

THE INTERNATIONAL WĀDĪ FARASA PROJECT (IWFP) 2000 SEASON

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I. Introduction

The year 2000 saw the first field season of the International Wādī Farasa Project (IWFP) that lasted from 1 to 25 October. The IWFP 2000 was carried out by the Association for the Understanding of Ancient Cultures (AUAC), based in Basel (Switzerland) and the Palestine Exploration Fund (PEF, London).¹ We would like to thank the Director-General of the Department of Antiquities, Dr. Fawwaz Al-Khraysheh, for his support and for granting the working permit for the IWFP 2000 as well as Dr. Fawzi Zayadine ('Ammān) and Prof. David Graf (Miami) for their continuous interest in the project.

The IWFP is grateful to Cyprus Airways (Larnaca) for assisting in transport and to Kodak International S.A. (Lausanne) for providing photographic material under generous terms.

Beside the writer, the following persons participated in the 2000 season of the IWFP: Dr. Daniela Pohl (Bonn), Dr. Martin Seyer (Athens/Vienna), Aktham Oweidi Abadi, MA (representative of the Department of Antiquities) whose help and advice were much appreciated. Eight workmen from the Bdul and Sa'idiyeen tribes were employed. Finally, the IWFP 2000 season would not have been possible without the friendly cohabitation in the John Lewis Burckhardt Centre (Nazzal's Camp) with the team from Basel University carrying out the Swiss-Liechtenstein excavations at az-Zantūr; the practical advice of Dr. Bernhard Kolb (Basel) and Rudolf Glutz (Solothurn) did much advance our campaign. We would also like to thank IFAPO 'Ammān, especially Jean-Pierre Braun and Ina Kehrberg, for lodging the team during its stay at 'Ammān, Ina Kehrberg further edited the text of this report.

In general terms the main tasks of the IWFP 2000 were: to examine the hypothetical re-

construction on paper by Bachmann (Bachmann *et al.* 1921: 75ff.) of a peristyle courtyard between the "Soldier Tomb" and the opposite triclinium (Brünnow and Domaszewski 1904: 272f. nos. 235 and 239); to locate the ancient walking surface between the two monuments and estimate the total amount of debris above the ancient level on the lower terrace of the Wādī Farasa (وادي فرسة) East.² In addition, the water drainage system of the "Soldier Tomb" and the fountain of the huge cistern on the upper terrace of the Wādī Farasa East were cleared in order to draw an accurate plan and to understand the connection to the other monuments of the area. The different water supply and drainage systems of the Wādī Farasa East from Jabal 'Aṭūf جبل عطوف (the so called High Place) to the "Renaissance Tomb" (Brünnow and Domaszewski 1904: 239ff. no. 85 and 269 no. 229 resp.) were documented and mapped.

II. Lower Terrace

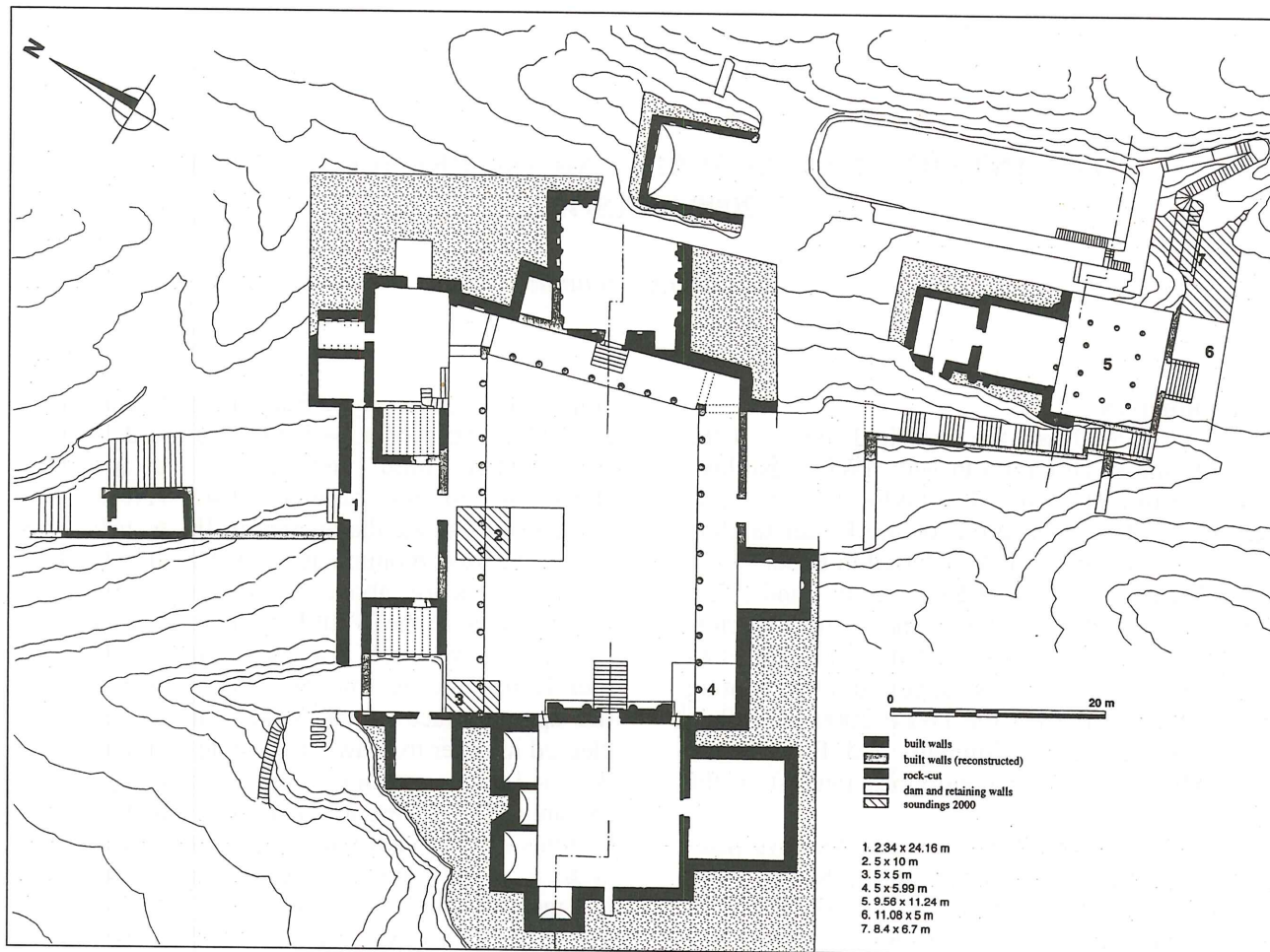
II.1. Architectural Remains and Structures

On the lower terrace of the Wādī Farasa East two trenches (trenches 2 and 3 on **Fig. 1**) were opened in order to verify the hypothesis of a peristyle courtyard between the two main monuments of the terrace as described by the *Deutsch-Türkische Denkmalschutzkommando* in 1916 (Bachmann *et al.* 1921: 75ff.), or in more general terms to locate the original floor level.

In both soundings the ancient floor level was reached at about 930.60m above sea level and the hypothesis of a courtyard surrounded on three sides by *stoai* was confirmed, at least for the northern side of the area (**Figs. 2-4**). The original floor was paved with huge rectangular stone slabs put on a foundation of smaller and irregular slabs founded on a very hard layer of clay-containing earth (the

1. On these two institutions see also <http://members.xoom.com/ArchLinks> and <http://www.pef.org.uk>.
2. For the theoretical background of the project, its mid and

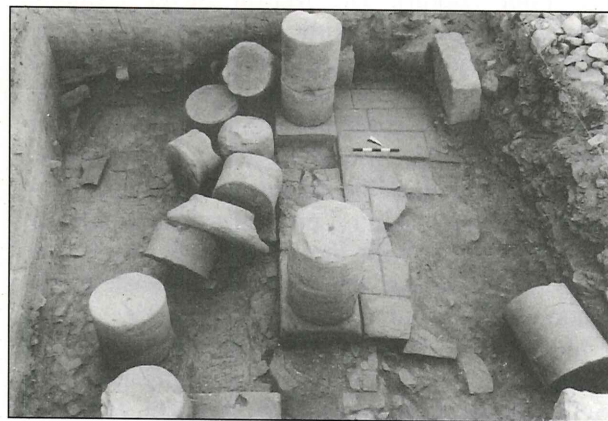
long term goals and detailed references for the different monuments quoted here see Schmid 2000c.



1. General plan of Wādi Farasa East with lower and upper terrace (after Bachmann et al. 1921, digitised and modified by S. Fachard, Lausanne).



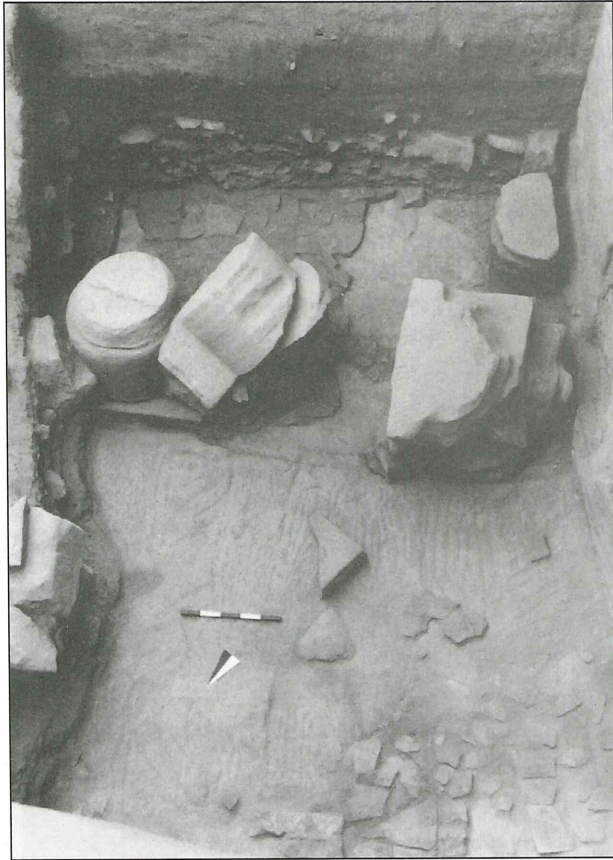
2. Trench 2 from NW showing floor slabs and column drums (photo Schmid).



3. Trench 2 from SW showing floor slabs and column drums (photo Schmid).

so called *samaqa* that was used in the village of Wādi Mūsā until recent times, see Kolb 2000: 258 n. 467; Zayadine 1974: 135). In sounding 3 in the east corner of the courtyard, the floor slabs were put directly on bedrock which had been cut away in the entire area in preparation for the installations of the lower terrace (Fig. 5). Sounding 2, however,

revealed that at this spot the original bedrock was not cut away by the builders; here, the floor slabs were embedded on a layer of huge and irregular stones that were carefully filled in with the above described foundation matrix of smaller slabs and clay-containing earth (Fig. 6). Apparently at the position of sounding 2 the bedrock is on a lower



4. Trench 3 from NW showing bedrock, foundations and column drums (photo Schmid).



6. Trench 2 from NW showing small sounding beneath the level of the floor slabs (photo Schmid).



5. Trench 3 from SE showing bedrock, foundations and column drums (photo Schmid).

level than at sounding 3. This is because at sounding 2, the valley lies at its lowest where the water had eroded the original wadi bed long before building activities began in this area. In order to create an even surface for the installations of the lower ter-

race, the original wadi bed had to be back-filled with huge blocks of stone at the lowest point while in the eastern part the bedrock had to be cut away to match the walking level. In trench 3 the level of the bedrock is at 930.58-66m above sea level,

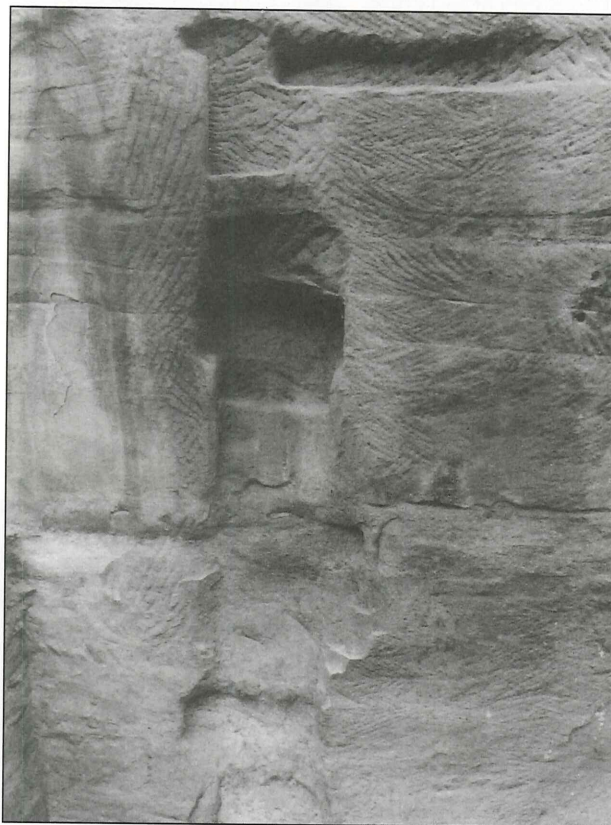
while in trench 2 the level of the back-fill of the wadi bed is at 930.31-45m above sea level. As can be seen on Fig. 7, the floor subsided in some parts of sounding 2 because with the collapse of the Nabataean hydraulic systems (see below) the water gained back its old way and washed out the artificial fill and the foundation of the floor level.

In both soundings it was found that special care had been applied to the area of the columns that formed once the north stoa of the lower terrace. In trench 3 the rock was cut some seven centimetres deeper and was then carefully refilled with the above described foundation. In trench 2, the foundation in the area of the columns is also very carefully executed and slightly higher than in the surrounding areas. The columns were not standing on bases but on a kind of plinths of which two were found *in situ* in trench 2 and a third in trench 3. The level of the plinths is at 930.73m (trench 3), 930.72m and 930.71m (trench 2) above sea level, respectively. The three plinths are about 20cm high and were found either with a column drum still *in situ* or still showed the raised circular surface on which the columns once stood (Figs. 2-6). The first column of the north stoa is a half column abutting the rock cut surface which had already been posited by Bachmann

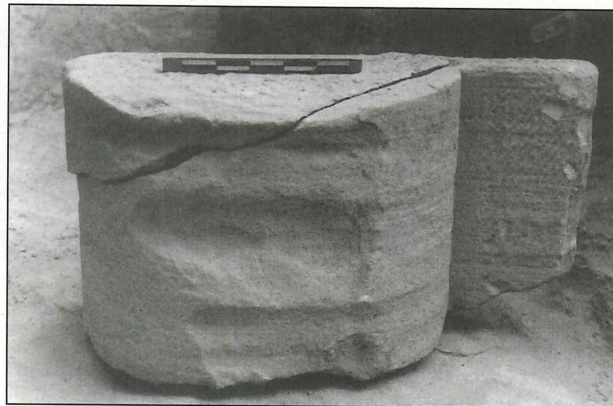
et al. (1921: 75ff.). Drums and the capital of the half column were found in trench 3 which have provided the missing elements to explain the carved out rock features (Fig. 8). In addition, their place is confirmed by the corresponding measurements of the carved out space on the one hand and the dimensions of the half column and the half capital on the other. In two cases, the rock carvings show a lateral enlargement. Into these enlargements perfectly fit analogous enlargements of two half columns drums of which one was actually found (Fig. 9). According to the dimensions of the enlargement this must be the higher of these half drums because the



7. Floor slabs in trench 2 (photo Schmid).



8. Rock carvings for half column in trench 3 (photo Schmid).



9. Half column drum from trench 3 (photo Schmid).

carving of the lower one is too narrow.

The architectural remains found in 2000 and the measurements of the carved rock for placing the first half column, make it now possible to reconstruct the basic layout of the north stoa on the lower terrace of the Wādī Farasa East. The diameter of the columns is 60cm, the distance between the columns (*intercolumnium*) is about 187cm with the bay measuring 247cm.³ This means a slight modification of the reconstruction proposed by Bachmann *et al.* who proposed smaller columns and *intercolumnia* of about 160cm. As referred to above, the columns have no bases but are directly put on plinths. The height of the columns up to the capitals can be calculated by comparing the plinths (930.71-73m above sea level) with the rock carvings for the half capital (lower level: 934.74-79m, top level: 935.04m above sea level): this comes to a height of ca. 4m without capitals and with capitals of about 4.27-4.30m. The half capital from trench 3 measures 27cm in height, the complete capital from trench 2 is 29cm.⁴ All column drums and the two capitals were badly damaged by the wind when still standing and further worn due to the seasonal alluvia when the stoa had collapsed and they were laying on the ground. Their bad state of conservation makes it difficult to say much about their form and type. However, they appear to be plain Doric capitals and the stoa must have looked similar to the porticoes of Tomb no. 4 (the so called Khān خان) at Bāb as-Siq باب السيق (Brünnow and Domaszewski 1904: 195f. no. 4) showing Doric capitals and no bases, although there the columns are slightly bigger in diameter. This is an other modification of the reconstruction as proposed by the German scholars who thought, according to the size of the rock cuttings they correctly identified with the capital, of as Corinthian capitals (Bachmann *et al.* 1921). However, as became clear from the half capital found in 2000, the hewn slightly larger space was to make the back part of the capital fit the carved out socket. Although these changes seem very small at first sight, they lead to an overall modified plan of the entire installation (Fig. 1). The larger Doric columns instead of the supposed Corinthian and their wider *intercolumnia* result in the removal of three free-standing columns on the plan, that is there are now 12 Doric instead of 15 Corinthian columns.⁵

As mentioned earlier, the level of the original paved floor was 930.61-66m above sea level. The floor level of the so called "Soldier Tomb" is on 932.27m above sea level and therefore about 1.65m higher than the courtyard. The interior of the opposite triclinium is 931.58m above sea level, that is about 0.95m higher than the courtyard. This means the courtyard was accessible from the two rock-cut monuments by steps no longer visible, but in all likelihood still in place.

In trench 2 some pavers of the original floor level were found *in situ*, but exclusively in the stoa (Figs. 2, 3). These slabs were about 40cm wide with different lengths sometimes exceeding 80cm and were roughly 10cm thick. In the area of the courtyard no flagstones were found *in situ* but some fragments from the destruction debris suggest that they were the same size if not bigger. The fact that the original floor slabs were completely missing in trench 3 and to a big extend also in trench 2 suggests that part of the lower terrace was robbed out, but only after maintenance had already ceased for some time; this can be gleaned from the stratified sections in the two trenches.

II.2. Stratigraphy and Chronology

The stratigraphy in soundings 2 and 3 allows us to draw a fairly accurate picture of the relative chronology of the installations on the lower terrace of the Wādī Farasa East. Together with some small finds these stratified contexts can provide information on the absolute chronology of the monuments.

As referred to above, most of the original floor slabs were no longer *in situ* when the north stoa collapsed. This means that the monument was still standing upright but apparently no longer cared for. The same can be deduced from the fact that some of the column drums were found directly on the foundations of the paved floor while others had collapsed on 20-30cm layers of sand above the floor level. Therefore, some of the columns must still have been standing for some time after the complex had been abandoned.

Especially in trench 3 the destruction layer above the floor level, containing ashes and many stones including broken architectural blocks, was clearly visible. The pottery from that layer contained some forms of coarse ware that correspond

3. The better preserved column drums showed careful carving that points to the application of stucco. If we consider a layer of approx. 1cm of stucco around the columns this would give an original diameter of 62cm and therefore an *intercolumnium* of 185cm; however the measurements of the bay would still be 247cm.

4. The difference of 2cm within the two capitals would perfectly fit the difference of 2cm within the plinths between the two trenches (cf. above).

5. Compare the traditional plan of the area: Schmid 2000c: 336 fig. 1.

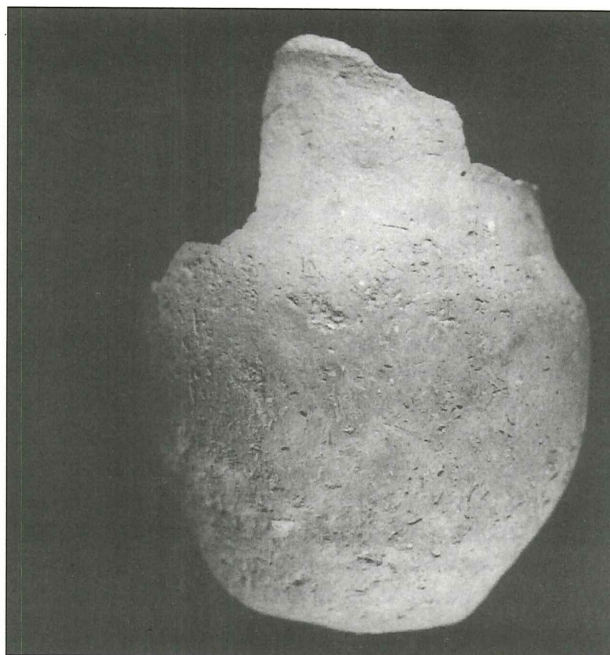
very well to the pottery found in the destruction layers of the houses on az-Zanṭūr which can be associated with the earthquakes of AD 363 and 419 (on similar pottery see Fellmann Brogli 1996: 242ff. figs. 730-732, 736-741, 760-763, 772-777, 793-795; on the houses and their destruction see Kolb 2000). It is plausible to consider one of these earthquakes as the cause of destruction of the courtyard and its stoai on the lower terrace.

Above the destruction debris is a sequence of layers showing clear evidence of alluvial soil. The texture of these layers is very compact and layers of earth with clay alternate with more sandy ones. These layers do not contain any stones. This could be an indication that most of the Nabataean hydraulic system in the Wādī Farasa East was not functioning anymore which caused the build-up of alluvia. The retaining walls would still have prevented bigger pieces like boulders to be carried in flash floods of heavy seasonal rainfalls. The archaeological contexts corresponding to these alluvia were heterogeneous and no precise date can be attributed to them, except that they occurred after the collapse of the stoa in late antiquity.

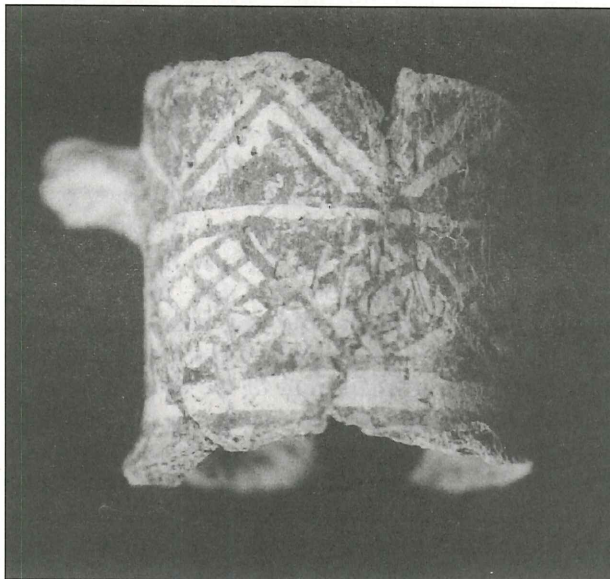
A second unit of sandy layers was much thicker in trench 3 than in trench 2 and again contained no datable material.

In trench 3, the alluvial fill is topped by a level of occupation 932.70m above sea level which can be clearly distinguished from the underlying structures and layers. This occupation includes a small kiln or oven built from small stones into the north-west corner of the stoa. The pottery from this occupation corresponds very well to the selection of pottery from the crusader fortress of al-Wu‘ayra الوعيرة on the outskirts of Petra, dating to the 12th century AD (Vannini and Vanni Desideri 1995). In our occupation the characteristic plain hand-made pottery was found (Fig. 10) as well as some painted coarse ware pottery and a few sherds of a fine but hand made red painted ware (Fig. 11) which may have been imported (see comparable pottery in Vannini and Vanni Desideri 1995: 531ff. figs. 16-20). Similar pottery is apparently common in the Carmel and in Ceasarea from later 13th century AD contexts (Pringle 1984: 95f. especially fig. 3.11; Pringle 1985: 175f. especially fig. 2.2).

Although this late occupation does not belong to the main objective of our project, it provides interesting information on medieval Petra. It has been suggested that on top of Jabal al-Madhbaḥ (جبل المذبح) there was another crusader fortress although no detailed investigations has so far been done (Vannini and Vanni Desideri 1995: 512). This suggestion had already been put forward in



10. Hand made pottery from the Medieval occupation in trench 3 (photo Schmid).



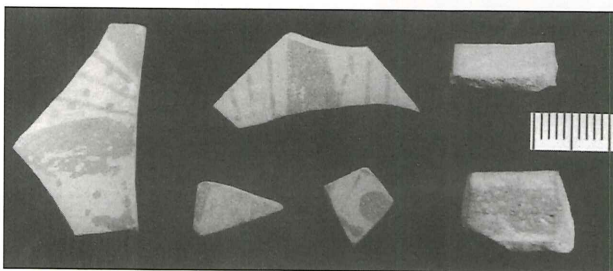
11. Red painted pottery from the Medieval occupation in trench 3 (photo Schmid).

early literature (see for example Brünnow 1909: 250; Dalman 1912: 12-14) and if it is found to be true — as it seems to be — then the Wādī Farasa East would have been one of two important access routes to this fortress and received special attention by the Crusaders. The lower terrace with its huge retaining wall towards the northern part and the narrow steps leading to the upper terrace would have formed an appropriate place to install a guard post in order to control the way up to the castle. It is probably in this light that we have to view the Crusader occupation evidenced in trench 3. These

findings also put in a wider context a stone slab, maybe a tomb stone, with a carved cross that was found in the “Garden Triclinium” and most probably belongs to the same period (Brünnow and Domaszewski 1904: 275 fig. 307; Dalman 1908: 196 fig. 117; Brünnow 1909: 249f.; Lindner 1997: 104 with n. 10).

On top of both trenches was an ashy layer representing the latest event that could be assigned a precise context within the history of the Wādī Farasa East: These layers together with some dumped stones are almost certainly from cleaning the two rock-cut monuments, that is the triclinium and the “Soldier Tomb” carried out by the Department of Antiquities of Transjordan in the 1930s (Horsfield 1938: 40 with n. 5, 7).

However, the most important result in terms of chronology is related to the construction of the north stoa. In both trenches opened in 2000 the very hard *samaqa* layer that was used as part of the foundations for the floor slabs contained some Nabataean pottery, providing a rather precise terminus for the construction of the monument.⁶ Beside some small rim sherds of plain Nabataean fine ware there were also a few tiny fragments of painted ware (Fig. 12), all belonging to phase 3 and more precisely to phase 3a of Nabataean pottery, dating from AD 20 to 70/80 (Schmid 2000a: 25, 38). As there is no earlier or later material from this layer we may conclude that the north stoa was built in the second or third quarter of the first century AD. This is especially interesting because the construction of the huge cistern of the upper terrace was dated to the same period by painted pottery found in the mortar of the basin in front of it (Schmid 2000c: 343f.). It would appear that most of the monuments of the two terraces belong to the same building programme. As the stoai of the courtyard of the lower terrace cannot be earlier than the rock-cut installations but are most probably contemporary or



12. Nabataean plain and painted pottery from soundings beneath floor slabs in trenches 2 and 3 (photo Schmid).

6. The very hard texture of this *samaqa* layer sealed it against intrusions from above. This is also underlined by the homogeneous aspect of the pottery found in it.
7. On Nabataean rock-cut facades in general see Schmidt-

— although less probable — slightly later, this means that the same date can also be applied to the triclinium and to the “Soldier Tomb”. This is also supported by the cuirass of the central statue of the tomb that can be dated stylistically to around the middle of the first century AD as already pointed out by M. Lyttelton (1974: 62).

Therefore, the term “Roman” very often applied to the “Soldier Tomb” has to be abandoned. There is no reason to date this tomb as well as the related installations from the lower terrace later than the third quarter of the first century AD and therefore to the Nabataean period.

II.3. Water Drainage System of the “Soldier Tomb”

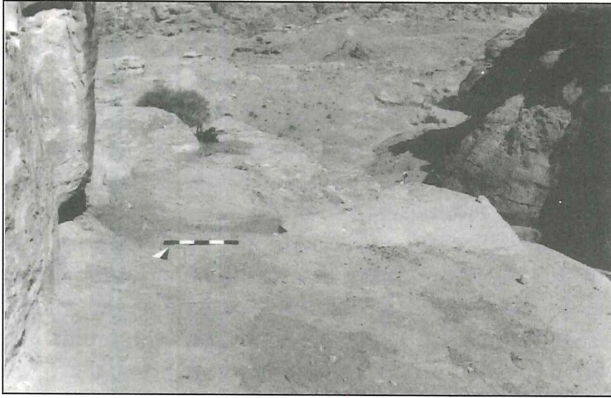
One of the most important aspects of the Nabataean rock-cut facades is their dealing with the seasonal rainfalls. The very soft sandstone of Petra makes for easy carving of the monuments, but it is also easily eroded by wind and weather.⁷ In order to prevent the rock-cut monuments from erosion the Nabataeans applied two basic means:

1. Facades were covered by stucco (and sometimes painted).
2. A system was devised to prevent rain water flooding to reach the facades.

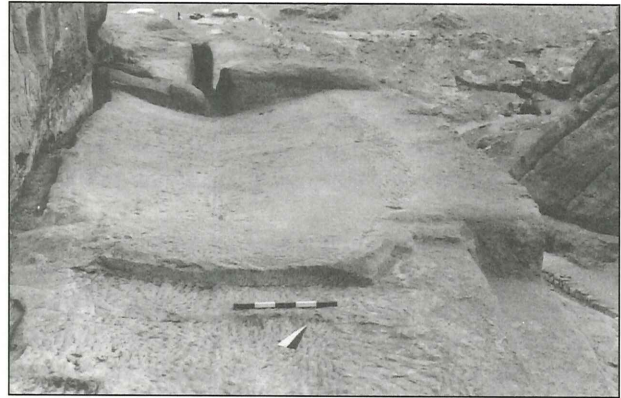
There were two main methods by which the builders of these monuments tried to prevent water from running down the facades: Some monuments are cut well back *into* the rock to avoid the rain water gushing down from the valleys. The most prominent example for this type of protection is al-Khazna الخزانة. Other monuments are cut *out* of the rock; in these cases, the exposed facades had to be protected by water drainage systems which had to be installed on top or behind them. Good examples for this category are ad-Dayr الدير or the so called “Palace Tomb”.

The water management system of the “Soldier Tomb” belongs to the second category. Remains of a rock-cut channel draining water towards the northeast, to the area between the Wādī Farasa East and the Wādī Farasa West, where many huge cisterns are located, were partially visible before clearance in the area began (Fig. 13). The cleaning revealed the canalization for a length of about 10m (Fig. 14). On top of the “Soldier Tomb” there are two installations for collecting water. On the northern part there is a small basin that feeds the canalization and on the southern part another was con-

Colinet 1981; McKenzie 1990; Zayadine 1997; Schmid 2000b, all with further references; on the erosion of the Petraean sandstone see Abu Safat 1986 and recently Heinrichs and Fitzner 1999.



13. Top of "Soldier Tomb" before clearing (photo Schmid).



14. Rock-cut basins and water channel from drainage system on top of "Soldier Tomb" after clearing (photo Schmid).

nected to the first one. While the first basin is completely cut into the rock, the second one consisted of small walls built to collect water preventing it from running down the facade. The cut-out rock to hold these walls are still visible. It would be easy to reconstruct them and to make the ancient water drainage system work once again for the protection of the facade. Regular maintenance of these installations would be necessary because the strong roots of the different plants which grow there endanger the soft sandstone and the canalizations (Fig. 15).

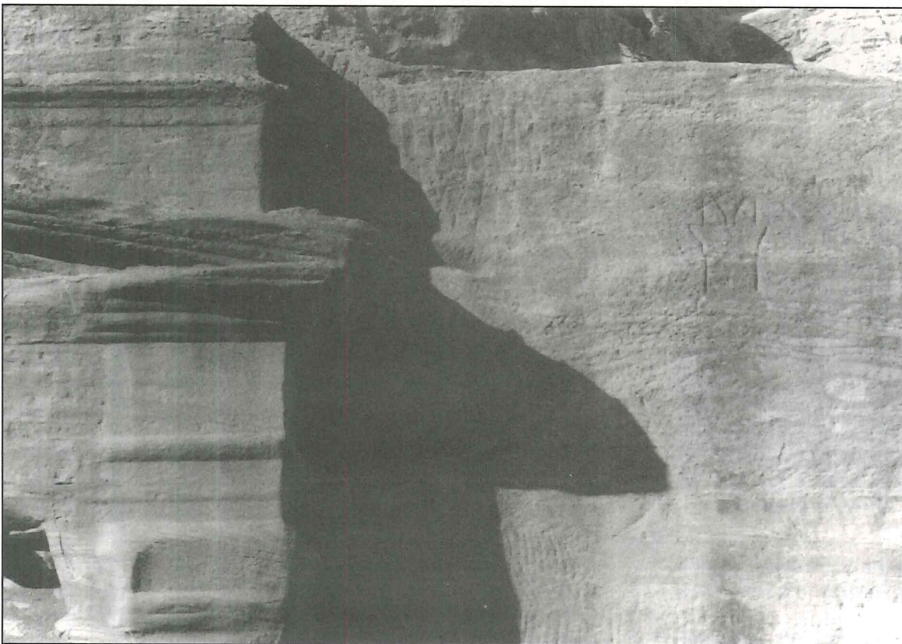


15. Roots of plants growing in water channel on Fig. 14 (photo Schmid).

II.4. Rock Graffito

A charming discovery was made while looking carefully at the façade of the "Soldier Tomb". Every morning, for about half an hour when the sunlight comes in at a sharp angle, a small rock carving to the right of the pediment becomes visible (Fig. 16). It shows a rectangular altar with small

horns on top of it, commonly believed to be carved by the workers employed in the Nabataean quarries: similar carvings can be seen in the *al-Ṣayyagh* quarries (Brünnow and Domaszewski 1904: 321ff.; Wenning 1987: 260f. fig. 44; Lindner 1997:



16. Pediment of the "Soldier Tomb" with rock carving of an altar to the right of it (photo Schmid).

35f. fig. 21).

More graffiti representing obelisks and nefeshs were discovered on the lower part of Wādī Farasa towards the city centre but as they are not part of the investigations of our 2000 season, they shall be discussed at another occasion.

III. The upper Terrace

III.1. Cistern and Basin

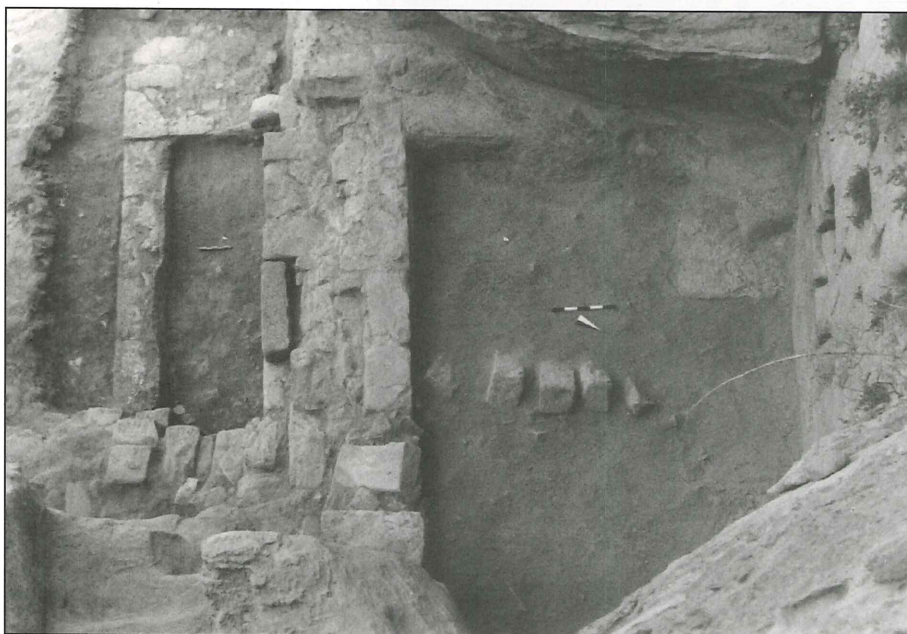
On the upper terrace of the Wādī Farasa East the main monuments such as the huge cistern and the so-called "Garden Triclinium" are today somewhat removed from their ancient context. In antiquity many built structures, of which some scanty

remains are still visible, integrated these single installations into a complete system of buildings and structures.

During the 2000 season of the IWFP, sounding 7 was opened in front of the huge retaining wall of the cistern (on this area see Schmid 2000c: 339, 342ff.). Immediately in front of the cistern there is a basin that was partially visible when the first travellers visited Petra in the early 19th century. Also visible was a water spout at what was believed to be the bottom of the basin. Clearance of that part revealed, however, that this was not the bottom of the basin and that further down there was a second water spout feeding the basin (Figs. 17-19). The higher spout is on the same level as a



17. Trench 7 on the upper terrace from above before clearing (photo Schmid).



18. Trench 7 after clearing showing two water basins in front of cistern (photo Schmid).

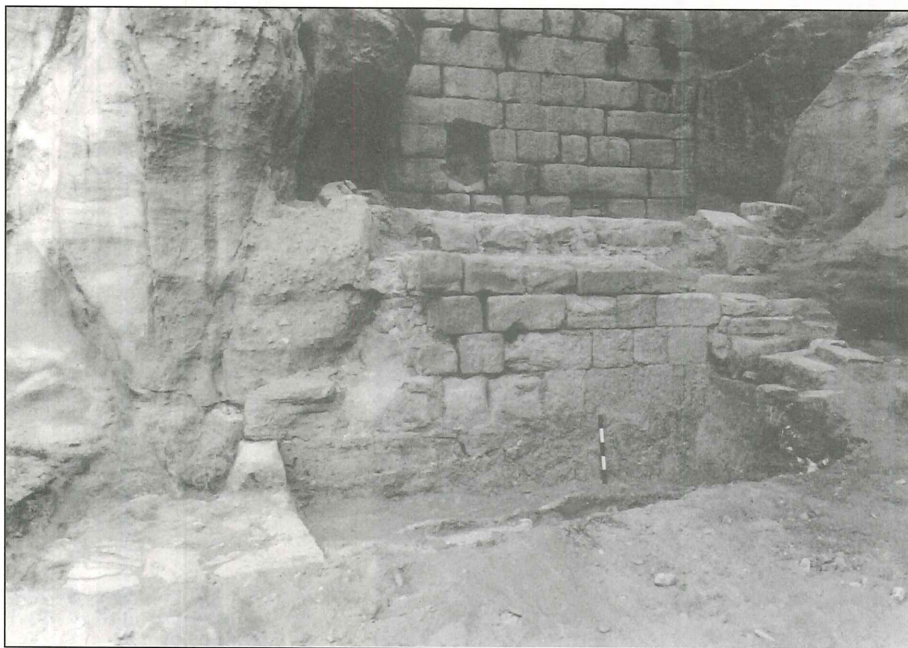


19. Retaining wall of cistern on the upper terrace with two water spouts (photo Schmid).

rock-cut water channel that leads the water out of the basin. A direct connection between them is missing but a curved stone-cut fragment of a water canalization was found in the debris in front of the basin that may have belonged to this installation. The sand and debris collected inside the basin were removed by 60cm but the bottom was not reached; the depth of the basin must have been considerable and may have corresponded to the height of the retaining wall in front of it, that is about 1.7m according to the visible remains (Fig. 20).

The debris in front of the basin reached a height of roughly 1.7m and was cleared first. This re-

vealed a second, smaller basin in front of the first one measuring 3.1m x 1.0m at the inside (Figs. 18, 20). To the east of the small basin towards the "Garden Triclinium" there is a structure built of stone slabs which may either connect the two monuments or may have been used as a kind of pedestal to get water from the basin. The bigger and the smaller basins are connected to each other by the rock-cut water channel referred to above and by a small spout in the retaining wall of the big basin. It is not yet clear whether the big basin was accessible or whether people used the small basin to fetch water. The area to the west of the small basin has



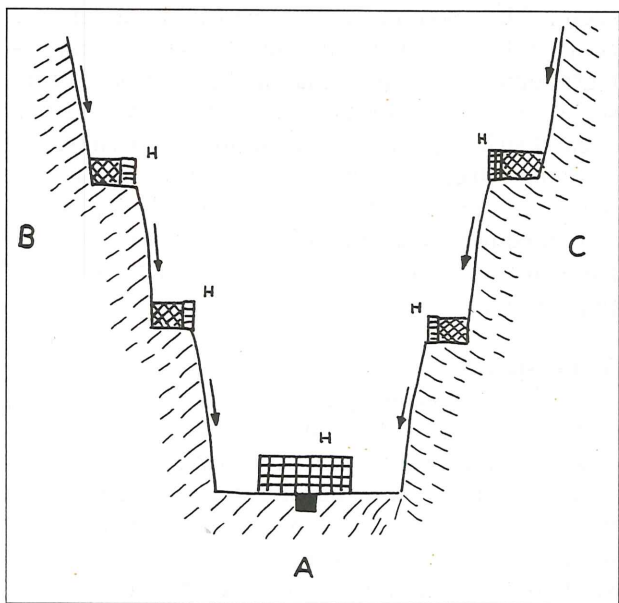
20. Retaining wall of basin in front of cistern on the upper terrace (photo Schmid).

not yet been completely cleared and it could be there that steps lead to the upper basin.

The construction of the huge basin — or at least its final phase — can be dated to the second or third quarter of the first century AD by a painted potsherd embedded in the hydraulic plaster (Schmid 2000c: 343 fig. 16). The fill of the small basin contained quite a lot of pottery that covers a chronological range from the first to the fourth centuries AD. Whether the small basin ceased to function as a water reservoir after the fourth century AD will be known after excavation has been completed. The Crusader occupation of the Wādi Farasa East (see above) makes it probable that at least the big cistern was still in use considerably later than the fourth century AD.

IV. The Water Supply and Drainage Systems of the Wādi Farasa East

The Wādi Farasa East with its manifold installations disposed of a highly sophisticated and complicated system for water supply but also for water drainage in order not to damage the rock-cut as well as the stone built monuments (on Nabataean water supply systems in a wider context see Oleson 1992; 1997; Muheisen 1990). In the Wādi Farasa East and probably in many other small and bigger valleys in the Petra area, these systems are tripartite (Fig. 21). There is one system (A) in the valley proper that collects the water on the deepest



21. Schematic drawing of the water supply and drainage systems in Wādi Farasa East (drawing Schmid).

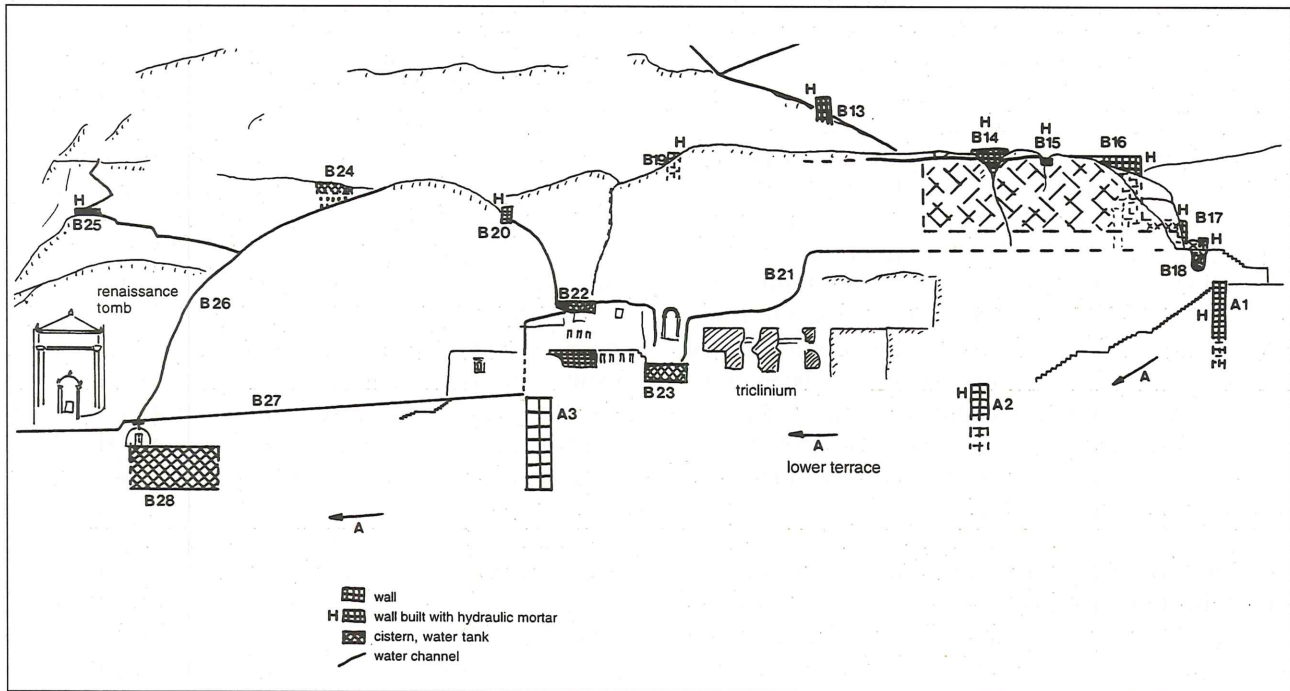
point of the overall system; a second system (B) covers one side wall of the valley and a third system (C) covers the other side wall of the valley. In the Wādi Farasa East the system (A) at the valley's bottom has since been covered to a large extent by a lot of sand. The only remains still visible are a series of huge retaining walls that are constructed with hydraulic mortar and must have been part of that system. The western side wall (system C), that is the one above the "Soldier Tomb" has already been partially described above. The most interesting and also the most complicated installations are the ones on the eastern flank, that is the one leading up to the "High Place" (system B). This system seems to have been part of a network of a long-distance water supply system, bringing spring water from the area of 'Ayn Brāq عين براق outside Petra to the central area of the city between az-Zanṭūr الزنطور and Qaṣr al-Bint قصر البنت (Lindner and Hübl 1997).

We will focus in this report just on the area above the triclinium on the lower terrace of the Wādi Farasa East in order to illustrate the ingenuity Nabataean engineers and planners in order to assure a smooth functioning of the city (Figs. 22-24).

Most of the water coming from above to the eastern flank of Wādi Farasa East is collected in the huge cistern (B 16) on the upper terrace, the rest joins system A on the valley's bottom. The rock above the triclinium shows careful planning against any loss of water that would otherwise escape towards the lower terrace: There is a series of retaining walls with hydraulic mortar (B 14, B 15) as well as a water channel running horizontally in front of them in order to absorb water that would not be retained by the walls. From the basins in front of the big cistern there must be a water channel feeding a small cistern in front of the "Garden Triclinium". From the level of the "Garden Triclinium" there is a rock-cut water pipe bringing water to a cistern on the lower terrace. The first meters of this channel are no longer visible but they can easily be deduced from the still visible rock cuttings (B 21) above the windows of the triclinium which then decline sharply and leading down into a cistern that is now buried under sand and stones (B 23).⁸ Into the same cistern leads another water channel coming from the northern part of the flank where another cistern is cut into the rock (B 22). This cistern is fed from channels coming from above and shows some of the typical features of Nabataean hydraulic systems known in Pe-

8. Considering this water channel we have to come back on our statement that no such system would lead above the tri-

clinium; see Schmid 2000c: 342.



22. Schematic drawing of water supply and drainage systems on the E flank of the lower terrace (drawing Schmid).

tra. Usually such cisterns have more than one incoming or outgoing lines, often several. Most of the cisterns of the Wādi Farasa East are filled by several water pipes coming from the western flank of Jabal al-Madhbaḥ and they have at least two outgoing pipes, one following the general direction of the main channel and one leading towards the bottom system (A) of the valley. Cistern B 22 has two outgoing pipes as well, one reaching the above-mentioned cistern (B 23) and a second reaching one of the main water channels of the area (B 27) that leads from the lower terrace of the Wādi Farasa East to the huge cistern at the entrance of the valley (B 28), where the water coming from the northern part of the western flank of Jabal al-Madhbaḥ is also collected.

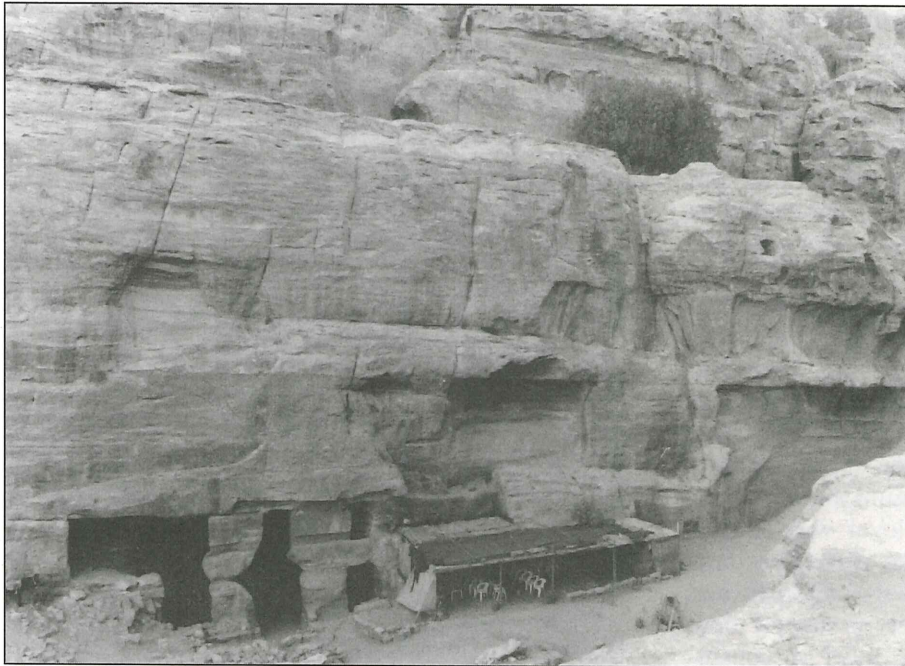
The cistern B 23 cannot only be inferred by the two water channels leading into it but also by the rock carved niche between them. Very often the Nabataeans did put such niches containing the image of a deity in places where significant waterworks were installed. This became particularly evident during recent investigations in as-Siq السيق as well as on the al-Khubtha الخبثة water supply systems (as-Siq: personal communications by U. Bellwald and D. Keller; al-Khubtha: Gunsam 1997). The immense work in order to keep only a single part of the valley dry and to bring the water exactly to the points where it was needed makes it possible to estimate the total amount of engineering and planning that was needed to install the water supply and drainage

systems of the entire Wādi Farasa East, itself being just a small part of the city of Petra.

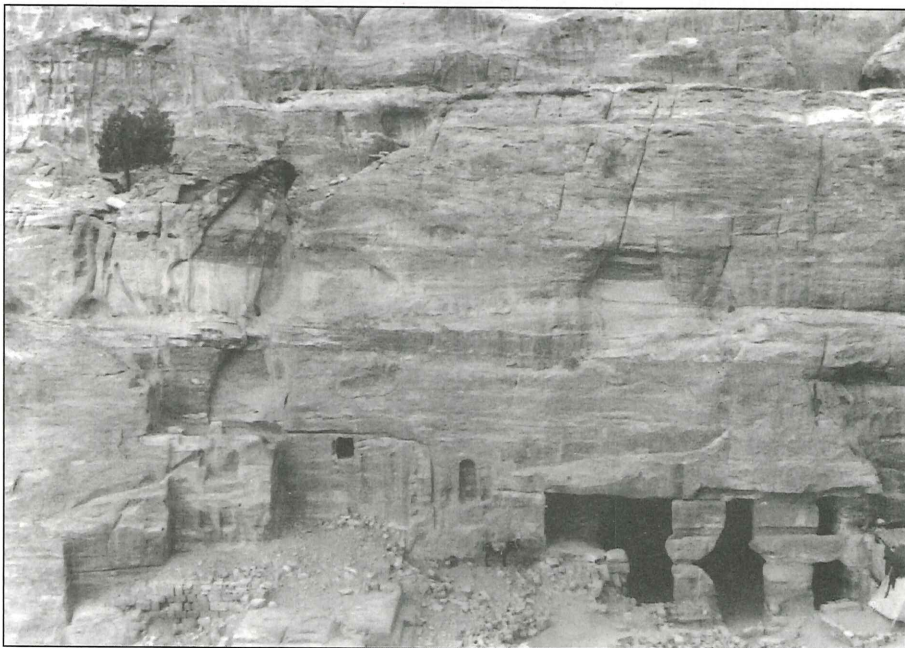
It becomes clear from such evidence that the Nabataean authorities must have developed a very effective programme of urban planning in order to implement such huge infrastructure works. Further, it is obvious that the construction of monuments such as the "Soldier Tomb", the triclinium and the courtyard between them must be seen as an integral part of an overall plan and execution. Large-scale operations like these and their maintenance needed strict control by the authorities because installations like these were part of the network on which a large and sprawling population depended. A breakdown or abuse in one part could have serious and immediate effects on other parts of the population.

V. Perspectives

Many answers to questions related to the upper and lower terrace of the Wādi Farasa East have already been answered; however, there remain many more still outstanding. For the architecture it would be interesting to know how the main entrance to the courtyard as well as the entrances to the courtyard from the triclinium and the "Soldier Tomb" were constructed. Further interest would also focus on the construction of the architrave, the roofing and the attica zone supposed above the stoa according to the rock carvings near the "Soldier Tomb" (Bachmann *et al.* 1921: 75ff.). During the



23. *Southern part of the E flank of the lower terrace with the water drainage and supply system (photo Schmid).*



24. *Northern part of the E flank of the lower terrace with the water drainage and supply system (photo Schmid).*

2000 season of the IWFP none of these elements were found, perhaps because they had fallen farther into the courtyard when the stoa collapsed. Details of construction of the courtyard are still not clear. To find out more about this would be particularly helpful, especially as the water from system A mentioned above has to run through this area (on this see also Schmid 2000c: 340ff.).

On the upper terrace the clearance of the area of the "Garden Triclinium" and connecting it to the zone already cleared in front of the cistern are targets that could easily be reached in a next season.

This would also allow to proceed further with the reconstruction of that monument. As it has never been cleared since first described by travellers of the early 19th century, the discussion about whether it once had a peristyle courtyard or not still goes on (see for example McKenzie 1990: 171 with further references).

Conservation and preservation of the site face the same problem today as the Nabataeans did 2000 years ago. The erosion by wind and mainly by water is an immediate danger to the monuments of the Wādī Farasa East. The huge main retaining

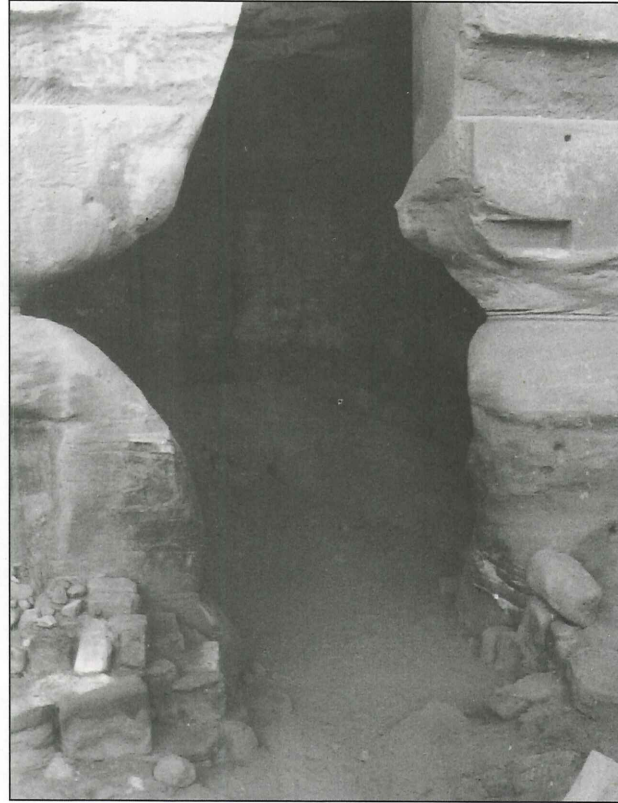
wall of the lower terrace is particularly threatened by the elements. As the ancient water supply and drainage systems are no longer working, the water that runs through the valley during the winter rainfalls reclaims its old natural way on the deepest point of the valley. This results in the washing out of the ancient built structures as was shown above by the sunken floor level in trench 2. More dangerous is the washing out of the terrace's main retaining wall which has already lost some boulders and thus stability. This wall is especially problematic as it never was meant to retain water but just was designed as a terrace wall. The water was brought through the lower terrace by specific water supply and drainage systems as was shown above.

The same occurs at the triclinium and the "Soldier Tomb". In antiquity their level was considerably higher than the one of the peristyle courtyard (cf. above II.1.). This and the sophisticated water drainage systems completely protected them from water. As nowadays their level is considerably below the level of the former courtyard that is filled by sand and tumbled stones, the water penetrates these monuments with every rainfall and is gradually destroying them as is seen on Fig. 25.⁹

As a short term solution one could restore the main retaining wall and include a small water drain. However, this would just reduce the problem and not eliminate it. Further, this solution would have no effect on the problem of the triclinium and the "Soldier Tomb" being regularly invaded by water. In order to change this, the level of the courtyard should be lowered. As with the exception of the small central rift of the former valley the floor slabs of the courtyard are almost directly based on the natural rock, excavation and conservation of that area would seem to be a comparably simple task. The main problem for these activities consist in the evacuation of the dumped material that requires a pick up in order to carry it away.

If it would be possible to find funding and technical support for such a solution, the lower terrace of the Wādī Farasa East not only would profit in terms of conservation and preservation but it would for sure become a main attraction for visitors because, as was shown by the results from our trenches 2 and 3, the columns of the courtyard are in satisfying condition and easily to be partially restored without heavy interventions.

For the time being, trenches 2 and 3 were filled



25. Entrance to the triclinium on the lower terrace showing erosion by wind and water (photo Schmid).

back according to the guidelines of the Department of Antiquities.

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9. During heavy rainfalls in winter 2000/2001 the triclinium not only was filled with water, but it also remained full of water for several days after the rain stopped. In antiquity such a situation would not have occurred, as the lower lev-

el of the courtyard compared to the triclinium did not allow the water to penetrate the rock-cut monument and to remain in it. If this situation does not change soon, the triclinium will be destroyed within a few years.

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