

THE 1998 FINNISH JABAL HĀRŪN PROJECT A PRELIMINARY REPORT

by

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The Finnish Jabal Hārūn Project (FJHP) focuses on Jabal an-Nabi Hārūn (the Mountain of the Prophet Aaron) located ca. 5 kms to the southwest of Petra. According to the Jewish, Christian and Muslim tradition, the mountain is the place of burial of Moses' brother Aaron. Currently, the peak of the mountain is occupied by the Muslim shrine (*welī*)¹ which contains a sarcophagus (cenotaph) built in the place believed to be Aaron's burial site. Ca. 70 m below and ca. 150 m to the west of the peak there is an extensive but ruined architectural complex located on a wide plateau of the mountain, at ca. 1250 m above sea level. This architectural complex, thought to have been a Byzantine monastery, is the focal point of the Finnish investigation. Previous explorations and descriptions of the mountain and its antiquities are few, and all are summarized in the recent article (Peterman and Schick 1996). More historical information comes from the Petra Papyri discovered in 1993. The bilingual Greek-Latin document Papyrus Petra inv. 6 (Papyrus Petra Daniel C. and Nancy E. Gamber), now dated to June 15, AD 513, mentions "the House (Lat. *domus*, Gr. *oikos*) of our Lord the Saint High-Priest Aaron" outside of the city of Petra. The combination of specific terminology used in this papyrus implies that the papyrus almost certainly refers to a monastic complex or church of Saint Aaron headed by the Most Holy Presbyter and Superior (Gr. *hegoumenos*) Cyricus, son of Petrus. As such, the religious tradition associated with Jabal Hārūn and the existence of an architectural complex on the high pla-

teau of the mountain would strongly suggest that the complex could indeed be identified as the monastic complex of Saint Aaron. While the exact date of the abandonment of the mountain by the Christians cannot be determined, it must have happened not later than the mid-14th century when the Muslim *welī* was constructed at the peak.

The research goals of the Finnish Jabal Hārūn Project designed as a multi-season, multidisciplinary scholarly investigation, include the following:

- 1) the study of the variations in spatial and temporal human occupation in the area of Jabal Hārūn throughout the ages, with special emphasis on the extent and nature of occupation at the site located on the high plateau, and tentatively recognized as a Byzantine monastery.
- 2) the investigations of the patterns of human adaptation in the area, i.e., the technoeconomic aspects of land-utilization, including studies on ancient agriculture and resource exploitation.
- 3) the significance of the Jabal Hārūn area in a larger historical perspective. That especially includes the relationship of the site with Petra during the Nabataean through the Islamic periods.

To meet these objectives the project utilizes archaeological excavations, survey, cartographical fieldwork and research, architectural studies, geoenvironmental exploration, and ethnoarchaeological research. Furthermore, the project will undertake the preservation, protection and presentation of the explored architectural complex situated on the plateau of Jabal Hārūn.

1. Palestinian grid coordinates of the shrine: 188.64E x 969.667N; UTM coordinates 731200E x 3356470N. The architectural remains located di-

rectly under the *welī* are not the subject of the FJHP activities.

THE 1998 SEASON

The first fieldwork season of the FJHP lasted between July 23 and September 3, 1998. The project is directed by Prof. Jaakko Frösén, University of Helsinki. The archaeological fieldwork is supervised by Dr Zbigniew T. Fiema, Dumbarton Oaks Center, with Dr Mika Lavento, University of Helsinki, being in charge of the survey part of the project. In total, 4 archaeologists, 2 architects, and 10 students from the University of Helsinki, and 6 cartographers from the Helsinki University of Technology and Espoo-Vantaa Institute of Technology, as well as Richard Holmgren, archaeologist and draftsman from Sweden, have actively participated in the fieldwork. Additionally, Professor Ari Siiriäinen, professor of archaeology at the University of Helsinki, and Prof. Henrik Haggrén, cartographer from the Helsinki University of Technology, have participated as senior staff members during a part of the season. Dr Fawzi Zayadine and Mr Hani Falahat were the representatives of the Department of Antiquities.

The goals of the 1998 season followed the propositions which emerged from the reconnaissance conducted in 1997, and were tailored to provide data essential for the planning of the following seasons, and for developing a comprehensive methodology applicable to the entire project. The following specific objectives have been identified:

- 1) Determination of the depth, nature, and the temporal parameters of the occupation at Site 1 (the monastic complex), through limited test excavations in several areas of the site, which appeared to be most promising in terms of achieving this objective.
- 2) Determination of the state of preservation of some structures/rooms of particular interest at Site 1 and the preparation of the comprehensive top plan of the monastic complex through the intensive clearance of the surface material at Site 1, and

through the use of appropriate cartographic techniques.

- 3) Intensive survey and documentation of a selected irrigation agricultural zone located to the west of the Jabal Hārūn mountain.

Site Documentation (H. Haggrén, K. Koistinen, J. Latikka, V. Putkonen, R. Karjalainen, J. Mononen, J. Heikkinen, P. Honkanen and P. Pöntinen)

The goals and objectives defined for the 1998 cartographic work were as follows:

- 1) the establishment of the control point networks for mapping of the monastic complex and the survey area. Networks are also used for photogrammetric measurements in both areas. The establishment of the networks has been done using tachymeter and GPS.
- 2) the continuation of producing video sequences and digital stills to complete the photogrammetric documentation which began during the 1997 reconnaissance.
- 3) the daily recording of spatial information data produced by the excavations and survey, and the editing of this information in the form of the project's database.
- 4) the improvement of the 3D computerized image of the mountain and its environs.

The equipment used during the work included 2 electronic tachymeters (Geodimeter), 3 GPS-receivers (Ashtech), 1 digital camera (Olympus C1400-L) and 2 video-cameras (Sony Handycam) in addition to the other equipment.

GPS-Survey

GPS-measurements were done so that the local coordinate systems (monastic complex and survey) can be transformed into a global coordinate system (UTM). The same measurements were used to transform the surface model made by using aerial images to the same coordinate system. In total eight points were measured using GPS. Two of the points are located on the top of the mountain and the rest are around the survey

area. The monastic complex control point network was tied into GPS-points by measuring the angles and distances from the monastic complex control points 103 and 105.

Tachymetry

Tachymetric measurements were carried out in the monastic complex area and in the survey area. In addition to laying out the trenches, the 3D measurements of all loci (matrix deposits, features/installations), and significant objects were taken. The tachymeter measurements produced XYZ coordinates in local coordinate system. In addition to the coordinate data, extra information (like object code, etc.) relating to every point was saved to the data collecting unit of the tachymeter. The number of measurements varied from dozens to hundreds of points. The mapping project also included the surface modelling of the monastic complex, which resulted in over 2000 measured points. The data was later processed using computers. The measurements of the survey area were almost solely mapping measurements. The barrage and terrace constructions of the main and secondary wadis were measured so that their shape and relative height were recorded. The bottom of the wadi was also measured, so that the relation between the constructions and the ground shape could be informatively visualized.

Photogrammetric Recordings

Photogrammetric recordings were done by using a videocamera and digital still camera. The videocamera was used mainly in the monastic complex area while the digital camera was used both at the monastic complex and in the survey area. The videocamera was mainly used to take cocentric and linear videosequences from Trenches A, B and C. Styrofoam balls were placed in the corners of every trench as control points for measurements. Plane coordinates of the points have been measured with a tachymeter and the heights of the center of the styrofoam balls

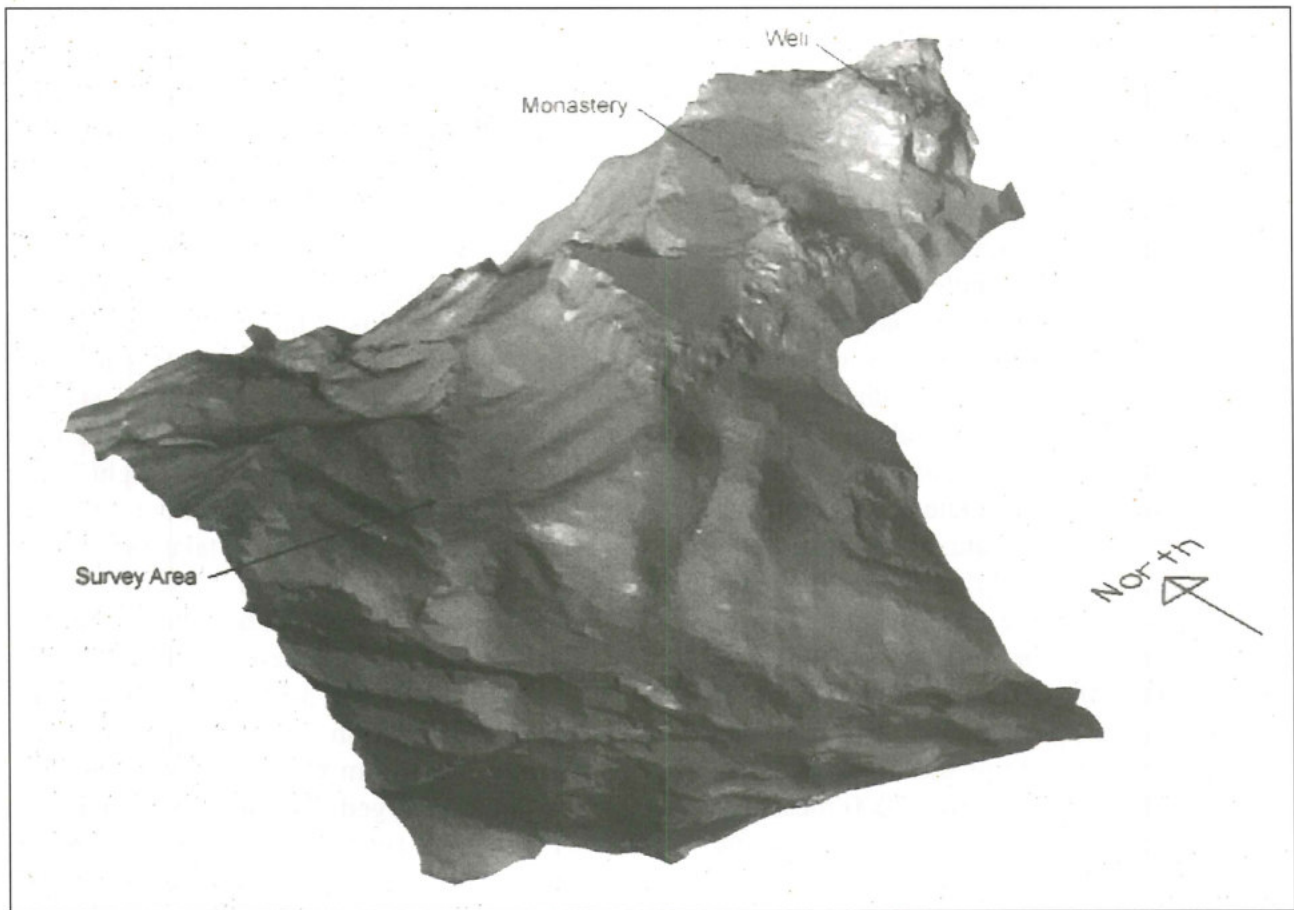
with a measuring tape. Recordings were made using the wide angle position of the zoom. In addition to the wide angle, the zooming was used in Trenches A, B and C to get a better resolution of some details.

The digital camera was mainly used for taking stereo-images from trenches in the monastic complex area and the barrages and other installations at the survey area. Digital images are used for photogrammetric measurements and modelling of entities such as trenches and their components. Images were taken from about 1.6 to 1.8 m height above the ground and from ladders about 2.0 to 2.5 m high. Some images were taken so that the imaging axis was almost vertical. An orthoimagemosaic has been made from the floor of the Trench B, based on those images.

Additionally, the 3-D terrain model of the top of Jabal Hārūn covering approximately an area of 0.7 km x 0.6 km created in 1997, was now enlarged. The terrain model (Fig. 1) based on aerial images covers after the enlargement an area of approximately 1.2 km x 1.5 km. The 1998 mapped areas are located to west and south of the top of Jabal Hārūn. The tachymeter was also used in the survey area to get more detailed information on irrigation systems, to be added to the terrain model based on aerial images.

FJHP Database

The archaeological database of the project was developed with the idea of combining the textual information (site description), digital imagery and spatial data into one interrelated system which would also be compatible with the GIS information and 3-D modelling requirements. As such, the database permits a conduction of visual and statistical analysis and a preparation of a comprehensive report. For the relational database, the "Microsoft Access 97" proved to be both convenient and reliable, while "Microstation 95" by Bentley became the project's all-in-one 3-D modelling, GIS and mapping tool. The latter has also an essential



1. Digital terrain model of the Jabal Hārūn area, 1998 (seen from SW).

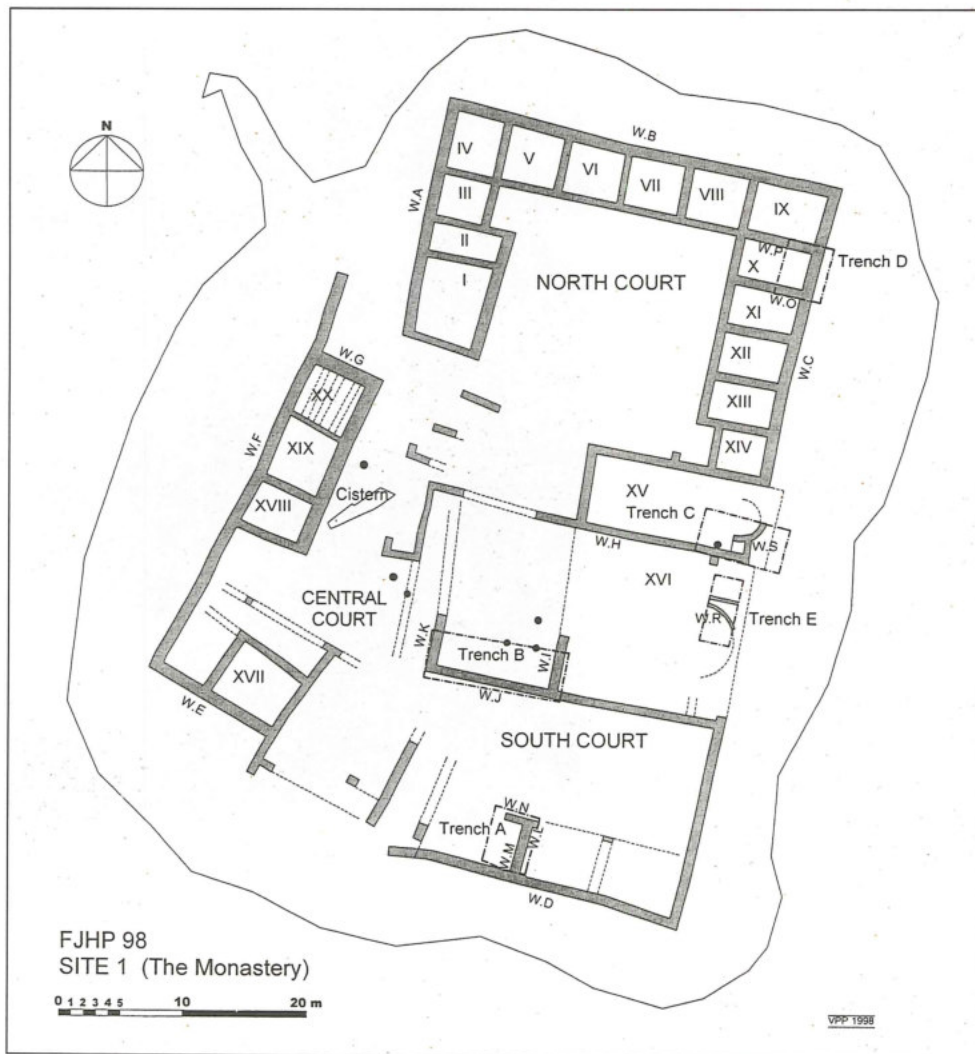
tachymeter data processing module (Ter-survey). For the textual information gathered in the field, traditional forms (locus, artifact, tract, site) were developed. Upon the completion of a form, the information was transferred to a laptop computer using pull-down menus for recurring entries. As such, each paper form has its faithful equivalent in a database form. Linking the form records to the measured points in 3-D space is being currently done in order to show the spatial relationships between different categories of data. Data collection and transmission procedures will be further streamlined and simplified.

ARCHAEOLOGICAL EXCAVATIONS

The limited excavations which took place within Site 1 (the monastic complex) provided basic and relatively diverse in-

formation concerning the general stratigraphy and history of the site while partially exposing some representational or significant parts of the complex. Simultaneously, an architectural survey was conducted at the site, which involved electronic recording of all extant walls visible on the surface. This survey produced a new, preliminary plan of the complex (Fig. 2), which should be regarded as a considerable improvement over the idealized plan previously published.

The excavation work was conducted in three trenches (A, B, C) which were fully excavated down to the lowermost stratum. A preliminary phasing of the occupation detected in these trenches is provided below. Two other trenches (D and E) were cleared on the surface, and the excavations there did not proceed beyond ca. 20-40 cms below the surface. The purpose of these latter trenches



2. The 1998 Preliminary Plan of Site 1 (the monastic complex).

was to test hypotheses which emerged during the 1998 excavations, and the work in these trenches will be continued at a later date. A brief description of the progress of work in these trenches is provided below. The recording of strata, features and finds in every trench was based upon the 3D readings and mapping provided by tachymeters, as well as the descriptions included in notebooks and special locus and artifact forms specifically developed for the Project's computerized database.

Trench A (J. Vihonen, K. Tuori, A. La-helma, R. Ylönen and K. Lorentz)²

Trench A was laid out roughly halfway

along the well-pronounced tumble ridge which marks the course of the southern outer wall (D) of the complex. The trench's size was 7m (N-S) by 4m (E-W), the southern part being about one meter outside the building. Originally set up to clarify the course, construction and dating of Wall D as well as to obtain dating material from its foundation trench, Trench A proved somewhat a disappointment in the latter goal since the structures were built directly on the bedrock. Other objectives were to clarify the function of the complex around South Court, and to find out the function and extent of enigmatic stone circles faintly visible on surface. The latter were proved to be accidental

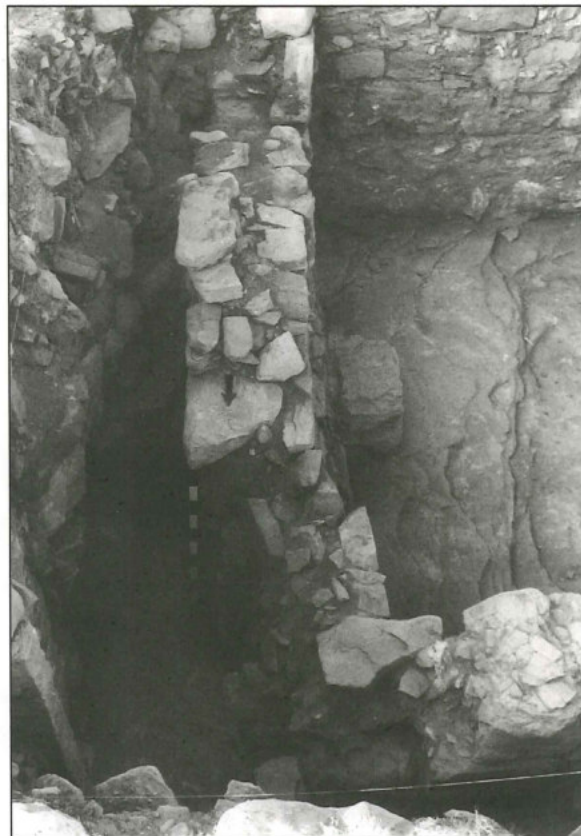
2. For the sake of clarity and space, all levels given on the plans and sections omit the first two digits,

12. As such, the level of 44.43 is, in fact, 1244.43 m above sea level.

patterns, whereas the function of this part of the complex still remain unclear.

Phase 1: Construction. During the first phase parallel Walls D (locus 4) and N (loci 15 and 23) were built directly on the bedrock (locus 25). Wall D is ca. 0.9 m thick and preserved up to the height of ca. 2.05 m. Its southern (exterior) face features well carved ashlar set in rows but the northern face, which was obviously plastered, is made of less regular and much weathered stones. Wall N is 2.9 long, ca. 0.6-0.8 m wide and rises above the bedrock to ca. 0.95 m. There is a gap in Wall N in the north-eastern corner of the trench, which marked the original entry from South Court to the space defined by Walls D and N. The finely built east doorjamb section of this entry is well visible in the eastern balk of Trench A. Apparently, there was a floor pertaining to this phase, although no trace of it remains. An empty space below the doorjamb (locus 28), indicates the location of a later removed wooden/stone (?) threshold.

Phase 2: The Remodelling. The second phase was marked by the construction of Wall L (loci 8 and 12) which runs in N-S direction perpendicular to and connecting Walls D and N (Fig. 3). With the appearance of this wall, the space within Trench A was now divided into the western and eastern parts. Wall L was constructed of rough sandstone cobbles and rubble without mortar, but reinforced by mortar at a later date. Presently, Wall L is ca. 4.0 m long, 0.6-0.7 m wide, and with the height ranging from 0.85 to 1.45 m. Since this wall was also built directly on the bedrock, the floor of Phase 1 was apparently removed, at least in the wall's area. A new doorway was pierced through in the western part of Wall N (locus 15). This doorway was a simple opening in the wall without doorjambs, the threshold of which being ca. 0.8 x 0.9 m, and 2 courses high (locus 22). Whether the eastern door-



3. Trench A (eastern half, seen from N). Wall L in the center, Wall D (upper right), Wall N (lower right).

way in Wall N remained still in use is debatable (*infra*). No deliberate blocking or other marks of discontinued use of the first doorway were found, other than the awkward position of this doorway in relation to Wall L.

Remains of floor paving under the threshold (locus 22) consist of mortar and stone pavers (locus 27). Apparently, these are the only remains of a floor which consisted of stone slabs (in the west) and of exposed bedrock (in the east). The stone floor served to level the occupational surface, otherwise very uneven because of the eastward-sloping bedrock. An enigmatic stone structure (locus 24) connected to Wall L and built directly on the bedrock also belongs to this phase. It is ca. 0.68 m long, 0.43 m wide and ca. 0.46 m high. Its purpose is unknown, although its benchlike appearance may indicate its function.

Phase 3: The Damage. This phase is characterized by the damage inflicted upon Wall L, caused by an earthquake or other mechanical forces. The central part of Wall L is pushed in eastwards, while the lowermost courses form a straight line. The damage is most severe where locus 8 bonds with locus 12, ca. 1 m from Wall N. There, Wall L continues abruptly at a line ca. 20 cm eastwards from the original straight line formed by and still preserved by the lowest courses. The northeastern end of Wall L - the east side of locus 12 - was entirely destroyed. Therefore it remains unclear how far the eastern side of the wall extended. Whether or not the first doorway was in use during Phase 2, could only be determined with Wall L preserved intact. If the wall was originally straight the first doorway could still have been in use before the wall was damaged. This is supported by the fact that the wall is of uniform width, ca. 60 cm, and the lowest courses of Wall L which were the least likely to have shifted during an earthquake, are in a straight line. This would indicate that the central part of the wall shifted to the east, perhaps due to the pressure resulting from an earthquake (collapsing of the roof or adjacent walls). On the other hand, the edges of the wall, which were firmly linked with the bedrock or Walls D and N survived the seismic damage. However, the wall might also have been of varying width at its top and bottom, even before the damage in Phase 3. This possibility is suggested by the straightness of the upper line of the eastern face of the wall, which is not parallel to the western bottom line of the wall. In this case the wall, when built in Phase 2, would have blocked the first doorway. While the evidence is inconclusive, the eastern doorway might have been in use before the damage, but definitely not after it.

Phase 4: The Courtyard. The space continued to be occupied but apparently in a different function. The floor of Phase 2, prob-

ably damaged at the same time as Wall L, was removed during this phase. A new occupational surface included sandy yellowish deposit (loci 20, 26), probably brought in from outside. That fill covered the entire room except for small areas in the northeastern and southeastern corners where bedrock was visible. Remains of a probable fireplace (locus 21) were uncovered above the sandy floor. This may or may not indicate that the room now probably had no roof, which had perhaps fallen down during the previous phase. Wall N (locus 15) was found to be preserved at an almost uniform height of ca. 1 meter above the bedrock level. This levelling down might have been intentional. Furthermore, the top of the wall displays a thick layer of mud mortar. It may be that the room was turned into an open courtyard, probably immediately after Phase 3 when Wall L was damaged and perhaps could no longer support a roof.

Phase 5: The Dumping. This phase appears to represent a partial abandonment of the room, during which a relatively thick, brownish layer of wind-blown sand (loci 17A, 17B, 18 [partly] and 19) accumulated, thicker along the walls than in the center of the room. The finds - such as commonware, charcoal (particularly in loci 17 A and B), quantities of bones and marble fragments - indicate that the area had not been entirely abandoned. It may have been used for casual squatter-like occupation (although without clear occupational surfaces) or, alternatively, as a dump for the other, still functioning parts of the complex. In particular, locus 17 located by the southern face of Wall N, could be easily recognized because of the high contents of ash in its matrix. This locus, which appears to have been a debris midden is ca. 2.35 m (E-W) and 1.0 m (N-S). The sublocus 17A contained most of the loose ashy deposit, charcoal bits, burnt and unburnt bones (including fishbones), glass and commonware (often with charring marks on

the outside). The sublocus 17B, was more compact and it contained fewer finds than 17A, probably being its spill area.

Phase 6: The Destruction. This phase represents at least one, but most probably a whole series of earthquakes, natural decay and other damage which created a stone tumble which was deep, extensive and difficult to separate. The subdivision during the excavation was thus largely arbitrary. The western section features several layers which are more separable, and thus the phase can tentatively be divided into at least four sub-phases. Undoubtedly, the stones deposited through earthquakes and natural decay of the ruins formed layers of loose rubble through which wind- and water-borne sand, pottery sherds, coins and the like could easily have filtered, creating a rather confused, secondary stratigraphy of the finds, especially pottery of all periods (Russell 1980: 57; 1985: 52, note 12, for these processes in Petra). The following is a rough approximation of what may have happened:

- 6a: The first major stone tumble (parts of loci 16 and 18) caused by an earthquake was deposited on top of the sand of Phase 5.
- 6b: The earthquake was apparently followed by a relatively brief period of natural deposition of sand (parts of loci 11 and 16; loci 13 and 10 outside the Wall L may also be counted here), mixed with some large boulders falling from the ruined walls. A number of finds of a similar type as in Phase 5 indicate some form of continued use - either as a dump or for squatting occupation.
- 6c: A second major earthquake further ruined the still standing structures, and created a new, distinguishable stone tumble (loci 6, 9, and parts of 11).

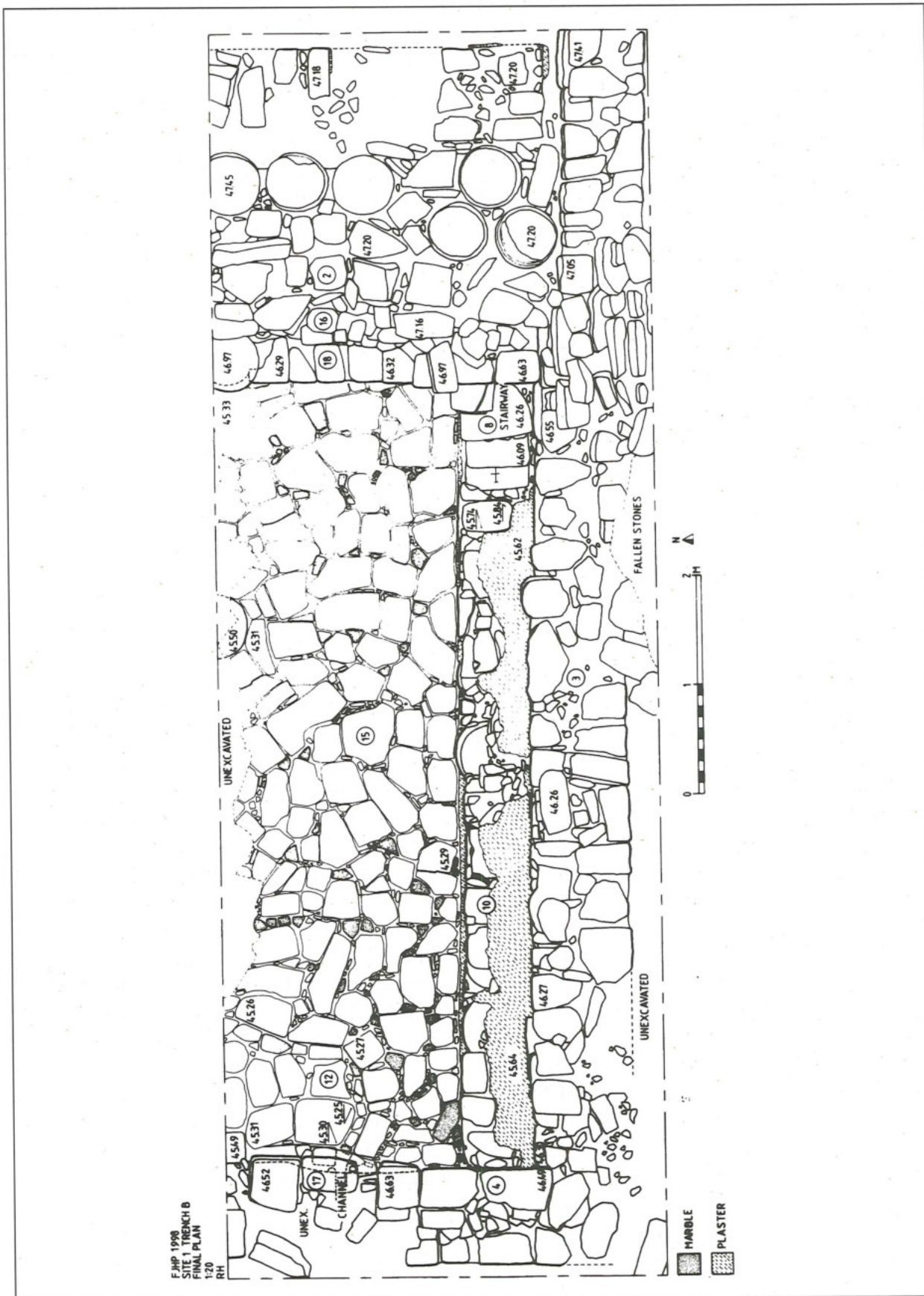
Phase 7: Natural Deposition and Latest

Activities. The incessant accumulation of wind-blown sand, remains of pastoral-type occupation and a very limited stone deposition resulting from the natural decay of walls, can be associated with the latest phase in Trench A. This phase includes not only loci 1, 2 and 3, but probably also the stone structure (loci 7, 12 = Wall M) on top of Wall L (locus 8). This structure appears to have been a sort of a temporary enclosure or windbreaker, integrated with the uppermost preserved parts of Walls L and D, of the type still being used by the transhumant population of this area. Locus 10 consists of the sand fill inside this enclosure, which provided only a few finds.

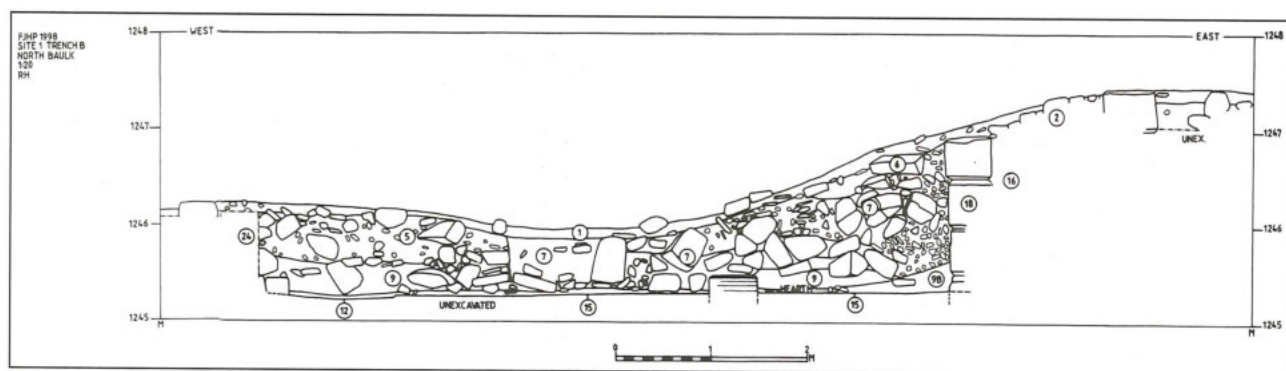
Since the excavation outside Wall D was not completed, the stratigraphic sequence there remains incomplete and thus does not permit a full integration with the phasing of the interior. Below the surface and locus 1, the loci (5, 14, 29, 30) in this area were uniform in composition: mostly sand, small pebbles and a few fallen boulders. Locus 29 was a lense of ashy sand, perhaps the remains of a campfire started outside Wall L which provided a shelter for it.

Trench B (R. Holmgren, A. Lahelma and R. Ylönen)

This trench (11.4 x 4 m) has been opened in front of Room XVI, the largest architectural entity within the complex, in the eastern part of the Central Court. The excavation revealed a paved area enclosed by Walls J and K, the former associated with a long bench set against it and the latter having a blocked door (Fig. 4). Furthermore, a series of column drums appeared visible in the northern balk of the trench, set as if in a W-E pattern (Fig. 5). The whole design resembled a long colonnaded hall, not unlike an aisle of a large church, the west wall having an entrance door. The close examination of the surface of Room XVI, the evaluation of the spatial arrangements of Room XVI and the area of Central Court, and finally the



4. Trench B - Top plan.



5. Trench B - North Balk.

opening of Trench E where the central apse of the so-defined church would have been (*infra*), have all confirmed this hypothesis. As such, the remains uncovered in Trench B most probably represent the southwestern part of the southern aisle of a church. Following is a short description of architectural phases detected in Trench B which, however, will not deal with the earliest, pre-church phases at the site. The considerable amount of the Nabataean pottery recovered from all different strata, and the reuse of several column drums inside the structure of the bench strongly suggest that there must have been a structure(s) in the area of Trench B, as well as generally at Site 1, which should pre-date the Byzantine period.

Phase 1: Early Church. Walls J and K, most probably built in this phase, are the main south and west walls of the church, respectively, which continued their existence in the following phases. The stone bench (locus 10) was built against Wall J, apparently contemporary with it. The bench is ca. 65 cm wide and ca. 50 cm high, although the extant (later) pavement was laid out against the bench at the level of only 34 cm below its top. Thick plaster on the top of the bench is moulded to form raised supports on both ends and in the central part. In order to detect the early floor, three soundings (loci 13, 14 and 20) were opened in the extant pavement. All three soundings yielded quantities of scattered tesserae, which suggest that the early floor in the aisle, nave or another

building at Site 1 was decorated with mosaics. The sounding, locus 13, featured the plaster covering the side of the bench, which continued down below the level of the extant pavement. The remains of the early floor were ambiguous there, due to the small size of the exposure. The sounding, locus 14, displayed a better preserved floor (locus 19) under the extant pavement. It featured a row of flat stones set against the lower part of the bench, flanked by what appears to be a well-made thick plaster surface. This must be regarded as the early church floor. The plaster applied to the side of the bench lips out on the row of flat stones. The drums of the columns, visible in the north balk also belong to Phase 1 as they stand on this floor. The distance from the drums to the bench (ca 2.9 m) would be the approximate width of the south aisle of the church.

Wall K had a door opening, ca. 1.2 m wide, which was later blocked. The early threshold of this door, made of two large stone slabs, is slightly higher than the extant pavement which abuts it. It means that this threshold was significantly higher than the level of the early church floor.

Phase 2: Later Church. In this phase, a new floor (locus 15) was laid out in the aisle. The fill between both floors contained quantities of tesserae and also charcoal fragments, which may or may not suggest a calamity which ended Phase 1. On the other hand, the fill could have been carted in from somewhere else. The floor is made of ir-

regularly shaped but flat flagstones with numerous small marble pieces wedged into the crevices between the flagstones. This floor abuts Wall K, the bench and the early threshold. Also in this phase, the original northern door-jamb section of the door in Wall K had been dismantled and reinstated in the same place. A new threshold was set upon the early one, which raised the threshold level ca. 25 cm above the new floor. It is unknown whether this reconstituting of the northern door-jamb was in response to a destruction. However, the new threshold was now fully integrated with the northern door-jamb, but not with the southern one which was obviously not disturbed since its construction in Phase 1. In the northwestern corner of the trench, just against Wall K, the pavement forms an oval, slightly depressed area (locus 12). A small, very shallow channel leads from this area toward the early threshold which has a deep groove chiseled in to drain the liquid (?) outside the aisle.

Phase 3: The Division of the Aisle. It is not certain whether the church was still in use during this phase, but obviously the westernmost part of the southern aisle was now completely separated from the rest of the aisle by the construction of the massive Wall I (combined loci 2, 16 and 18). While this needs to be fully tested by excavations, it appears that this wall continues farther north until the junction with Wall H, thus fully separating the entire western part of the church from its eastern counterpart. Wall I consists of the outer wall made of ashlar (locus 18), the fill of smaller stones in more or less regular courses (locus 16), and the uppermost preserved two courses of ashlar (locus 2) directly upon locus 18. Significantly, this uppermost coursing also contains several reused column drums. The function of Wall I - as a "blocking wall," or a construction within a building (no longer a basilica) - cannot be safely determined yet. It should, however, be related to the stairway

(locus 8) which runs up against Wall J starting from the level of the top of the bench. As such, Wall I may have been intended to form a sort of a flat surface-platform, since the stairway seems to be running up to this feature, either straight eastward, or making a 90 degree turn to reach the platform. The stairway consists of three well-defined steps and the probable fourth. Each step is ca. 15-20 cm high, and the entire stairway ca. 70 cm high. The lowermost step is integrated with the top of the bench by a thick layer of plaster (with small stones inside) which gradually rises up from the bench's level. The surface of the second step from the bottom contains a shallow relief of a cross with its arms, ca. 13 and 7 cm long crossing in their centers. Additionally, during this or the following phases the door in Wall K had been blocked using roughly hewn ashlar.

Phase 4: Casual Occupation. It is possible that Phase 4 may in fact be temporally combined with the previous one. However, the occupation during this phase appears to be casual, almost squatter-like. Remains of a hearth partially in the eastern part of the north baulk have been exposed. Bones of fish and chicken were found atop the hearth, and mixed with the ashy deposit around the hearth. Similar fish bones were found directly east of the hearth and against the façade of Wall I. The abundance of fish and chicken bones should indicate a specific, non-monastic occupation in this phase. For example, the Judaeen Desert monks abstained from meat and probably fish, these being reserved only for ailing monks (Hirschfeld 1992: 88). When the cooking fire was made on the pavement, sand had already begun to accumulate against Wall I.

Phase 5: Levelling (?). This phase is difficult to define, but it seems to be represented by locus 9 which is on a level with the top of the bench, locus 10. Locus 9 consists of numerous sharp-edged stones in a

sandy matrix - it may be an intentional fill. In the west, plaster fallen from the wall appears lying on the top of these stones.

Phase 6: Collapse and Disuse. This phase represents a disuse of the space and the collapse of stones from the walls around. It is nearly impossible to differentiate between the layers of collapsed stones, also due to the relative shallow depth of the deposition covering 3/4 of Square B. Only locus 7 appears distinctively as a result of a major destruction, probably an earthquake. The uppermost deposit within the trench is a wind-blown, waterborne sand.

Trench C (E. Mikkola, N. Heiska and J. Sipilä)

The trench has been laid out in the area against the main eastern wall (C) of the complex, where the outline of a small apse, believed to belong to a chapel, could be discerned on the surface. The trench covered the southern half of the apse. The trench size was approximately 3.7 m (N-S) and 7 m (E-W). Given the material found at this site, it is highly probable that the earliest construction phase discussed here was preceded by largely unknown pre-Byzantine phases. Reused column drums, marble fragments, roof tiles found in the foundations of the early-phase floor, as well as the Nabataean pottery are safe indicators of that earlier occupation. However, the limited exposure of the lowermost deposits as well as the fact that the whole complex seems to have been constructed directly on the bedrock prevents detailed comments on this matter.

Phase 1: Construction and Early Use. The walls of the room were constructed, including the apse's wall (Wall S). The southern wall of the room (Wall H) is the massive wall of the structure directly to the south, which turned out to be a church (*infra*). It appears that the chapel is either contemporary with the church, or was added lat-

er on, although the evidence for either proposition is inconclusive as shown below. Although the outer line of the eastern wall of the room was not definable within the trench limits, it is most probable that the apse is fully incised, with the outer line of its back wall probably somewhat projecting eastward from the line of Wall C. Together with the apse, a closet or cupboard with three shelves was constructed in the southeastern corner of the room. The shelves are sandstone slabs (0.84 x 0.93 x 0.8 m) which were inserted into horizontal grooves in Wall H - the northern wall of the cupboard. Although the apse wall abuts Wall H, the shelves are fully integrated and thus would seemingly support the notion of contemporaneity of the chapel and the church. The cupboard displays close similarity to that found in the atrium wall of the mosaic-decorated church in Petra, recently excavated (Fiema, forthcoming)

The bedrock inside the apse was levelled by using stones and sand to serve as the main bedding for a floor (loci 24d and e). The actual mortar-bedding (locus 24c) of the floor was found flush with the fine stucco-plaster which covered the wall of the apse. Whether the floor in this phase was made of marble slabs is not confirmed, but the abundance of fragments found (e.g., in the foundations of the earlier floor -locus 24d) indicates that marble was available, possibly from earlier structures. In the nave, the floor was probably on the same level as within the apse, but the details were unclear.

A column (locus 13) made of six surviving drums (diameter ca. 57 cm) and located against Wall H was obviously modified to serve as a pilaster for an arch spanning the room by connecting the column to the wall with stones, to serve as an arch-springer. This is supported by the partial chiselling out of the drums' curvature facing the wall, and filling the space with chinking stones. Probably the entire column was coated with a thick layer of plaster to achieve a visual integration with Wall H.

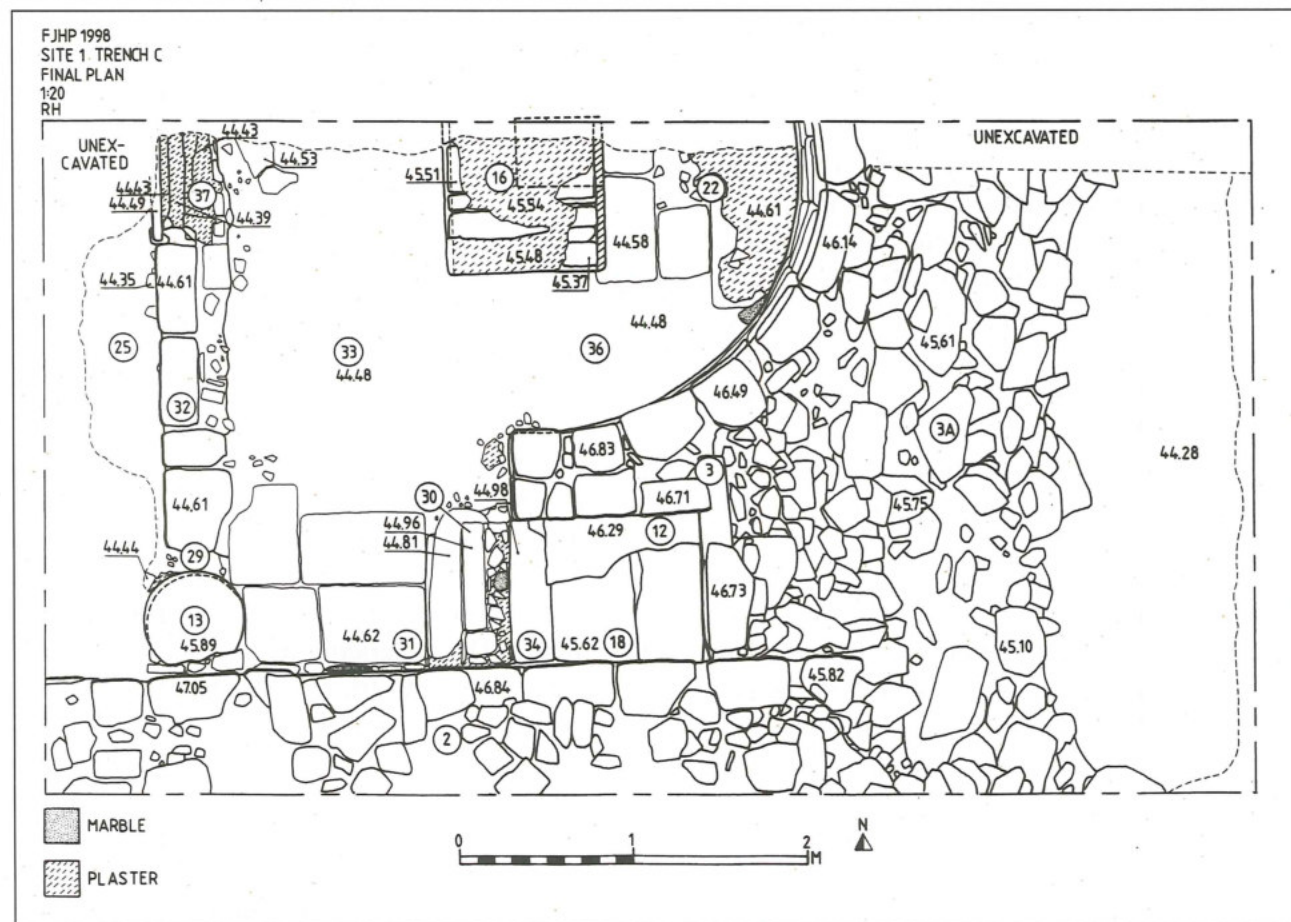
The width of the room is ca. 6-7 m, the span of the arch thereby being a little less. The arch probably supported wooden roof beams of which no remains were found. Since very few roof tiles were found in the fill of the room it is probable that the wooden roof superstructure was covered by a coat of mortar, a practice also known in the Byzantine Negev (Colt 1962: 11). Large chunks of such thick mortar coating were recovered in Trench C. Nine of the collapsed voussoirs of the arch were found within locus 8.

Phase 2: Remodelling. This phase indicates a remodelling of the space or a rebuilding following a small-scale destruction. The latter, however, does not find full reflection in the archaeological data. The occupational level inside the apse was raised and a kind of bema was constructed directly in front of the apse and on the level with its

new floor (Figs. 6 and 7). This process involved the deposition of a layer of red homogeneous sand (locus 24b), a layer of mortar (locus 33) and then placing floor flagstones on top of it (loci 24a, 22, 31). This combined apse/bema floor appears to have featured zones of sandstone, limestone and marble pavers (the two latter zones later



6. Trench C. The chapel (seen from W). The apse, bema, and the "cupboard." The masonry altar base seen in upper left.



7. Trench C - Top Plan.

removed). A small broken marble slab was found *in situ* against the wall of the apse. The fine stucco-plaster of the previous phase appears to have been broken off and dismantled just above the level of the new floor, but the application of new coat of plaster on the apse's wall is less evident. Small marble pieces were also used as a filling in the crevice between the new bema floor (locus 31) and Wall H. A chancel-screen and a threshold structure (locus 35) to the bema was built. The former is known only from grooves at the edge of the bema while the latter is very poorly preserved. The step-like structure (locus 30) was built in front of the shelves; the upper step being a re-used limestone cornice of an intricate moulding. The nave floor was integrated with the bema and with the column with plaster, as indicated by locus 29. Whether or not the nave floor or its foundations were newly constructed during this period remains uncertain.

In the center of the apse's chord an enigmatic masonry structure (locus 16) had been built on flagstones of which only the eastern sandstone ones (locus 22) are still *in situ*. On top of these flagstones were remains of plaster or mortar, perhaps indicating some construction, contemporary or later. Since the other half of the structure is still within the northern balk, thus its dimensions (length 0.88 m, width ca.1.40 m, height ca. 0.78-0.97 m) are approximate. The structure is hollow inside, having a small compartment (0.54 x 0.45 x 0.65 m) with the opening towards the apse (Fig. 8). Cream-yellow plaster covered the structure on the exterior while white plaster coated the interior. The marble fragment of the inscription, which reads APΩN, found in front of the structure is most likely related to this phase. The fragment could have belonged to a marble balustrade (see the description *infra*, under Small Finds). The structure, which looks like a large box or pedestal, most probably served as an altar base.



8. Trench C. The entrance to the compartment inside the masonry altar base (seen from E).

Phase 3: Robbing-out (?). This phase must represent a period of decline during which the chapel may or may not have remained in use. Most of the limestone and marble flagstones were then removed from the central zone of the apse/bema, including the flagstones from under the western side of the altar box. The wall plaster deterioration began, exemplified by numerous flakes and fragments collapsed on the robbed-out floor space. The threshold of the bema (locus 35) was replaced by a makeshift construction, a vertically positioned, poor-quality flagstone. Some marble fragments, small pavers and a great quantity of stone floor tesserae were stacked up on the lowest shelf of the cupboard. The origins of these objects, especially the tesserae, are unknown.

Phase 4: First Destruction (?) and Abandonment. This phase should remain in a close relationship with the previous one, perhaps even combined with it. At any rate, the chapel was definitely abandoned at this time. The abandonment may have been caused by a destruction (earthquake?) which perhaps had affected the area of the chapel which is not yet excavated. But if destruction indeed took place at this point of time, its traces are primarily notable in the apse area. The altar box was tilted towards the west, because the flagstones were removed from under it in the previous phase,

and due to the pressure of the newly collapsed stone rubble. The latter included only fragments suggesting that the intact ashlar or unbroken stones might have been collected and carted away before the final destruction. The thin layers of disintegrated wall plaster which covers this rubble indicates the continuous decay, perhaps reinforced by the destruction. It appears, however, that an intentional depositing of stone and other construction material in front of the shelves (loci 3b, 14) took place during this phase. This deposit, while affected by the later destruction, still preserved a certain degree of regularity. The abundance of limestone tesserae, and marble and mortar/plaster fragments within this pile is striking. It all suggests that the area in front of the cupboard may have been used as a dump for material cleared from the other parts of the chapel or the church.

Phase 5: Major Destruction. The final destruction as documented in Trench C was most likely caused by earthquake(s). The direction of the collapse as indicated by the layers of stones and ashy mortar was probably E-W or SE-NW (loci 3b, 7, 9). The arch collapsed on top of the layers (loci 14, 20) which contained large quantities of mortar and plaster fragments. This material originated either from the disintegrated dump-pile mentioned above, from which the fragments in due time before and during the destruction slid down towards the nave, or it came from above during the destruction. The latter proposition is supported by the abundance of the thick mortar fragments, which might have been used for roofing instead of roof tiles (*supra*).

Phase 6: Latest Natural Deposition. The later phenomena which affected the site up to modern times basically include natural deposition of wind-blown and waterborn sand, the decay and collapse of material from eroded construction elements, and pos-

sible human activities like camping, collecting stones for building material, and the like (loci 1, 4, 5).

Trench D (R. Ylönen, N. Heiska)

Trench D was situated in the northeastern part of the complex, in the area where the wall lines of several smaller rooms around the North Court were visible on the ground. The trench, 3.3 x 4.5 m, was laid out across Wall C and between two walls running perpendicular to that Wall. It was hoped that the trench would provide information on the nature and date of occupation in this part of the complex. Unfortunately, the work in this trench did not progress beyond the removal of the uppermost strata, due to the unavailability of the staff members stricken by illness.

The surface of the trench substantially sloped down to the east. Upon the removal of the topsoil and the uppermost, unpatterned stone tumble (locus 1), Walls O and P (loci 4 and 6 respectively) which run E-W, and parallel to each other, became well defined. These walls are the southern and northern limits of a room which is ca. 3 m wide (N-S) and the eastern limit of which is Wall C (locus 5). The first tumble layer of the interior (locus 2), ca. 0.45-0.6 m thick, was removed, exposing another stone tumble (locus 9) which was left unexcavated. In the exterior, a layer of reddish brown sand and some cobbles and boulders (locus 3) was exposed, the stone deposit being particularly dense along Wall C. Generally, the walls in this area were made of rough ash-lars with rubble inside, clearly inferior in construction to the walls in Trenches A, B and C. Two inward projecting long stones, ca. 0.4 x 0.2 m, visible in the southern face of Wall P (locus 6), might be the remains of an arch springer. However, no parallel installation of this kind was encountered in the northern face of the opposite wall (locus 4). The width of Wall C, the main east wall of the complex, is difficult to estimate because

the eastern edge of the wall was difficult to distinguish from the eastern stone tumble (locus 7). Furthermore, there is an irregular row of rough ashlar (locus 8), set against the western side of Wall C. It appears that this row is the upper part of a support or reinforcement built against the wall. The finds included pottery and some scattered fragments of glass and bones but no wall plaster.

Trench E (A. Lahelma and K. Tuori)

Trench E was specifically opened to test a hypothesis which emerged during the excavation of Trench B. In particular, it was postulated that Walls J and K, the bench set against it and the associated two floor levels (*supra*) could be probably interpreted as the southwestern part of the south aisle of a large tripartite church.³ This hypothesis also appeared attractive because of the presence of several column drums which protrude through the surface in the area east and northeast of Trench B, and which appear to be arranged in two, E-W rows. To test this hypothesis, the approximate position of the central apse of such a church was estimated, and Trench E was laid out where the apse's northern half should be located, i.e., along the eastern outer wall of the complex (Wall C), and several meters south of Trench C (the chapel). The hypothesis proved to be correct and the trench well-placed. The uppermost remains of a large apse and walls that supported it were exposed and cleared (Fig. 9). Upon the completion of these activities, the work in the trench was stopped until the next season.

The surface of Trench E, being 5.5 m (N-S) and 2.5 m (E-W), did not display any indication of the remains below. The uppermost deposit (locus 1) featured a notably higher density of stones in the northern part of the trench vs. its southern part. About 20-30 cm below the surface, the outline of half



9. Trench E. The central apse of the church (seen from W.)

of a large apse appeared, roughly in the middle of the trench, dividing it into the southern part, being the sandy interior of the apse (locus 3), and the northern part, being the stony exterior of the apse (locus 2). Large numbers of stone tesserae and mosaic fragments especially (but not exclusively) in the SW corner of the trench were recovered in loci 1 and 3, in addition to marble fragments. The tesserae are all large and made of limestone of two colours: light bluish-grey and a creamy white hue. In addition to thick fine mortar bedding to which many tesserae are still attached, a grey mortar also appears on top of some loose tesserae or mosaic fragments, which may indicate that the mosaic from which the fragments originate had been paved over. Following the removal of locus 2 - a stone tumble ca. 0.3 m thick - the curved wall of the apse became more pronounced as well as a straight wall which runs W-E, directly behind the curvature and supporting it (locus 4 = Wall R). The northern face of the apse's back wall was covered with plaster preserved in the western part. Roughly in the middle of the wall there was an arch springer (locus 6) consisting of two ashlar one upon the other and projecting from the Wall. A coat of plaster was still adhering to the lower ashlar.

Assuming that half of the apse chord, as exposed during the excavations, well ex-

3. Warmest thanks are offered to Prof. Yoram Tsafrir, Hebrew University, and Dr Uzi Dahari, Israel An-

tiquity Authority, for their help in formulating this hypothesis.

ceeds 2.5m, the complete length at the chord would be approximately 5.5 m. So far, the church appears to be a tripartite, mono-apsidal basilica with lateral pastophoria. If so, the apse's back wall running E-W, may also mark the southern limit of a rectangular pastophorion, with a collapsed ceiling once supported by a single arch. It is also possible that the pastophorion may have been later transformed into a small side apse, but except for a very vague curve of stones inside the pastophorion no further indication of this was detected.

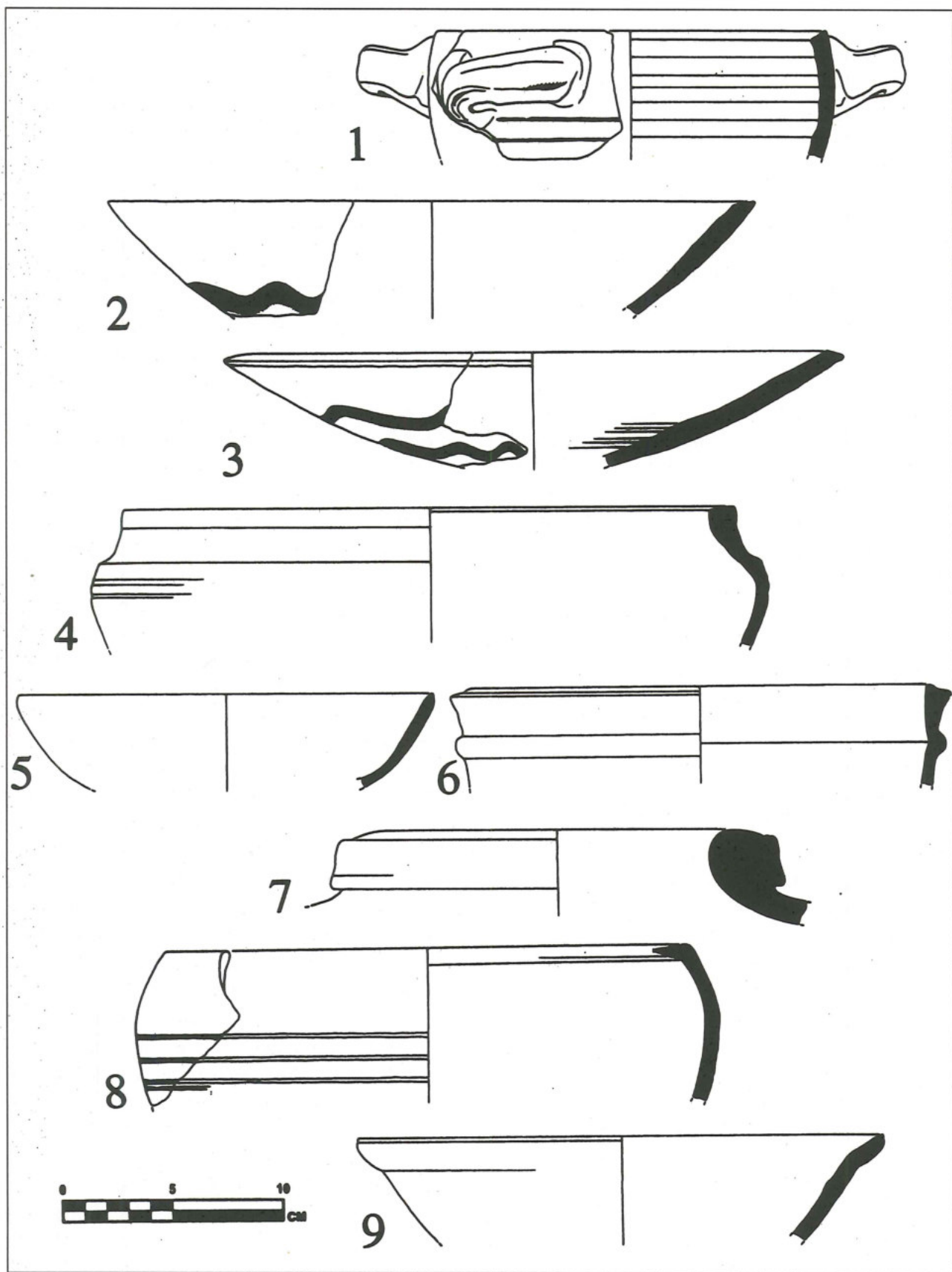
Pottery from Site 1

Although the pottery finds at Site 1 were abundant, the achieved ceramic sequences are still inadequate for the overall and precise dating of the discrete phases of occupation at the site. Stephan Schmid and Yvonne Gerber, the ceramic experts of the Swiss *az-Zanṭūr* excavations at Petra, have conducted preliminary studies of the ceramic material recovered at Site 1. While the results of their studies partially complement each other in conclusions, the differences in dating, especially in case of the commonware, are also notable. Therefore, instead of integrating these studies into one text, it appeared more instructive to publish these separately and under each author's name (Stephan Schmid and Yvonne Gerber). This experimental way of presentation has the advantage of outlining the variations and difficulties in dating of pottery from Petra and southern Jordan in general. Furthermore, it is hoped that this presentation which well reflects the still inadequate understanding of the Byzantine - Early Islamic ceramics in southern Jordan will open and further stimulate a discussion on this subject among the experts. The preliminary studies of the ceramic lamps were conducted by A. Karivieri.

General Comments

In general terms, most of the ceramic material found at Site 1 appears to date between

the sixth to the mid - eighth century AD, but the ceramic deposits found in particular strata were generally heterogeneous and Nabataean sherds were commonly found in layers which also yielded much later ceramics. This mix of Nabataean through Early Islamic material in a single stratum is not uncommon in southern Jordan, and was, for example, observed in most strata inside Byzantine churches excavated at al-Ḥumayma (Schick 1995: 326-7). Thus the precise dating of particular phases in trenches at Site 1 is not feasible at this point of time, although the future seasons should provide comparable sequences which will allow for establishing a basic ceramic chronology at the site. As such, only the most representative samples of (non-Nabataean) ceramics from Jabal Hārūn will be presented here with a short commentary. Cooking pots found at Site 1 are numerous, and the closest parallels appear to come from the late fourth and early fifth centuries AD (and possibly later) contexts from *az-Zanṭūr* (Fellmann Brogli 1996: 242ff. Fig. 730-741). Rather common in later antiquity in the Petra area is the so-called casserole, which also appears at Jabal Hārūn (Fig. 10:1). At *az-Zanṭūr* this form was found in the levels dated from the second half of the fourth century AD and later (Fellmann Brogli 1996: 257 Fig. 772-777). The *az-Zanṭūr* casseroles appear to be finer examples of that type than the ones from Jabal Hārūn but the latter has good parallels at Mādabā (Harrison 1994: 434; Fig. 3, 1. 2. 5. 6. 8; sixth/seventh centuries AD) and at 'Aqaba (Melkawi, 'Amr and Whitcomb 1994: 458, Fig. 9 b-f; seventh century AD). The same is true for the flat bowls or, in most cases, lids (Fig. 10: 2, 3), being integral parts of the casseroles. The green-glazed sherds from Trench C may be the latest ceramics occurring at Jabal Hārūn, indicating a date in the 12th century AD. However, these are few and, in general terms, the pottery from Jabal Hārūn shows little in



10. FJHP 98 - selected ceramic material.

common with what has been published as the 12th century forms from the Crusader castle at al-Wu'ayra (Brown 1987).

(S. Schmid)

In general, the pottery from Site 1 dates, with the exception of the Nabataean ceramics, Islamic glazed pottery and the Abbasid lamps, to the fourth - sixth centuries AD, and the early seventh century AD at the very latest. Comparative material from other sites in Jordan may indeed suggest a slightly later date for types similar to these found at Jabal Hārūn. However, this later date does not seem to be applicable to the material from Jabal Hārūn, as argued below.

(Y. Gerber)

Trench A

Loci 1-3 appear to contain very coarse and probably relatively late ceramics. There are also some poorly made roof tiles. Further down, however, some loci may easily represent earlier phases of use of this space. The most evident is the material from locus 20, with two rim sherds that are much finer and better fired than most of the pottery from this trench. For one of these (Fig. 10:4) a fairly good parallel can be found in Fellmann Brogli (1996: 239, 259; Fig. 783) which belongs to the phase dated between AD 363 and 419 (and later), considered a local form typical of the Petra area.

(S. Schmid)

Phases 2-4 (loci 20-21, 24, 26) have yielded the fourth - fifth centuries AD ceramics. Among the types comparable to the az Zantūr material are a crater (Fig. 10:4) published by Fellmann Brogli (1996: 258, Fig. 782) and lids (Fellmann Brogli 1996: 269, Figs. 841-842). A jar's rim, similar to one published by MacDonald (1992: 222 Pl. 24,4) is common at Jabal Hārūn but otherwise not well attested in the pottery assemblages from Petra. Phase 5 (loci 17A-B, 18-19) is represented by a relatively poor se-

quence. In particular, loci 17A and B yielded the fourth century AD material (e.g., Fig. 10:3, lid); locus 18: fourth - fifth centuries AD (Fig. 10:2, lid); locus 19: very late fourth - fifth centuries AD (with a possible extension into the sixth century). Rim forms from cooking pots (loci 18 and 19) are similar to those from az-Zantūr (Fellmann Brogli 1996: 242f. Figs. 730-732), however, the rib on the rim is not rounded but angular, a feature which is typical for cooking pots from the fifth century AD, and probably later. Phases 6 and 7 are represented by the late fourth - fifth century AD (possibly the sixth century) types.

(Y. Gerber)

Trench B

The uppermost stratum and the surface are represented by very homogeneous material which consists of coarse ware, probably late in date. However, in locus 2 there is already a considerable amount of earlier (Nabataean) pottery. Locus 7 contained predominantly Nabataean pottery of the first century AD, and one sherd dated to the late first century BC. This phenomenon may be partially related to the shallowness of the trench and the intrusive nature of wind and waterborn depositions. Besides locus 7 all the units down to locus 14 respond to the general stratigraphic picture of the monastic complex area, by yielding predominantly Late Byzantine ceramics. Exclusively earlier pottery is provided again by loci 16 and 20 although only to a limited extent. Neither will help in overall dating as locus 20 is a fill below the extant pavement while locus 16 is a fill of Wall I. Most probably, these deposits were brought in from somewhere else.

(S. Schmid)

Loci 13,14,20 of Phase 1 yielded little pottery; few sherds from there seem to date to the fourth - fifth centuries AD. Pottery from loci 2 and 16 (Phase 3) may, in fact, originate from the interior fill of the massive

Wall I. Phase 5 (locus 9) is represented by the abundance of the Nabataean fineware pottery from the first century AD, and the commonware from the fourth - fifth centuries AD. A rim sherd of a strainer decorated with the incised wavy lines on the exterior should be dated to the fifth, possibly sixth century AD. Phase 6 (locus 7) features Nabataean fineware from the first - early second centuries AD; commonware sherds, almost exclusively body sherds, are from the fourth - fifth centuries AD (with the possible extension into the sixth century AD).

(Y. Gerber)

Trench C

Although most of the material from this trench dates to the mid-sixth - mid-eighth centuries AD, there are some exceptions worth further attention. Trench C was the only area that provided green-glazed pottery. There are mainly two types, an open bowl (Fig. 10:5) and a pot with a characteristic rim. All sherds appear to represent the same production center, with a rather dark glaze on the exterior and a yellowish one on the interior of the vessel. Glazed sherds were yielded by locus 3 (2 sherds), 3a (3 sherds), and 6, 10, 15, one sherd each respectively. Undoubtedly, this pottery indicates a late date for these deposits, and this conclusion fits the the non-ceramic evidence from Trench C, which suggests a long-term occupation, including dumping and possibly squatter-like activities. Preliminary parallels to the glazed ware will include Whitcomb (1988: 212, 219, Fig. 7) and Brown (1987: 279, 284, 286, Fig. 10, 28). According to Brown, this type of glazed ware does not occur before the 12th century. On the other hand, some loci from the same trench yielded clearly earlier pottery than the other loci. These are loci 24b, c, d and e, all representing the soundings in the extant floor level of the apse/bema. Loci 24b-e produced Nabataean material from the first century AD, and the earliest sherd was found in 24e

- a small fragment dated to the later Phase 2b at az-Zanṭūr, i.e. towards the very end of the first century BC. From 24d comes also a fragmentary orange-red, well-fired roof tile, notably of better quality than its typical Byzantine counterparts. While the material from the soundings primarily represents the build-up fill, the ceramics could either be brought together with the fill or may, at least partially, belong to an unknown demolished Nabataean structure which could have preceded the Byzantine chapel in this area.

(S. Schmid)

As for Phase 1, locus 24e, together with locus 24d, consists of 8 Nabataean fineware sherds dated to the first century BC and AD, and commonware body sherds dated to the second - fourth centuries AD. All sherds from locus 24d (28 Nabataean fineware, 7 commonware), except one, date to the first century AD. The exception is the rim of a small bowl which is dated to the fourth century AD. The large fragment of a roof tile, being of a clearly different fabric (orange to light red) than other tiles at Site 1, belongs to the roof tile found in locus 25, dated to the fourth - early fifth centuries AD. Locus 24c, being the actual mortar bedding, yielded mainly Nabataean fineware sherds (first - early second centuries AD), and only a few commonware sherds (second - fourth/fifth centuries AD). Phase 2 (locus 24a-b, 29, 33) is poorly represented by only a few sherds dated to the first - early fifth centuries AD. Loci 3b,14,20 which represent Phase 4, yielded the fourth - sixth centuries AD sherds. Types comparable to the az-Zanṭūr material include cooking pots, cooking casseroles (Fellmann Brogli 1996: 257, Figs. 775-776), and lids (Fellmann Brogli 1996: 269, Figs. 841-842), all datable to the fourth/fifth century AD. The casserole body is usually plain or roundly ribbed on the exterior (Fig. 10:1). But almost all casseroles found at Jabal Hārūn have small but sharply drawn grooves on the exterior of the body (Fig.

10:8); a ribbing manner which is not known from the Petra pottery assemblages. Locus 14 material also seems to date into the sixth century AD, judging from the form and the fabric of a jug as well as the rim of a dolium (Fig. 10:7). Parallels come from al-Lajjūn (Parker 1987: 611, Fig. 120,211), dated there to the first half of the sixth century AD. Further, the body sherd of a jar, with the external fishbone-decoration, is paralleled by jars from the Petra Church (on display in the Petra Museum), dated to the sixth century AD. The Phase 5 loci (6-7, 9-10, 15) mainly yielded sherds dated to the late fourth - sixth centuries AD. Loci 6,10 and 15 contained a few glazed sherds which are attributed to the Islamic period.

(Y. Gerber)

Trench D

Despite the material being only from the surface or the uppermost strata, one sherd deserves special attention. Locus 1, yielded a characteristic rim sherd that is either a good imitation or an actual African Red Slip Ware of Hayes' type 3, the most characteristic form of the so-called Late Roman C Ware, dated to the second half of the fifth and the first half of the sixth centuries AD (Hayes 1972: 329-338, Fig. 67-69).

(S.Schmid)

Trench E

Locus 1 yielded sherds dated to the fourth - fifth centuries AD. The pottery from the northern part from the apse (locus 2) yielded Nabataean fineware from the first century AD. However, the pottery from the southern part of the apse (locus 3) should be dated to the fourth - early fifth centuries AD.

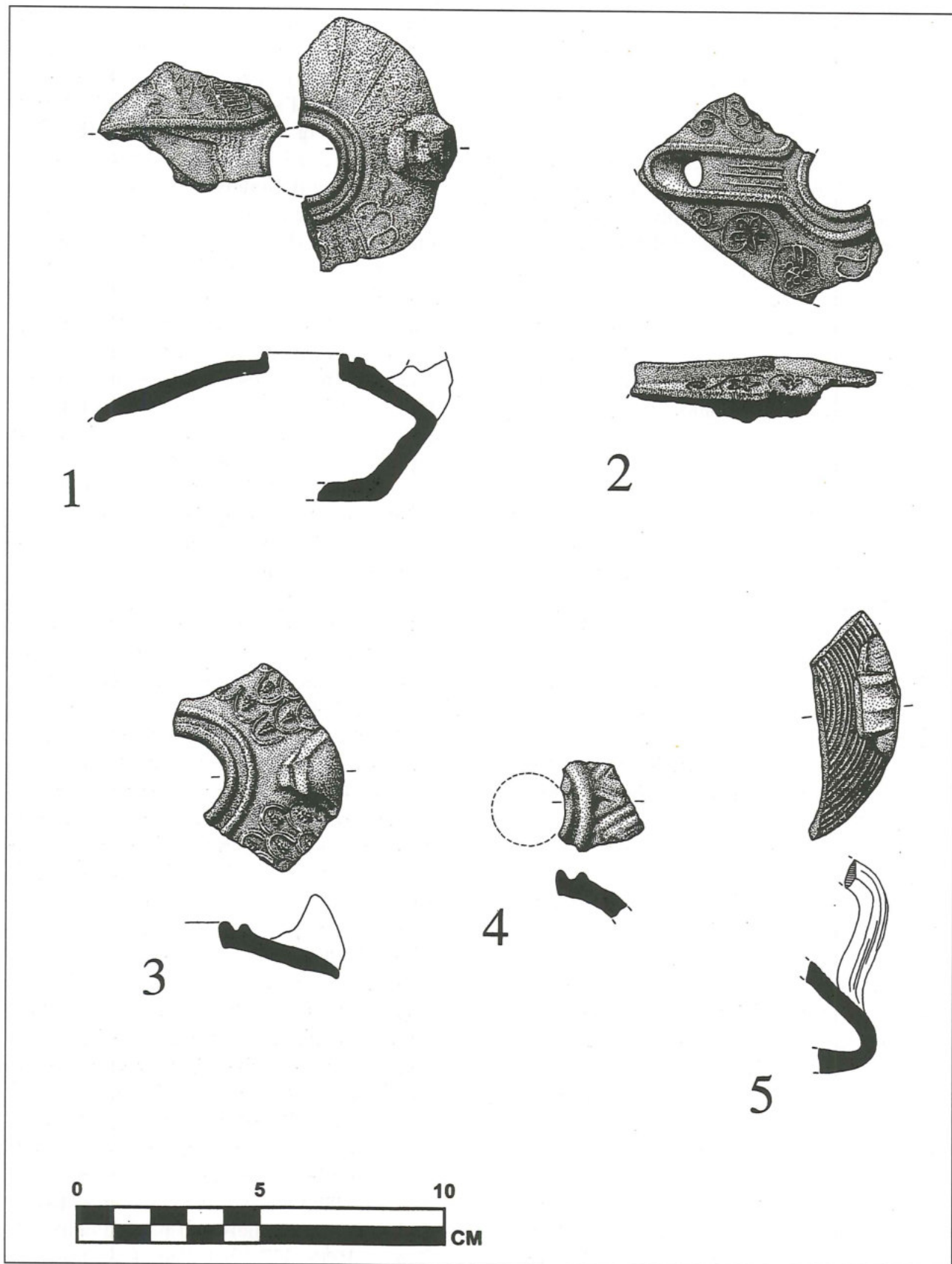
(Y. Gerber)

Ceramic Lamps from Site 1 (A. Karivieri)

These objects found at Site 1 represent the sixth-eighth century types. The three lamps from Trench B belong to the Abbasid period. Reg. No. 10 (locus 9, pail 11) can

probably be dated to the beginning of the second half of the eighth century, or slightly later (Fig. 11:1). A good parallel from Jarash includes Scholl's subgroup V lamps (Scholl 1986: 165, Fig. 1, no. 8). The lamp Reg. No. 16 (locus 1, pail 16) with a vine-scroll on the shoulder can definitely be dated to the second half of the eighth century or even to the ninth century (Fig. 11:2). The Jarash parallel is Scholl's subgroup VI: 2 (Scholl 1986: 165, Fig. 1, no. 11; also T. Scholl in M. Gawlikowski 1986: 120, pl. XIV B). The same date can also be suggested for the second lamp from locus 1 (pail 16, Reg. No. 17; Fig. 11:3). Again, the close parallel from Jarash includes Scholl's subgroup VI: 2; the type is the same but the Jabal Hārūn piece has different shoulder decoration. To this main type also belong the so-called Jarash lamps, dated to the second half of the sixth-second half of the eighth centuries (Lapp 1995: 437-8, Figs. 1,2, and 440, Fig. 7, 1-4) and pear-shaped types with a channel between the filling hole and the nozzle (Schick and Suleiman 1991: 334, Pl. V2), dated to the early Abbasid period.

The two lamp fragments from Trench C are earlier in date. The fragment from locus 14, pail 42, with a large filling hole and zig-zag decoration on the shoulder can plausibly be dated to the second half of the seventh century (Fig. 11:4). The parallel example from Jarash includes Scholl's subgroup IV: 2 (Scholl 1986: 163, 165, Fig. 1, no. 5; see also Schaefer 1986: 373, no. 20, pl. V). The fragment from the same locus but pail 48 (Fig. 11:5) is a slipped wheel-made lamp with an applied vertical band-handle. The parallel examples from Egypt were dated to ca. AD 550-650 (Bailey 1988: 232, 274-275, nos. Q 2270-2274, Pl. 56). It needs to be mentioned for the type from pail 48, that several lamps of the same type were found at az-Zanṭūr in sealed deposits dated to AD 363-419 (for parallels and bibliography, see Zaroni 1996: 327-330). Therefore, this type seems to appear in southern Jordan as early



11. FJHP 98 - ceramic lamps.

as the late fourth century and it continues onward.

Petra and the Jabal Hārūn Pottery - Preliminary Observations (Y. Gerber)

The following comparative commentary attempts to specifically relate the 98 Jabal Hārūn ceramics to the material recovered in the previous excavations in Petra. Specifically, the following projects are taken into consideration:

- the Swiss az-Zanṭūr excavations of the habitation quarter (material dated to the fourth century - first half of the fifth century AD; Fellmann Brogli 1996: 219-281);
- the Brown University Southern Temple Project (material dated to the fourth - fifth centuries AD);
- The ACOR Roman Street in Petra Project - RSP (material from the shops, dated to the fourth - sixth/early seventh centuries AD, unpublished study by Y. Gerber).

As the forms of vessels for the daily food preparation and storage appear, during the Byzantine period, to have been in use over a long period of time, and their rim forms were only slightly changed during that time, the fabric of a vessel may be a particularly useful dating indicator. A good example is provided by the rim form of a jar, already mentioned above, which was dated to the late Byzantine period in the Wādī al-Ḥasa Survey (MacDonald 1992: 222, Pl. 24,4). This type is quite common at Jabal Hārūn but was found there together with rim and body sherds which securely date to the fourth century AD, and later. Also the fabric (light red clay and a brownish slip) of those rims certainly does not restrict the date to the Late Byzantine period. In addition, the majority of the cooking casseroles from Jabal Hārūn have sharply drawn grooves on their exterior. Their fabric is identical to that of the above mentioned rims. Except for the fabric which is comparable, there are no parallels for this particular jar rim form and the grooves on the casseroles' exterior to be

found in the fourth/fifth century material in Petra. Therefore, one wonders whether these two features should be interpreted as an evidence for dating of the Jabal Hārūn pottery into the Late Byzantine period, i.e., later than the fourth/fifth century AD. However, such a late dating would be inconsistent with the fabric and the thickness of the vessels' bodies at Jabal Hārūn. For example, the Jabal Hārūn samples considerably differ from the pottery found in Shop XXVI excavated by the RSP, which can be dated to the sixth/early seventh century AD. The clay of the Shop XXVI samples is grayish to greenish in color, coarser and badly burnt, and with a dirty slip on the surface.

A possibility that the Jabal Hārūn pottery was produced in another, yet unknown ceramic center in the area, will also hardly support a proposition for the Late Byzantine date for the majority of the ceramic material from Site 1, as further objections to this date may be put forward. The form of the cooking casseroles is well known all over in Jordan. It appears already in the third century AD, and is well attested until the eighth century AD, displaying some development during these centuries. Late Byzantine casseroles, such as these from Mā'in (Piccirillo 1976: 63, Fig. 3,2b; mid-sixth century AD), Mādabā (Piccirillo 1981: Pl. 82, 33, second half of the sixth century AD), Jarash (Uscatescu 1996: 343, Fig. 73,381-383,385,388, Late Byzantine; Uscatescu 1996: 371, Fig. 101, 695-696, transitional Byzantine-Umayyad period), and Petra (Petra Church Project, on display in the Petra Museum; sixth/early seventh century AD), tend to feature horizontal handle(s) originating out of the rim, and pulled upwards. On the contrary, all the casserole handles of the Jabal Hārūn samples are attached to the body below the rim (see, Fig. 10:1).

Furthermore, except for the Islamic glazed pottery, there is no real indication that the Byzantine pottery from Jabal Hārūn should be dated later than the sixth century

AD. The only somewhat comparable vessel forms (such as cooking casseroles, *dolium*), as known in the ceramic studies, are precisely those which were produced for a specific function and were used, with only slight developmental changes, for more than 300-500 years. As such, these are not appropriate for precise dating. Except for those, no other vessel form can be easily compared with the forms from Jabal Hārūn. Therefore, the application of pottery dating as developed, for example, at 'Aqaba, Dhibān, or Mādabā, to the ceramics from Petra or Jabal Hārūn is debatable and of dubious value. While the dating of pottery from the 'Aqaba kilns (seventh century AD) may be correct, some forms known from there were already in production during earlier times, e.g., basins, cooking casseroles, 'Aqaba amphorae (Melkawi, 'Amr, and Whitcomb 1994: 457 Fig. 8p [fabric appears to be different]; 458, Fig. 9,a-e; 459, Fig. 10e). All these forms were already present in the stratigraphic context of "Spättrömisches II" at az-Zanṭūr, Petra (Fellmann Brogli 1996: 222).

This phenomenon of the longevity of certain ceramic types needs to be specifically addressed. For example, the Jabal Hārūn *dolium* rim (Fig. 10:7) is dated at al-Lajjūn to the first half of the sixth century AD. Prototypes of this rim already appear in the late third/early fourth - fifth centuries AD. (Magness 1993: 232, Fig. 3), or Late Roman period (Abū Dayyah *et al.* 1991: 375, Fig. 6,16; from Amman). All that, calls for the establishment of a standard ceramic chronology scheme specifically and exclusively based upon the well-stratified Byzantine pottery assemblages from Petra, recently recovered.

The presence of the Abbasid period dated lamps at Site 1, but not of the contemporary Abbasid pottery, is puzzling. Two lamps dated to the late sixth - eighth, and late eighth - ninth centuries AD, were found in locus 1 of Trench B, associated there with

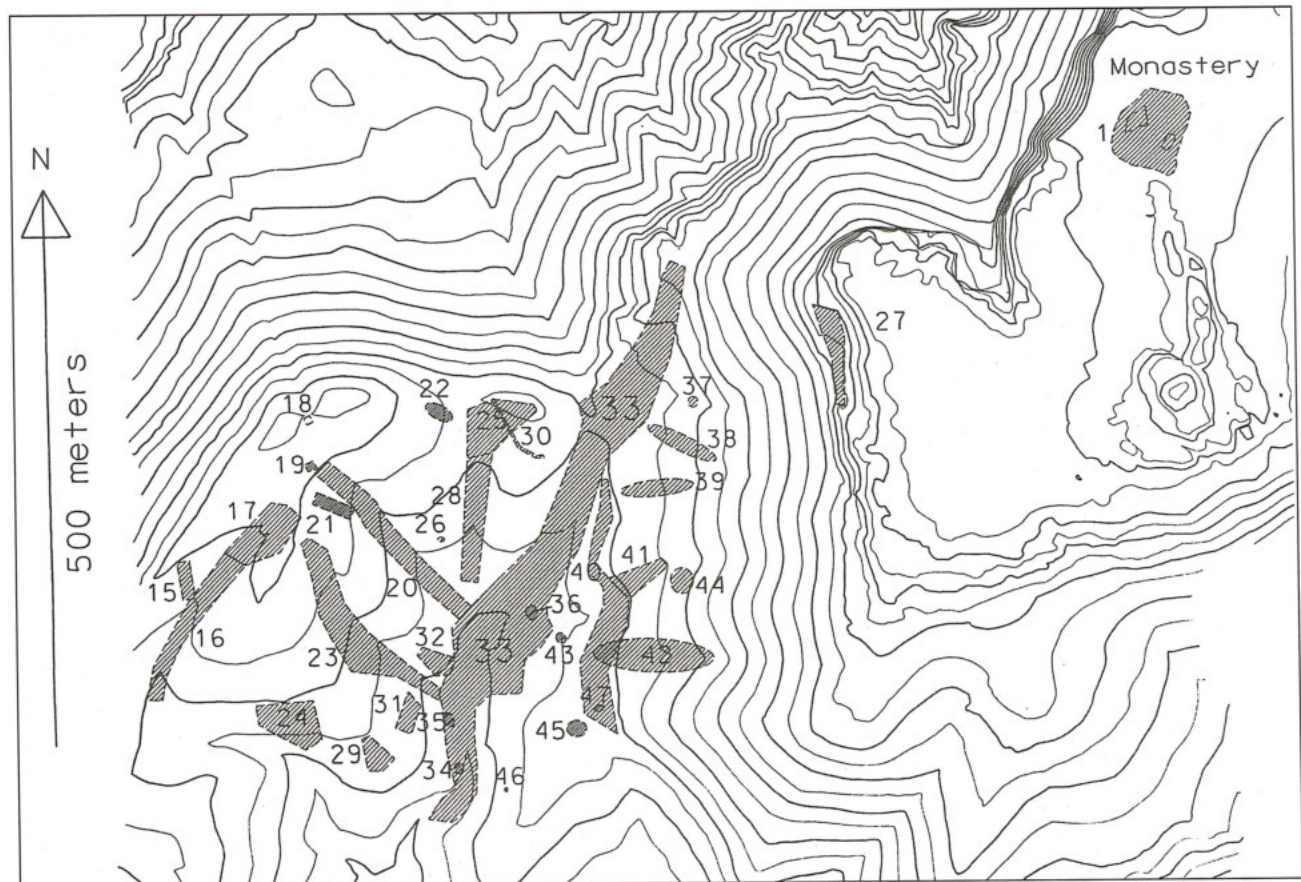
the sherds dated to the fourth - fifth/sixth centuries AD.

Another Abbasid lamp (second half of the eighth century - ninth century AD) was found in Locus 9 of the same trench. The ceramic material from that locus is not homogeneous, and its latest components would probably not date later than the sixth century. The redating of the contents of these loci to the Abbasid period on the basis of 3 lamp fragments does not appear reasonable as it would require a revision of the already established basic chronological framework of the Byzantine commonware at Petra.

Archaeological Survey (A. Siiriäinen, M. Lavento, M. Huotari, H. Jansson, S.-L. Schildt, S. Silvonen and S. Schmid)

Concurrently with the excavations conducted at the Site 1 (the monastic complex), intensive archaeological survey was conducted in the area west of the mountain, in the environs of the northern part of Wādī ar-Rubā'ī (Fig. 12). With the information provided by the 1997 reconnaissance, the following objectives were defined for the 1998 survey:

- 1) study of the geomorphology and sedimentation evolution history in the area in order to generate a model of the erosion patterns (including human influence) for the area. The study was also concerned with the general configuration of terrain and the location of major water catchment and watershed areas.
- 2) location, mapping and description of archaeological sites within the survey area and the establishment of site typology. As the 1997 reconnaissance results suggested the existence of a large-scale farming-related, interdependent water management regime in the environs of Jabal Hārūn, the emphasis was placed on the topographical description and functional analysis of installations in the area in order to fully visualize and understand the dynamics of the system.



12. The 1998 Survey Area.

- 3) collection of surface finds (both artifacts and ecofacts) for the purpose of study and the establishment of a geological chronology and the historical sequence of human occupation in the area.

The survey was conducted by walking the tracts or transects (normally, ca. 60 x 1200 m in size, with ca. 10 m intervals between the surveyors) marked on the map. Each tract was closely monitored for possible traces of human activities, and subjected to a thorough surface collection of finds. All finds were separately counted and recorded on the tract form, then subjected to further analysis. Clearly defined concentrations of artifacts, or clusters of installations/features were recognized as archaeological sites. Elements instrumental in recognition of a concentration of artifacts or a cluster of installations as a site, included: the number and nature of the surface finds, geomorphological factors or constraints (e.g.,

the location in relation to a wadi or water channel, etc.), interrelationships among the installations or structures, general archaeological context, and estimated boundaries of the site. Once a site was defined, the most important structures were described (using specifically designed forms), drawn, photographed and mapped using a tachymeter. A general site plan was made with the MicroStation program. In some cases, augerings and test pits were used to discern the stratigraphy. Surface clearance was also carried out at some sites, in order to delineate the extent of structures or installations. In total, ca. 200,000 square meters of the survey area were covered by 34 tracts, and several major sites were recorded, including ca. 130 barrages (in clusters of several barrages per each site). The following have been reported: 12 barrage and terrace wall complexes, 2 water reservoirs, 1 water channel, 4 dwelling sites, 8 house re-

mains, 1 graveyard, 1 rock shelter, 1 lime kiln, 1 watchtower, 1 storage cave, and 1 non-natural stoneheap.

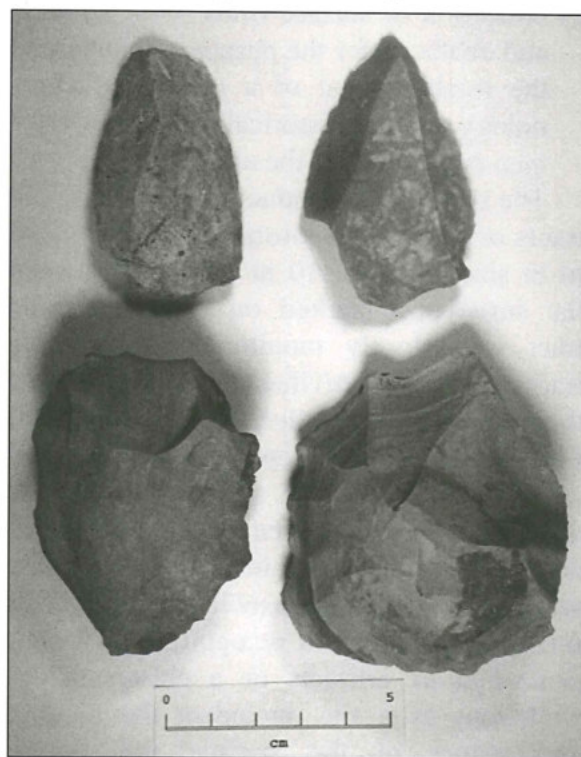
Altogether, nearly 14,000 sherds were collected, of which 5700 were considered diagnostic and were saved. Significant is the great homogeneity of the ceramic material from the survey. All sites and tracts are so strongly dominated by the Nabataean material that the other sherds - a few Roman, Byzantine and Ottoman - do not play any role in statistical analysis. According to the terminology and dating developed at az-Zanṭūr, Petra (Schmid 1996: 151-218), all of the saved Nabataean pottery from the survey belong to Phase 3, lasting from ca. AD 20 to the beginning of the second century AD, (more precisely, phase 3a and 3b). Even in the few cases of pottery of phase 3a, these seem to date rather to the later part of that sub-phase and therefore into the third quarter of the first century AD, while the second quarter of that century is not represented. As such, the overwhelming majority of the pottery from the survey belongs to the third and fourth quarter of the first century AD with a few earlier and later exceptions.

A total of 1296 lithic artifacts were found. Although isolated artifacts were quite numerous, only one certain and two possible sites were recorded on the basis of the spatial distribution of the lithics. Most of the material found is surface scatter, which has been exposed and moved horizontally by erosion and weathering. It seems that at the eastern limits (=western slopes of Jabal Hārūn) of the surveyed area, lithic material is more scarce than at the western limits. The southwestern part of the surveyed area was also generally lacking in lithic material, site 17 (*infra*) being an exception. The raw material for the lithic implements is only partially of local origin. Many artifacts are made of chert and flint that are abundant all over the survey area but other lithics were of almost black or greyish flint, which must come from some unknown location outside

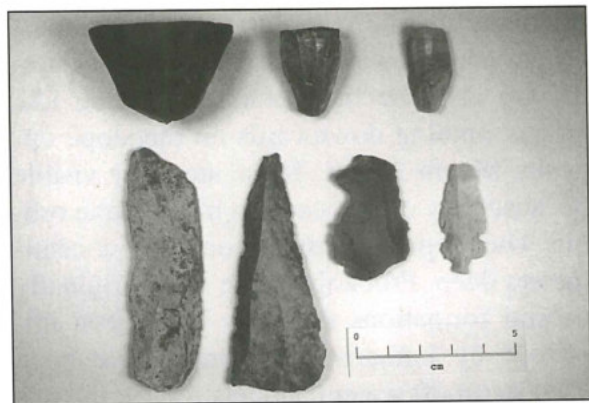
the survey area. The typological studies of the material are still in a preliminary phase, but some observations can be made. The oldest artifacts belong to the Middle Palaeolithic Levallois industry types, exemplified by the very frequent Levallois blade-flake (Fig. 13). Closely parallel material has been found at several sites in Jordan, i.e. Ṭor Şabiḥa, Rās an Nyasi and 'Ayn Difla (Henry 1988: 12- 13; Schyle and Uerpmann 1988: 42; Clark *et al.* 1997: 85). Lithic artifacts dating to the Early Neolithic or possibly later, are also present. A small survey conducted around the monastic complex at Jabal Hārūn yielded a fragmentary microblade core and an arrowhead. Similar Khiamian type arrowheads have been found in Bayḍa and Şabra and can be dated to the early Pre-Pottery Neolithic period (Fig. 14) (Müller- Karpe 1968: 101; Gebel 1988: 78-80).

Topography and Geomorphology of the Wādī ar-Rubā'ī

The following remarks help to understand



13. Levallois flakes and cores.



14. Upper row: Microblade cores. Lower row: Khiamian arrowhead, notched piece, blades.

the nature of the human land exploitation of the area. It needs to be stressed that the average rainfall in the Petra area, including the environs of Jabal Hārūn, is only about 150 mm/year (SWC 1966: 53). The sedimentation is episodic, occurring only for a short time during the rainy season. Heavy thunderstorms and highly erosive rainfall have a catastrophic effect on soil surfaces and sedimentation structures since soil formation requires stable conditions during centuries or even millennia. Generally, the average rainfall, the nature of the bedrock, the rate of alluviation, the grain size of the surface deposits, and even local vegetation influence the soil formation (Gladfelter 1992: 178-180). The soils in the survey area are Yellow Soils, which occur in the environment where average rainfall varies between 100 and 200 mm. The absence of well-developed soil profiles indicates that the rate of pedogenesis is surpassed by the rate of sedimentation; erosion and accumulation are quicker than soil formation. The permeability of the soil is weak, which means that it retains only a small amount of runoff water (SWC 1966: 5). The soil also contains only a small amount of organic matter.

The Wādī 'Arabah-Jordan Graben belongs to the very long fault system stretching from East Africa to northern Syria (Bender 1974: 25). Local tectonics make the bedrock very variable and the contacts between different sedimentary units are very

deep. The bedrock of the area surveyed during the 1998 season can be divided into four separate lithological sections, two of them representing Ram Sandstones, two others belonging to Limestones and Volcanic rocks. The bedrock of the upper plateau of Jabal Hārūn is the red Umm 'Ishrin Sandstone of Ordovician-Cambrian Era. The lower terraces and the eastern slope of the Wādī ar-Rubā'i, including the steep slope of Jabal Hārūn, are the Abū Khushayba Sandstone of Cambrian Era date, which is stratigraphically older than the Umm 'Ishrin Sandstone (GS 1992: lithological map). The sandstone is formed of fine or coarse sand that contains a considerable number of roundish concretions which make the sandstone fragile and easily weathered. The bedrock displays parallel or nonparallel structures, cross-bedding, etc. (GS 1992: 7; Reineck and Singh 1980: 22-130). In the northernmost corner and the southeastern part of the area, there are red volcanic rocks which belong to the Bayḍa' Quartz-Feldspar Porphyrites dated to the Late Proterozoic Era, thus representing the earliest stratigraphical sedimentary unit in the area (GS 1992: 5).

Limestone in the survey area is yellowish brown or brownish yellow, with only a few exceptions. The predominant limestone type in the area is the Wādī as-Sir Limestone, which was deposited during the Late Cretaceous Era (GS 1992: lithological map). The limestone area contains some three of four small hills (ca. 15 x 15 x 2 m in size) indicating a different kind of sedimentary environment. These formations represent the Wādī Umm al-Ghudrān Limestone, which is stratigraphically more recent than the Wādī as-Sir Limestone (GS 1992: lithological map). The Fuhaus/Hummas/Shu'ays Limestone on the northern side of the survey area is also stratigraphically older. The separation between the Wādī as-Sir Limestone and the Umm 'Ishrin Sandstone is very sharp and easy to discern in the field. The nature and workability of these rocks also differs con-

siderably, which is easy to see in the size and structure of the water installations. The larger and higher installations have been built of sandstone blocks, the smaller ones of limestone. Volcanic rocks have not been used in construction. Flint and chert nodules also occur in the local bedrock in limestone. High-quality black flint or obsidian does not seem to appear in the survey area, but low-quality chert is available almost everywhere in the limestone bedrock.

The amount of alluvial deposits in the 1998 survey area is small for two reasons. The topography in the valley is relatively steep and does not favor the deposition of alluvial sediments. More importantly, the nature of water movement during the rainy season is chaotic but violent. Water washes fine particles away, leaving only coarse sediments to be deposited. Alluvial sediments occur only sporadically in the valley of Wādī ar-Rubā'ī and can be almost exclusively found in connection with human-made barrages or terrace walls. This fact illustrates the significance of the large-scale construction of water installations: without these systems it would have been impossible to carry out cultivation in the valley.

Mount Aaron rises to the northeast and east of the valley. On the valley bottom, below the mountain slope, there is a talus formation consisting of large boulders, stones, gravel and sand. The sandstone bedrock at the foot of the slope is rapidly eroding, producing new alluvium, which, however, is soon washed away by seasonal floods. It is striking that the grain size of the material in the sandstone bedrock is much coarser than in the gently sloping limestone bedrock on the western side of the valley. This is a result of the hardness of sandstone in comparison with the limestone bedrock. The sandstone cleaves in form of large blocks from the cliff creating a steep slope below the topmost vertical cliff. Four alluvial fans run into the valley of Wādī ar-Rubā'ī, all filled with large boulders. Because of the steep

gradient, all fine material, including almost all gravel, had washed downwards. Of interest are also the light features looking like stripes running downwards on the slope opposite Mount Aaron. These are quite visible because they do not contain much stone rubble. The stripes are usually only a few centimeters deep. Probably, these were originally natural formations that may have been improved by humans. They may have been used as runoff water channels. As for the micro-morphology of the soil surface, there are small geomorphological structures which are partly erosion structures, that have been caused partly by animals, e.g., resulting from the trampling effect of sheep and goats (Homès-Fredericq *et al.* 1995: 62). A closer look reveals micro terrace walls, about 20-40 cm wide and about 5-10 cm high. This micro-terracing can be explained by the activity of sheep and goats moving around in search of vegetation for food, and creating a great number of paths and tracks. They can also be caused by material sliding downwards together with rainwater.

Water Management Sites

The majority of the structures and installations located and recorded included barrages, or wall-like "steps" built across the main wadi and its tributaries (e.g., Fig. 15). These served to slow down the rapid runoff water, allowed for the deposition of fertile silt in farming plots between two neighboring barrages, and helped to redistribute excess water into the neighboring fields located on the lower slopes of the wadi. Since the barrages hardly exist as single installations, these were defined and recorded here as barrage sites (complexes) being purposeful clusters of interrelated walls built across a wadi or its tributary. The size and structure of barrages vary according to their place in the water management system. Barrages are smallest in the uppermost tributaries and the largest in the lower part of the main wadi since the water strength is the



15. Tract 24, Site 33.
Barrages built
across the wadi.

greatest there. The latter are solidly built and can be as large as 20 m long and 5 m thick. Water channels are often found in association with barrages, which lead water into smaller tributaries, water reservoirs, or irrigated fields nearby. At the foot of the northeastern most fan, several massive barrages have been built, one of which ends at a circular cistern carefully manufactured of large blocks (Site 36). Over 130 barrage walls and approximately 30 terrace walls connected to the water installations were recorded during the survey, although many, being in a poor state of preservation, are difficult to define or can be easily confused with naturally deposited heaps of stone. At any rate, they all form a carefully planned and uniform system, which might have been utilized during several different periods. Most probably the system was built during the Nabataean period and then continued throughout the Byzantine period. In the Middle East and Africa these rainwater management systems directly related to irrigation farming were extensively used in both the past and the present times (Stevens 1941; Kedar 1957:179-189; Mayerson 1962: 231-246; Zohary 1954:20-21).

Small-scale test pits and surface clearance were utilized in some places to obtain details concerning the function of the water

guiding and controlling systems as a whole. For example, a clearance was conducted at the eastern end of a barrage situated in the middle of site 33e. A step-like installation (ca. 3.15 x 2.92 x 1.92 m), which runs perpendicularly right through the barrage, was skillfully built of unworked slabs. Two phases of construction and use could be distinguished. The actual steps, heavily eroded by water, must be contemporary with the barrage and were clearly constructed as part of it. Probably, the steps functioned as a water channel, slowing down and controlling the flow of the water over the barrage, perhaps in addition to being a kind of maintenance stairway. At the same end of the barrage as the steps, there is a higher barrier wall, running perpendicular to the main barrage. Because the barrier wall prevented water from running down to the wadi on that side, some kind of water channel to evacuate an excess of water was probably built there. At the second phase, a wall was constructed on the lowest step, probably to plug the lower end of the water outlet. Later, the construction was filled with rubble, intentionally or as a result of erosion. Site 42 also contains a similar, but smaller, step-like construction. It is also situated at the end of a barrage bonding to a higher and perpendicular barrier wall. These type of struc-

tures have also been documented in the Negev (Evenari *et al* 1971: 104-109).

At the southern part of site 33e, a barrage had been cut in two by the heavy erosion in the area. The eastern part of the barrage contains a construction made of horizontally placed slabs. In the western part of the barrage, three steps could be observed. The construction could have functioned as a water channel, guiding the water over the barrage in a controlled way. This hypothesis was supported by the fact that the construction clearly slopes in the direction of the current during the rainy season. Some constructional details were observed in the section that was formed when the middle part of the barrage had eroded away. Apparently, two parallel walls were constructed first and then the space in between was filled up with coarse rubble, making the entire construction ca. 5 m thick. When the section was cleared for documentation, a Nabataean potsherd was found in the filling, dated to the later first century AD. Since the steps clearly continued into the alluvium along the lower side of the barrage, a profile was excavated in order to study the sedimentation of the alluvial deposits and collect macrofossil samples. Furthermore, eight steps were uncovered integrated in the western (downstream) face of the barrage wall (Fig. 16). The steps are narrow, extending for only about 30-40 cm from the wall into which they are bonded. Upon reaching the lowest step and the bottom line of the barrage, it was observed that the lowest step had been constructed on a hard clay surface. The barrage is located at the lower end of a large intersection area, which is probably the center of the whole agricultural area of the valley. Just upstream of it, several tributaries join the main wadi. The barrage with the stairs is situated exactly where the intersection area narrows down and where a great amount of water and energy would have concentrated. Therefore, this place could possibly have functioned as a water-



16. Tract 33, Site 33. The barrage wall with the associated flight of steps.

collecting place, with the steps leading down to the water table, and the water channel. The position of the channel at the top of the barrage, forming a kind of threshold for the water, helped to filter at least the largest particles from the water running over the barrage. Approximately 10 m below the barrage with the steps and channel, there is another, equally massive barrage. This may indicate the existence of some kind of an open water reservoir between the two barrages.

Other Sites

To provide a good sample of the infrastructure located in the valley, some representative sites are briefly described here. Site 17 is located in the northern corner of tract 4 on the western side of the survey area, more specifically, on a plateau between two ridges. Site 17 is one of the few places in the survey area suitable for a dwelling site, and the finds indicate that there have been at least two periods of use. The site is 63 m long and 15 m wide in the western part, but it widens up to 51 m in the east. The extant surface artifacts indicate that it was a domestic occupation site, with a dense concentration of ceramics and flint and chert implements and flakes, as well as remains of hearths. A total of 184 lithics were collected within quite a small area, most of these being blade-flakes probably of Middle, Upper and Epipalaeolithic date (Henry 1988: 12-13; Schyle and Uerpmann 1988: 42), and

perhaps a few Neolithic artifacts, too. More than 1700 sherds were recovered, mostly Nabataean fine and common ware dated to ca. AD 20- 70/80. Site 17 also contains two small stone cairns that may be burials. The first is 2.3 m long (SW-NE) and 1.2 m wide (W-E), and the second cairn is 1.7 m long (S-N) and 0.8 m wide (E-W). However, the nature and function of these structures can be fully determined only by excavations. The stone cairns may also relate to a Bedouin camp or other temporarily dwelling activities, although the stones do not seem to be burned and no ash or charcoal was found. Hand augerings were carried out in the middle of the plateau where Site 17 is situated, indicating a soil layer of ca. 0.25 m. No clear cultural layers were observed and the stratigraphic disposition cannot be determined without excavations.

Site 29 is situated in the southeastern corner of tract 18. The main structure is a stone rectangle, ca. 18.5 m by 11 m. It is constructed of carefully laid large stones and boulders without mortar, forming a low wall around a platform. No paving could be detected on the surface of the platform. The upper part of this structure contains the remains of a small hut, approximately 3 m by 3.5 m in size. There are three natural formations in the bedrock, which could have been used to guide water towards the structure. A few lithics and a number of pottery sherds, mainly Nabataean common and fine ware, were found at the site. An interpretation of this site, whether a reservoir, a threshing floor, or an enclosure for animals (the latter probably being a secondary function) is not easily forthcoming.

Site 32 is situated on tract 21 by the main wadi, and it contains two structures. An oval structure formed by a partially collapsed wall, is made of piled stones and is 21 m long and 8 m wide. There are also remains of a small, collapsed building or hut, made of stone slabs. The finds include some lithics, and over 500 ceramic sherds, mostly

Nabataean coarse and fine ware (ca. AD 20-100), and probably Ottoman. The site was probably an animal enclosure with a small shepherd's hut, as the walls are quite high and there seems to be an opening or a doorway. However, that function may be secondary.

Site 24 is situated on tract 14, on the southwestern slope of the border wadi of the 1998 survey area. It contains a well-built circular structure, ca. 5.2 m in diameter and at least 1.2 m deep. The structure is most probably a lime kiln. Inside the structure on the western side, there is a small stone installation with one large block resting on top of two slightly smaller ones. This installation could have been an integral part of the kiln, through which air was blown into the kiln to maximize heat, but it also could be a later addition of unknown purpose. There are signs of possible secondary use: an additional structure has been built on the southern side of the circular structure. The finds from the site were quite scarce but they included late Ottoman commonware.

Site 37 is situated on tract 28 on the northeastern side of the survey area, at the foot of the northernmost tributary running down from Jabal Hārūn. The main structure at the site is a round stone structure, most probably a cistern, made of large ashlar laid in regular rows. The cistern is about 1.5 m in diameter, with an undetermined depth. Stones with slightly concave sides were used in the mouth of the cistern. There is a semi-circular stone construction around the mouth of the cistern and fully integrated with it, which includes a two-stepped bench. The tributary near the cistern contains two ruined barrages made of exceptionally large blocks of stone. The site might have had a special purpose, and its association with water would not exclude a cultic character. Only a few indistinguishable pottery sherds were found there.

Site 27 is situated in the northeastern part of the survey area, on the northwestern side

of Jabal Hārūn, approximately 15 m above the steep slope strewn with the stone blocks which eroded away from the bedrock. It consists of a series of terraces, ca. 120 m long and ca. 2 - 20 m wide, which are situated under the steepest part of the cliff. There are several rock shelters running N-S on the terraces along the side of the mountain. The site has been divided into 5 sectors (a- e) according to the natural borders of the terraces. Surface collection included pottery and lithics, with sector c being the most abundant in finds. Therefore, the exploration concentrated on this sector, especially in the main rockshelter there. The maximum depth of the sediment in the southern part of the rockshelter was about 1 m. The sediment there consists of silt eroded from the roof of the rock shelter. A test pit of 0.4 x 0.4 m was dug about 1 m from the wall, which, however, yielded only a few finds. At a depth of 10 cm, there was a layer of goat droppings, about 5-7 cm thick, which indicates that the place has been used as a shelter for animals in recent times. At the depth of 45 cm, two potsherds were found, probably dating as late as the 16th to 19th century. Only one chert flake was found at the depth of 50 cm. Since the lithics cannot be definitely dated, the two sherds may indicate that at least the later occupation of the rockshelter may be relatively recent. It is known that lithic artifacts were produced and used by pastoralists in the Petra area even in recent centuries (Simms and Russell 1997: 470). The finds from the outer edge of the terraces, especially the Byzantine potsherds, could have washed down from the top of the mountain.

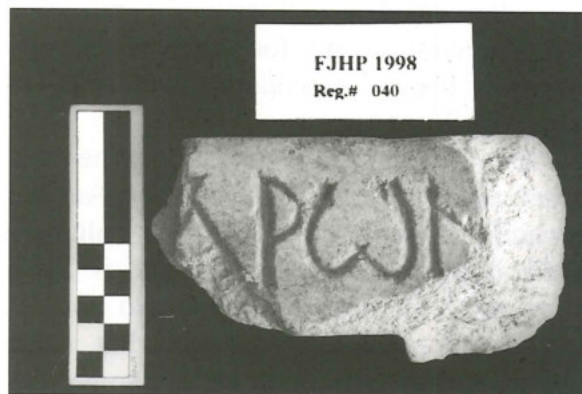
Small Finds (J. Frösén and J. Lindblom)

In addition to the aforementioned activities, the archaeological team has collected all marble fragments from the area around Site 1, and deposited these in the lapidarium inside the site. All architectural stones (door-jambs, column drums, etc.) which were recovered through the excavations,

were marked and deposited in the lapidaria inside Site 1. The project took care that all excavated debris (soil, rubble, ashlar) were orderly and properly deposited in two areas outside the monastic site.

The most interesting find of the 1998 season was a corner fragment of the rightmost piece of a white marble orthostat (Reg. No. 40), which preserves the end of a Greek inscription (Fig. 17). The fragment was found in Trench C (*supra*). The fragment measures 15.5 x 8.5 x 7.7 cm. The height of the letters is ca. 4-4.5 cm. The height of the horizontal part of the corner is 7 cm, while the width of the preserved vertical part on the right is 6 cm. On the right upper edge, there is a carved hole which appears to be made for joining with a connecting marble piece. Thus, the last visible letter of the fragment is probably also the last letter of the whole inscription. The letters are well cut in sharp grooves, based on traditional forms, with sherifs, featuring alpha with dropped bar, oblongated rho, and cursive omega, all paleographically datable most probably to the sixth century. The text reads ...]APΩN, most probably 'A]αράων, the name of Aaron (in genitive?).

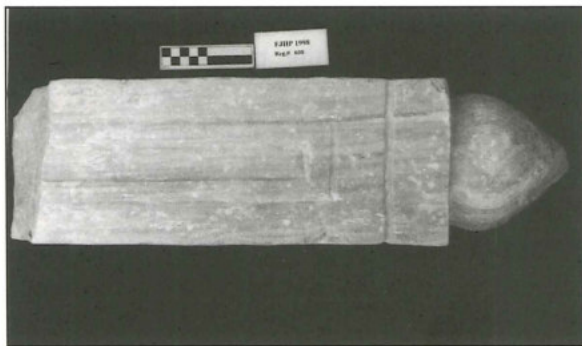
Floor mosaic stone tesserae were found in Trenches A and B but the majority of tesserae came from Trench C. There, several loci contained clusters of tesserae, but generally, almost half of all stone tesserae found at the site in 1998 came from the lowermost shelf of the cupboard located directly south of the



17. The ...]APΩN inscription.

chapel's apse. The average tessera was usually cubic, ca. 2.5 - 3 cm on each side. Two small gold-plated glass tesserae were found on the surface of Site 1, and five glass or small coloured stone tesserae came from by the excavations in Trench B. Only a small number of metal objects, mostly unidentified fragments, were found. Some iron nails were found in Trenches A to C, and copper alloy nails in Trench C. The bone material from the site, primarily from Trench B, was predominantly fish and chicken. A considerable amount of painted plaster was recovered from Trench C, especially in the area of the apse.

As for the stone objects, marble was abundant and included broken fragments of paving slabs, tables (altar?) and stone vessels. An outstanding find was a marble post which must have supported a chancel screen (Fig. 18). The post is ca. 60.5 x 17.5 x 13 cm; the bottom part of the shaft was broken off. The post was recovered from the western baulk of Trench C, in an upper tumble layer. The post belongs to a very well known type of a square or rectangular horizontal section, vertical grooves, and crowned by a bulbous pointed finial. Examples are numerous from Byzantine churches in Palestine, e.g., from Shivta/Sobata (Segal 1988: 252, 255). A post of the same type was also recovered from the mosaic-decorated church in Petra, where it was dated to the early sixth century (Fiema, forthcoming). Furthermore, during the clear-



18. The chancel screen post uncovered in Trench C (the chapel).

ance of wall tops in the area directly north of Trench C, two fragmentary sandstone relief panels were discovered just under the surface. The material was very fragile and flakes of the sandstone easily peeled off. One panel, ca. 51 x 53 x 4 cm (in four fragments) features a peacock in profile, executed in a shallow relief. The other panel, ca. 60 x 30 x 6 cm (in two fragments) most probably features the lower part of an eagle (wingtips and claws) in a frontal position. The peacock is a well-known symbol in Christian iconography, symbolizing spring-time renewal, paradise, and redemption as well as being used to represent the many-eyed wings of Seraphim, Cherubim and Archangels (Weyl Carr 1991: 1611-12). A lintel with a peacock relief was found in the mosaic-decorated Church in Petra, recently excavated (Fiema, forthcoming). The panels at Jabal Hārūn might have been decorative orthostats or screens in the church or the chapel, which later were apparently reused to reinforce the walls.

Of all glass fragments recovered during the 1998 campaign, over 2/3s came from Trench C. Among the registered objects (Reg. No. 29, locus C.19 and Reg. No. 036, locus C.6) are two fragments of the same glass vessel with pinched diamond-shaped ribs as a surface design, which seems to be typical of the second to the fourth centuries AD (von Saldern 1980: 20-21 and Pl. 4.; Weinberg and Goldstein 1988: 80-81 and Pl. 4-15). The third registered glass object is a solid, blue-beaded stem (Reg. No. 28, locus C.19) belonging either to a goblet or a glass lamp, known as Jarash B.1 type (Crowfoot and Harden 1931: 198 and Pl. XXIX; von Saldern 1980: 59 and Pl. 12.). Among non-registered fragments there is a rim of a small "pillar-moulded" bowl, possibly from the first century AD (von Saldern 1980: 12 and Pl. 2; Stern 1977: 25-30 and Pl. 3; Barkóczy 1996: 26, 117, and Pl. B, II, XXIV, XXXVII, LXXIII). Among other distinctive pieces are some five fragments of a mould

blown vessel with a string of concentric circles in shallow relief. This design is probably related to the Byzantine products dated to the seventh-eighth centuries AD, but could also be earlier. Nearly ten fragments belong to a vessel with engravings. The closest parallel at this time appears to be a fragment from the excavations at Saraçhane in Istanbul, where it is identified as 16th century Austrian glass (Hayes 1992: 344, 412 [No.11] and Pl. 52h). All the fragments mentioned here were found in Trench C. Some fragments of window panes were also found in the same trench; not only transparent but also at least one dark green window glass and some yellow pieces. Four stems of glass lamps (one solid with a knob and three hollow) of a type often used in polycandela and many possible rims and handles of such type were also recovered, mainly in Trench C, but also some in Trenches A and B.

Conclusions

The 1998 fieldwork of the FJHP has produced important results which will be instrumental in designing the excavation and survey strategy in future seasons. Important is the discovery of a large tripartite basilican church at Site 1, the remains of which were detected in Trenches B and E. The church's size is approx. 24.2 m x 14.2 m, with a single central apse measuring ca. 5.6 m at the chord, and lateral rooms, probably pastophoria. The later insertion of side apses is not impossible either but cannot be ascertained without further excavations. Compared with the size of the mosaic-decorated church in Petra recently excavated and dated to the later fifth century AD, which is internally ca. 23.21 m long and ca. 15.35 m wide (Fiema, forthcoming), the Jabal Hārūn church is of similar dimensions, thus the ratio of the inner length to inner width, being exactly 3 : 2 in case of the Petra church, will not be much different in case of the Jabal Hārūn church. Incidentally, this length to

width ratio is quite typical of earlier churches in Palestine (fourth-fifth century) characterized by long and relatively narrow aisles (Crowfoot 1941: 54, 61; Smith and Day 1989: 84). It is also usually accepted that basilicas with an inscribed central apse and quadrangular lateral pastophoria are relatively early, and, for example, generally dated to the fifth century in Syria (Butler 1929: 48-82). One should also examine the comparable monoapsidal churches at Humayma (Schick 1995), which, in addition to the Petra church in its earliest phase, may be the closest spatial and temporal parallels. Examining the plan of the site, it is possible to discern traces of a structure to the west of the church which might have been a narthex, probably associated with a portico (judging from the traces of a "stylobate" and extant column drums there). The entire area farther west (Central Court) might have been an irregular atrium with the rock-cut cistern (see Fig. 2). Again, such an arrangement would have been similar in components to the appearance of the Petra church in its earliest phase. However, while the fifth century date for the Jabal Hārūn church is not improbable, it should be considered only as a working hypothesis until further excavations provide a firm date.

Of interest is also the chapel, directly north of the church, which may be contemporary with the church or added later. Arguments can be produced for either of these hypotheses, so the answer will be provided only through future excavations. The small compartment inside the masonry pedestal uncovered in the chapel might have served as a depository for reliquaries. If the pedestal was indeed a base for an altar table, the location of a reliquary below the altar would make it accessible and would allow for its display on various occasions. This would be generally consistent with the practices observed in *Palaestina I, II and III* and *Arabia* during the Byzantine period (Donceel-Voute 1995: 198-200; 1996: 328). Al-

though in this particular case the reliquary would not be located in a shaft or fosse under the structure of the altar on the bema (e.g. at Umm ar-Rāṣaṣ, see Alliata 1994: 312-14 and Michel 1994: 117, 119, note 15), but rather under the altar table. The reason for that may be a relatively high level of the bed-rock under the chapel and a shallow buildup for the floors of the bema and the apse's floors. The construction of a solid masonry altar structure only in Phase 2 of the chapel's existence may also well correspond with the chronological observations concerning portable vs. fixed altar installations. Recent studies indicate that the fixed altar installation appears relatively late in the sixth century, and only at the end of that century special panels or mosaic arrangements clearly marked the emplacement of the fixed altar's supports (Duval 1994: 170, 203).

The discovery of a large church with an associated chapel at the architectural complex below the summit of Jabal Hārūn may also be significant with regard to the overall function of the complex and the nature of occupation there.⁴ Basilican churches are very rare in the monasteries of the Judaeen Desert (Hirschfeld 1990: 63-65, Site 57; 1992: 130). Furthermore, it may be relevant that the rooms around the northern court of the complex appear to be relatively large in size; almost twice the size in comparison with known cells in some Judaeen Desert *coenobia* (Hirschfeld 1992: 176-7). Perhaps, these could be interpreted as pilgrim hostel rooms rather than monks' cells. While the monastic complex hypothesis is certainly still upheld here, it is possible that the complex represents a pilgrimage center related to the veneration of St. Aaron and most probably associated with the monastic presence. Again, this proposition remains highly hypothetical at this stage of the archaeological

exploration of Site 1. In fact, the Jabal Hārūn complex may resemble a monastic complex type (always a *coenobium*) usually erected next to a memorial church which generally served the needs of pilgrims coming to the holy places. The *coenobium* type, being reminiscent of late Roman agricultural estates, was a self-sufficient complex (Hirschfeld 1992: 33, 55-58), which appears to hold also in case of the Jabal Hārūn complex. Probably, monks could also have lived in caves nearby, or in smaller structures located on the plateau or in the valley below.

Undoubtedly, the lack of literary evidence specifically mentioning pilgrimages to the Mountain of Aaron, either performed by Christian Arabs (Shahid 1998: 375-7) or foreigners is disturbing, while the neighboring Negev certainly benefited from the pilgrim traffic to Sinai (Figueras 1995). But since one of the three main itineraries to Mt. Sinai would lead from Syria, first to Ayla (Maraval 1995: 295), possibly on or following a general course or some sections of the *Via Nova Traiana*, detours to Jabal Hārūn could have been made. It is imperative that the main goal of future seasons at Jabal Hārūn is to determine the nature of occupation from the archaeological standpoint.

As for the survey results, it is significant that the collected ceramic material extensive agricultural installations in the valley (a task which will be continued in the following seasons) revealed that the irrigational agriculture was particularly prominent in the area between ca. AD 50 and the beginning of the second century AD. This would fit well the previously made suggestion that the irrigational systems for terrace-type agriculture in the neighboring Negev particularly increased in use during the reign of Rabbel II (Bowersock 1983: 73). As no later pottery than that dated to the very early second century AD was found, this could lead

4. The remains under the *weli*, whether or not of a Byzantine church, cannot enter the discussion

here, as no detailed archaeological exploration is possible there.

to a preliminary conclusion that following the annexation of the Nabataean Kingdom by Rome, the agricultural production in the Jabal Hārūn area had, for unknown reasons, (temporarily?) dwindled. It is also not without significance that the predominantly Nabataean ceramic material yielded by Site 1, exactly fits the ceramic pattern obtained in the survey, i.e., the ceramics in both areas cover the same time span.

It is definitely too early to propose any chronological assessment of the history in the excavated and surveyed areas. However, the Byzantine period apparently witnessed a revival or continuation of the intensive farming in the valley, and obviously a major expansion on the mountain's plateau, exemplified by Site 1: the church, the chapel, and the associated structures. Significantly, two major phases of occupation in the church (Trench B) and the chapel (Trench C) could be easily distinguished. However, it is not feasible at this time to propose a firm date for the construction of the architectural complex and its components, nor for their abandonment or destruction. Further refinement of the Byzantine period pottery from the Petra area, as discussed above, and new ceramic sequences at the site will be needed to conclusively address these issues. Thus, while there seem to be little doubt that the intensive occupation at Site 1 took place during the fourth-sixth centuries AD, a more substantial and firmly dated evidence for the post-sixth century occupation remains to be discovered. Judging from the presence of the glazed ware and Abbasid lamps, as well as indicated by the extant written sources, the occupation would have continued in some form in the following centuries, possibly until the Islamic *welī* was constructed at the top of the mountain's summit. However, the nature, intensity, and duration of the post

sixth century occupation at Jabal Hārūn cannot be fully ascertained at this moment. In any case, this situation holds great promise for the investigation of the transitional Late Byzantine - Early Islamic period in the Petra area in the forthcoming campaigns at Jabal Hārūn. Furthermore, the project will be able to explore a unique opportunity to test historically derived postulates against the archaeological reality at Site 1.

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CATALOG OF ILLUSTRATED CERAMICS

- 1) Trench A, locus 1, pail 3
casserole
ware: 7.5YR pink 7/4
inner surface: 7.5YR pink 7/4
outer surface: 7.5YR pink 7/4
parallels: Harrison (1994: 432ff., fig. 3, 2. 5. 6; sixth/seventh century AD); Abu Dayyah *et al.* (1991: 378ff., fig. 7, 31; late Byzantine); Melkawi, 'Amr, Whitcomb (1994: 458, fig. 9, b-f).
- 2) Trench A, locus 18, pail 22
lid with incised wavy lines decoration
ware: 2.5YR light red(dish brown) 6/5, coarse with many white grits
inner surface: 2.5YR light red(dish brown) 6/5
outer surface: 10YR white 8/2 (slip)
parallels: see Pottery from Site 1 above
- 3) Trench A, locus 17A, pail 18
lid with incised wavy lines decoration
ware: 2.5YR light red 6/8, quite fine, lamella-shaped structure
inner surface: 2.5YR light red 6/8
outer surface: 10YR light red 6/6
parallels: see Pottery from Site 1 above
- 4) Trench A, locus 20, pail 24
ware: 2.5YR light red 6/7, fine and well fired
inner surface: 2.5YR light red 6/7
outer surface: 10YR light brownish gray 6/2
parallels: Fellmann Brogli 1996: 258, fig. 782
- 5) Trench C, locus 3a, pail 29
glazed bowl
ware: 5YR pink 7/4
inner surface: glazed with dark green (upper part) and 5Y yellow 8/6 (lower part)
outer surface: glazed in dark green, splintered off
parallels: see Pottery from Site 1 above
- 6) Trench B, locus 9, pail 11
neck fragment of a steamer
ware: 2.5Y very dark gray 3/ , with small white grits
inner surface: 2.5Y very dark gray 3/
outer surface: 2.5Y very dark gray 3/
parallels: Oleson *et al.* (1995: 339, fig. 19, 3; 352 no. 3 (second half of the seventh century AD); Melkawi, 'Amr and Whitcomb (1994: 459, fig. 10b, c; seventh century AD)
- 7) Trench C, locus 9, pail 21 (joining fragment found in C.10.24)
rim from a large storage vessel

ware: 10YR very pale brown 7/4, quite fine, some bubbles and grits
inner surface: 7.5YR reddish yellow 7/6
outer surface: 7.5YR reddish yellow 7/6
parallels: Parker 1987: 611, fig. 120,211; Abu Dayyah *et. al.* (1991: 378f, figs. 7, 23; late Byzantine)

- 8) Trench C, locus 14, pail 42
deep bowl
ware: 5YR pink 7/4, quite fine
inner surface: 5YR light reddish brown 6/4
outer surface: 5YR light reddish brown 6/4
parallel: Harrison (1994: 431, fig. 1, 16; sixth/seventh century AD).

- 9) Trench B, locus 5, pail 7
flat bowl
ware: 2.5YR light red 6/6
inner surface: 2.5YR light red 6/6
outer surface: 2.5YR light red 6/6

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