4	NAB/R/ EBYZ	**Sī'** (Orssaud and Blanc 2003: Pl. 147, no. 20).
11	EE:001.5.3	Bowl	Jerash bowl	*Ext S*: 2.5YR 6/4 *Int S*: 2.5YR 6/4, 6 *Fab*: 2.5YR 6/6	LBYZ	**Jerash** (Watson 1989: Form 7b; Uscatescu 1993: Form 11B).
12	EE6:001.5.2	Bowl	ARS	*Ext S*: 2.5YR 5/6, 8 *Int S*: 2.5YR 5/8 *Fab*: 2.5YR 5/6	mid-6th to mid-/late 7th cen.	**Form 104C** (Hayes 1972: Fig. 30, no. 23; Reynolds et al. 2011).

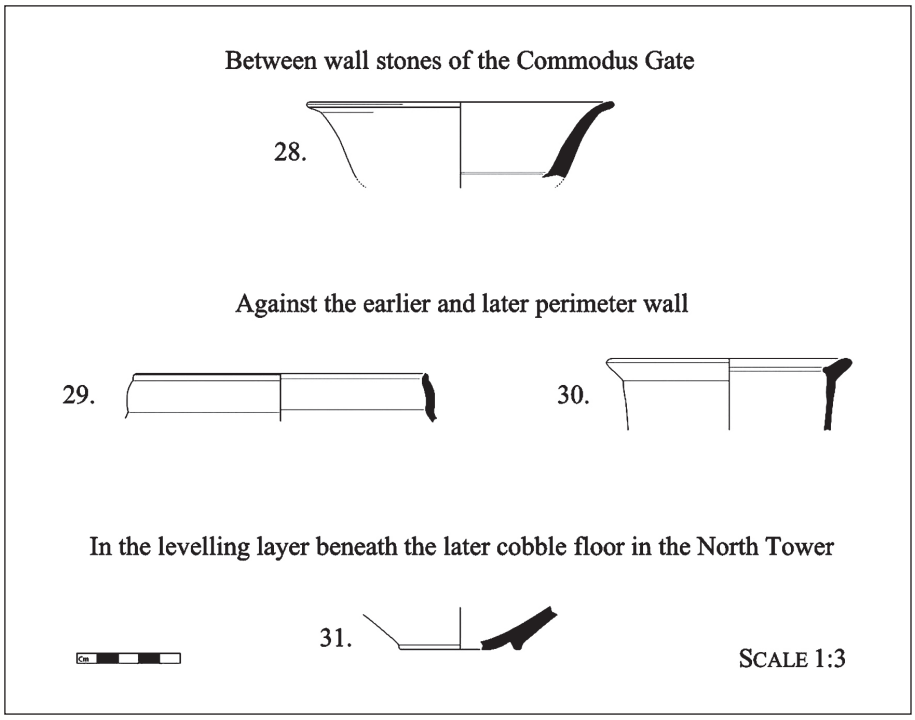
Ghadima and Aurelian), which is hinted at by the deep ashy layer of EE.3. During the Tetrarchic recovery, the road leading from the gate toward the Via Nova was reconstructed as part of the Roman defensive buildup, which also included the construction of a fort: the Roman castellum on the east side of Umm al-Jimāl. After the degeneration of the Roman military frontier in the 4th century, the roadway was resurfaced and paved again in the Late Byzantine or Early Umayyad period (*ca* late 6th-7th century). Perhaps also at this time, the North Tower of the Commodus Gate was repaved with cobble stones. This may represent a general remodeling of the site in the Late Byzantine/Umayyad period, also evident in the Praetorium and House XVII-XVIII Complex.



22. Ceramics from the roadway.

Table 2: Description of ceramics in **Fig. 22**.

No.	Context	Form	Ware	Munsell	Date	Selected parallels
13	EE.3:007.16.4	Lamp	Jerash lamp	*Ext/int S*: 5YR 6/4 *Fab*: 5YR 5/4	LBYZ–EUM	Nozzle end, perhaps with half-volutes, e.g. **Jerash** (Kehrberg 1989: Fig. 5, no. 25).
14	EE.3:007.14.1	CP/jar	Jerash tc.	*Ext/int S*: Burning, 5YR 5/3 *Fab*: 5YR 5/4	LBYZ	**Jerash** (Uscatescu 1996: Fig. 86, no. 540–41).
15	EE.3:007.16.2	BSJ	Jerash tc.	*Discoloured* *Ex, int S?*: 10YR 5/1, 6/2 *Fab*: 10YR 5/1		**Jerash** (Uscatescu 1996: Fig. 94, no. 609).
16	EE.3:007.14.6	BSJ	Jerash tc.	*Ext*: 10YR 5/1, 6/2 *Int*: 7.5YR 5/3, 5/4 *Fab*: GLEY N4		An omphalos base is typical of these bag-shaped jars, e.g. **Jerash** (Uscatescu 1996: Figs. 93–94, nos. 594, 598, 599, 600, 618).
17	EE.3:007.16.5	Basin	Coarse redu st. ware	*Ext, int*: 10YR 5/1 *Fab*: 10YR 5/1, 5/2		**Jerash** (Uscatescu 1996: Fig. 87, no. 557).
18	EE.3:009.18.12	Bowl	NPFW	*Ext*: 10R 5/4 *Int S, Fab*: 2.5YR 6/6 *P:* 10R 5/3	NAB (c. AD 70/80–100)	**NPFW Phase 3b** (Schmid 2000: Abb. 91, Farbtafels 3–4, nos. 7–11)
19	EE.3:009.18.4	Bowl	NP?FW	*Burned through, post-deposit*		Probably also **N(P)FW Phase 3b** (e.g. Schmid 2000: Abb. 91, no. 89).
20	EE.3:009.18.8	Cup	ESA	*Ext S*: 10R 4/8 *Fab*: 7.5YR 7/4	NAB/R (early 2nd cen.)	**Form 61** (Hayes 1985: Pl. VII, no. 15).
21	EE.3:009.19.4	Bottle?	Misc. tc.	*Ext S, Fab*: *Burned* *Int*: 5YR 5/4	NAB/R	String-cut base, e.g. **Lejjûn** (Parker 2006: Figs. 51, 144). Possibly the same vessel as no. 22.
22	EE.3:009.19.12	Bottle?	Misc. tc.	*Ext S*: 2.5YR 6/4 *Int S?*: 5YR 6/4 *Fab*: 7.5YR 5/4		No certain parallels. Possibly the same vessel as no. 21.
23	EE.3:009.18.6	BSJ	Misc. BSJs	*Ext/int:* 7.5YR 8/2 *Fab margins*: 10YR 7/2; *core* 5YR 7/4	LR	**Capernaum** (Loffreda 2008: DG75, no. 17; DG 79, nos. 34, 48); similar to: **Jerash** (Falkner 1985: Fig. 31, no. 253) and **Bostra** (Wilson and Sa'd 1984: Fig. 162).
24	EE.3:009.18.16	CP	Hauran ware	*Ext S*: 2.5YR 5/4 *Int*: 10R 5/4 *Fab*: 2.5R 5/6	NAB/R	**Sī'** (Orssaud and Blanc 2003: Pl. 151, nos. 52–63); form, not fabric, as **Kefar Hananya** (Adan-Bayewitz 1993: Pl./Form 4B).
25	EE.3:009.18.11	Jar	Hauran ware	*Ext/int S*: 2.5YR 5/6 *Fab*: 2.5R 4/6		**Sī'** (Orssaud and Blanc 2003: Pl. 147, nos. 30–31).
26	EE.3:009.19.7	Dish?	Hauran ware	*Ext/int S*: 2.5YR 5/3 *Fab margins:* 2.5YR 5/4; *core* 5YR 4/2		Similar to **Sī'** (Orssaud and Blanc 2003: Pl. 129, no. 26).
27	EE.3:009.19.11	Bowl	Hauran ware	*Ext/int S*: 2.5YR 5/4 *B:* 2.5YR 4/4 *Fab*: 2.5R 5/6		**Sī'** (Orssaud and Blanc 2003: Pl. 139, nos. 55–57).



23. Ceramics from foundation contexts.

Table 3: Description of ceramics in **Fig. 23**.

No.	Context	Form	Ware	Munsell	Date	Selected parallels
28	CG WALL.1	Bowl	ESA	*Int/ext S*: 2.5YR 4/8, 6/8 *Fab*: 10YR 8/3	LR (2nd cen.)	**Form 58** (Hayes 2008: Fig. 7, no. 165).
29	EE.5:005.9.3	CP	Jerash tc.	*Ext S*: 7.5YR 6/4, 7/4 *Int*: 7.5YR 7/4 *Fab*: 5YR 7/4	LR	**Jerash** (Falkner 1985: nos. 336, 338). This form is part of the broader tradition of LR grooved rim cooking pots (summarised by Parker 2006: 335–6).
30	EE.5:004.5.1	BSJ	Pellet ware	*Ext/int S*: 10YR 7/3 *Fab margins:* 7.5YR 5/2; *core:* 7.5YR 5/1	LR/ EBYZ	**Lejjûn** (Parker 2006: Fig. 34); similar to **Capernaum** (Loffreda 2008: DG77, no. 3).
31	EE.2:006.14.1	Bowl	Hauran ware	*Discoloured* *Ext/int S*: 2.5YR 5/3 *Fab*: 2.5YR 4/3	NAB/R	Similar to **Sī'** (Orssaud and Blanc 2003: particularly Pl. 131, no. 45).

Appendix A: Project Staff (Fig. 24)

Senior staff

Bert de Vries	Calvin College	director; architect
Sally de Vries	Calvin College	administrator
Paul Christians	Open Hand Studios	visual documentation
Jeff DeKock	Open Hand Studios	visual documentation
Muaffaq Hazza	Al al-Beit Univ.	field director
Mohammad Bashtawi Yarmouk Univ.	field superviser	
Elizabeth Osinga	U of Southampton	stratigrapher; ceramics
Jobadiah Christiansen	Kent State Univ.	objects; samples

24. Team Photo, 17 June 2015. By Jeff DeKock.

Lauren Coughlin	American U at Rome	community education
Representative	Dept. of Antiquities	

Field School Students

Bryan Burke	Calvin College	excavator
Ruth Cahill	Calvin College	architect
Rebecca Lawson	Calvin College	excavator
Brianne Lynn	Calvin College	excavator
Elijah Morton	Calvin College	expediter
Jessica Petrie	Calvin College	excavator

Local Staff

Ali Aqil	foreman
Ahmed Hussein Fakhri	site management trainee
Ahmed Hassan Eid (Abu Leith)	site management trainee
Ahmad Hassan es-Serour	site management trainee
Mohammad Hazza' Suwan	excavation trainee
Abdullah Suleyman Ighveli	site management trainee
Awda Halal Hassan al-Masa'eid	mason
Awda Mifleh Awda al-Ghveir	site management trainee
Abdu er-Razak Faris al-Masa'eid	site management trainee
Abd ar-Rahman Hasan Za'al	excavation trainee
Awad Hussein Matar al-hadeib	site management trainee
Bashar abd al-Majeed es-Salihi	site management trainee
Hamadeh Falah Mashwah	site management trainee
Majid Atica Fa'our	site management trainee
Fa'iz es-Senayan Awad	mason
Omar Ghazi Ariyan (Abu Lehyeh)	site management trainee
Mum'a Shatiy Jow'an	guard
Sened Ahmed Saalim ar-Rhaide	guard
Ahlam Kurdi	excavation trainee
Noor Ali	digital communication trainee

Appendix B
Context = Trench:Locus.Pail#.Sherd#.
Form abbreviations:
BSJ = Bag-shaped jar
CASS = Casserole
CP = Cooking pot

Ware abbreviations:
ARS = African red slip
ESA = Eastern Sigillata A
FBW = 'Fine Byzantine Ware'
LRA = Late Roman Amphora
NPFW - Nabataean Painted Fineware
tc. = terracotta

Munsell abbreviations:
S = Slip
P = Paint
B = Burnishing

Dating based on Parker's (2006) and Uscatescu's (2003) periodization, tailored to Umm al-Jimāl's known settlement history (**Table 4**). All dates AD.

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Table 4: Pottery periodization at Umm al-Jimāl.

Abb.	Period name	Date range
R	*Roman*	*c. mid-1st cen.–324*
ER	Early Roman	c. mid-1st cen.–135
NAB	Nabataean	c. mid-1st cen.–106
LR	Late Roman	135–324
BYZ	*Byzantine*	*324–640*
EBYZ	Early Byzantine	324–491
LBYZ	Late Byzantine	491–640
TRANS	Transitional	640–661
EIS	*Early Islamic*	*661–c. 800*
EUM	Early Umayyad	661–700
LUM	Late Umayyad	700–750
EAB	Early 'Abbasid	750–c. 800

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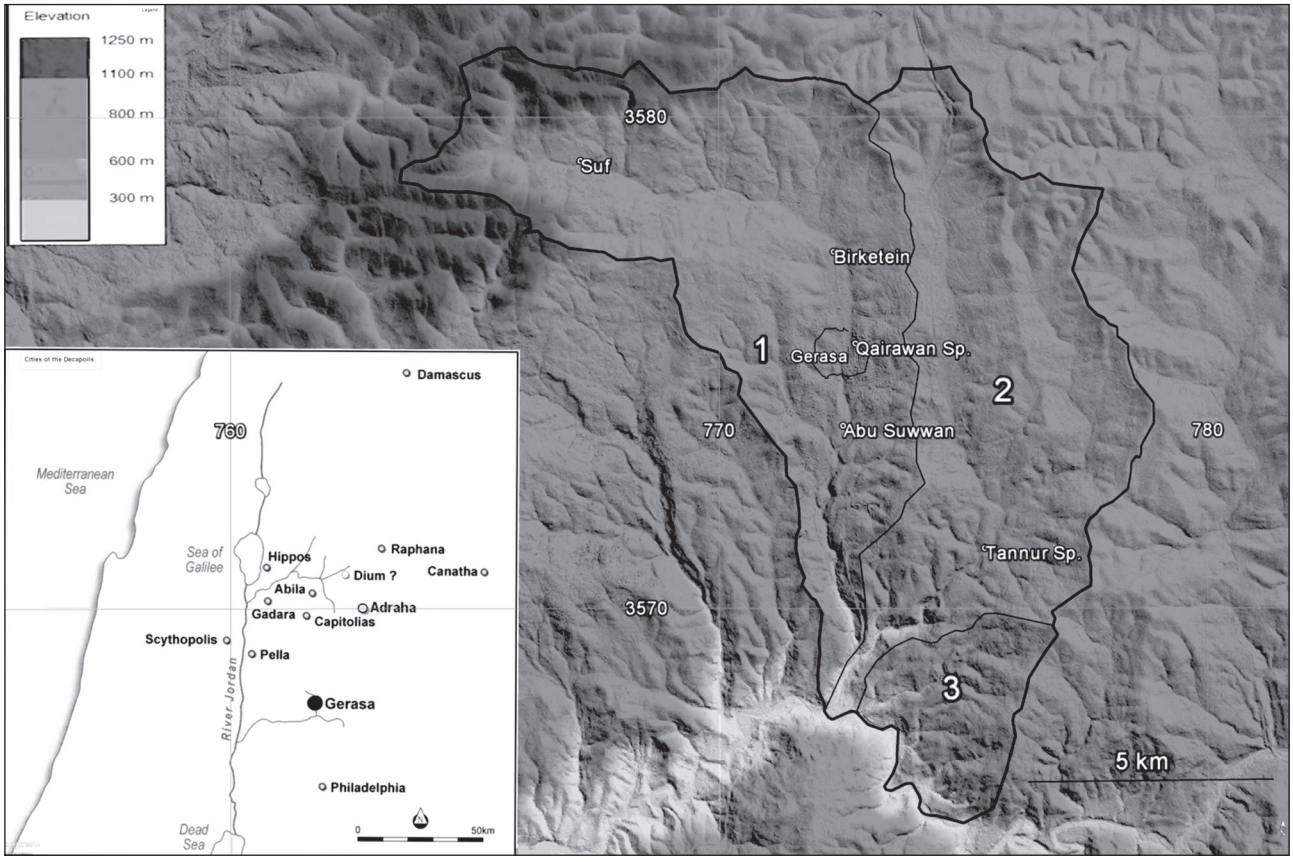
THE JARASH WATER PROJECT 2016 REPORT ON THE FOURTH FIELD SEASON

David D. Boyer

Introduction

The Jarash Water Project (JWP) is investigating the water-management system to Gerasa and its hinterland in the Hellenistic to Byzantine period (2nd century BC - mid 7th century AD). The 100 km^2 project area comprises the Jarash valley[1] and the neighbouring Majarr-Tannūr valley[2] (**Fig. 1**). The JWP study seeks answers to several fundamental research questions, including the sources of water supply for the city and its hinterland, the nature of the water distribution network and the period of its use. This report covers fieldwork conducted in the fourth and final field season between 8th May 2016 and 19th May 2016.

Previous field seasons were conducted in 2013, 2014 and 2015 (respectively Boyer 2017; 2018a; 2018b. Surface surveys identified



1. Study area and catchment boundaries on 5m digital surface model obtained from AW3D satellite: (1) Jarash valley; (2) Majarr-Tannūr valley; (3) South-eastern wadis. (©NTT Data, RESTEC/Image ©2016 CNES/Astrium).

1. From north to south, the Jarash valley comprises Wādī Sūf, Wādī ad-Dayr and Wādī Jarash.

2. This valley comprises Wādī al-Majarr and Wādī at-Tannūr (also known as Wādī ar-Riyāshī).

aqueduct and storage components of an extensive water-management system in the Jarash and lower Majarr-Tannūr valleys, primarily sourced from strong springs (Boyer 2016a; 2016b). The ancient water-distribution system to both rural and urban consumers generally comprised open canals cut directly into outcropping bedrock. However, the survey also recorded masonry canals and relatively short sections of aqueducts carried in tunnels. The limited application of archaeological excavation during the study has meant that the dating of water-related installations has relied on obtaining radiocarbon dates (C_{14}) from charcoal-bearing plaster or mortar lining these installations (Boyer in prepare). Few installations identified in the study have suitable charcoal-bearing plaster, the north-west aqueduct being a notable exception.

Research on cave sites west of the Jordan Valley (Bar-Mathews and Ayalon 2011; Vaks *et al.* 2010; Verheyden *et al.* 2008) has shown that speleothems can be important palaeoclimate proxy archives. To date, there is no published research on speleothems from the Ajlun Highlands, and JWP has initiated palaeoclimate studies on speleothem and tufa samples collected from sites in the Jarash valley in an attempt to fill this knowledge gap. Studies in Turkey and western Europe have found that carbonate sediment (sinter) commonly found lining Roman aqueducts can also be a useful palaeoclimate proxy archive (for example Passchier *et al.* 2016; Sürmelihindi *et al.* 2013), and in this context a separate palaeoclimate study is investigating the carbonate sinter from Gerasa's north-west aqueduct.

The 2016 field program included pedestrian surveys of selected areas to complete the identification of the visible hydraulic installations in key areas. Total-station surveying recorded additional site data at nine important locations in the Jarash valley with the assistance of Department of Antiquities (DoA) staff. The 2016 surface survey recorded twelve new archaeological sites (JWP181-192), bringing the total number of archaeological sites recorded in the four field seasons to 92, and revisited four previously recorded sites (JWP111, 125, 135 and 164). The surface survey focused on sites within the Jarash valley, with only two new sites recorded in the Majarr-Tannūr valley. While the surface survey successfully identified many new archaeological elements, housing and farm development activities limited visibility and access. These factors continue to be the major causes of the destruction of archaeological sites outside of the Jarash Archaeological Park.

The survey identified new aqueduct elements on the east side of Wādī ad-Dayr in the Birkatayn locality and several new spring sites, including a major relict spring site 150m north-west of Birkatayn reservoir that probably supplied the Birkatayn baths.

Contextual geoarchaeological observations made during the field survey contributed to the understanding of the area's landscape history and clarified the depositional extent of the (?) Pleistocene Jarash Conglomerate formation. Studies in the southern Jarash valley provided a relative dating sequence for the main fluvial events in this section of the *wadi*.

Objectives and Methodologies

The program built on the results of the three previous seasons with the aim of finalising the field component of the project. It had four main objectives:

1. To conduct a total-station survey of key archaeological sites identified in the study.
2. To carry out a purposive pedestrian field survey of selected areas identified from photographs and satellite imagery (ALOS World 3D and Pleiades) as being likely to yield information on the ancient water-management system and palaeolandscape.
3. To collect samples of mortar/plaster and carbonate sinter from key water installations for C_{14} dating and laboratory analysis.
4. To make geoarchaeological observations and collect geological materials for analysis.

As in previous seasons, the pedestrian survey focused on locating and recording archaeological sites related to water management. The procedure involved the recording of the archaeological elements at each site by means of a written description, physical measurements, colour digital photographs and sketches, with the location determined by hand-held GPS. The survey concentrated on discrete geographic sectors: in the city area, these included the eastern part of the walled city and on the hill slopes west of the Jarash Archaeological Park,

while in the rural hinterland they included the hills west of the city, the Jarash valley and in the Majarr-Tannūr valley.

The 2016 program included the total-station surveying of nine sites selected because of the uniqueness of their archaeological features and the perceived risk of damage or destruction from new building construction or agricultural activities.

Results

Site Types

The focus on water-related archaeology limits the number of recorded site types. **Table 1** lists the archaeological elements recorded at the various sites and **Fig. 2** shows site locations. **Fig. 3** shows aqueduct alignments referred to in the report.

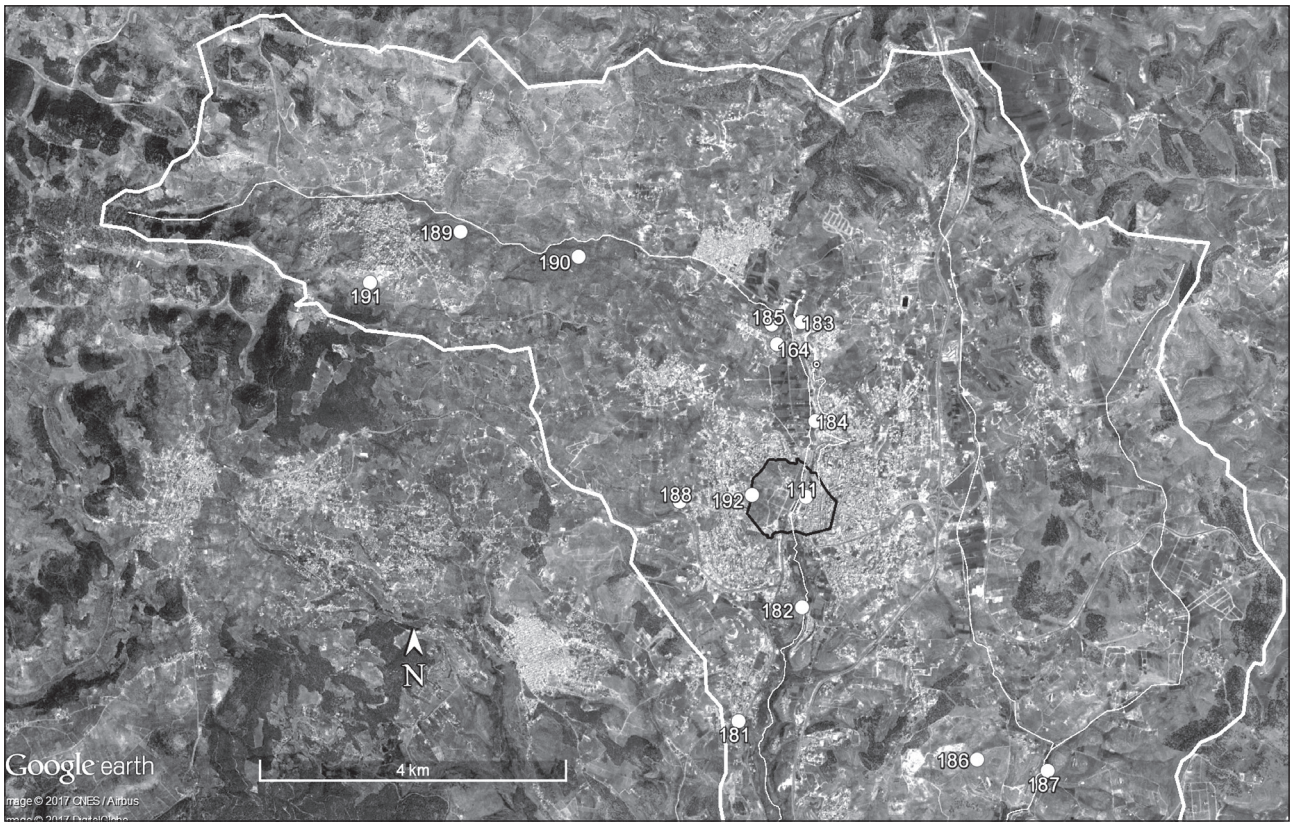
Aqueducts

Qayrawān Aqueduct

The only surviving above-ground section of the Roman aqueduct from Qayrawān spring (site JWP-111) was revisited, as a new stratigraphic profile had been temporarily revealed during new building construction adjacent to the substruction wall carrying Qayrawān aqueduct. Excavations associated with the new building had revealed that the full height of the substruction wall is *ca* 3.5m at this location. This wall is part of the same substruction wall previously recorded by Lepaon (2008: 65-67) in the excavation of the Small (Byzantine) East Baths (Lepaon 2008: 65-67) 10-15m to the south. No date for the Qayrawān aqueduct has been published, but it is likely to date to the same period as the monumental parapet wall at Qayrawān

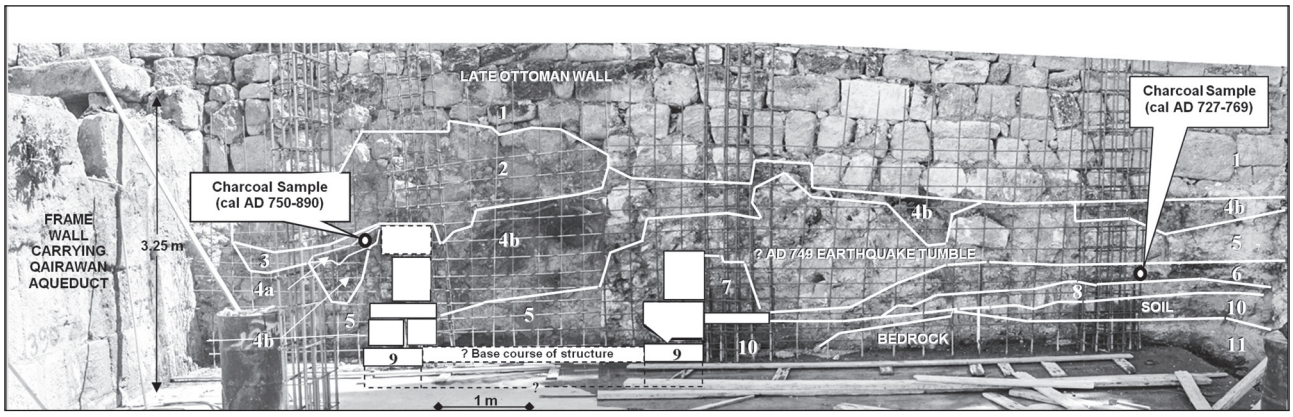
Table 1: Archaeological site details - Jarash Water Project, 2016 Field Season.

JWP_Site No.	Locus	lat (N)	long (E)	GPS Elev	Remarks
111	1	32.28055	35.89503	562	Masonry structure
125	1	32.30048	35.89516	642	Rock-cut canal
135	1	32.24370	35.92445	473	Water mill masonry canal(leat)
135	2	32.24383	35.92451	473	Masonry structure (foundations)
135	3	32.24383	35.92463	477	Masonry structure (foundations)
135	4	32.24355	35.92445	473	Masonry structure (?mill house foundations)
135	5	32.24350	35.92461	473	Masonry specus blocks
164	1	32.29841	35.89148	640	Rock-cut canal
164	1	32.29841	35.89148	640	Rock-cut canal
181	1	32.25473	35.88517	449	Spring
181	2	32.25450	35.88504	466	Spring
181	3	32.25419	35.88545	459	Spring
182	1	32.28055	35.89503	500	Rock-cut basin
183	1	32.30079	35.89502	646	Rock-cut canal
183	2	32.30091	35.89485	645	Rock-cut canal
183	3	32.30098	35.89481	644	Rock-cut canal
183	4	32.30119	35.89465	644	Rock-cut canal
184	1	32.28931	35.89655	589	Rock-cut canal
184	1	32.28931	35.89657	593	Rock-cut canal
185	1	32.30075	35.89080	649	Rural installation_olive/grape press
185	2	32.30075	35.89080	649	Spring/rock-cut waterfall
186	1	32.24947	35.91779	573	Rural installation_olive/grape press, rock-hole
187	1	32.24794	35.92759	507	Spring, basin
187	2	32.24794	35.92759	507	Rock-cut canal
188	1	32.28024	35.87761	596	Spring (kokosi)
188	2	32.28020	35.87774	603	Spring (kokosi)
188	3	32.28037	35.87841	596	Rural installation_olive/grape press
188	4	32.28037	35.87841	596	Rural installation_olive/grape press
189	1	32.31236	35.84802	848	?masonry canal
190	1	32.30913	35.86430	773	Rural installation_olive/grape press
191	1	32.30617	35.83532	1039	Spring
192	1	32.28088	35.88756	610	Masonry canal (Gerasa SW gate)



2. Location of sites recorded in 2016 (Satellite data: Google, DigiGlobe, CNES/Atrium and CNES Airbus).

3. Plan of aqueducts referred to in report (Satellite data: Google, DigiGlobe, CNES Airbus).



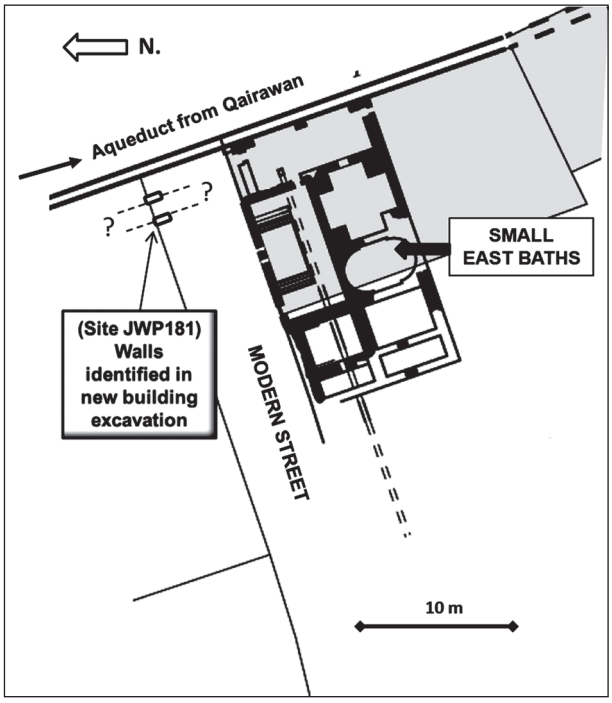
4. Site JWP111: Section showing masonry structure and stratigraphic contexts revealed in a modern building excavation adjacent to the Qayrawān aqueduct frame wall (looking south).

spring. The architecture of this parapet wall appears identical to the architecture of the parapet wall of the *nymphaeum* on the west side of the city, dated by inscription to the late second century AD (Welles 1938: 406, insc. 69).

The 10m long south wall of the building excavation revealed a *ca* 1.5m high, well-layered stratigraphic sequence below a stone wall of late Ottoman (Circassian) date. The section exposed two parallel walls of dressed masonry 1m high, part of a 3.65m wide structure aligned north-south (**Fig. 4**) lying on a (?) masonry floor. The building was probably constructed on Jarash Conglomerate bedrock, and this bedrock was exposed at the western end of the section. The coarse tumble layer in context 5 contains dressed building blocks and is underlain by context 6, which is rich in charcoal dated to cal AD 669-769 (95.4% probability) and overlain by a thick charcoal and ash layer (context 4). A C_{14} date of cal 710-890AD (95.4% probability) was obtained from charcoal in context 4a, making it likely that the coarse tumble layer (and possibly the overlying charcoal and ash layer) is related to the 749AD earthquake. The property owner reported that a watercourse (still carrying water) had been observed during building-site excavation prior to the laying of the concrete slab for the new building, but its function and destination are unknown. This watercourse ran roughly parallel with the Qayrawān aqueduct and passed under the masonry building. The masonry structure may form part of the Small East Baths, which lie *ca* 10m to the south of the stratigraphic section (**Fig. 5**). Lepaon (2012: 294) dated these baths to the mid-fourth century AD.

Site JWP164

The rock-cut aqueduct (SW02) at site JWP164, 150m south-west of Birkatayn, was revisited and excavated to expose the cross-sectional profile of the soil-filled canal. Excavation of the aqueduct at its northern end revealed two stages of canal construction. The first stage involved the cutting of a *specus* up to 0.85m wide and 0.40m deep into an exposed east-facing rock slope. The second stage involved the deepening of the western side of this *specus* to create a separate *specus ca* 0.10m deep, and the construction of a *ca* 5cm high wall of lime-rich mortar on the east side of this new *specus*. The

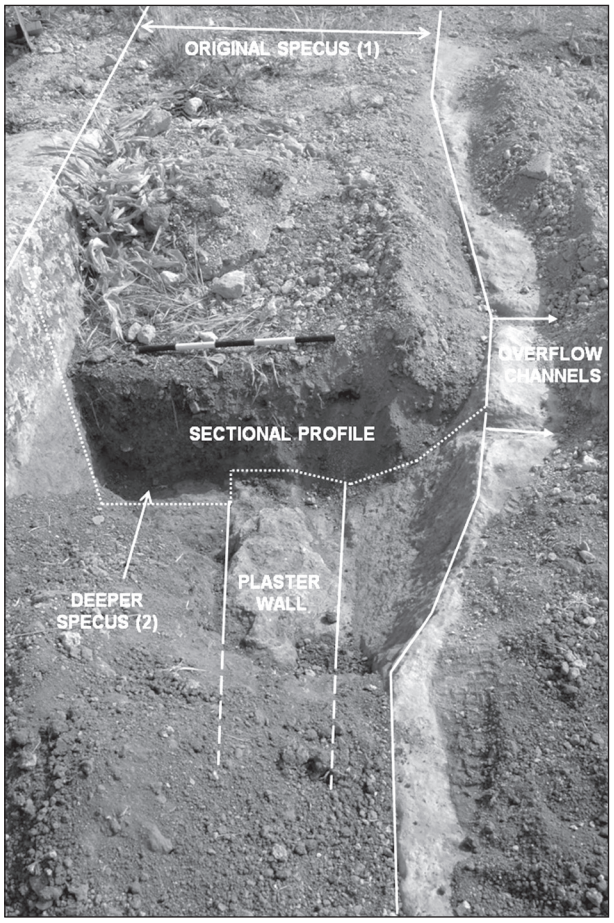


5. Site JWP111: Plan showing proximity of masonry structure to nearby Small East Baths (plan modified from Lepaon 2008: fig. 11).

maximum wettable sectional area of the deeper *specus* is around 30% of the equivalent area for the first, shallower *specus*. While this was presumably done to improve flow velocity in low-flow conditions, it is not clear if this was done to accommodate seasonal fluctuations in spring discharge or was a response to an overall reduction in spring discharge. Two small (overflow?) outlets have been cut into the eastern wall of the easternmost canal, at a point where the original *specus* had been widened (**Fig. 6**).

Aqueducts from (as-Sawdā') Spring

Two ancient canals were supplied from a spring (as-Sawdā') located 400m north-east of Birkatayn reservoir at site JWP183. The upper canal from this spring (SE06) was partly rock-cut and partly constructed on a raised bank at an elevation of *ca* 649m (**Fig. 7a**). Details preserved in several rock-cut sections show that this canal was constructed with a double *specus*, the floor of the western *specus* being 13cm lower in elevation (**Fig. 7b, c**). A similar double-*specus* profile was observed in the lower canal (SW05 - site JWP125), constructed at an elevation 7m below and 25m to the west of the upper canal, where the difference in elevation of the *specus* floors is also 13cm (**Fig. 7d, e**).

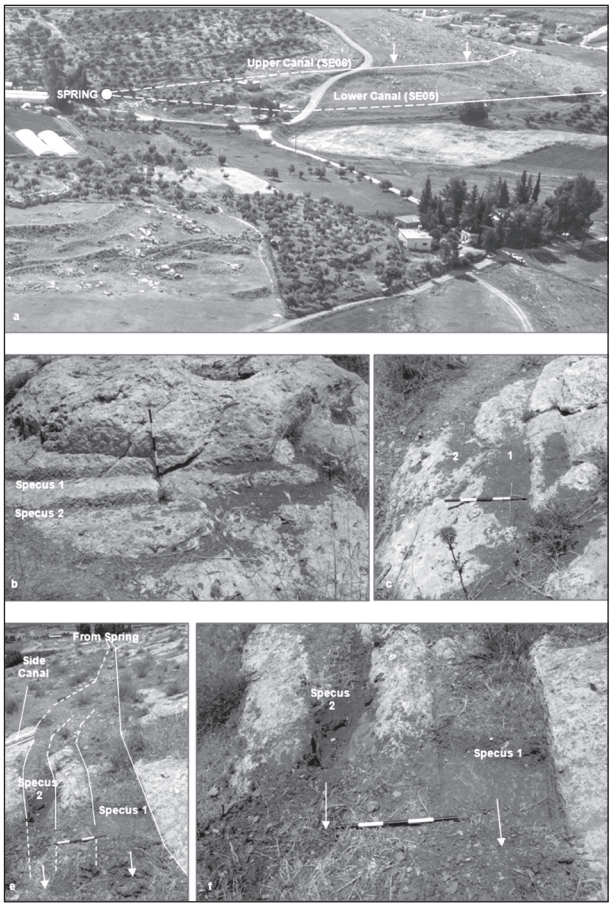


6. JWP164: View of the two specus, separated by a low plaster wall, and small overflow outlets (looking north; scale bar 0.5m).

Springs

Spring Cascades and Natural Fountains

Five new spring sites were recorded in 2016. In all cases, some or all of the observable spring outlets lay within or above a bedrock scarp, and water discharging from these outlets would have formed natural curtain cascades and fountains when the spring was active (**Fig. 8**). Rock-cut modifications to enhance or concentrate water flow were found at the majority of spring sites recorded in 2016 and are a common fea-



7. Rock-cut aqueducts supplied from as-Sawdā' spring: (a) Oblique aerial view (looking south-east) showing relict bank supporting upper canal SE06 (arrows) from spring (Photo courtesy of APAAME: APAAME_20130427_DDB-0558, Photographer, D. Boyer); (b) and (c) Site JWP183, showing the double specus on upper canal SE06; (d) and (e) Site JWP125 showing the double specus on lower canal SE05 (scale bar 0.5m).

8. Relict spring cascade at site JWP191 (looking north).

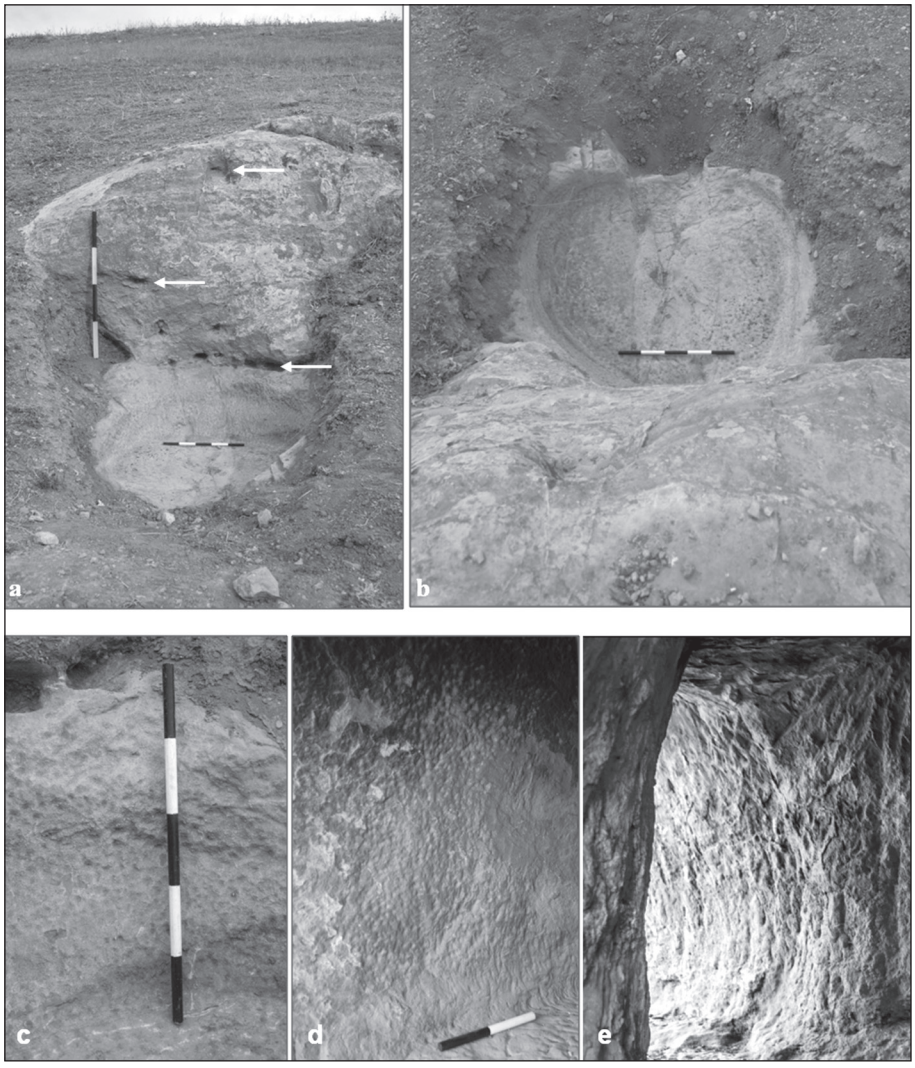
9. Site JWP185: View (looking west) of natural spring cascade with rock-cut channels (arrows) that directed spring-water flow over the 3m high scarp.

ture of spring sites in the Jarash valley. Modifications recorded in 2016 included the cutting of channels to concentrate the flow of water over the top of the cascade to form individual fountains or to direct water flow down the face of the scarp into small catchment basins (sites JWP181, 185, 187 and 191), and the cutting of catchment basins below natural fountain outlets (site JWP182). These modifications would have had the dual effect of dramatising the appearance of the site and making it easier for the water to be collected for domestic use. Modifications to re-direct flow are well preserved at the major relict spring recorded at site JWP185, located on a hill slope 250m north-west of Birkatayn, where at least four channels were cut into the top of the 3m high cascade (**Fig. 9**). This spring may have supplied the Birkatayn baths and may have been a source for the large aqueduct recorded at site JWP164.

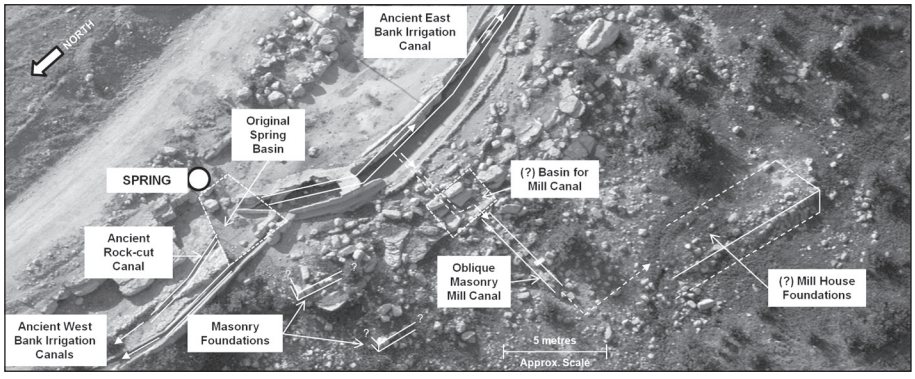
Surveying at the southern end of the large (0.7 ha) relict spring complex at Ficus springs in Wādī Jarash 1km south of the city identified a small, well-preserved, natural fountain and rock-cut catchment basin exposed in a looters hole on the *wadi*'s west bank (site JWP182). Uniquely, the basin surface has a distinctive coarsely 'pecked' finish compared to the usual 'picked' finish found in the tunnel walls and canals at Ficus springs. The picked finish is attributed to the use of a pointed iron pick of '*escoude*' type (Bessac 1988: 37). The coarsely pecked finish of the basin closely resembles the pecked finish observed on the interior surfaces of (?) Bronze Age rock-cut tombs preserved in the Kurnub Sandstone cliffs overlooking the Jarash bridge crossing the Zarqa River (**Fig. 10)**. While this raises the possibility that the basin may date to the Bronze Age, the present evidence does not preclude an earlier or later construction date. Evidence from Petra, for example, shows that pecked finishes on sandstone surfaces were a common feature in Nabataean architecture (Rababeh 2005: 93-95). The site is located on the eastern edge of the terrace that contains the abū aṣ-Ṣuwwān Neolithic 'megasite' (al-Nahar 2010, 2013) and 550m north of the hilltop Early Bronze Age *tall* of Khirbat Khālid (Hanbury-Tenison 1987: 156; Leonard 1987: 354).

Buildings at Spring Sites

While it is likely that some form of building was originally constructed at each of the larger spring sites in antiquity, very little evidence of these buildings has survived. Surveying in 2016 revealed evidence of building foundations at at-Tannūr spring, which is the strongest spring in the Majarr-Tannūr valley and supplies an extensive irrigation network (**Fig. 11**). The main ancient structure is a water-mill complex, comprising an oblique mill canal (leat) and the foundations of a building thought to be the mill house. Water was supplied to the leat from the spring via a basin. While the best-preserved horizontal watermills in the present landscape are watermills of the *arubah* penstock type with a horizontal leat (Avitsur 1960: 40), there is evidence that horizontal watermills with a slanting or oblique leat (oblique chute) were once a common feature of the historic landscape - although rarely preserved today. The 1m wide masonry wall carrying the oblique chute at Tannūr spring is the best preserved in the study area, although hard to discern amongst the stone tumble on the slope below the spring (**Fig. 12**).



10. Ficus springs: (a) Natural fountains (highlighted) and catchment basin cut into Kurnub Sandstone at site JWP182 (scale 0.5m); (b) Vertical view of catchment basin at site JWP182 (scale 0.5m); (c) Detailed view of coarse 'pecked' finish on the basin surface at site JWP182 (scale 0.5m) ; (d) View inside (?) Bronze Age tombs at az-Zarqā' R. / Wādī Jarash junction, showing coarse-pecked finish (scale 20 cm); (e) Coarse 'picked' finish on tunnel wall, site JWP146 Ficus springs.

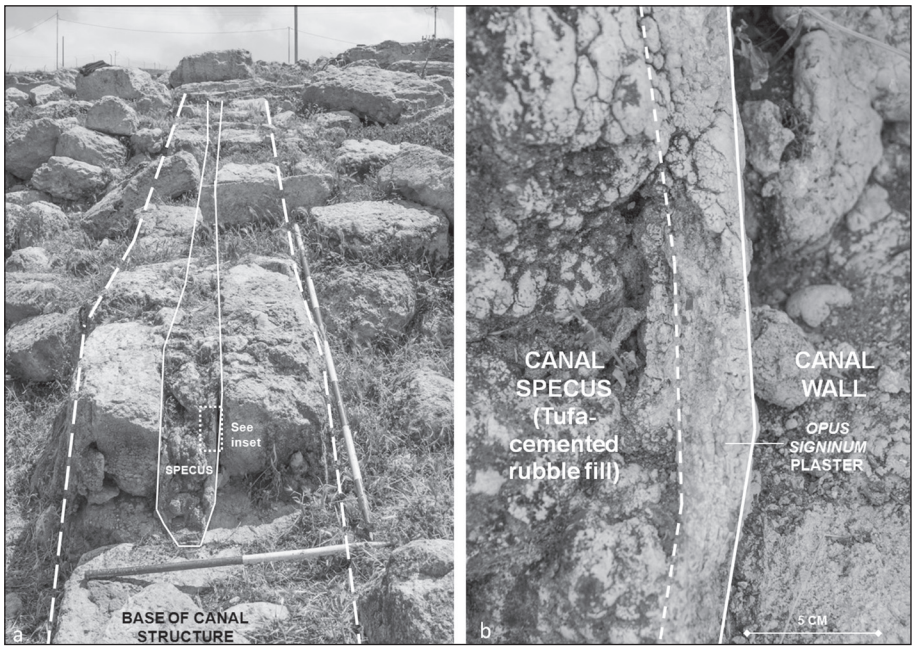


11. Tannūr spring (site JWP135): Aerial view showing main structural elements (Photo courtesy of APAAME; APAAME_20130428_REB-0064; Photographer R. Bewley).

Blanc and Genequand (2007: 304) considered that oblique chute mills were introduced in the early Islamic period, and provisionally dated several of these mills in Syria to the early 8th - 9th centuries AD. The *opus signinum* plaster lining the *specus* of the oblique chute at Tannūr spring may suggest a pre-Islamic date, although Wilson (2003: 129) noted that the use of this typical Roman plaster continued into the early Islamic period in North Africa and Turkey. Radiocarbon dating of charcoal in this plaster will clarify the construction date.

al-Majnūnah Dolmen Field

A small dolmen field on the edge of al-Majnūnah village was recognised by DoA representative Mr. Adnan Mujalli while surveying in the 'Ayn ar-Riyashah area. The dolmen lo-



12. Tannūr spring (site JWP135): Oblique chute canal: (a) view upslope towards spring (horizontal pole 1m); (b) Detailed view of opus signinum plaster lining canal specus.

cality is shown on a plan by Sapin (1992: fig. 2), but no description has been published. Although not related to water management, the site was briefly recorded during the Jarash Water Project survey as it is under threat from new housing.

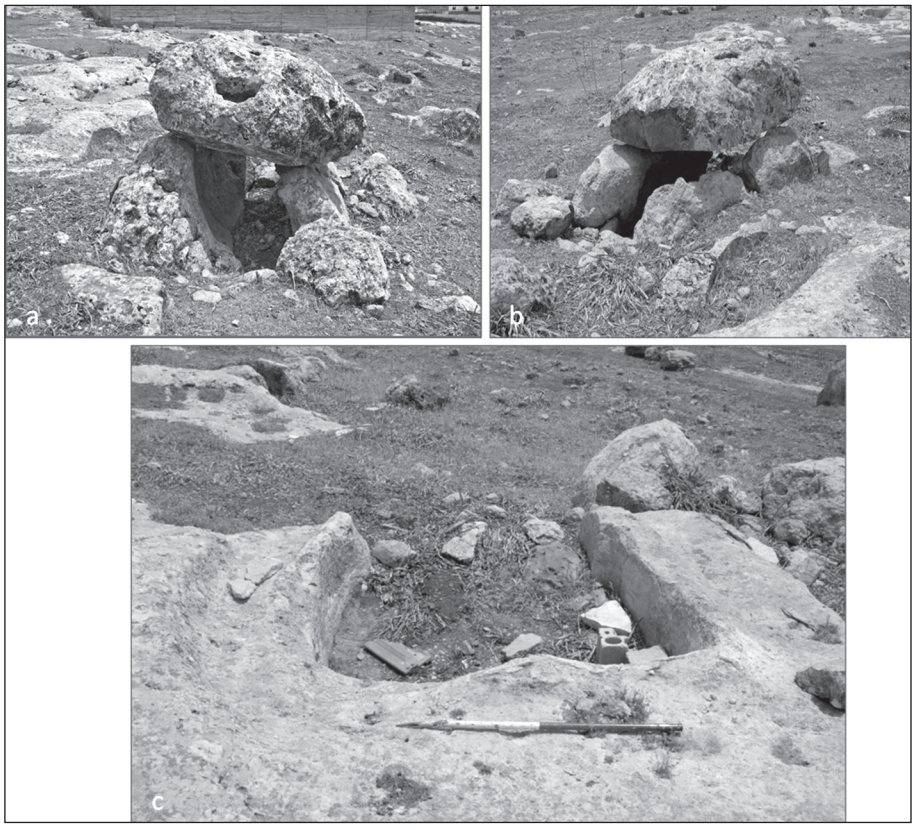
The site covers roughly 0.1ha, although a detailed survey may prove it to be larger. It is located between two houses on the west side of the village, about 0.5km west of 'Ayn ar-Riyashah. Only one dolmen retains its capstone and side megaliths (**Fig. 13a, b**), however the burial floor of this dolmen is a distinctive, smooth bath-shape cut in the bedrock, and many similar features - presumably representing dolmen sites robbed of their megaliths - were observed in close proximity. One of these dolmen floors is rectangular in plan and may represent a multiple-burial site (**Fig. 13c**). The site lies close to western edge of the main dolmen fields in the Majarr-Tannūr valley. However, the site is under threat from new housing construction and warrants a detailed study and preservation.

Geoarchaeological Studies

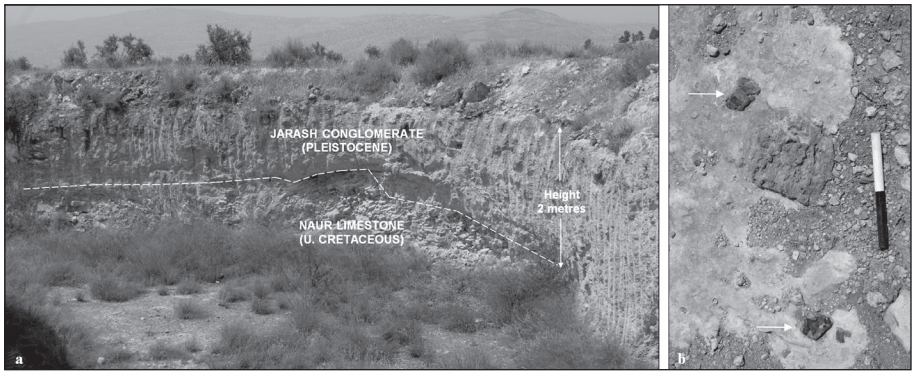
Geoarchaeological surveys conducted by the Jarash Water Project in 2014 and 2015 recognised a new debris-flow type of geological formation at a number of locations in the Jarash valley and, to a lesser extent, in the upper Majarr-Tannūr valley. It has been tentatively assigned a Pleistocene age based on a comparison with the Pleistocene Dawqarah Conglomerate (Parenti *et al.* 1997: 19) in the upper Zarqa valley (Boyer 2017; 2018a–2018d). Similar surveys conducted in 2016 extended the depositional limit of the formation in the Jarash valley to around 8km^2, and also identified exposures of the formation in the lower Majarr-Tannūr valley (**Fig. 14a**), including one locality west of al-Majnūnah village where the formation contains flint cobbles (**Fig. 14b**). This potential flint source may have been a factor in the location of the Neolithic settlements adjacent to the nearby perennial springs at ar-Riyāshī (Hanbury-Tenison 1987: 154 site 15) and al-Mītah (Leonard 1987: 354 site 27). Similarly, the abū aṣ-Ṣuwwān Neolithic 'megasite' south of Jarash is also located adjacent to Jarash Conglomerate bedrock containing flint cobbles that are likely to have been a source of raw material for a local flint industry (Baker and Kennedy 2011: 457).

Investigations at Ficus springs, 1km south of Jarash, revealed evidence of a multistage landscape history of this part of the Jarash valley. Studies are incomplete, but provisional findings indicate two (degradation) phases of *wadi* incision followed by a more stable phase, during which water-related installations (well-preserved fountain catchment basins and probably adjacent rock-cut canals) were constructed. Graffiti (Greek?) preserved *in situ* on a western cliff face probably also date to this phase. Debris flows subsequently filled the *wadi* and

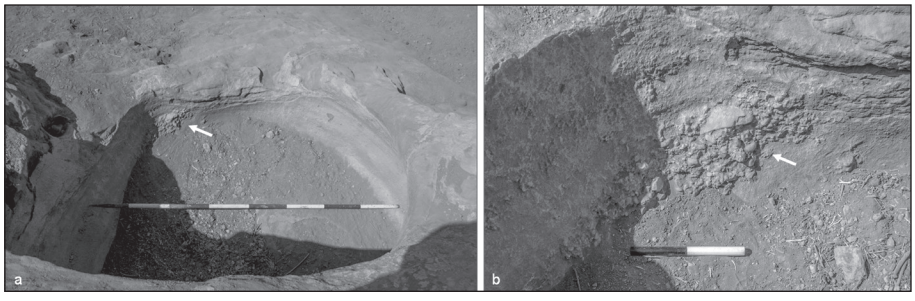
buried at least some of the water installations, as attested by remnant conglomerate cemented to the floor of a fountain's catchment basin on the east bank (**Fig. 15**). These later debris flows are tentatively dated to the pluvial events of the Byzantine period that peaked in 6th and 7th centuries AD (Izdebski *et al.* 2016: 197), and may be comparable to the debris flows recently identified at Abila that have been dated to the same period (Lucke and Schmidt 2017). The later debris flows at Ficus springs appear superficially similar to the older Jarash Conglomerate debris-flow sediments outcropping on the upper slopes of the *wadi*'s west bank at the



13. al-Majnūnah Dolmen Field: (a) and (b) Dolmen complete with side megaliths; (c) Rock-cut floor of large dolmen that may reflect a multiple burial (1m pole).



14. Jarash Conglomerate in lower Majarr-Tannūr valley, west of al-Majnūnah village: (a) Contact of Jarash Conglomerate with underlying Upper Cretaceous Naur Limestone in quarry; (b) Flint cobbles (arrowed) in exposed 'pavement' of Jarash Conglomerate (scale 20cm).



15. Ficus springs, site JWP146, showing debris-flow conglomerate cemented to the floor of an earlier fountain catchment basin: (a) Vertical view of catchment basin; (b) Detailed view of cemented conglomerate on basin floor.

Bāb ʻAmmān locality: they comprise reworked rounded clasts from the older debris-flow material mixed with soil, but are less indurated (**Fig. 16**). Taken together with evidence of the debris flows occupying channels aligned orthogonally to the present *wadi*, it appears that the debris flows were associated with landslips along the west bank of the *wadi*. The massive, *ca* 400m long landslip on the west bank evident in the landscape between Ficus springs and the city could have contributed much of the material for the debris flows, but this landslip event has not yet been separately dated (Boyer 2018c: 236, fig. 10b). A subsequent degradation phase removed the debris-flow sediments from the *wadi* bed and exhumed the buried water installations. The final aggradation phase saw the deposition of *wadi* sediments on the *wadi* bed, and this is the current state of fluvial processes in this section of Wādī Jarash.

Acknowledgements

The support of the Director-General of the DoA in granting a permit for the fieldwork in 2016 is gratefully acknowledged. Thanks also go to the staff of the DoA offices at Amman and Jarash for their assistance during the season and to the CBRL for their assistance and logistical support. Particular thanks go to Dr. Ali Al Khayyat, Director of the Jarash office of the Department, and to Departmental representative Adnan Mujalli for his diligence and assistance during the survey. The season was part-sponsored by a Rodney R. T. Prider Travel Scholarship from the University of Western Australia.

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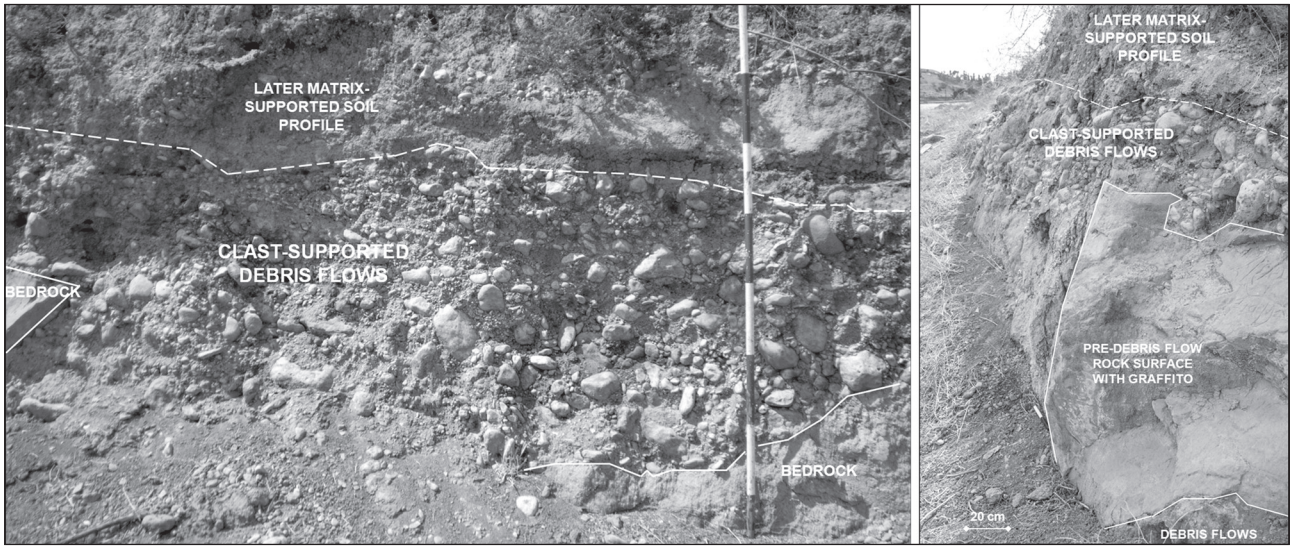

16. Ficus springs: Sedimentary profile exposed on west bank of wadi (2m pole).

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THE HELLENISTIC PETRA PROJECT: EXCAVATIONS ALONG THE COLONNADED STREET PRELIMINARY REPORT OF THE THIRD SEASON 2007

David F. Graf, Steven Sidebotham, Benjamin Dolinka,
Tali Erickson-Gini and Alexander Wasse

The primary objective of the Hellenistic Petra Project (hereafter HPP) is to locate, define the character, and determine the perimeters of the early Hellenistic settlement at Petra. In spite of 75 years of excavation at Petra, the period between the 4th and 2nd centuries BC remains elusive and relatively unknown; so we established it as our primary focus for excavations. The methodology is to place a number of small exploratory soundings at strategic locations in the civic center in the Wādī Mūsā basin. By these small surgical cuts into the central urban landscape of the Nabataean capital we hoped to expose evidence for the earlier settlement dating to the late Achaemenid Persian and early Hellenistic eras.

The project director is David F. Graf (University of Miami). The trench supervisors were Professor Steven E. Sidebotham (University of Delaware) and Dr. Benjamin Dolinka (Albright Institute, Jerusalem), assisted by Maria Elena Ronza (Wādī Mūsā) and Jessica Goldfin (Miami). The ceramic analysis was provided by Tali Erickson-Gini (ACOR) and the faunal analysis by Alexander Wasse (Yeditepe University, Istanbul). Jean-Louis Rivard (Toronto) served as the architect.

The excavations took place between July 31 and August 10, 2007. The project was supported by a grant from the Council of Research Administration at the University of Miami and a very generous contribution by Paris Katsoufis of Miami. The project is licensed by the Department of Antiquities of Jordan. The HPP team wishes to express their appreciation to the staff of the Department of Antiquities and to the late Director General Dr. Fawwaz al-Khraysheh for their support and assistance. The Department representative Sulaiman al-Farajat was particularly helpful. We also wish to thank Dr. Jean-François Salles and Christian Augé at the Institut français du Proche-Orient (IFPO), for their support and assistance to the project.

Although in the past extensive major excavations in Petra's civic center have been conducted, relatively few stratified Hellenistic levels or surface finds of the Early Hellenistic period have been recorded that point to the existence of a Hellenistic settlement at the site. Before our HPP III excavations in 2007, the only stratified Early Hellenistic settlement was that discovered by the British excavations of Trench III in the southern portico along the Colonnaded Street, directed by Peter Parr between 1958 and 1964. This trench was located about 90m east of the Monumental Gate leading to the *temenos* area of Qaṣr al-Bint, between the street and portico wall. This area is just south of the paved street in the narrow confines between and beneath the approximately 30 shops constructed between the Temenos Gate and Upper Market as components of the retaining wall of the portico (Kannelopoulos 2001: 11). The adjacent east-to-west Colonnaded Street below runs parallel to the *wadi* bed just to the north of the northern portico. Here between the southern portico and street Parr discovered the remains of some crude domestic structures built of limestone boulders from the nearby *wadi* bed (Phases I-IV), which he dated to the late 3rd century BC on the basis of some Arados coins and an imported Rhodian amphora handle (Parr 1965: 528, 1970: 357-358, 369-370, fig. 1, 2007: 275-280 with plans and photos). The walls that he exposed measured *ca* 85cm to 1m thick and were "resting directly on the natural

and undisturbed gravel of the *wadi* bank" (Parr 2007: 278). These discoveries were described as "well stratified deposits beneath the paved street and the colonnades, offering promise of an undisturbed sequence of structures" (Parr 1990: 15). This important observation of the potential of this area for Hellenistic-era Petra was subsequently ignored for almost half a century until we began our excavations recently in the same area. The emergence of new documentary evidence that the Nabataean dynasty existed in the early 3rd century BC (Graf 2006) enhanced the prospects of finding an earlier Nabataean occupation at Petra.

Parr's earlier exploration along the Colonnaded Street provided the impetus for the HPP launched in 2004. Trench supervisor Leigh-Ann Bedal placed a sounding (our Trench 3) immediately east and adjacent to Parr's Trench III along the Colonnaded Street. Our sounding revealed a similar occupational sequence as that of Parr's Trench III strata, with structures and walls that seem to correlate well and connect with his structures (Bedal in Graf *et al.* 2005: 421-427). Beneath the upper Nabataean levels (Phases V-IV), a few amphora fragments with some black-glazed Hellenistic sherds were found (Phase III), along walls that apparently correspond with those in Parr's Trench III. In even lower levels was a clay floor covered with burnt wood, sandwiched between Greek amphora fragments (Stratum II), and beneath that an earlier settlement (Stratum I), which, like Parr's walls, was resting directly on the undisturbed *wadi* bank. In essence, our sequence of occupation in Trench 3 compares remarkably well with that of Parr's Trench III and supports his findings. These results suggest this area was of high priority for the early Hellenistic period and deserved further consideration.

For this purpose, we returned in 2007 (HPP III season) and placed two more contiguous trenches just east of Parr's Trench III and our Trench 3, separated only by a north-south wall that runs between the portico wall and the street, representing the eastern boundary of our previous Trench 3. Both Trenches 8 and 9 lay in front of the Garden Pool complex to the south and between the southern portico wall and the southern edge of curbstones of the Colonnaded Street (**Fig. 1**). Trench 8 (4m N-S × 3.5m E-W) was located 50m east of the staircase of the 'Great Temple' and about 90m west of the Monumental Gate.

I. Trench 8

S.E. Sidebotham

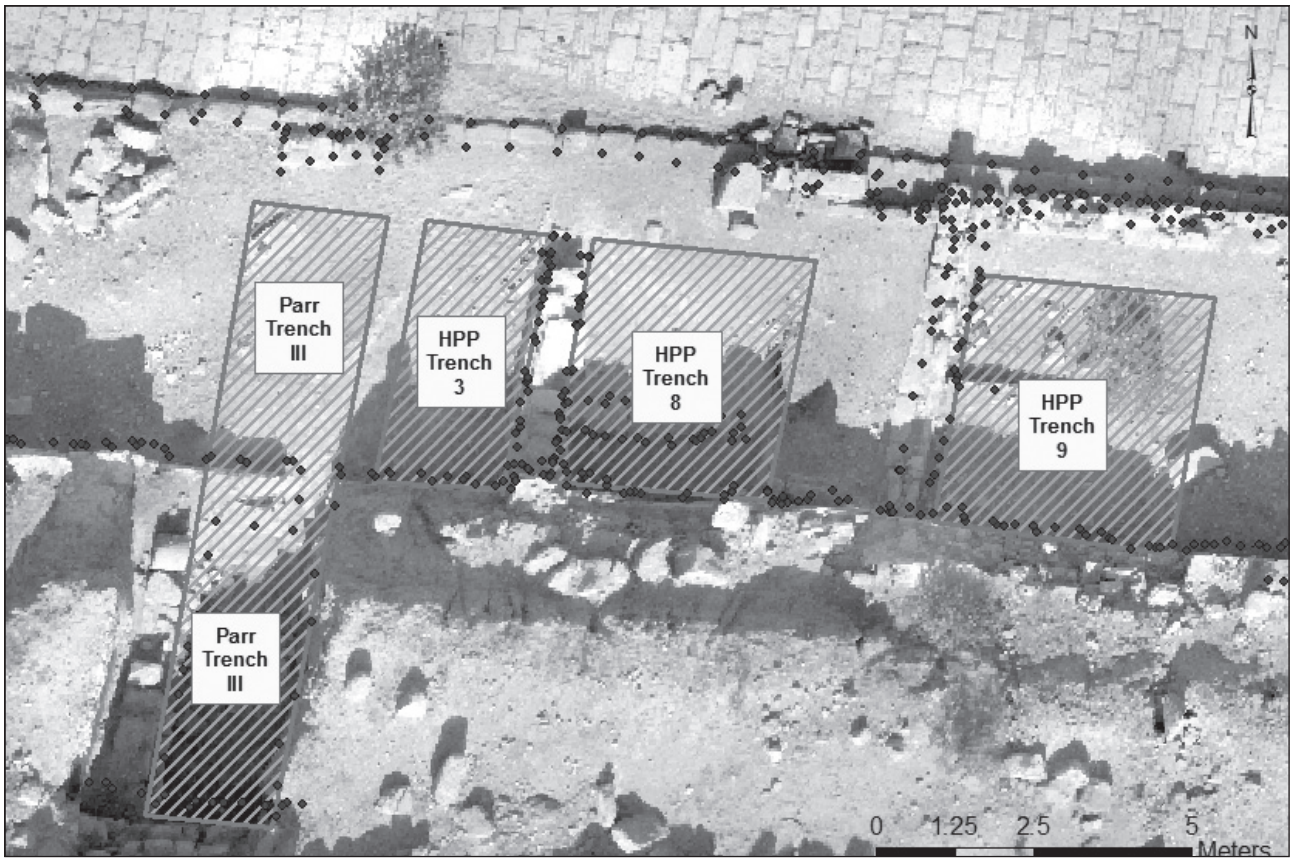
HPP Trench 8 measured 4.0m N-S × 3.5m E-W and was oriented along the southern side of the main colonnaded street (*decumanus maximus*) at Petra. It comprised 21 *loci* - including sub-*loci* (nos 200-220) - and formed ten or possibly eleven phases/sub-phases. Trench 8 lay immediately east of the N-S wall constituting the eastern baulk of HPP Trench 3 and is 2.74-2.82m west of HPP Trench 9. The northwestern corner of HPP Trench 9 was 2.82m east of the northeastern corner of HPP Trench 8 while the southwestern corner of HPP Trench 9 was 2.74m east of the southeastern corner of HPP Trench 8. The northwestern corner of Trench 8 lay *ca* 50m east of the easternmost end of the reconstructed staircase (7.4m wide) that ascends from the colonnaded street to the so-called 'Great Temple'. The Monumental '*temenos*' Gate that marks the current western boundary of the *decumanus* or Colonnaded Street stands approximately 90.9m west of the northwest corner of HPP Trench 8.

In summary, HPP Trench 8 lay east of Trenches 1 and 3 excavated along the southern side of the *decumanus* by the Hellenistic Petra Project in 2004 (Graf *et al.* 2005) and more than 90m east of Trenches 4-7 excavated in 2005 between the Monumental '*temenos*' Gate and Qaṣr al-Bint (Graf *et al.* 2007). Peter Parr's Trench III was also located on the southern side of the *decumanus* east of HPP 2007-8, and between Trenches 1 and 3 excavated during the HPP 2004 season (Graf *et al.* 2005: 419-422, figs. 2 and 7). The purpose of HPP III Trench 8 was to determine if there was any continuation of the structures and early occupation in Trench 3 of HPP 2004 and Parr's Trench III with the area to the east.

I.1: Main Architectural Features of the Trench

Wall 203/303

The most prominent feature directly associated with HPP III Trench 8 was the east-west ashlar wall W203 (W303 in Trench 9). This substantial wall, forming the southern boundary



1. Locations of Trenches along Colonnaded Street: Parr III, HPP 3, 8 and 9 (Courtesy Bjorn Anderson).

of both Trenches 8 and 9, runs almost parallel to the Colonnaded Street for its entire length. Wall W203/303 separated the area of the Colonnaded Street and the line of structures oriented east to west, which have been interpreted as shops/commercial areas and/or small-scale industrial facilities below the plateau (see below). Parr's Trench III and HPP Trenches 3, 8 and 9 are involved in this zone of architecture on the plateau above that includes the area south of wall W203/303, much of which remains unexcavated or only partially excavated to sterile levels (*cf.* Bedal *et al.* 2007; Joukowsky 2007). The western extension of wall W203/303 may have served as a portico for the colonnaded part of the street or a retaining wall. The western extension of wall W203/303 may have served as a northern *temenos* wall or retaining wall for the so-called 'Great Temple' complex. In Trench 8, wall W203 had an overall maximum height of 2.5m, with at least three major construction phases exposed at the conclusion of the 2007 excavation season.

The earliest visible wall phase (Phase 1/203A) comprised three courses of ashlars and part of a fourth course that contained some nicely cut ashlars using a modified *anathyrosis* technique, in places bound together with a fine gray mortar. Equally, the extant gray 'mortar' may be the remnants of plaster that once covered the face of wall W203A. There is evidence of repairs to this wall in the southeastern corner of the trench (which may or may not have been undertaken as part of wall Phase 2/203B). Excavations this season did not reach the bottom or foundation level of wall W203A.

Wall Phase 2/203B (on a slightly different alignment constructed for the most part immediately atop earlier phase 203A) consisted of three courses of recycled blocks with chinking stones, making apparent use of a mud mortar/binding material. It was during wall Phase 2/203B that perpendicular wall W204 was constructed (see below).

Wall Phase 3 (203C), the latest, encompassed two to three courses of reused and well-worn ashlars interspersed with smaller stones aligned in a fashion that slightly overhung both wall Phases 1 (W203A) and 2 (W203B). Neither the second nor third construction phases of

wall W203/303 (W203B and C) were as well built as the first (W203A).

Our excavations provided no absolute date for the construction of any phase of wall W203/303, although floor 201/205 (locus 305 in HPP III Trench 9) appears to postdate the latest use of the first phase of wall W203/303 (*i.e*. W203A) and seems to have been in use with the second phase of wall W203/303 (*viz.* W203B) and wall W204 (see below). The sherds from above floor *loci* 201/205 in locus 206 are primarily Middle Roman (2nd to 3rd century AD) and provided a *terminus post quem* date for use, if not the latest phase of construction (203C). The penultimate phase (203B) of wall W203/303 as well as dates for wall W204 may well accord with a *terminus ante quem* date for the earliest phase of wall W203/303 (W203A). Pottery discovered from the earliest *loci* south of wall W207 (see below) should provide, minimally, *terminus ante quem* dates for the use, if not construction, of the lowest/earliest visible phase of wall W203/303 (*viz. W*203A). Ceramic evidence from the earliest *loci* excavated on the south side of W207 should also provide dates for that wall (see below).

Walls 204 and 207

HPP III Trench 8's western boundary was also a wall (W204), oriented north to south nearly perpendicular to W203/303; its visible remains did not extend to the curbstones bounding the southern side of the *decumanus.* This was the latest wall built in HPP III Trench 8 which was constructed of recycled building materials including ashlars and at least one column drum. Wall W204 measured 1.75-1.80m long (N-S); it survived to a maximum height of four courses (1.01-1.02m) and was two rows wide (0.60-0.65m E-W). Wall W204 abutted wall W203/303 and clearly post-dated the first phase of that larger feature; it was built in the same phase as wall W203B.

A third, rather poorly built wall (W207) comprised small ashlars and other stones, some unhewn, of various sizes. Lavish use of mud mortar and chinking stones indicated a jerry-built structure. Wall W207 measured 2.90m in length (WSW-ENE) × *ca* 0.60-0.65m in width (roughly N-S) × *ca* 0.45m in extant height. W207 was neither exactly perpendicular to wall W204 nor parallel to wall W203A-B-C, but ran at slight angles to both. A break in the eastern end of wall W207 may be its terminus or possibly a doorway. The break was *ca* 0.65m wide inside the trench, and might have extended farther east outside the trench. It appeared to connect the northern and southern rooms appearing in Trench 8. The room on the southern side of Trench 8 (bounded by wall W203 on the south, wall W204 on the west and wall W207 on the north) was quite small. Wall 207 ran beneath W204 on its eastern side, indicating that it predated that feature. Wall 207 continued in a west-southwesterly direction under and, probably, west of Wall W204 and outside the trench. Though crudely built, wall W207 probably belongs to wall Phase 2 (W203B) of the main east-west oriented wall and the southern boundary of the trench: wall W203.

I.2: The Phasing of the Trench

There were six major phases in the Trench, with several sub-phases. Early Hellenistic sherds dominated the lowest level (VI) and the area appears to have been primarily domestic with some suggestions of industrial activity.

Phase Ia

Lay at the northernmost portion of the trench. It was a sondage 0.50m in width (N-S) (locus 220), which extended across the entire east-to-west width of Trench 8 and was excavated down to sterile *seyl*-washed *wadi* material (*cf*. Graf *et al.* 2007: 229). It comprised large cobbles of red sandstone, small whitish-gray pebbles and yellowish sand. This locus contained no artifacts or finds of any kind and was clearly a pre-habitation/construction level.

Phase Ib

Included locus 219, also on the northern side of the trench at a depth of -1.44-46 Datum Point. Pottery was predominantly Early Hellenistic, comprising what appears to be an Attic Black-glazed lamp (III. **Table 3:A**) and the rim of a storage jar (III. **Table 3:B**). A terracotta *tabun* fragment, a cowry shell and ashy deposits may also be noted. This locus contained no architectural evidence of actual occupation. The finds from locus 219 appeared to represent elements of the shops/commercial areas and/or

small-scale industrial facilities (see below) that had been washed by *seyul* into the area.

Phase II

Included wall W203A (the southern boundary of the trench), which may - in fact - be contemporary with Phase Ib (locus 219, which lay on the northern side of the trench). However, this could not be determined from excavations this season.

Phase IIIa

It consisted of wall W207 and the placement of locus 218 (at a level of -1.52 DP in the bottom of the hearth). The hearth was rather well-preserved, bordered by five cobbles and abutting the north face of wall W207 (**Fig. 2**). One Early Hellenistic black-glazed sherd was found within it. The investigation of locus 218 clearly indicated that some domestic/small-scale industrial activities took place during this phase. On the opposite side of the wall, in the southeastern area abutting the wall, locus 215 revealed some Early Hellenistic sherds and one Late Hellenistic sherd (III. **Table 3:C-E**).

In the wider area south of the wall and between the southern terrace wall (locus 217) were some early Hellenistic sherds, but mostly Middle Roman sherds. The levels reached were -83, -84 and -73 DP, from west to east.

Phase IIIb

Included the earliest recognizable surfaces reached during excavations this season: *loci* 210/212/213. Locus 210 was a large, well-constructed flagstone surface measuring 0.80×0.46×0.055m thick. It seems to have been in a context of secondary use, abutting the southern side of wall W207 and the eastern side of wall W204. Locus 210 appeared to be on the same level as *loci* 212 and 213, both of which lay north of wall W207 and consisted of pebbles and soil. All three floor surfaces were clearly in use with wall W207 and perhaps in the same phase with wall W203B. However, as excavations did not reach the bottom of wall W203, we cannot be certain if *loci* 210/212/213 represented the earliest surfaces associated with wall W203; most likely they do not. Early Hellenistic ware dominated *loci* 213 and 212, while locus 210 has mainly Nabataean painted fine ware sherds of the 1st century BC and the rim of a cooking pot of that era (Stratum III. **Table 3:L**).

Phase IIIc

It comprised debris-and-sediment locus 209 (north of wall W207). Here we discovered primarily 1st century AD pottery, with an almost equal quantity of Early and Late Hellenistic sherds, for example an Early Hellenistic black-glazed bowl (III. **Table 3:M**) and a late Hellenistic cooking pot rim (III. **Table 3:O**), but also one notable fragment of the Persian period: a sherd of a painted lekythos of the 5th century BC (III. **Table 3:N**). The sediment and debris in locus 217 lay south of W207. It contained a large amount of animal bones, and sherds primarily of the Roman period mixed with some Early and Late Hellenistic sherds, and an unidentifiable *aes* Nabataean coin . no 4). Locus 217 lay above surface locus 210. Sediment and debris layer locus 215A-B contained a few large sherds of the Early Hellenistic period and one Nabataean Painted Fine Ware sherd of the 1st century AD. Sediment and debris locus 216, situated north of W207, lay above the hearth (locus 218) and included animal bones and non-diagnostic sherds. Locus 206B, a sediment-and-debris layer, produced a large quantity of 1st century AD pottery and Nabataean Painted Fine Ware sherds, mixed with a few Hellenistic and Middle Roman sherds, and several *aes* coins one of which is an issue of Aretas IV-Syllaeus (IV. no 1)**.**

Phase IVa

It included surface locus 208 south of W207

2. Trench 8: View to south with wall W207 and hearth abutting north face.

and, possibly, locus 211 north of W207. The surface of locus 208 was made of cobbles while locus 211 was merely a pile of cobbles, which may have been destined to be flooring contemporary with, but not touching the surface of locus 208. These features and *loci* were roughly contemporary with wall Phase 2/203B.

Phase IVb

This represents the period when wall W207 fell out of use; debris-and-sediment locus 214 filled the break or 'door/opening' at the eastern end of W207 that linked the northern and southern rooms of Trench 8. Locus 214 also covered portions of W207. Locus 214 contained many bones, including those of one or more large mammals, as well as some Hellenistic vessels **(**III. **Table 3:F-H**).

Phase Va

It included wall W204, associated with wall Phase W203B, and the latest surfaces in the trench. The latter comprised locus 201 (flat stones in poor condition, perhaps recycled from elsewhere, and plaster). This floor did not survive across the entire trench. Locus 201 may have been a repair of locus 205, which consisted of cobble-sized stones and soil**,** with a number of Nabataean Painted Fine Ware sherds (Dekor-phase 2b-c), mixed with a few Late Hellenistic (including Eastern Sigillata A) and Middle Roman sherds.

Phase Vb

It included ash pits, burned areas and fire pits from which were recovered immolated bones, a fine piece of worked bone that was green in color, fish vertebrae, mother-of-pearl shell fragments, an iron nail and iron slag (*cf.* locus 202). This evidence suggested that domestic and small-scale industrial activities occurred in this phase of use of the trench. It is difficult to determine at this juncture if Phase 2 of W203 (W203B) or Phase 3 (W203C) was the one associated with surface *loci* 201/205. Locus 203C may have been added to existing wall W203A and B after floor 201/205 had fallen out of use. The pottery revealed in locus 201was dominated by ware of the first three centuries AD, with a few residual sherds of the Late Hellenistic period.

Phase VI

It consisted of locus 200, the latest debris-and-sediment layer in the trench. It was a relatively recent deposition from which were recovered modern glass fragments, plastic bottle tops and cigarette butts, mixed with pottery - likely residual - of the 1st to 4th centuries AD, and quite a few Early Hellenistic sherds. Also recorded from locus 200 was a column-drum-shaped architectural element with a large square hole in the center. Similar objects (one was also found at the extreme northern end of the trench and labeled locus 206A) were also documented in the area of these rooms and the street.

I.3: Interpretation

Some observations and tentative conclusions can be made about what the structure in Trench 8 looked like and what activities might have taken place there. The excavations documented architectural elements comprising two column-drum-shaped stones with relatively large holes of various sizes and shapes centrally drilled all the way through each one (one in locus 200, the other in locus 206a = 36.5-37cm diameter × 13cm high with central hole 7.5cm; a third example was recorded just outside the trench = 29-30cm diameter × 17cm high with central round hole 10cm). The varied diameters of these relatively small, column-drum-shaped stone artifacts and the size or shape of their central holes suggest that they were not the remains of column drums with centering points. The excavations documented no identifiable roofing materials such as roof tiles or roof-tile fragments, suggesting that there was no permanent roofing of this area during the latest phases of occupation. In place of permanent roofing, it is more likely that there was an awning-type arrangement, with the small column-drum-shaped stones acting as supports or anchors for poles atop which were placed cloth or animal-hide awnings. This may have been the arrangement for many of the rooms on the southern side of the *decumanus* in their later antique phases.

Clearly, the walls built against or in association with W203A-B-C (*viz.* W204 and W207) were relatively crudely constructed of reused building materials. Thus, the overall appearance of the architectural unit appearing in Trench 8 throughout much of the occupation reflected

a rather low-status, hastily built structure, meant to be utilitarian rather than impressive.

None of the rooms in Trench 8 were large. The room on the southern side of Trench 8 (enclosed by W203, W204 and W207) was particularly small and likely served as a storage area. Given the generally crude appearance of the architecture and the small size of the rooms it is evident that the activities that took place in these structures were small-scale.

While the area may have had commercial functions in its earlier phases, the discovery of numerous small-scale fires and quantities of burned bone, fish vertebrae *etc*. suggests domestic activities, while the recovery of iron slag, an ancient iron nail, worked bone and mother-of-pearl shell fragments from locus 202 suggest small-scale industrial/manufacturing activities took place here in the later phases. Indeed, it is possible that the rooms situated along the south side of the colonnaded street functioned as residential, small-scale manufacturing and commercial facilities.

Few coins were recovered from Trench 8 and two of these identified as Nabataean provide only a vague *terminus post quem* for *loci* 206B and 217. The ceramic analysis is far more important in contributing better chronological indicators for the phases of Trench 8 (see the pottery report at III).

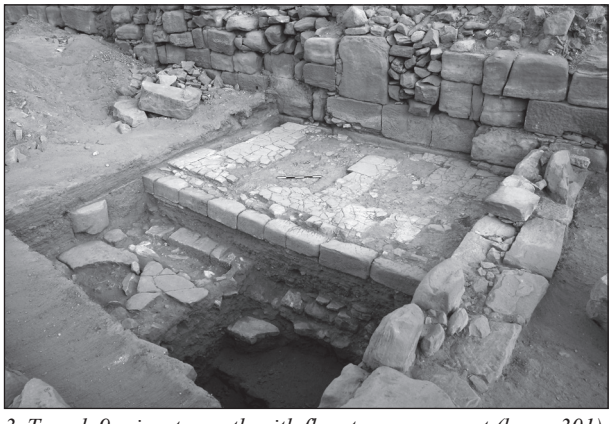
A subsequent intensive site survey undertaken in late June-July 2008 by a team under the aegis of the University of Delaware produced evidence suggesting that the *decumanus* adjacent to and immediately north of Trenches 8 and 9 underwent repairs and perhaps modifications in orientation and possibly size at some point(s) in its history (*cf*. Seigne 1999; Kanellopoulos 2001; Sidebotham *et al.* 2016: 145-169). Based upon the documentation of oddly aligned pavers and the use of recycled blocks (*e.g*. door pivots *etc*.) in its central and western portions, it appears that the course/orientation and possibly the size of the *decumanus* was likely different in some earlier phase(s) than is currently visible. In addition, the three phases of W203 (A-B-C) in Trench 8 exhibiting slight variations in alignment and the orientation of W204 might suggest that not only the colonnaded street, but also the structures abutting it, may have undergone modifications in size and orientation throughout their use in the Roman period that reflected the configuration of the adjacent thoroughfare.

II. Trench 9

Benjamin J. Dolinka

Trench 9 (HPP III 2007-9) was a 3.5m (E-W) x 4.0m (N-S) excavation unit situated directly south of the Colonnaded Street in the city center of Petra and east of Trench 8. The southern extension was represented by the retaining wall of what was formerly called the 'Lower Market' now known as the 'Garden and Pool Complex' (Bedal *et al.* 2007) situated on the hillock above and south of the trench. The northern extension abuts the curbstones of the paved Roman street. The primary goal in Trench 9 was to expose a complete stratigraphic sequence down to the sterile soil of the *wadi* bed in order to obtain detailed occupational phasing for the area. The main objective was to determine if artefactual evidence could be produced for the Persian and Early Hellenistic periods for which only limited data had been discovered in the adjacent areas of Parr's Trench III excavated between 1958 and 1964 and HPP Trench 2004-3. The aim of Trench 9, along with Trench 8, was to determine if the chronological horizon of the Hellenistic period could be confirmed or even expanded into earlier periods (**Fig. 3**).

After the removal of both topsoil and subsurface soil, a flagstone pavement (locus 301) was encountered across the southern sector of the trench, restricting our exploratory probe to the southern sector and confining our trench to a truncated area of 3.5×2m in the northern sector, close to the street. After removal of several stratified layers in the northern probe, the



3. Trench 9: view to south with flagstone pavement (locus 301).

excavation documented another pavement in the northeastern trench quadrant, much more poorly constructed. The trench was then divided in half again, in order to conduct a deep probe in the northwestern sector down to sterile soil. After reaching the *wadi* bed in the northwestern sector, the pavement in the northeastern sector was removed and the excavation again proceeded to the lowest levels of occupation above the *wadi* bed in the adjacent area. The description of the results of this process follow with consideration of the architectural remains first and then an account of the various occupational deposits in Trench 9.

II.1: Main Architectural Features of Trench 9

Locus 301

It is a stone pavement located in the southern sector of the trench that abuts locus W302 (the west wall) and locus W303 (the south wall). It lay beneath the topsoil of locus 300, which was only 14cm deep at its northern end and 26cm deep at its southern. This pavement consisted of flagstones which were rectangular and uniform in shape, and had an average size of 50×35cm. The locus covers an area measuring 3.50m (EW) by 2.00m (NS), *i.e*. half the trench. The best-preserved portion of the stone pavement (locus 301) is located in the western sector of the trench and measured 1.35m (NS) by 1.05m (EW).

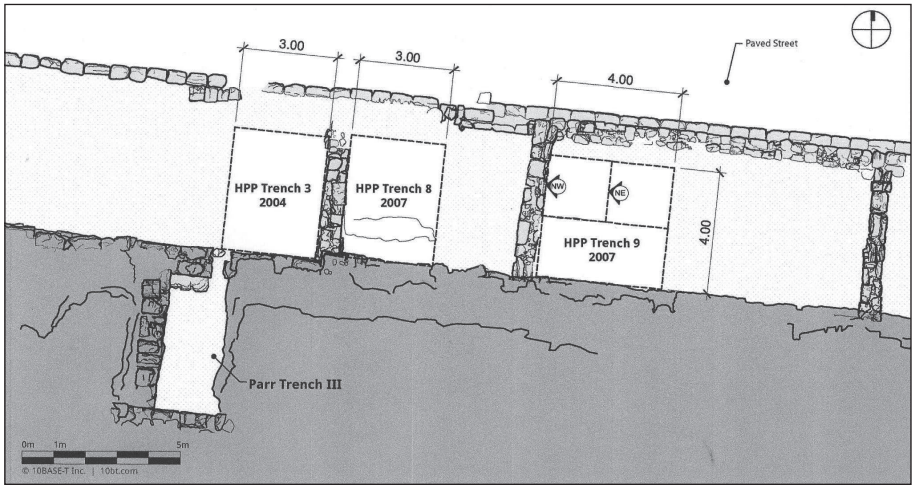
Eight well-dressed limestone ashlars with typically Nabataean diagonal chisel marks on the front and top faces bordered the northern edge of the payment. The ashlars, from east to west, measured 0.16×0.16cm extant (disappearing into the eastern baulk), 43×23cm, 44×16cm, 41×16cm, 33×14cm, 60×16cm (cracked almost in half), 52×17cm and 48×20cm. Interestingly, this pavement matched the same height and level as the Colonnaded Street. Owing to its fine preservation, locus 301 was left *in situ* and neither excavated nor back-filled. All of the remaining work in Trench 9 was conducted in the remaining 3.5×2.0m area to the north of locus 301 (**Fig. 4**).

Locus 302

It was the western wall that runs north-south and represented the western baulk of the trench. It was constructed of limestone, measured 2.00m in length and 32cm in width, and abuts the southern wall (locus W303). The extant remains included two visible courses of varying size and shape. The upper course consists of roughly hewn medium-sized boulders and the lower course had, for the most part, rectangular finely-dressed blocks measuring an average of 48×29×15cm. Pebbles and small chinking stones are between the two courses.

Locus 303

It was the southern wall oriented east to west and was the boundary for the southern baulk of the trench as well as the retaining wall for the 'Garden Pool Complex'. It is equal to locus 203 in Trench 8 and represented the southern baulk for Trenches 8 and 9. It was constructed of well-dressed local red sandstone rectangular ashlars that averaged 48×32cm in size. The central portion of locus W303 exhibited the pier-and-rubble technique, with the rubble fill consisting mostly of medium-sized unhewn boulders of varying shapes.



4. Plan of Trenches 3, 8 and 9 (J.L. Rivard).

Locus 317

It is a limestone wall that ran east-west almost parallel to the Nabataean ashlars on the face of W301 and was equivalent to W207 in Trench 8. It rested on *loci* 308 and 309, and was abutted by the floor surface of locus 307 in the west: a hard-packed pebbly floor that covered the entire probe area. In the western sector it is preserved at a lower depth and consisted of small, mostly flat and rectangular stones - some of which are unhewn - and had chinking of small cobbles. In the eastern sector it is preserved much higher, with an upper course of rectangular, finely-dressed ashlars.

II.2: Phasing of the Trench

Locus 300

It comprised the topsoil layer covering the entire trench. It consisted of a light reddish-brown (5YR 6/3) loose sandy fill with vegetation, and ranged in depth from -20cm in the north to -68cm in the southern part of the trench. This locus yielded a large amount of modern material, such as plastic and a German 50-pfennig coin. Ancient items included architectural fragments, glass, shell, a bronze ring and an unidentifiable bronze coin. This pottery-rich locus contained 1,202 sherds, the majority of which dated to the Early and Middle Roman periods, with one Early Byzantine radial lamp sherd. The finds also included the base of a Hellenistic Nabataean Painted Fine Ware bowl (III: **Table 2:J**).

Locus 304

It was uncovered directly below topsoil locus 300 in the northern half of the trench. It was a mixed fill layer containing a reddish-gray (2.5YR 6/1) sandy soil with intermittent small stones and architectural collapse. It had an average depth of 34cm. In the eastern sector of the trench, the poorly-preserved remains of a white (7.5YR 8/1) plaster floor were revealed. The pottery included three Dekorphase 2a bowl rims, a 1st century BC cooking-pot rim (Zeitler 1990: fig 11:1) and a Nabataean terracotta figurine of a nude youth possibly depicting Harpokrates (Christopher A. Tuttle pers. comm; see Tuttle 2009: 201, 270-272, and esp. 565-566).

Locus 305

It consisted of a reddish-brown (5YR 5/4) compact surface, 5-7cm in depth, which was covered by a thin layer of fine, light red (10R 6/6) sand. This surface appeared only along the northern baulk and most likely served as a leveling surface supporting the plaster floor above (locus 304). The ceramics uncovered from this locus were predominantly Dekorphase 2b-c and a few Middle Roman sherds.

Locus 306

It was a layer underlying locus 305 in the northern sector of the probe and locus 304 in its southern portion. It comprised a pale red (2.5YR 7/2), sandy, uneven fill layer that ranged between 13 and 18cm in thickness, reaching a depth of between -.70 and -.80m. This locus yielded six Dekorphase 2b body sherds, with one Early and one Late Hellenistic sherd and a fragment of a Judean rouletted bowl**.**

Beneath Locus 306 Was Locus 307

A hard-packed, weak red (2.5YR 6/4), pebbly floor that covered the entire probe area, although it was broken in some sections. It measured between 11 and 15cm in thickness. The pottery included mainly Dekorphase 2 sherds, with a rouletted 'honey pot', a cream ware strainer-jar sherd with wavy-band combing, and one Early Hellenistic ledge rim. The depth of the locus varied between -.82 to .92m.

Under Locus 307 Were Loci 308 and 309.

Locus 308 was a partially preserved flagstone floor located in the northeastern quarter of the trench. In the central portion of this locus, along the northern baulk, there was a circular installation. The dominant ceramic finds were Early Hellenistic, including a Black-glazed body sherd, and a considerable amount of Late Hellenistic sherds, including three ESA fragments, a Koan lamp fragment, and an imported amphora rim. The latest Nabataean Painted Fine Ware attested from locus 308 consisted of three Dekorphase 2b rims and a base. Three bronze coins were recovered from this locus, but the only one identifiable was an Aretas IV issue dating to 4/3 BC (IV: no 7). The depth of locus 308 was between -.87 to -.94m.

Also Situated below Locus 307…

Was a layer of collapsed architectural fragments (locus 309). These were found in a weak red (2.5YR 6/2) silty, sandy soil layer, 10cm in thickness. The depth of locus 309 was -.97 to -.99m. The ceramics were mixed, including one Early Hellenistic ledge rim and some Middle Roman sherds. The latest Nabataean Painted Fine Ware was a Dekorphase 2c rim. Two coins provided additional clues to the date of this locus. The earliest was one of the anonymous Nabataean issues of the early Hellenistic period (IV; no 9). The other was a coin of Aretas IV and Shuqilat dating to 39/40 AD**,** perhaps providing a *terminus post quem* for locus 309 (IV. no 9).

Although the Flagstone Floor in the Northeast (Locus 308)…

Was poorly constructed and badly damaged, we decided to shift the focus to the northwestern quarter of the trench with the goal of reaching the sterile soil of the wadi *DFGDFG* bed. The first locus uncovered in the northwestern quarter probe was locus 310, which was directly beneath the collapsed layer of locus 309. It was the first to reach a depth of over 1m from the datum point, varying between -1.03 to -1.43m. Locus 310 comprised a reddish brown (5YR 5/4) silty sand that contained numerous semi-dressed stones of varying sizes, as well as some *wadi* stones. Pieces of plaster, some painted in yellow and black-and-white, were scattered throughout this locus. This was a pottery-rich soil layer that included mainly Early Hellenistic and Early Roman period sherds (III. **Table 2:D**), including some pieces of ESA, amphora body sherds with dipinti, and part of a ceramic lantern with multiple circular piercings that were added pre-firing. The latest Nabataean Painted Fine Ware was represented by five Dekorphase 2b sherds. An important find from locus 310 was another bronze Nabataean anonymous issue of the 2nd century BC or earlier (IV: no 11).

Beneath Locus 310 Was a Loose…

Sandy and yellowish red (5YR 4/6) soil layer (locus 311), mixed with dark black charcoal pieces found within the southern, central portion of the locus. Of interest was the fact that the bottom levels from the northern half of the probe were 20cm lower than those in the southern half, probably representing the natural slope going down to the southern edge of the *wadi* or the occupational mound. The ceramics were mainly Early Hellenistic (three sherds), but included a Late Hellenistic fine ware rim and several Nabataean Painted Fine Ware sherds, the latest a Dekorphase 2b body sherd. The average depth was -1.18m.

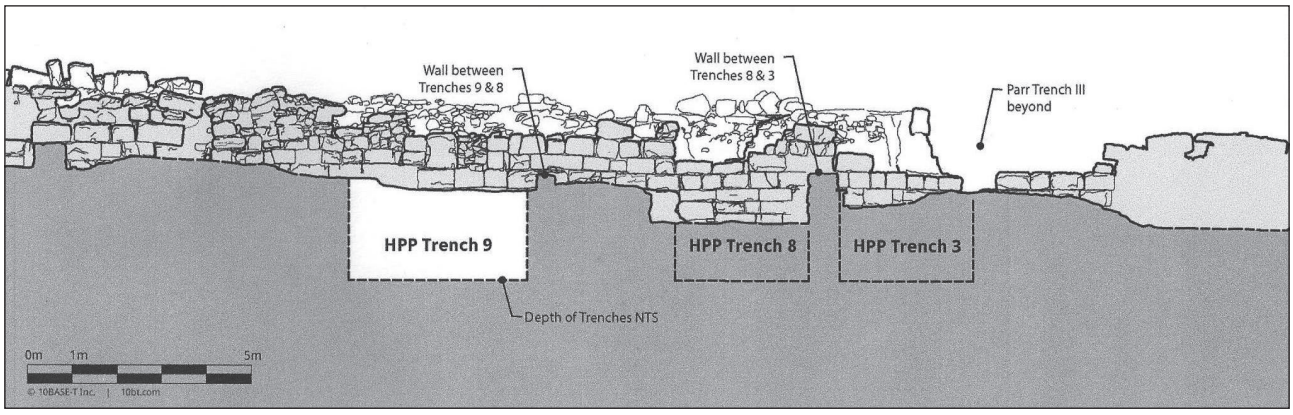
A Series of Three Fire Pits Appeared under Locus 311

The first (locus 312) lay in the southern sector of the probe and measured 64cm in diameter and 8cm in depth. The depth reached was -1.29m. The soil consisted of a very loose, sandy fill mixed with a large amount of light gray (N7) ash and black (5YR 2.5/1) charcoal. The pottery was dominated by Early Hellenistic sherds (III. **Table 2:A-B**), including a nearly complete profile of an incurved bowl that was found *in situ*, upside down and directly on top of the fire pit at -1.27m (III. **Table 2:C**). The northern sector of the northwestern probe revealed two additional hearths (*loci* 313 and 314). These were much smaller in diameter, measuring 31cm and 37cm respectively. Locus 313 yielded a fragment of an incurved bowl and the rim of a jug, both Early Hellenistic, but locus 314 contained only several undiagnostic body sherds. Locus 313 reached a depth of -1.32m.

After Removal of Loci 313 and 314…

A sandy, reddish brown (5YR 5/3) soil layer (locus 315) was discerned in the northern sector of the northwestern probe. This locus contained many stone and cobble inclusions of varying sizes, as well as fragments of plaster, and had an average thickness of 56cm, varying from -1.82 to -2.06m deep. Locus 315 also was rich in pottery, with a considerable amount of Early and Late Hellenistic ware mixed with Nabataean pottery, the latest Nabataean Painted Fine Ware consisting of three Dekorphase 2b rims and one base, and a few Middle Roman sherds. Worthy of note is that this locus reached a maximum depth of -2.06m, at which level the sterile *wadi*-soil layers had been reached (**Fig. 5**).

The penultimate soil layer unearthed in the northwestern probe was locus 316, located in the southern sector below the locus 312 hearth.

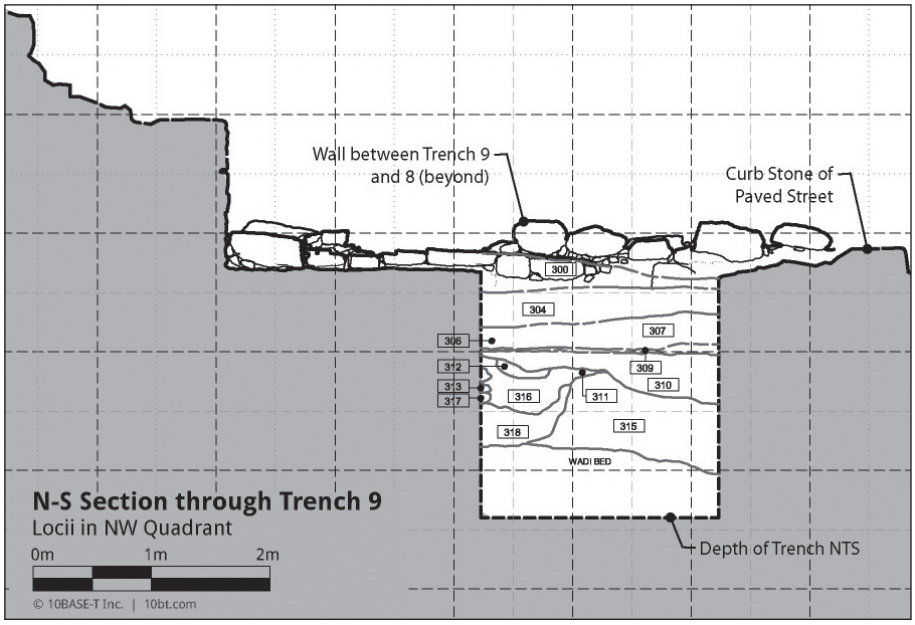


5. Depth of Trenches 3, 8 and 9 (J.L. Rivard).

This locus was deep -averaging 55cm- and consisted of a loose mixed layer of sand and pebbles that was yellowish red (5YR 4/6) in color and filled with numerous animal bones. The ceramics included Early and Late Hellenistic sherds, some ESA and ESB, with 1st century AD Nabataean, including a Nabataean Painted Fine Ware Dekorphase 2b rim and two Dekorphase 2b body sherds. Locus 316 also yielded a basalt grinder and two bronze coins, one of which was another anonymous Nabataean issue from the early Hellenistic period (IV: no 12), while the other was unidentifiable (IV: no 13). A wall made of irregular blocks and stones was encountered bordering the southern side of locus 316 in the northwest sector. A small fragment of an Early Hellenistic incurved bowl was found while cleaning the wall.

A final soil layer (locus 318) was excavated in the southern sector of the northwest probe. It was directly beneath locus 316 and consisted of a sandy, reddish brown (5YR 5/3) fill layer mixed with pebbles. It is equivalent to locus 315 in the northern sector, averaged 21cm in depth, was situated directly above the sterile *wadi* soil and had a maximum depth of -2.01m. Two pieces of Nabataean ware were found, one a Nabataean Painted Fine Ware Dekorphase 1 rim sherd (Schmid 2000: Abb. 76) (**Fig. 6**).

After the northern probe was excavated down to sterile *wadi* soil, excavation was resumed in the northeastern sector of the trench. Removal of the rough flagstone pavement of locus 308 revealed occupational remains in *loci* 319 and 320. Locus 319 was a weak red (2.5YR 6/4) sandy soil layer with numerous pebble inclusions; it was 57-62cm in thickness and reached a depth of -1.87m below the datum point. The pottery was almost exclusively Early Hellenistic, together with even earlier vessels



6. Trench 9: northwestern sector with loci (J.L. Rivard).

of the Persian period (III. **Table 1:D-J**). The assemblage includes the rim and bent handle of a Persian 'torpedo' jar (III. **Table 1:H-I**). The rest of the pottery of locus 319 was purely Early Hellenistic: an amphora handle, out-turned and incurved jar rims, lamp nozzles and a small Black-glazed sherd. In addition, perhaps the most important find from locus 319 was a North Arabian bronze coin, an 'Athenian imitation', dating probably to the 4th/early 3rd century BC (IV: no 14). This is the first find of this type in a stratified context at Petra, but hundreds of examples of this issue have now been documented recently across Northern Arabia, suggesting that they are the product of one or more local Arabian mint.

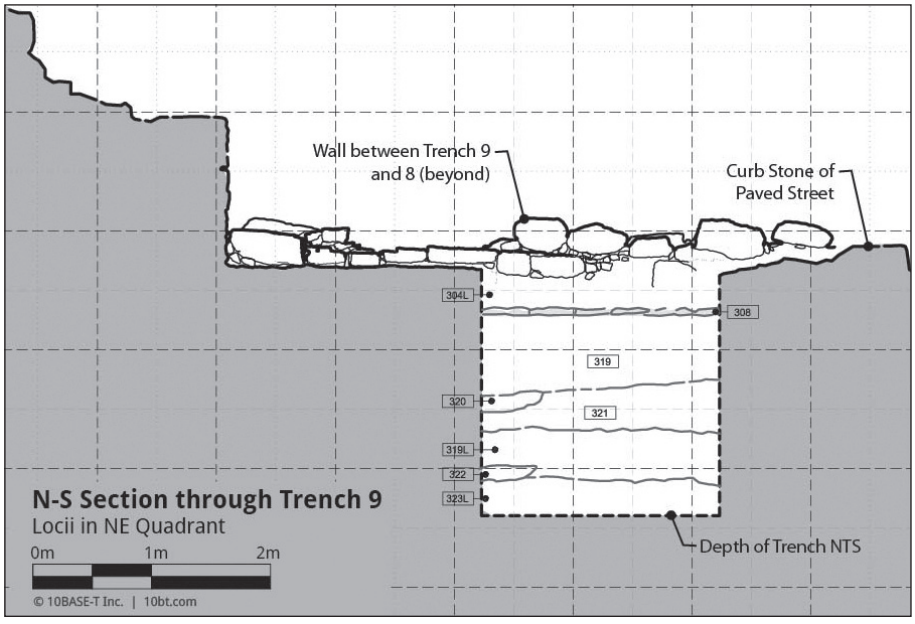
Also found beneath locus 308 was a large fire pit/hearth and its associated deposits (*loci* 320-323), uncovered in the southeastern corner of the probe along the wall of locus 317. Locus 320 was a thick layer of black (5.YR 2.5/1) ash measuring 29cm deep. This ash layer was over an 18cm soil layer of red (2.5YR 6/6) sand (locus 321), below which was a dark red (2.5YR 4/8) burnt soil layer (locus 322) that measured 8cm in depth. The pottery from locus 320 was purely Early Hellenistic (III. **Table 1:A-B**), including a heavy incurved bowl and the out-turned rim of perhaps a fish plate. The final layer excavated in Trench 9 was the bottom of the hearth (locus 323), which comprised another thick black (5YR 2.5/1) layer that was 39cm deep. At this point, the bottom of locus 323 was reached at -2.16m, just above the *wadi* bed, and at a point slightly below that of the northwest sector (**Fig. 7**).

II.3: Interpretation

The results of excavation in Trench 9 from the HPP III excavation season were nothing less than astounding. In a very short amount of time, the excavations revealed a stratigraphic sequence that ranged from the Persian to the Middle Roman/Early Byzantine periods. Important to the goals of the project was the discovery of stratified remains dating from the earliest settlement phase attested in Petra. The artefactual evidence from the associated *loci* included a coin dating to the late 4th/early 3rd centuries BC, early Hellenistic wares including imported Attic black-glazed pottery, and a fairly large ceramic assemblage of common wares of the Persian and Early Hellenistic period that have never been reported from the manifold excavations at Petra to date. This evidence both confirms and also supplements the literary account of the ancient authors with regard to this early occupation of Petra.

II.4: Results of Trenches 8 and 9

These stratified finds indicated a continuous occupation from the late Persian into the Early Hellenistic period just south of the Colonnaded Street, with structures built on the *wadi* bed, which obviously extended further south in earlier periods. In addition, from the architectural



7. Trench 9: northeastern sector with loci (J.L. Rivard).

perspective, the east-west stone wall (N) that Parr discovered in his Trench III appears to run continuously across all our adjacent trenches, in Trench 3 (Graf *et al*. 2005: 423-424, fig. 12, wall ST7a), Trench 8 (W207) and Trench 9 (W317). This wall is poorly constructed of small ashlars and unhewn stones of various sizes, with mud-mortar packing and chinking stones filling in the gaps. The wall is about 0.65m wide in Trench 8 and ran on a slight southwest to northeast angle that was neither parallel with the southern portico wall that marked the southern boundary of the trench nor perpendicular to the north-south walls that divided Trench 3 from Trench 8 and Trench 8 from Trench 9. This early east-west wall, resting on the *wadi* bed, appears to have gone through a number of renovations or repairs. A possible break in this eastern wall in Trench 8 could represent a doorway, indicating that the wall divided the area into a number of small rooms to the north and south. A well-constructed fire pit abutting the north face of the wall contained a single Early Hellenistic sherd (Phase IIIa, locus 218 [see **Fig. 4**]), with predominantly Early Hellenistic sherds just below the pit (Phase II-Ib, locus 219). In Trench 9, a similar find of a large fire pit/hearth on the northern face of what appears to be the same wall, yielded only Early Hellenistic sherds (locus 320). As a result, it appears that the construction of the wall dates from the late Persian/early Hellenistic period, and is bedded directly on the sterile soil of the *wadi* bed. Admittedly, the constructions along the wall represent only small-scale domestic quarters and/or industrial activities, but any early major architectural features could have been simply destroyed or cleared away by later constructions. Since these early strata were less than a meter from the edge of the street, it is possible the Colonnaded Street has destroyed or covered over much of the earlier settlement. In sum, these finds confirm those produced by Peter Parr's Trench III, providing additional credence to his envisaging an "undisturbed sequence of (early) structures" in the area.

8. Hellenistic pottery (S.E. Sidebotham).

III. Ceramic Analysis

Tali Erickson-Gini

The HPP III season in 2007 produced a relatively large amount of ceramic material from two trenches (Trenches 8 and 9) located south of and abutting the paved Colonnaded Street in the city center of Petra. The excavation of Trench 9 produced a clear stratigraphic sequence manifested in the architecture as well as the ceramic and numismatic finds ranging from the Middle Roman/Early Byzantine periods to the Late Persian and Early Hellenistic periods. This sequence was not immediately apparent in Trench 8 with regard to the architectural and numismatic finds. However, Trench 8 produced a pottery sequence similar to that found in Trench 9, with the earliest types discovered in the lower levels of the trench and later types discovered in the upper levels.

The ceramic finds were initially sorted by Benjamin J. Dolinka, the excavator of Trench 9, who separated and catalogued the diagnostic sherds examined in this report and made preliminary counts of both these and the discarded sherds. His initial sorting and recording of the ceramic finds forms an invaluable basis for this report. The HPP III ceramic assemblage was examined later by Dr. Jean-François Salles, director of IFPO, and myself. According to Dr. Salles (pers. comm.), the Black-glazed ware present in the assemblage dates to the 4th-3rd centuries BC and either belongs to Attic Black-glazed vessels or, more likely, to similar wares produced elsewhere in that period that were imported to Petra. He also selected a number of vessels from the assemblage to be drawn and provided the facilities in 2008 at IFPO in Amman, Jordan where the entire assemblage was examined (**Fig. 8**).

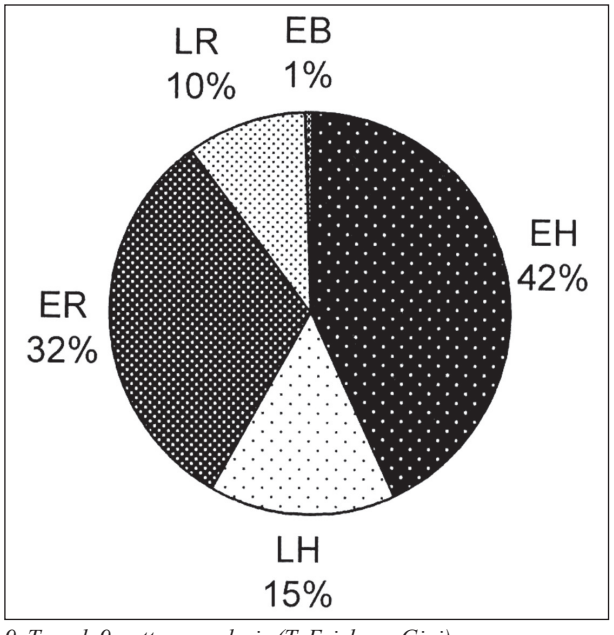
Parallels for the early wares in the assemblage were found primarily from sites located along the Mediterranean coast such as Khirbat al-Burj (Tel Dor), Arsūf (Apollonia), Ashdod

and Tall Michal. In addition, some imported Attic Black-glazed wares were also present. The coastal ports were the interface between the distant inland site of Petra and the Mediterranean world. Thus, it comes as no surprise to find distinct parallels with the assemblages of that region.

*III.1: Pottery from Trench 9 (***Fig. 9***)*
Loci 320 and 319

Persian and Early Hellenistic ceramic finds were discovered in the lowest levels of the excavation in Trench 9 in locus 319 the northwestern quarter of the excavation square. A hearth (locus 320) containing a small amount of pottery was discovered in the southwestern corner of locus 319. A minor amount of later material in the upper level of locus 319 (such as a sherd corresponding to Schmid's Dekorgruppe 1, from Phase 1 in az-Zanṭūr not presented here [Schmid 2000: Abb. 74-75]), marks the interface between the early and late phases.

The assemblage comprises wares identified as belonging to the Late Persian and Early Hellenistic periods. These include incurved rim bowls (**Table 1:A, D**) popular in the Late Persian and Early Hellenistic periods. **Table 1:A** is an early plain ware type clearly inspired by Attic imports, corresponding to Stern's Type E, which appears at the end of the Persian period (Stern 1995: 53). At Khirbat al-Burj (Tel Dor), incurved rim bowls made up 75% of bowls by the beginning of the Hellenistic period (Guz-Zilberstein 1995: 289). This form was produced into the Late Hellenistic period at Petra (Schmid's Dekorgruppe 1, from Phase 1 in az-Zanṭūr [Schmid 2000: Abb. 10-17]). A second type is a plain ware bowl with a concave rim (**Table 1:B**) that imitates the Attic form of the Persian and Early Hellenistic periods (*ibid*.: 290-291). A coarse ware vessel with a thick horizontal rim and thumb-impressed spout (**Table 1:C**) appears to be a type of Early Hellenistic *mortarium* also discovered at Khirbat al-Burj (Tel Dor) (*ibid*.: 295, fig. 6.10). The upright neck and flanged rim covered with a gray slip (**Table 1:E**) resembles that of a globular krater discovered in Persian contexts at Tall Michal (Singer-Avitz 1989: fig. 9.2:3). One of the earliest vessels in the assemblage is a coarse ware cooking pot with an upright neck and flanged rim (**Table 1:F**) with parallels found in the Persian period at Khirbat al-Burj (Tel Dor) (Stern 1995: fig. 2.37:9). Parts of storage jars have Persian and Early Hellenistic parallels (**Table 1:G-I**). The first is an outturned rim belonging to a type of elongated bag-shaped jar commonly found in the region. Parallels may be found in the Persian period at Arsūf (Apollonia) (Tal 1999: Fig. 4.40:3) (**Fig. 9**).



9. Trench 9 pottery analysis (T. Erickson-Gini).

Table 1:H-I are the rim and bent handle of a cylindrical 'torpedo' jar, Stern's Type G (Stern 1995: figs. 2.9:1,4). The bent handle bears traces of plaster accretions. This was a widespread type of storage jar found throughout the eastern Mediterranean region at coastal and inland sites (including Mesopotamia) primarily in the Persian period, that is to say the 6th to 4th centuries BC (Stern 1995: 62). Guz-Zilberstein reports that storage jars of this type were found exclusively in the transitional Persian-Hellenistic period (325-275 BC at Khirbat al-Burj [Tel Dor]) (Guz-Zilberstein 1995: 312). Parallels for our vessel were uncovered in a Persian-period assemblage in northern Sinai at Tall al-Qudayrat (ancient Kadesh Barnea) (Cohen and Bernick-Greenberg 2007: pl. II.132:8). That site was located along an ancient caravan route frequented by the Nabataeans in later periods. Raban suggests that the jars were used to preserve fish (Raban 1976) and they are known to have served as tomb offerings in the Persian period (Tal 1999: 103; Stern 1982: 75-76, fig. 109).

The nozzle of a lamp covered with a buff slip (**Table 1:J**) belongs to a closed lamp commonly found in the region in the Late Persian and Early Hellenistic periods. It appears to be an imitation of Attic lamps of the same period. Petrographic analysis on lamps of this type from Arsūf (Apollonia) (Tal 1999: fig. 4.41:15) suggests a Cypriot or Aegean provenance (*ibid*.: 161).

Loci 312, 310, 308 and 300

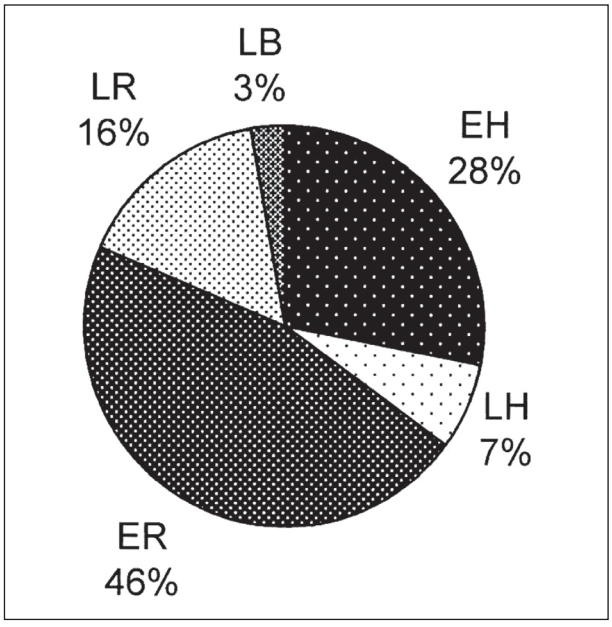
The upper levels of Trench 9 contain vessels of the late 2nd or 1st centuries BC and what appears to be an early cooking pot lid (**Fig. 2:C**) that has parallels in the Persian period at Khirbat al-Burj (Tel Dor) (Stern 1995: fig. 2.4:2). The assemblage is presented here in the order of the *loci*, from earliest to latest.

Parts of imported amphorae were uncovered (**Table 2:B, H**). The rim of **Table 2:H** and base of **Table 2:B** appear to belong to Rhodian jars similar to an example from Khirbat al-Burj (Tel Dor) in the Late Hellenistic period (Guz-Zilberstein 1995: fig. 6.45:1). Bowls include a base of the earliest form of Nabataean Painted Fine Ware bowls, Schmid's Dekorgruppe 1 (**Table 2:J**), dated to between 150 and 50 BC (Schmid 2000: Abb. 74). Open forms include a shallow, incurved rim bowl (**Table 2: E** [se *cf.* also **Table 1:A** and **D**]) and a bowl after the fishplate tradition with a drooping rim (**Table 2:F**). This type of plate belongs to a type generally found in the region in contexts dated to the 3rd and 2nd centuries BC. Plates of this form and ware have been found at Arsūf (Apollonia) (Fischer and Tal 1999: fig. 5:12:3-4). A carinated bowl covered with a gray brown slip has parallels with a form found at Khirbat al-Burj (Tel Dor) (Guz-Zilberstein 1995: fig. 6.7:10). According to Guz-Zilberstein, this type of bowl generally has pinched, horizontal handles, which she dates to the early 2nd through early 1st centuries BC (*ibid*.: 294). No exact parallels could be found for two deep, open vessels (**Table 2:D, G**). The first (**Table 2:D**) is a krater made of a heavy, coarse ware. It has a deep and lined form with an everted, grooved rim. The second (**Table 2:G**) is a large krater or *mortarium* with a lined, everted ledge rim. Part of a lamp nozzle with parallel lines (**Table 2:I**) made of a dark gray ware may belong to a mold-made lamp with radial shoulder decoration discovered frequently at Khirbat al-Burj (Tel Dor) in the period between 200 and 50 BC (Rosenthal-Heginbottom 1995: fig. 5.16:11).

*III.2: Pottery from Trench 8 (***Fig. 10***)*
Loci 219, 217, 215, 214, 212, 210 and 209

Similar to Trench 9, but less defined, the assemblage uncovered in Trench 8 contains ceramic vessels of an early date (Persian and Early Hellenistic periods) as well as vessels from the 2nd and 1st centuries BC. Many of early vessels appear to be residual in later levels. A selection of material from these *loci* is presented here from the earliest levels to the latest. It should be noted that the later levels, including locus 209, contain a mixture of early and late material, including sherds from the later part of the 1st century BC (such as Schmid's Dekorgruppe 2a and 2b), not presented here (**Fig. 10**).

One of the earliest vessels indicated in the assemblage (and in Petra itself) is residual, appearing in one of the later levels (locus 209). This is the shoulder of an Attic painted *lekythos,* possibly produced in the Beldam Workshop (**Table 3:N**). It is quite worn and made of a light red ware with worn red vertical lines applied at the bottom of the neck and on the angular shoulder. According to Tal (1999: 106), *lekythoi* produced in the Beldam Workshop became commonplace in the region by the mid-5th century BC.



10. Trench 8 pottery analysis (T. Erickson-Gini).

A number of imported Attic Black-glazed vessels were revealed in the assemblage. They include the base of an Attic wheel-made lamp (**Table 3:A**) discovered in one of the earliest levels of Trench 8. The walls of the lamp are thick and the base convex and raised towards the center. Lamps of this type were discovered on the Mediterranean coast at Khirbat al-Burj (Tel Dor) in contexts dating to between 420 and 290 BC (Rosenthal-Heginbottom 1995: 234, figs. 5.13:1-2). Two Attic Black-glazed bowls have flaring sides and slightly everted rims (**Table 3:D, M**). According to Tal (1999: 130), this form is one of the most common Attic bowl types imported into the region. They correspond to bowls discovered in the Athenian Agora dated to the period between 400 and 310 BC (Sparkes and Talcott 1970: 128-130, 293-294, nos 801-808, fig. 8, pl. 32). Stewart and Martin (2005: 91) report a complete cessation of Attic imports at Khirbat al-Burj (Tel Dor) after *ca* 300 BC.

Other early bowls include one with a flanged, incurving rim (**Table 3:J**). This appears to be an Early Hellenistic imitation of the Attic ware form similar to bowls uncovered at Arsūf (Apollonia) (Fischer and Tal 1999: fig. 5.7:1) and Ashdod (Dothan 1971: fig. 8:3). Another type has a horizontal, infolded rim covered on the exterior with a dark gray slip (**Table 3:K**). This may be an imitation of Attic flat plates of the late 4th and early 3rd centuries BC (Crowfoot *et al*. 1957: 25). At Khirbat al-Burj (Tel Dor), they were uncovered in Early Hellenistic contexts as well as contexts dated to the 2nd century BC (Guz-Zilberstein 1995: 292-293). No exact parallels were found for a coarse ware bowl with a heavy, squared and everted rim (**Table 3:C**). A shallow plate with a drooping rim after the fishplate tradition (**Table 3:G**) is present (see also **Table 2:F** above).

An early form of krater with a wide, flaring mouth and flattened, everted rim (**Table 3:H**) may be compared with a Late Persian deep krater form from Khirbat al-Burj (Tel Dor) (Stern 1995: fig. 2.3:2, 11). A similar example was uncovered at Arsūf (Apollonia) (Tal 1999: fig. 4.12:11). An early storage jar has a short, slightly concave neck (**Table 3: I**). A groove is located below the neck. It belongs to a class of storage jars found in the Persian period at Arsūf (Apollonia) (Tal 1999: figs. 2.25:9-11). A storage jar with a collared neck (**Table 3:B**) has a deep groove located below the neck and a pointed, upright rim. Jars of this type were found in Early Hellenistic contexts at Khirbat al-Burj (Tel Dor) (Guz-Zilberstein 1995: fig. 6.47:32).

Ceramic vessels found in later levels in Trench 8 include part of a worn molded relief ware ('Megarian'-type) bowl (**Table 3:E**), decorated with a row of plain medallions located between two ridges. The bowl is covered with a worn dark brown paint above and below the row of plastic decoration. The plastic decoration resembles that found on bowls from the Athenian Agora (Rotroff 1982: no 398; pl. 68:88). A hemispherical fine ware bowl with a slightly everted rim and a band of ridges below the rim (**Table 3:F**) is covered with a dark grayish brown slip on the exterior. This vessel may have been produced in Petra (Schmid's Type E7a, attributed primarily to Phase I in az-Zanṭūr [Schmid 2000: Abb. 157-158]).

Two cooking pots (**Table 3:L, O**) found in the later levels of Trench 8 correspond to Nabataean forms dated to the early 1st century BC from az-Zanṭūr (Stucky *et al.* 1994: figs. 15F, K). Both have short, bulging necks and flanged rims.

III.3: Conclusions

The outstanding feature of the HPP III ceramic assemblage is the significant presence of Persian and very Early Hellenistic vessels, including the presence of imported Attic Black-glazed wares in a stratified context (*cf.* Horsfield 1942: 128 nos 80 from bedrock and no 81 from the Katute dump).

This early assemblage appears to have been largely imported to the site. However, petrographic analysis may reveal that some of these vessels were produced locally. In contrast, there is a paucity of material dated to the later 3rd and early to middle 2nd centuries BC. The virtual absence of pottery from this period was also noted by Dr. Salles (pers. comm.). This stands in contrast to the adjacent Trench 3 of HPP I 2004, which showed continuous occupation from the early Hellenistic period to the 1st century AD, and the results of the French excavations in the *temenos* area of Qaṣr al-Bint in the heart of Petra, which provided evidence of a phase of the

Early Hellenistic period that postdates that of Trenches 8 and 9 (Mouton *et al.* 2008; Renal *et al*. 2012). It also conflicts with the numismatic evidence from Trench 9, which produced three Nabataean anonymous issues of Type 2, dating to the late 3rd and early 2nd centuries BC, from the lower layers in a Hellenistic context (see IV. nos 10-12). These finds make perplexing this apparent absence of clearly discernible diagnostic sherds of the 2nd century BC. The coinage suggests that the seeming gap may be a red herring, and that some of the Black-glazed ware may date later than assumed or 2nd century BC wares were disguised in the non-diagnostic sherds that were discarded. But the scarcity of imported wares in Trenches 8 and 9 remains a problem. Rhodian amphorae, molded relief ware (like the so-called 'Megarian' bowls) and the earliest forms of Eastern Sigillata appear elsewhere in excavations at Petra, in some quantity. However, in the HPP III assemblage such finds are comparatively rare, consisting only of a few fragments of Rhodian amphorae (**Table 2:B, H**) and a sherd of a 'Megarian'-type bowl (**Table 3:E**). There is even a marked scarcity of Schmid's Nabataean Painted Fine Ware Dekorphase 1 - a single sherd from Trench 9, dated to the period between 150-50 BC (Schmid 2000: Abb. 73-77) - and no sign of the ribbed-necked jars of the 1st century BC discovered, for example, in significant quantities and variations in an isolated building (farmhouse?) just north of Petra (Knodell *et al.* 2017: fig. 14: 20-27).

Whatever the case, this seeming gap in the ceramic assemblage and stratigraphic sequence requires some explanation, since it appears that most of the area was apparently undisturbed by construction until some time in the 1st century BC and the Early Roman period. This may be connected to our limited soundings, but the apparent ceramic gap is still noteworthy.

The later periods represented in the assemblage include the end of the Late Hellenistic period, *i.e*. the mid-1st century BC, the Early Roman period (the late 1st century BC through 1st century AD), the Middle Roman period (post 106 AD until the early 3rd century AD) and the Early Byzantine period (4th century AD). The pottery of the 1st century BC includes early forms of painted and unpainted Nabataean fine ware corresponding to Schmid's Dekorgruppe 2a, which he dates to the period between 50 and 20 BC (Schmid 2000: Abb. 79-82). That of the next period, the Early Roman, includes Schmid's Dekorgruppe forms 2b, 2c and 3a (Schmid 2000: Abb. 83-89), dated to the period between 20 BC and 80 AD. But some reservation must be expressed about the chronology of Schmid's az-Zanṭūr Dekorphases, particularly Phases 3a-c: 20-80 AD (a), 80-100 AD (b) and 100-150 AD (c). There are no coins at az-Zanṭūr for dating Phases3a and 3c, and rather than the proposed compressed chronology for Types 3b and 3c, it is clear they must be expanded into the 2nd and 3rd centuries AD (see Erickson-Gini and Tuttle 2017: 116-124). With this caveat about the az-Zanṭūr chronology in mind, only the sequences of the az-Zanṭūr Dekorphases are cited for convenience as a general guide. There is also a minimal amount of Eastern Sigillata wares, Nabataean piriform unguentaria, fragments of Nabataean molded lamps (Grawehr's Types C3 and E [Grawehr 2006]) and Nabataean painted and unpainted fine ware and plain ware bowls. The Late Roman phase includes forms of debased Nabataean painted ware bowls (Schmid's Dekorgruppe 3c [Schmid 2000: Abb. 92-93]) and rouletted ware bowls (Schmid's Gruppe 9 [Schmid 2000: Abb. 62-65]). A very small amount of Early Byzantine pottery was found, primarily in the topsoil of Trench 8, which produced parts of an African Red Slip ware bowl, possibly corresponding to Hayes Form 50 (Hayes 1972), as well as a fragment of a molded lamp (Grawehr's Type L [Grawehr 2006]) and a sherd of a Judean rouletted-ware bowl (Magness 1993: 195-186; Erickson-Gini 2010: fig. 4:6). The Early Byzantine vessels and lamp have been found in contexts correlating with the tremendous earthquake in 363 AD that destroyed much of Petra, as at Mezad Hazeva and Mampsis for example (Erickson-Gini 2010: 79-80, 85, 99).

Nevertheless, the substantial Early Hellenistic and even pre-Hellenistic finds in the ceramic assemblage of Trenches 8 and 9 are truly impressive and point to the probability that an Early Hellenistic settlement existed in the heart of Petra at a date earlier than previously assumed. The HPP III 2007 assemblage provides extremely valuable data for the dating of Early Hellenistic wares found in Nabataean sites.

The presence of what appears to be locally produced vessels at this early stage in Nabataean history, including Nabataean anonymous coinage discovered in association with architectural remains, suggests that these Nabataeans had become sedentarized much earlier than previously assumed by scholars. These findings are supported by the discovery of early Hellenistic remains at Qaṣr al-Bint at Petra (Mouton *et al.* 2008; Renal *et al*. 2012), the recent discoveries at Mada'in Salih (ancient Hegra) in Saudi Arabia (Nehmé *et al.* 2014) and early Nabataean forts at several sites in the Negev and western 'Arabah (Erickson-Gini and Israel 2013).

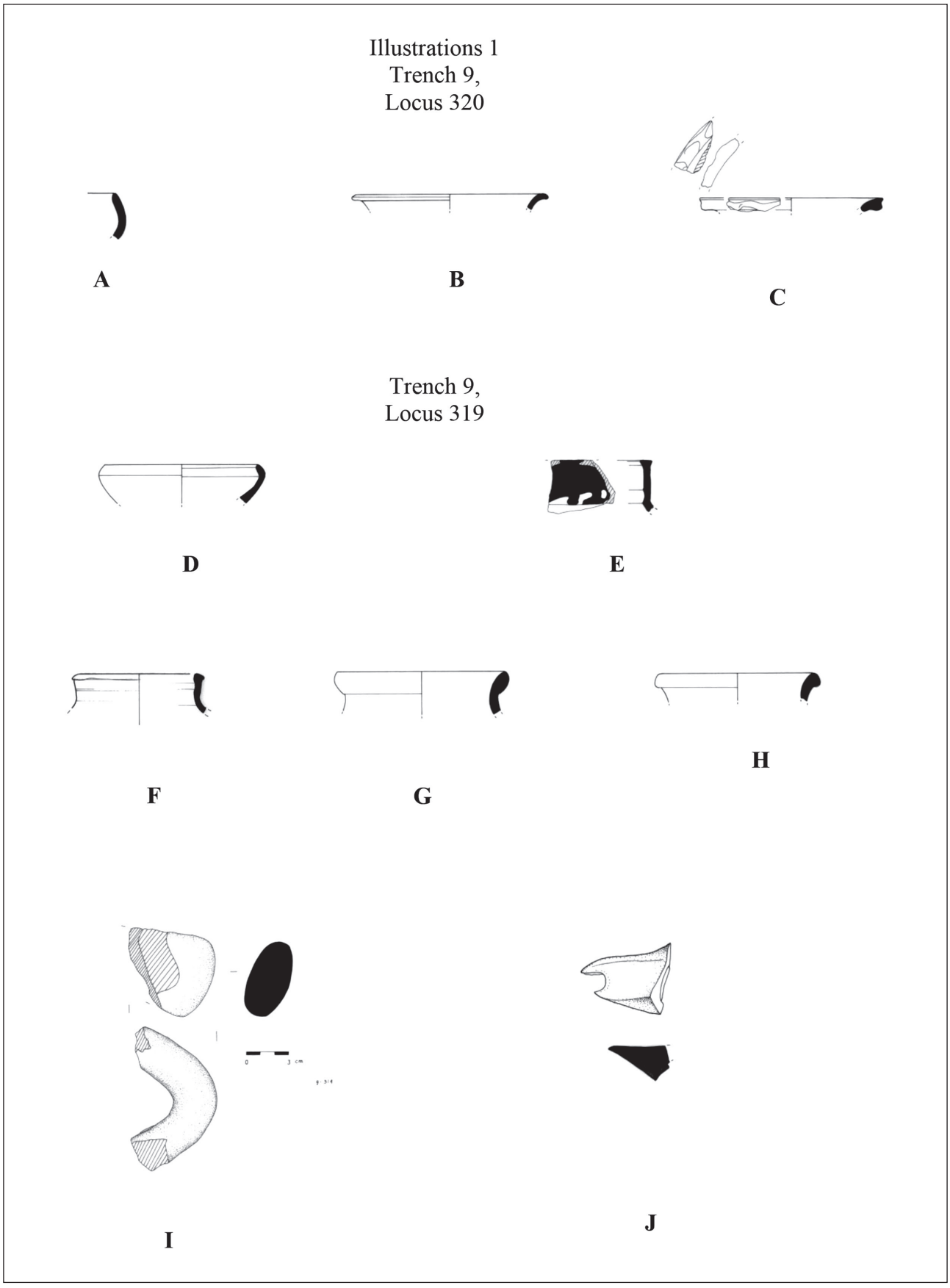
III.4: Catalogue of the HPP III Pottery

Table 1: Trench 9 (L320 – L319/15) (**Fig. 11**).

Fig. 1	Cat. No	Vessel	Description
A	320/3	Incurved rim bowl	Yellowish-red ware 5YR5/6; gray core; numerous tiny to small white inclusions.
B	320/2	Out-curved rim bowl	Yellowish-red ware 5YR5/6; light gray core; occasional small white inclusions.
C	320/1	*Mortarium* with thumb impressions on the rim	Light gray core; occasional medium white inclusions; red slip on exterior 2.5YR5/8; coarse texture, thumb-impression on rim.
D	319/4	Incurved rim bowl	Yellowish-red ware 5YR5/6; slip on interior: light gray 10YR7/2; light brown core; small to large white inclusions.
E	319/7	Krater	Reddish-yellow ware 5YR6/8; gray slip 7.5YR5/1 (slip is drippy on interior); light gray core; occasional medium white and light gray inclusions.
F	319/1	Cooking pot	Yellowish-red ware 5YR5/8; light brown core; numerous tiny to large white and light gray inclusions; rough texture.
G	319/2	Storage jar	Reddish-yellow ware 5YR6/6; light gray slip 10YR7/2; light brown core; occasional large white and light gray inclusions.
H	319/3	'Torpedo' jar rim	Reddish-brown ware 5YR4/4; gray core 7.5YR6/1; numerous tiny to small white inclusions; coarse texture.
I	319/9	'Torpedo' jar handle	Reddish-yellow ware 5YR6/6; pink slip 5YR 7/3; plaster accretions.
J	319/5	Lamp nozzle	Reddish-yellow ware 5RY6/6; very pale brown slip 10YR8/4; traces of charring.

Table 2: Trench 9 (L312 – L300) (**Fig. 12**).

Fig. 2	Cat. No	Vessel	Description
A	312/1	Carinated bowl	Reddish-brown ware 5YR5/4; gray-brown core; occasional very large white inclusions brown slip 7.5YR5/3 on exterior rim and upper interior, drippy on interior.
B	312/2	Amphora knob base	Reddish-brown ware 5YR6/6.
C	312/3	Lid	Light reddish-brown ware 5YR6/4; on both sides; numerous tiny white inclusions; gray slip 7.5YR5/1; semi-coarse ware.
D	310/1	Deep krater	Yellowish-red ware 5YR5/6; numerous small to large white inclusions; gray slip on exterior 2.5YR5/1, extends to upper rim past the groove; heavy coarse ware.
E	308/6	Shallow incurved bowl rim	Light red ware 2.5YR6/8.
F	308/5	Plate after the fishplate tradition	Red ware 2.5YR5/8; occasional small white inclusions; dark reddish-brown slip on exterior and on rim 5YR3/3.
G	308/4	Large bowl or *mortarium*	Red ware 2.5YR5/8; light brown core; occasional tiny white and gray inclusions; light brownish gray slip.
H	308/3	Rhodian amphora	Pink ware 7.5YR7/4.
I	308/1	Lamp nozzle	Very dark gray ware 2.5Y3/1.
J	300/1	Nabataean painted ware bowl base	Red ware 2.5YR5/6; light gray core; red deco 2.5YR4/6.



11. Pottery from Trench 9: illustrations loci 320 and 319, Table 1 (T. Erickson-Gini).

Illustrations 2
Trench 9,
Locus 312

A

B

C

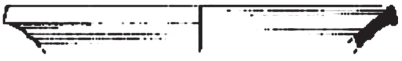
Trench 9,
Locus 310

D

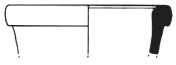
Trench 9,
Locus 308

E

F



G



I

H

Trench 9,
Locus 300

J

12. Pottery from Trench 9: illustrations loci 312-300, Table 2 (T. Erickson-Gini).

Table 3: Trench 8 (L219 – L200) (**Fig. 13**).

Fig. 3	Cat. No	Vessel	Description
A	219/1	Attic wheel-made lamp base	Reddish-yellow ware 7.5YR6/6; very dark grayish brown slip 10YR3/2.
B	217/1	Storage jar	Yellowish-red ware 5YR5/6; occasional small white inclusions; very dark grayish brown slip 10YR3/2; coarse ware.
C	215/1	Heavy bowl rim	Reddish-yellow ware 5YR6/6; occasional tiny to small white inclusions; rough texture; brown slip 7.5YR4/2 on exterior rim and upper interior.
D	215/3	Attic Black-glazed bowl rim	Yellowish-red ware 5YR5/8; metallic black glaze 10YR7/3.
E	215/2	Bowl	Red ware 2.5YR5/8; occasional tiny white inclusions; dark reddish gray slip 5YR4/2 on exterior and upper interior rim.
F	214/1b	Molded relief ware bowl	Red 2.5YR5/8 to reddish yellow 5YR6/8 ware; thick dark gray core; occasional tiny white inclusions; very worn dark brown slip 7.5YR3/2 on exterior above and below the plastic decoration.
G	214/2	Hemispherical bowl	Reddish-yellow ware 5YR6/6; worn very dark grayish brown slip on exterior and dripping on interior 10YR3/2.
H	214/1a	Plate in the fish plate tradition	Yellowish-red ware 5YR5/6; occasional tiny white and large white inclusions; light gray slip 10YR7/2 on exterior; drippy brown to red slip 2.5YR4/8 on interior.
I	214/2b	Krater	Yellowish-red ware 5YR5/6; numerous tiny to medium white inclusions; reddish-brown slip 2.5YR4/4 on exterior below rim.
J	214/5	Storage jar	Reddish-yellow ware 5YR6/8; thick light gray core; occasional small white inclusions; very pale brown lip 10YR8/2.
K	212/1	Plate with infolded rim	Reddish-yellow ware 7.5YR6/6; occasional medium white inclusions; very dark gray slip 10YR3/2 on exterior and on the interior rim.
L	210/1	Cooking pot	Reddish-yellow ware 5YR6/8; occasional medium light gray inclusions; light reddish brown slip 5YR6/4.
M	209/10	Black-glazed bowl	Yellowish-red ware 5YR5/8; shiny black glaze 5YR2.5/2.
N	209/11	Painted *lekythos*	Light red ware 2.5YR6/8; faded red decoration 2.5YR4/8; very worn.
O	209/13	Cooking pot	Reddish-yellow ware 7.5YR6/6; numerous tiny and small white inclusions and occasional small light gray inclusions; coarse ware.

IV. Coinage Report

D.F. Graf and S.E. Sidebotham

IV.1: Introduction

The third season of the Hellenistic Petra Project recovered 14 coins. All were *aes* issues; no hoards were discovered. Christian Augé inspected the coins in the field and his readings were extremely accurate. The coins were cleaned using muriatic acid diluted with tap water. Coins were weighed on an Acculab Pocket Pro C/60 precision electronic balance with accuracy to 0.01 of a gram. Coins were measured after cleaning with maximum diameters recorded to the nearest millimeter. All identifiable coins are Nabataean with the exception of catalogue no 14 (Trench 9, locus 319), which is North Arabian dating to the late 4th or 3rd century BC. Two coins (catalogue nos 3 and 6) disintegrated during cleaning. Several of the issues are important (no 1 and nos 10-12, and 14) and are discussed below.

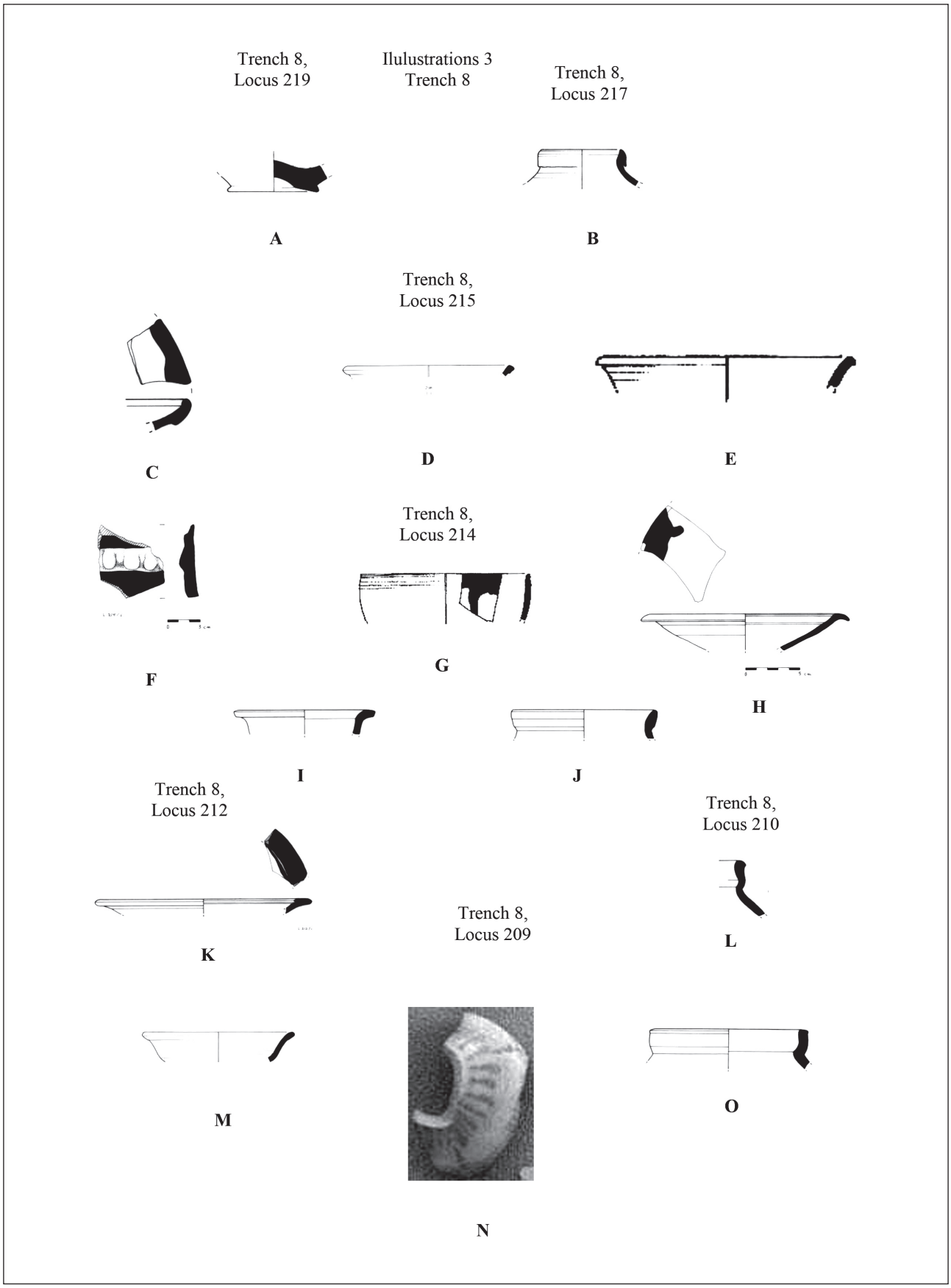
Abbreviations:

Obv. = obverse
Rv. = reverse
stg. = standing
l. = left
r. = right
fig. = figure
mm = millimeters
g. = grams

Format

The following format has been used to record the coins

1) Locus number
2) Date of find
3) Size (or denomination) of coin in mm



13. Pottery from Trench 8: illustrations loci 219-209, (T. Erickson-Gini).

4) Weight in grams
5) Origin of coin
6) Date
7) Obv.
8) Rv.
9) Die positions
10) Parallels (if any).

Entries marked with an * appear in accompanying photographs

IV.2: Catalogue

Trench 8

1*) Locus 206B (August 4); AE 16 Nabataean; 2.10 g.; Obodas II, with monograms of Aretas IV (= *ḥ*) and Syllaeus (= š); 9-6BC; Obv: flat, bust of Obodas II r.; Rv: concave, crossed cornucopiae, on r. *ḥ*, on l. š; parallels: *cf.* Meshorer 1975: 40-43A; Schmitt-Korte 1990: 111-112 no 25-28; Barkay 2017: 71-72, type 7c; al-Salameen 2013. 65-124 [Arabic].
2) Locus 206B (August 4); AE 18; 2.54 g.; unidentifiable.
3) Locus 206 B (August 4); disintegrated.
4) Locus 217 (August 8); AE 15; 1.44 g.; Nabataean ?; Obv. bust r.?; Rv. crossed cornucopiae?

Trench 9

5) Locus 300 (August 1); AE 14; 0.45 g.; unidentifiable.
6) Locus 308 (August 8); disintegrated.
7) Locus 308 (August 7); AE 14; 1.96 g.; Nabataean; 4/3BC; Obv. laureate head of Aretas IV r.; Rv. crossed cornucopiae with o between them, beneath o, the letter *Ḥ*; Meshorer 1975: no 73.
8) Locus 308 (August 8); AE 16 (largest piece); two pieces, about half the coin is missing and lost; 1.99 g. and 0.24 g.; unidentifiable.
9) Locus 309 (August 4); AE 17; 2.46 g.; Nabataean; Aretas IV, 39/40AD; Obv. jugate busts of Aretas IV and Shuqailat; Rv. double cornucopiae, with a three-line inscription *Ḥrtt*/Šqy/*lt*; ↑↑; Meshorer 1975: no 112.
10) Locus 309 (August 4); AE 15; 3.39 g.; Nabataean; Anonymous. Type 2 (*ca* 200BC); Obv. helmeted head r.; Rv. Nike stg. l., r. hand extended, r. hand down by side; Meshorer 1975: nos 1-2.
11*) Locus 310 (August 5); AE 18; 3.19 g.; Nabataean; Anonymous, Type 2 (*ca* 200BC); Obv. helmeted head r.; Rv. Nike stg. l., r. hand extended, l. hand down by side; Meshorer 1975: nos 1-2.
12) Locus 316 (August 7); AE 17; 3.83 g.; Nabataean; Anonymous, Type 2 (*ca* 200BC); Obv. helmeted bust r.; Rv. Nike fig. stg. l.; Meshorer 1975: nos 1-2.
13) Locus 316 (August 7); AE 17; 2.03 g.; Unidentifiable, badly corroded.
14*) Locus 319 (August 9); AE 21; 10.62 g.; northern Arabian; *ca* late 4th-3rd century BC; Obv. Crude stylized head of Athena r. full r. eye; Rv. Owl stg. r. face frontal, on l. olive sprig, legend ΘE downward to r; Hill 1922/1965: 77 (no 3); *SNG* 1981: nos 1453-1454; *cf*. Mildenberg 1996.

IV.3: Analysis and Discussion

There are a few issues of exceptional importance that deserve some comment.

(i) Coin of Syllaeus (**Figs. 14-15**)

Catalogue 1 is an issue of Aretas and Syllaeus. The portrait on the obv. is that of Obodas II, *ca* 30 BC (Schwentzel 2005: 152-153, fig. 5), but has the monograms *Ḥ* (= Aretas) and Š (= Syllaeus) on the rev. (Meshorer 1975: 36-40; Schmitt-Korte 1990: 127-129; Schmitt-Korte and Price 194: 101-103; Barkay 2017: 72, Type 7c; many examples in al-Salameen 2013: 64-114). The putative previous King Obodas designated II is now regarded as fictional (Huth 2010: 214-217). Obodas II is depicted here with a simple Dionysiac 'white' headband with free-hanging ends that is common for Nabataean kings from Aretas III to Rabbel II (*cf*. Smith 1988: 34-44). The king's long-flowing hair

14. Coin 1, Syllaeus, Obv. (S.E. Sidebotham).

15. Coin 1, Syllaeus, Rev. (S.E. Sidebotham).

reflects the hair-style of Dushares-Dionysus (Bowersock 190: 31). Since Syllaeus' name appears in full on some issues (Šly), it is clear that the monogram letters *Ḥ (*Aretas) and Š (Syllaeus) on the reverse represent both claimants to the throne during the succession crisis that followed the death of King Obodas II in 9/8 BC (Josephus, *AJ* 16.293-299). New discoveries greatly expand the types and variants of the silver and bronze issues of Syllaeus, with more than a dozen new variants (al-Salameen 2013: 65-126). There is even a series with a portrait head of Aretas on the obverse and with what may be the portrait of Syllaeus on the reverse, each accompanied by the appropriate Aramaic monogram letters of *Ḥ* and Š, respectively (Huth 2010: 220, fig. 4iii). The newly discovered issues include large quantities of silver coins (hemidrachms), some with the head of Obodas II and others with that of Aretas IV (Hoover and Barkay 2010: 202; al-Salameen 2013; al-Rawabdeh 2015: 80-81). The quantity and variety of the issues of Syllaeus suggest a minting period of some length, so that the Obodas-Syllaeus and Aretas-Syllaeus issues are now dated for an extended period between 9 and 6 BC (Huth 2010: 218-220; Barclay 2017: 67-81 [for other issues of Syllaeus, see al-Salameen 2013; Goussous *et al.* 2014: 17-19, nos 68-81, and for an issue in the Fīnān see Kind *et al.* 2005: 171, no 16 = Meshorer 1975: no 45 variant]). Our catalogue no 1 suggests the period in which both claimants to the throne were mutually recognized, before Aretas was finally confirmed by Augustus and before Syllaeus was allegedly tried, sentenced and executed in Rome (for a discussion of the complicated and controversial literary sources for Syllaeus see Graf 2016b).

(ii) Nabataean 'Anonymous' Issues (**Figs. 16-19**)

Our finds also include three anonymous Nabataean issues, all from Trench 9: catalogue nos 10-12 from *loci* 309, 310 and 316. They were previously assigned to Aretas II (*ca* 110-96 BC), continuing under Obodas I and Aretas III (Meshorer 1975: 12-13), or assigned later to the period of Aretas III to Aretas IV, from *ca* 72 to 9 BC (Schmitt-Korte and Price 1994: 95-96). However, the stratigraphic context of our finds and other excavations at Petra suggest a much earlier date (see ceramic report above). It is also now clear that the issues were produced over a lengthy period. The diverse issues have recently been categorized into four types, chronologically extending from the 3rd century to the late 2nd or very beginning of the 1st century BC (Barkay 2011: 67-73). Type 1 consists of overstrikes of early Ptolemaic issues (Ptolemy I-III), with a helmeted head on the obverse and a standing Nike to the left on the reverse, which is not represented among our specimens. Our finds rather conform to Type 2, dated to the late 3rd or early 2nd century BC (Barkay 2011: 72). Previously, several dozen such issues were found in the British excavations in the 1950s and 1960s, including a few earlier stray finds at Petra (Bowsher 1990: 223). More recently, French excavations at Qaṣr al-Bint found nine such issues in the upper phases of Phase II (b and c), and almost as many uncertain ones. Although initially assigned a traditional date of the end of the 2nd century BC (Mouton *et al.* 2008: 68-6), the diagnostic pottery and radiocarbon dates of the sounding led to a revision of the chronology to perhaps the end of the 3rd

16. Coin 10, Anonymous, Obv. (Byron Maldonado).

17. Coin 10, Anonymous, Rev.

18. Coin 11, Anonymous, Obv. (Byron Maldonado).

19. Coin 11, Anonymous, Rev. (Byron Maldonado).

century and assuredly the early 2nd century BC (Renal *et al.* 2012: 47-48, 51), which conforms to the stratigraphic context of our finds. At Bi'r as-Sabi' (Beersheba) in the Negev, Types 3 and 4 are represented and were assigned a date after 129/8 BC and before 112/111 BC (Kushnir-Stein and Gitler 1992: 13-20). Our stratified finds of Barkay Type II are, then, an important contribution to the early Nabataean 'anonymous' issues at Petra.

(iii) North Arabian Coin (**Figs. 20-21**)

Catalogue no 14 is especially noteworthy as it is one of the earliest coins found in a stratified context at Petra (locus 319). It is clearly modeled on the famous 5th century BC silver Athenian tetradrachms, which circulated extensively in the Near East and were copied locally in the Levant and, apparently, in northern Arabia in the following centuries. These issues are modeled after Athenian tetradrachms, with a stylized head of Athena on the obverse and on the reverse a standing owl, flanked by motifs inspired by the Greek letters *alpha*, *theta* and *eta* of the original Athenian legend and the olive branch. The numerous issues represent diverse types that are dated to the end of the 3rd century into the middle of the 1st century BC, since they appear with Alexander types and early Ptolemaic issues. The closest previously published *aes* parallels (in size and weight) are in the British Museum (Hill 1922/1965: 77, no 3, pl. XI.26, nos 1453-1454), with parallels or similar issues found throughout Palestine (Huth and Qedar 1999; Gitler and Tal 2006b). Our issue from Trench 9 likely dates to the late 4th or early 3rd centuries BC, given its context in locus 319, where early Hellenistic pottery dominates.

20. Coin 14, North Arabian, Obv. (Byron Maldonado).

21. Coin 14, North Arabian, Rev. (Byron Maldonado)

Although similar finds from Petra exist in private (reported in as-Salṭ and Ma'ān) and public collections (at least a dozen or more have been deposited in the Jordan Ahli Bank Numismatic Museum in Amman [*cf.* Goussous and Tarawneh 1991: 32, no 48A]), this is the first stratified find of such an issue in Petra or anywhere else in Jordan.

Since our discovery, hundreds of issues of similar nature are now known from northwestern Saudi Arabia. At Madā'in Ṣāliḥ (ancient Hegra), the excavations since 1986 - and particularly after the French excavations between 2008 and 2016 - have produced hundreds. They have been recently tabulated, classified and discussed in regard to provenance and date (Bauzou 2016). The list and number includes Madā'in Ṣāliḥ (242), Maghāyir Shu'ayb (31), Khuraybah in al-'Ulā (7), Petra (3), Dūmat al-Jandal (1), Babylon (1) and unknown provenance (38), for a total of 320. The concentration at Hegra of 75% of the issues tabulated has led to the assumption that this was the center for issuing the type. However, the number may be inflated as of the 232 Hegra finds, only 168 have been "securely identified" (Bauzou ????). Moreover, it appears that only 15 were found in stratified contexts, the rest comprising surface finds. Moreover, Bauzou's corpus fails to mention two from Qaṣr al-Ḥamrā at Taymā' (Hausleiter 2012: 236, n. 41) and one from Aynuna (Michal Gawlikowski pers. comm.), as well as a dozen or more in the Jordan Ahli Bank Numismatic Museum in 'Ammān, mentioned earlier.

It should also be observed that Bauzou's pronounced classification of the various types (arranged into eight types designated A to H) is primarily dependent on stylistic analysis, with the larger silver issues placed first followed by the bronze issues in descending order dependent on size. From this perspective, the bronze issues appear to devolve from a stylized type to a quasi-abstract 'Picasso-like' type consisting of lines and dots, often with the absence of the Greek A in the legend (Bauzou 2014: 217-220). However, not all the evidence is compatible with this arrangement. One coin categorized as late Type F or G was found in Phase 1, dated by radiocarbon to the 5th to mid-4th century BC (Bauzou 2016: 102), so his classification can only be considered with reservation and caution

until firmer controls emerge and are executed. Some of the types also may be coterminous. Our imitation Athenian bronze tetradrachm has its closest affinity to Bauzou's Type C, which originates - in his opinion - in the 3rd century BC (Bauzou 2016: 103), but - in our case - the context suggests the end of the 4th or beginning of the 3rd century BC. In support of this date is the succession of a number of Nabataean 'anonymous' issues that are assigned to the end of the 3rd century BC in later stratified levels. This chronology is also supported by a similar type from Taymā' that is dated to the late 4th or early 3rd century BC (Hausleiter 2012: 236). The large quantity of diverse and irregular sizes at Madā'in Ṣāliḥ reflects the longevity of their production (Huth 2010: 227-234) and defies compressing them into simply the 2nd century BC (*pace* Roemer and Charloux 2015: 311-312). The find of one of the Arabian issues with Ptolemaic bronze issues in the excavations at Khuraybah in al-'Ulā (Bauzou 2014: 219) supports an earlier date. In sum, all indications suggest a date for the beginning of the bronze imitation issues by or *ca* 300 BC. It should be noted that the anonymous Nabataean issues, well known at Petra, are absent at Hegra where only two of the 329 Nabataean coins dated before the reign of Aretas IV.

As for the issuing authority for the imitation Athenian issues in Arabia or the so-called 'Hegra owls', it has been proposed that they were the product of the Liḥyanite dynasty at al-'Ulā (Augé 2010: 217, fig. 4a-b; Bauzou 2016: 103-104). But none of the coins bears a legend with the name of the city or authority responsible for minting the coins. In the past, it has been suggested that the Liḥyanite dynasty may have been an offshoot of the Qederite confederacy. The frontiers of the sizeable Qederite kingdom are determined by epigraphic evidence. In the west, it is marked by Tall al-Maskhūṭah in the Wādī aṭ-Ṭumaylāt-Suez region of Egypt, where some silver bowls dated around 400 BC, have one inscribed by "Qainu son of Geshem, king of Qedar, offered to Han-'Ilāt" (Rabinowitz 1956: 2, 5-7), considered to be the son of "Geshem the Arab" in the Hebrew Bible who is mentioned as an opponent of the Judaean Nehemiah's attempt to fortify Jerusalem in *ca* 445-433 BC (Nehemiah 2:19; 6:1-2, 6). For the southern frontier, a Liḥyanite text from al-'Ulā that mentions "Gashm son of Sharhas" been connected to the same "Geshem the Arab" (Winnett and Reed 1970: 115-117; *cf*. Eph'al 1982: 204-214). More recently, the dynastic patronym of Šahru appears in a stele from Taymā' that mentions a *Pṣgw* Šhrw *b*[*r m*]*lky lḥyn*, *i.e.* "Pṣgw Šahrū son of the King of Liḥyan", proposed as perhaps the grandson of "Geshem the Arab" in the time of Nehemiah (Cross 1986: 387-391). More importantly, the name Šahrū is derived from the divine name *Shahr*, an epithet of the moon god, perhaps explaining the double crescent on the cheek of the goddess depicted on Arabian imitations of the Athenian tetradrachms. This may also explain the appearance of a *shin* on the two early silver imitations representative of Type A, in which the Aramaic letter (*shin* is inserted after the Greek letter A (that appears like a Δ) in the Greek legend AΘH on the coins (Bauzou 2016: 89). These connections are buttressed by some recently published ancient North Arabian ('Taymanite') texts from the southern environs of Taymā' that contain references to Qedar and Dedan - one text even indicates the author "encamped in QDR (Hayajneh 2012: 123-139, esp. 127 and forthcoming) - lending further support to the extension of Qedar to Tayma' and northwestern Arabia (Graf 2016a: 444-445). Finally, several Thamudic texts (*JS* 695 + 696) from just southwest of Tabūk in northwestern Arabia have been ingeniously connected and re-read as mentioning a "tribe of Gešem" (King 1990: 691). There also are suggestions that the Nabataean association with the Qedarite dynasty was intimate (Graf 2013: 40-41).

Although there are no attested Arabian tertradrachms in southern Palestine, there are local Athenian styled 'Philistio-Arabian' coins that suggest Qedarite presence. A coin inscribed possibly with GŠM/Geshem (Huth and Qedar 1999: 295-297) is questionable (Graf 2015: 295-296), but coins attested in the region that bear the Qedaraite dynastic name ŠHRW are more likely associated with the Arabian confederation (Rizack 1984; *cf*. Graf 2015: 294-295; *pace* Gitler and Tal 2006a: 47-51). This interpretation is supported by other issues in the region inscribed with the names of Arab deities like al-'Uzzā and Manāt (Graf 2015: 296-298), suggesting an Arab derivation. These imitation

Athenian or Athenian styled issues are normally assigned to the period from the late 5th century BC to the campaign of Alexander the Great (Gitler and Tal 2006b: 146-157; *cf.* Fischer-Bossert 2010: 138). The absence of the Arabian coins may be explained by the domination in the area of the so-called 'Philistio-Arabian' types, and assigning them to the Qedarite conferation remains viable given their distribution throughout northwestern Arabia.

V. Analysis of the Faunal Remains

Alexander Wasse

V.1: Intoduction

This report presents a preliminary discussion of the faunal assemblage excavated at Petra, Jordan by the Hellenistic Petra Project in 2007. Almost all of the material (listed in full at Appendix A) recovered was examined during the preparation of this report, the sole omissions being three small bags of animal bone recovered during section cleaning whose stratigraphic provenance could not be accurately determined.

A total of 9,914g of animal bone was recorded. Of this 2,381g or 24.0% by weight was identifiable (**Table 1**), represented by 381 fragments (**Table 2**). In general the material was highly fragmented. A minority of bones were burned, with a handful displaying cut marks consistent with skinning, disarticulation and defleshing (Rixon 1988).

Of the 381 identifiable fragments (**Table 2**), the remains of caprines account for 315 fragments, or 82.7%. A total of 61 caprine postcranial and horncore fragments could be identified as sheep or goat with varying degrees of confidence, with the former (n = 34) slightly outnumbering the latter (n = 27). Chicken, fish and camel each account for approximately 5% of the identifiable fragments. Gazelle, pig, donkey, horse/mule and quail are also represented in the assemblage, but only by a handful of specimens.

Identification was attempted for almost all fragments, excluding vertebrae other than the atlas and axis, as well as ribs. Teeth that comprised less than half a complete tooth crown were also excluded. Measurements were taken following the guidelines of von den Driesch (1976) and Davis (1992). These measurements are listed by locus for each taxon at Appendix B, but have not been examined in detail owing to small sample sizes and the preliminary nature of this report.

V.2: Sample Bias and Recovery

2.1: Sample Bias

Diverse cultural and environmental factors determine the extent to which the remains of the animals that contributed to a faunal sample are represented in it. Factors such as off-site butchery and processing of animal carcasses (the so-called "schlepp effect" [Perkins and Daly 1968]) or differential preservation between taxa and, within a taxon, between dense and less dense skeletal elements (*e.g.* Behrensmeyer and Hill 1980; Lyman 1994) serve to incorporate varying degrees of bias and distortion into the available data. Although all techniques for estimating the likely degree of assemblage attenuation possess deficiencies on account of the assumptions on which they are based, they may nevertheless be usefully employed.

Assuming that the dry skeletons of two of the main taxa represented in the HPP III assemblage (*i.e.* caprines and camel) represent a constant 7% of live bodyweight (Bourdillon and

Table 1: Identified and unidentified animal bone by number of fragments and weight.

Category	n	wt (g)	% wt
Identified	381	2,381	31.6
Unidentified	n/a	7,533	68.4
Total sample	n/a	9,914	100.0

Table 2: Total numbers of identified animal bone fragments.

Taxon	n	% n
Caprine	315	82.7
(Sheep)	(34)	(8.9)
(Goat)	(27)	(7.1)
Chicken	22	5.8
Fish	19	5.0
Camel	17	4.5
Gazelle	2	0.5
Pig	2	0.5
Donkey	2	0.5
Horse / Mule	1	0.3
Quail	1	0.3
Total	**381**	**100.0**

Brackets indicate caprine specimens identified as either sheep or goat.

Coy 1980), if MNI (Minimum Number of Individuals) counts for caprines and camel (**Tables 3** and **6**) are multiplied by 7% of the live-animal bodyweight, an estimate of the bone weight which these taxa ought to have contributed to the assemblage can be obtained (Croft 1998: 296). Calculating the difference between this value and the total weight of bone recovered at HPP III is one way of estimating how much bone has been lost, assuming that whole carcasses were brought to the site in the first place.

The calculation for the HPP III assemblage assumes a live bodyweight of 34kg for caprines (Croft 1998: 296) and 320kg for camel (Russell 1988: 192). Postcranial MNI counts of ten caprines and one camel suggest that the total assemblage weight should have been at least 46.2kg, excluding the contribution of other taxa. As the total weight of bone that was actually recovered for all taxa was just 9.91kg, it may be surmised that at least 78.5% of the HPP III assemblage is missing.

Table 3: Caprine remains by skeletal element.

Element	Left	Right	Unknown	Total
scapula	9	10	-	19
d. humerus	7	5	1	13
p. radius	8	2	-	10
d. radius	4	3	-	7
p. ulna	3	3	-	6
p. femur	4	3	-	7
d. femur	4	-	-	4
d. tibia	5	5	-	10
p. tibia	3	1	-	4
patella	1	-	-	1
astragalus	4	3	-	7
calcaneum	9	1	-	10
p. m/carpal	4	7	-	11
d. m/carpal	3	3	-	6
p. m/tarsal	3	7	-	10
d. m/tarsal	2	4	2	8
axis	-	-	-	2
sacrum	-	-	-	1
pelvic fragments	-	-	-	25
long bone shaft	-	-	-	7
carpal	-	-	-	5
tarsal (other than ast. and cal.)	-	-	-	3
phalanx 1	-	-	-	45
phalanx 2	-	-	-	10
phalanx 3	-	-	-	8
Total postcranial fragments				239
head and teeth	-	-	-	76
Total fragments				**315**

The above figure should be regarded as a rough estimate rather than a calculation with any pretensions to accuracy. Nevertheless, it serves to highlight that the HPP III assemblage is no exception to the general rule that "faunal assemblages normally represent only a very small proportion of even the minimum amount of material from which they could possibly have been derived" (Croft 1998: 296).

2.2: Recovery

All excavated deposits were dry sieved through a 2-4mm. mesh, thereby aiding the recovery of all but the smallest faunal remains (Payne 1972); wet sieving was not carried out.

2.3: Summary

In sum, the evidence suggests that the HPP III faunal assemblage had undergone serious attrition and was highly attenuated before the 2007 excavations took place. This situation is by no means unique, as "it will inevitably prevail to some degree in any assemblage which was retrieved by less than total sieving through a fine wet sieve" (Croft 1998: 298). Nevertheless, it does serve to emphasize the extent to which discretion must be applied when interpreting the results of this study.

V.3: Skeletal Element Representation

Analysis of postcranial skeletal element representation for the most numerous taxon in the HPP III assemblage, *viz.* caprines, is hindered by relatively small sample sizes (**Tables 2 and 3**). Cranial fragments and teeth are collectively by far the most common part of the skeleton represented, comprising 24.1% of caprine remains. This is almost certainly a reflection of the fact that each animal has many more teeth in its head than any other easily identifiable skeletal element. Notwithstanding small sample sizes, comparison of postcranial element frequency for caprines indicates that all parts of the skeleton are relatively evenly represented in the assemblage (**Table 3**). This suggests that whole animals were brought to the site, whether alive or dead, and that there was little preference for

Table 4: Mortality of caprines, based on epiphyseal fusion.

Stage	Element	n Unfused	n Fused	% dead by end of stage
Infant (birth to 1 yr)	d. scapula	3	10	
	d. humerus	2	10	
	p. radius	0	2	
TOTAL		**5**	**22**	**18.5**
Juvenile (1 to 1.5-2.5 yrs)	d. tibia	2	9	
	d. m/podial	6	9	
TOTAL		**8**	**18**	**30.8**
Subadult (1.5-2.5 to 3.5 yrs)	p. ulna	3	1	
	d. radius	3	4	
	p. femur	4	2	
	d. femur	4	1	
	p. tibia	3	1	
	calcaneum	5	2	
TOTAL		**22**	**11**	**66.7**

one part of the animal over another on the part of the inhabitants of this area of Petra.

V:4: The Animals

4.1: Caprines

Even though caprines are the most common taxon in the HPP III excavations, the total post-cranial assemblage of caprine bones numbers just 239 specimens, of which only 61 could be identified as either sheep or goat, with the former slightly outnumbering the latter. This makes it impossible to reconstruct a separate age profile for each taxon, and difficult to reconstruct a combined age profile for caprines in general, *i.e.* sheep and goat combined, with any degree of certainty.

With that caveat in mind, epiphyseal fusion data (**Table 4**) (based on Silver 1969) suggests that 18.5% of caprines died during their first year (all ages necessarily approximate), 12.3% during their second year and 35.9% during their third year, leaving 33.3% to be slaughtered as adults. A slight peak between the ages of 24 and 36 months would accord well with Payne's (1973) model for meat production in a domestic flock: "if meat is relatively more important and winter feeding presents no difficulty killing at 2-3 years will probably be the rule" (Payne 1973: 282).

Data for mandibular tooth eruption and wear (**Table 5**) (based on Payne 1973) are equivocal, owing to small sample sizes, but appear to be biased in favor of older animals. Lower second and third molars provide slight evidence that only a minority, *viz*. 21.4%, of caprines in the HPP III soundings were slaughtered during their first two years of life. Of 14 recordable specimens, 11 displayed the relatively heavy wear indicative of survival into and beyond a third year. This accords reasonably well with the epiphyseal fusion estimate of 30.8% dead by two to two and a half years of age.

The caprine remains appear on cursory examination to represent relatively small animals, especially in the case of goats. This, and the unequivocal presence of twisted goat horncores, suggest that the great majority of Petra caprines were domestic animals kept for consumption. A minority of extremely large specimens could be derived from large domestic males, but their presence also raises the possibility that some hunting, whether of wild goat or Nubian ibex, continued in the Petra region until well into the Hellenistic period.

Table 5: Eruption and wear data for caprine mandibular teeth.

Mandibular tooth row	dp4	P4	M1	M2	M3
Eruption	*0-6 wks*	*24 mths*	*3 mths*	*12 mths*	*24 mths*
	-	-	-	h	c-d
	i	-	d	-	-
	-	-	h-k	-	-
Single teeth					
dp4	h				
P4	g, i				
M1	h				
M2	b, b, h, h, h, h-j, h-j				
M3	h, j, j, j, j-m (+2 no data)				

4.2: Chicken

Chicken is an infrequent but recurring taxon within the HPP III assemblage, represented by a total of 22 specimens. All parts of the skeleton are present, suggesting that there was little preference for one part of the bird over another. A noticeably wide range of sizes could be discerned, ranging from bantam-sized remains at one end of the scale to those of modern domestic fowl at the other, suggesting that different breeds of chicken had evolved by the Hellenistic period.

4.3: Fish

The remains of fish were more frequent in the HPP III assemblage than the relatively dry, inland location of the site might suggest. Similarly-sized vertebrae from a locus were recorded as one specimen when it was felt that they probably derived from the same individual. On this basis, 19 specimens were identified as fish and separated from the main assemblage pending analysis by a fish bone specialist. The relatively large size of some of the fish remains was, however, self-evident, suggesting that dried or otherwise preserved fish from the Red Sea or Mediterranean were traded significant distances inland as early as the Hellenistic period. Fish remains are a recurring if not always a common feature of the Roman, Byzantine and early Islamic faunal assemblages from the southern Levant, *e.g*. Gharandal (Wasse 2003) and Upper Zohar (Lernau 1995).

4.4: Camel

Camel was represented in the HPP III assemblage by 17 identified specimens, but its frequency is likely to have been much higher than this figure suggests, as camel-sized but otherwise unidentifiable vertebrae, rib and long bone shaft fragments were present in almost every locus.

Table 6: Camel remains by skeletal element.

Element	Left	Right	Unknown	Total
d. radius	1	-	-	1
astragalus	1	-	-	1
p. m/podial	-	1	-	1
d. m/podial	-	-	1	1
phalanx 1	-	-	-	1
phalanx 2	-	-	-	2
Total postcranial fragments				
head and teeth	-	-	-	10
Total fragments				**17**

4.5: Gazelle

Two gazelle specimens were identified: a calcaneum from Trench 9, locus 305 and a proximal metatarsal from Trench 9, locus 316. These provide tentative evidence for the continuation of at least some hunting in the Petra area into the Hellenistic period.

4.6: Pig

Two pig specimens were identified: an unfused metacarpal IV from Trench 9, locus 300 and a first phalanx from Trench 8, locus 206B. The scarcity of pig in the HPP III assemblage is unsurprising in view of this taxon's preference for mesic environments and/or riverine thickets. The presence of these two specimens suggests either that there was a trade in pork (*c.f.* fish, see 4.3 above) or, more likely, that suitable environments for pig were present in a number of restricted niches around Petra, most likely in *wadi* beds or around the springs of Wādī Mūsā, during the Hellenistic period.

4.7: Donkey

Donkey is represented in the Petra assemblage by two specimens from Trench 8, locus 214: a distal radius and a distal tibia, perhaps from the same individual animal.

4.8: Horse/Mule

An unfused distal tibia, tentatively attributed to horse or mule rather than a donkey on account of its morphology and relatively large size, was recovered from Trench 9, locus 316.

4.9: Quail

A single quail humerus was recovered from Trench 8, locus 209.

V.5: Discussion and Conclusions

The most important contexts excavated during the 2007 season were four fire pits/hearths represented by *loci* 218-219, 312-314, 316 and 319-320. These are located along the edge of a small *wadi* on the southern side of an east-west wall located a few meters south of the colonnaded street. As these fire pits/hearths were located in the lower levels of the excavation

units, they are amongst the earliest deposits excavated in 2007. Comparison of the animal bones from these fire pits/hearths with those from the remaining, presumably later, *loci* provides a rough measure of faunal changes at Petra through time (**Table 7**).

The data in (**Table 7**) demonstrate that there is little appreciable difference between the earlier and later material, other than a slightly higher proportion of 'exotic' taxa, *e.g.* chicken and fish, in the later material, in which a generally wider range of taxa is anyway represented. Whether this reflects a gradual increase in dietary sophistication through time, the larger sample size of the later material or the possibility that the animal bones from the fire pits are unrepresentative of the assemblage as a whole is impossible to say at present owing to the limitations of available data.

The identified faunal remains from the four fire pits/hearths, plus a shell concentration represented by locus 201, are presented in **Tables 8 to 12**. No evidence for the deposition of particular taxa, whole animals or specific parts of animals in these *loci* could be discerned. The balance of probability is that the greater part of this material represents refuse from consumption that was dumped along the east-west wall located just south of the Colonnaded Street. This raises the possibility that the adjacent small *wadi* and its immediate environs served as some sort of dump or small-scale industrial area, where rubbish accumulated in pits and was perhaps periodically burned - albeit incompletely. In this context, it should be noted that a high proportion of animal bones from *loci* 201, 205, 206B, 306 and 319 was stained green, suggesting high concentrations of copper or copper residues, and that a higher than average proportion of animal bones from *loci* 207, 319 and 320 was burned.

Acknowledgements

Thanks are due to the Council for British Research in the Levant for granting access to the comprehensive collection of modern zoological material held at the British Institute at 'Ammān, Jordan. The structure of this report and its approach closely follow Croft's (1998) report on the animal remains from Kissonerga-Mosphilia, Cyprus.

Table 7: Faunal changes through time.

Taxon	n early	% n early	n late	% n late
Caprine	76	82.6	239	82.7
(Sheep)	(5)	(5.4)	(29)	(10.0)
(Goat)	(4)	(4.3)	(23)	(8.0)
Camel	9	9.8	8	2.8
Chicken	3	3.3	17	5.9
Fish	2	2.2	19	6.6
Gazelle	1	1.1	1	0.3
Horse / Mule	1	1.1	-	-
Donkey	-	-	2	0.7
Pig	-	-	2	0.7
Quail	-	-	1	0.3
Total	**92**	**100.0**	**289**	**100.0**

Early = fire pits represented by *loci* 218-219, 312-314, 316 and 319-320.
Late = all other *loci*.

Table 8: Identified animal bone fragments from fire pit in Trench 8, Locus 218-219.

Taxon	N	% n
Caprine	5	83.3
Chicken	1	16.7
Total	**6**	**100.0**

Table 9: Identified animal bone fragments from fire pit in Trench 9, Locus 312-314.

Taxon	N	% n
Caprine	9	100.0
Total	**9**	**100.0**

Table 10: Identified animal bone fragments from fire pit in Trench 9, Locus 316.

Taxon	N	% n
Caprine	27	77.1
(Sheep)	(1)	(2.9)
(Goat)	(2)	(5.7)
Camel	3	8.6
Fish	2	5.7
Chicken	1	2.9
Gazelle	1	2.9
Horse / Mule	1	2.9
Total	**35**	**100.0**

Table 11: Identified animal bone fragments from fire pit in Trench 9, Locus 319-320

Taxon	n	% n
Caprine	35	83.3
(Sheep)	(3)	(7.1)
(Goat)	(3)	(7.1)
Camel	6	14.3
Chicken	1	2.4
Total	**42**	**100.0**

Table 12: Identified animal bone fragments from shell concentration in Trench 8, Locus 201.

Taxon	n	% n
Caprine	7	77.8
(Sheep)	(1)	(11.1)
Fish	1	11.1
Camel	1	11.1
Total	**9**	**100.0**

VI. Summary of HPP III Results

The primary object of the HPP III season was to locate stratified levels of the occupation of Petra during the Persian and Hellenistic periods. In this regard the project was remarkably successful. Both Trenches 8 and 9 provided excellent evidence of the Early Hellenistic period, *i.e*. of the late 4th and early 3rd century BC, with the latter trench even providing ceramic material from the Persian period. In fact, the finds became richer and more impressive as we progressed eastwards from Parr's Trench III toward the so-called Trajanic Markets. The Early Hellenistic pottery in Trench 8 comprised 28% of the ceramic assemblage, whereas Trench 9 produced 42%. Two particular ceramic finds symbolize the success of reaching pre-Hellenistic period material: in Trench 8, locus 209, the discovery of a shoulder of an Attic painted *lekythos*, perhaps from the Beldam Workshop in Attica dating to the second quarter of the 5th century BC (III. **Table 3:N**), and a rim and bent handle of a cylindrical 'torpedo' jar in Trench 9, locus 319 (III. **Table 1:H-I**), a form common in the Levant and Mesopotamia in the 6th to 4th centuries BC. The latter was found in the same 4th/3rd century BC context with the North Arabian imitation of an Athenian tetradrachm and other purely Early Hellenistic ware. The discovery of a string of the 'anonymous' Nabataean issues of the late 3rd-early 2nd century BC supports a Nabataean occupation at Petra in the early Hellenistic period.

The most outstanding architectural feature of Trenches 8 and 9 is the main wall running on a slight angle from southwest to northeast, not quite parallel to the Roman street. This wall in Trench 8 (locus W207) is rather poorly built, with small ashlars and some unhewn stones of various sizes, and is *ca* 0.60-0.65m wide. Lavish use of mud mortar and chinking stones indicated a jerry-built structure. Wall W207 measured 2.90m long (WSW-ENE) × *ca* 0.60-0.65m wide. The fact that it is not perpendicular to the retaining wall or the street curbing suggests that it was of earlier construction. Its crude construction may reflect, to some extent, rebuilding. It appears to continue in Trench 9, where it is almost parallel to the Nabataean ashlar facing that supports the pavement in the southeastern part of the trench. This limestone wall (W317) runs in a similar ESE-WNW direction that connects very well with the wall (W207) in Trench 8. It should be noted that in the eastern sector in Trench 9, the upper courses of the wall comprise well-dressed ashlars, in contrast to the shabbier construction in Trench 8. This wall in Trenches 8 and 9 appears contiguous with the wall discovered in our earlier Trench 3 and seems connected to Parr's east-west wall in his Trench III. According to Christopher Tuttle (correspondence in 2013), it is possibly connected to a wall discovered in a deep probe beneath the forecourt of the so-called Great Temple further to the west. If this is the case, our 20-25 meter-long wall extends even much further to the west. The wall in our trenches is constructed on the sandy soil of the *wadi* bed, with Early Hellenistic materials at the foundation.

In sum, the prospects of finding an extension of the Hellenistic settlement further east along the southern area adjacent to the Colonnaded Street seem excellent, and it is possible that the settlement also extends to the northern side of the street. Future exploration of the area to determine the extent of the settlement would appear to be a fruitful enterprise.

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