THE 2003 FINNISH JABAL HĀRŪN PROJECT: PRELIMINARY REPORT

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The Finnish Jabal Hārūn Project (FJHP) carried out its sixth fieldwork season between July 26 and August 28, 2003. The project is directed by Prof. Jaakko Frösén, University of Helsinki. The archaeological excavations were supervised by Dr. Zbigniew T. Fiema, and Prof. Mika Lavento was in charge of the survey (both from University of Helsinki) while Dr.Christina Danielli, Italy, directed the conservation activities. Prof. Henrik Haggrén, Helsinki University of Technology and Dr. Majdi Barjous, Natural Resources Authority of Jordan have also participated in the survey activities. In total, 34 archaeologists, conservators and cartographers from Finland, Italy, Sweden and the United States took part in the 2003 fieldwork. One DoA representative assisted in the fieldwork and up to 22 local laborers were employed. The FJHP is sponsored by the University of Helsinki and by the Academy of Finland. The Project wishes to express thanks to the Director-General of Antiquities of Jordan and the DoA office in Petra for their cooperation and support.

The FJHP focuses on Jabal an-Nabī Hārūn (جبل النبي هارون) located ca. 5kms SW of Petra, which, according to Jewish, Christian and Muslim traditions, is the place of burial of Moses' brother Aaron. The peak of the mountain is occupied by a Muslim shrine (*weli*) which contains a cenotaph believed to contain Aaron's remains. Below the peak, on a plateau ca. 1250m asl., there is a Byzantine monastery/pilgrimage center dedicated to St. Aaron, and preliminarily dated to the later 5th through the 7th/8th centuries AD. The main objectives, fieldwork methodology, and the results of the previous seasons have already been presented elsewhere (Frösén *et al.* 1998, 1999, 2000, 2001a, 2001b, 2002). The following is a summary of the excavation, survey, cartographic and conservation activities conducted in 2003.

CARTOGRAHIC REPORT

(J. Latikka and K. Koistinen)

During the 2003 field season, the cartographic team continued to provide assistance in the recording of the excavated entities. The recording system based on the use of a tachymeter, with 3D readings downloaded every afternoon to the Project's database, was supplemented by digital imagery taken regularly in the excavation area. This year, special attention was given to the digital documentation of the re-exposed mosaic floor in the narthex. The technical development work at the Helsinki University of Technology was continued, using the collected imagery to further improve the 3D model and to create various image products, such as photomaps. The aim of the photogrammetric documentation, extensively used in 2003, was to gather additional data in the excavated trenches which could be used later, either in modelling the trenches or in recovering data which might have been lost during the excavations. The digital images have also been utilized to record specific information related to the conservation work. Regularly taken, the photographs also act as a visual diary of the excavations. Finally, the plan of the entire monastery was updated again this year.

EXCAVATION REPORT

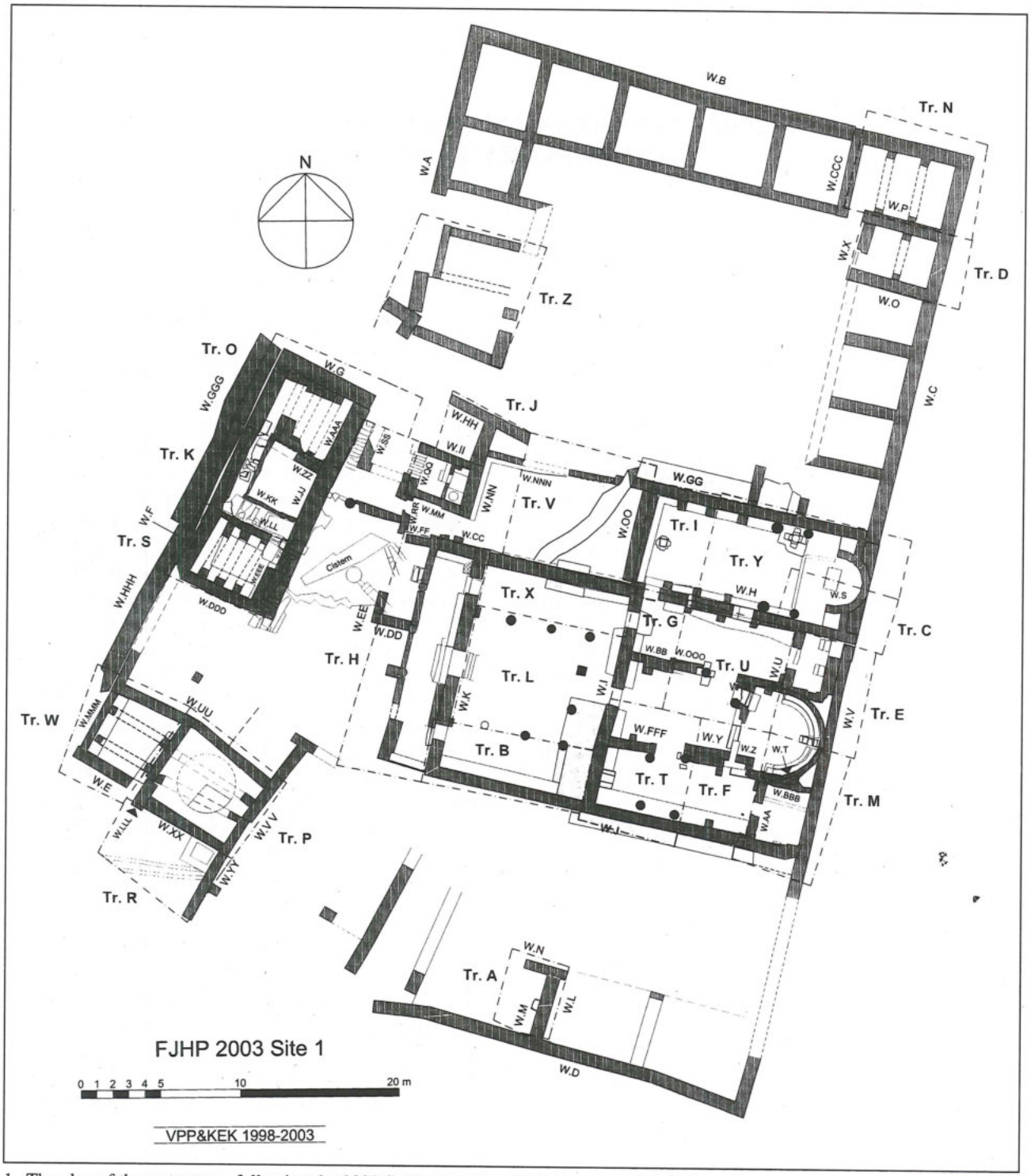
The 2003 exavations at Jabal Hārūn were carried out in five trenches; in the church proper, in the atrium, in the chapel, in the SW corner of the site, and in the area west of the atrium (**Figs. 1, 2**). Work was also started in a trench located at the SW end of the "hostel" but only the deep clearance was effected there.

Trench U (E. Mikkola, P. Miettunen, H. Kuisma)

Trench U covers the area of the eastern part of the northern aisle and a corresponding, substantial part of the nave. Following the excavations in this trench, the entire basilica is now exposed.

Phase I: Early Church.

The following walls were constructed in Phase I: Wall H (locus 05), i.e., the northern wall of the



1. The plan of the monastery, following the 2003 field season (by K. Koistinen and V. Putkonen).

basilica, Wall U (locus 06), the northern pastophorion wall, and Wall R (locus 04), being the apse's wall with the corresponding pilaster of the northern colonnade. Wall H had a doorway to the adjacent chapel. The floor construction included the mortar bedding (locus 44) and marble slabs (locus 41). The slabs differ in size, from ca. 1 x 1m to 0.4 x 0.4m. Judging from the imprints of the mortar bedding, the northern edge of the floor ended ca. 0.7m south of Wall H, i.e., there was a bench along Wall H, which did not cross the doorway. The bema platform (locus 42), possibly two courses high, was built in the front of the apse. Its estimated width (N-S) is ca. 6m while the length (E-W) is 2m. The

2. The view of the monastic site, looking west (photo by M. Mustonen).

bema's construction features sandstone ashlars and most likely a marble floor (locus 19) with bluish gray mortar bedding (locus 35). The northern column row separating the nave and the northern aisle is evidenced within the trench only by the pilaster (locus 04), but the information from Trench G and the remaining columns in Trenches B and L indicate its original existence. The original width of the northern aisle was ca. 3.1m from the wall to the central line of the northern colonnade, and the intercolumnal space was ca. 2.7m.

Phase II: The "Short" Basilica.

The destruction that ended Phase I was followed by a major reconstruction. The original church was shortened by the construction of the partitioning wall (I). Changes evidenced in Trench U include the modification of the roof support system, repairs to the marble floor and changes within the bema area. Wall H was repaired at least in its top courses, and many marble fragments, tesserae and other materials were used either as chinking stones or as a fill of the wall. The original colonnade was removed and re-erected in a different arrangement. Its line was now moved more towards the central E-W axis of the church, which enlarged the width of the aisle to 3.4m, while narrowing the nave to ca. 5m. This new support system seemingly consisted of only one column (locus 25), which was connected by arches to the corresponding pilasters: one by the apse wall (locus 08) and another one built against Wall I (G.05). The two arches which now spanned the E-W space of the church were ca. 3.80m long. The pilaster (locus 08) was built on the bema abutting the western end of the apse wall, clearly following the apse line. The gap of ca. 5cm between it and the Phase I pilaster was filled with smaller stones (locus 08a). This arrangement is mirrored on the southern side of the church (Trench F, loci 06a and 06). The column (locus 25) was erected on the new, probably sandstone foundations, with the drums recycled from the columns of the Phase I colonnade. Probably, the new roof arrangement would still accommodate the clerestory walls supported by E-W arches.

The marble floor, which most likely suffered severely in the destruction, was at least repaired, but also probably altered at this phase, especially where the foundations of the column (locus 25) were inserted. The doorway to the chapel was narrowed at this phase. The appearance of the bema area in this phase is uncertain due to the major modifications of the later phases, but probably it was still paved with marble slabs. A bedding of white mortar, with nine squarish impressions (locus 36) is most likely from this phase.

Phase III: New Roof and Other Modifications

There must have been another destruction that ended Phase II since the roofing system was again heavily altered. Abundant wall-plastering seems to be related to this phase. The new roof supports were both added to the already existing elements and built as new structures. Pilasters (loci 26-29) were added to the column (locus 25) forming a cross-shaped support with the column in the center. Also, an L-shaped pilaster (locus 37) was added to

the south and west sides of the pilaster (locus 08) and the pilasters (loci 16-18) by Wall H. As for new elements, free standing pillars (loci 24 and 38), made of local yellow limestone were erected on the marble floor, to which lateral extensions (loci 34 and 39/40E) were added. Thereby, as evidenced in Trench U, the following roof supporting system was created: four E-W, back-to-back arches, with spans of 1.4m, and three N-S arches over the northern aisle with spans of 3m, which in turn had corresponding arches over the bema, the nave and the southern aisle.

The bema area witnessed substantial modifications. It was extended ca. 0.59m towards west by adding a new edge made of sandstone ashlars (locus 43) and filling the space between it and the early bema with soil and stones (locus 46). On this new bema, and on the earlier marble slabs, a large masonry-built pulpit (*ambo*) structure (locus 40) was constructed. It consisted of five parts (subloci 40A-E): the platform and the steps leading to it, the column supporting a no longer preserved part of the platform, the bema chancel wall, the counter-like structure built between the pillar, locus 38/39, and pilaster, locus 37, and the integrated pilaster/ arch springer directly south of pillar, locus 38. The entire installation was plastered over, including a part of the marble pavement of the bema (locus 20). It is probable that the doorway to the chapel was blocked (locus 31) in this phase. The pilaster (locus18) was erected partially over the blocking, and the center section of the bench (locus 15B) was built in front of it.

Phase IV: Latest Modifications

The main change in this phase was the construction of Wall OOO (locus 07) between the pillar (locus 24/34) and the pilaster (locus 29) probably related to the support for the existent roofing system, but generally of an uncertain function. The eastern end of the northern aisle was also modified: a bench (locus 15 C) was built along Wall H during this phase, and the floor pavement was slightly rearranged. It is possible that the apse of the church was already destroyed or abandoned during this phase.

Phase V: Casual Occupation and Collecting Activities

At some point in time, the ecclesiastical use of the complex had ended. The apse and bema were no longer in use and instead, these spaces served as a collecting point or dump for tesserae, mosaic fragments and other materials (locus 02). Some sections of the marble floor were lifted and they were collected by the column (locus 25) in a pile which later collapsed in front of the ambo (locus 22).

Phase VI: Final Destruction

The lack of occupational strata on the marble floor may indicate that the structure was abandoned due to a sudden disaster. The lowermost layers in the nave (locus 23) and in the eastern end of the northern aisle (locus 32) were clayish with small fragments of charred pieces of wood and uncharred wooden beams, possibly the remains of the roof construction. This may suggest that these areas were the only remaining roofed sections. This also fits the floor evidence: no beams were found in the areas where the floor had previously been removed. All architectural elements, including ashlars and voussoirs, were found within the tumble layers (loci 03, 09, 10, 13, and 21). The soil among these layers partially originated from the wall infill, and partially as wind-blown sand filtered through the stone tumble layers. The column (locus 25) had stood for a long time since some of the fallen drums were already visible on the surface.

Phase VII: Latest Natural Deposition

The uppermost strata (loci 01 and the upper layers of 03) were the topsoil, which consisted of deteriorated sandstone and wind-blown sand.

Trench V (A. Rajala, V.Holmgvist, and M. Whiting)

The trench was located in the space between the chapel (Trench I) and the structures excavated in Trench J. The southern limit was Trench X - the northern part of the atrium of the church.

Phase I: Early Occupation in the Area

It appears that some pre-monastic activities were conducted in this area, reflected by rough modifications done in the bedrock, probably to accommodate a large water reservoir (?) or a channel. The date of these carvings could not be established. Some deposits of very hard-packed (probably water-borne) soil soon accumulated on top of these depressions.

Phase II: Early Construction

This phase is associated with the construction of the early chapel. It is probable that the easternmost area of the trench was occupied by the unpreserved western wall of the chapel. Some of the bedrock depressions were possibly modified in relation to the baptismal font in the chapel, in the form of steps and a basin (loci 24 and 28). The southern

wall (H, locus19) and northern wall (GG, locus 17) of the chapel were built then, the southern one separating the chapel from the northern aisle of the church. The western (not extant) wall (locus 27) of the chapel was built, utilizing the modification of the bedrock for its foundations. The remains of this wall are very poorly preserved. Basically, only its corner with Wall GG is the real, extant evidence for its existence. Notably, all these walls were built on top of the bedrock, using a layer of mud-mortar in between the stones and bedrock. The sandstone pavement (loci 22 and 23) was laid out outside the western wall of the chapel.

Phase III: The Remodeling

Major structural destruction associated with fire seriously damaged the structure of the early chapel. The rebuilt chapel was reduced in length, and its original western wall (locus 27) was completely demolished. The new western wall (OO, locus 18), built on top of a single course of sandstone blocks (locus 20) was now located closer to the baptismal font. Wall OO clearly abuts both Walls H and GG. The font itself seems to have continued in use during this phase. However, the basin and the steps, originally associated with the font, seem now to have been abandoned, as they were located outside the new, western wall. Debris of the burnt timber roof structure, including partially melted and fire-twisted shards of glass lamps, were dumped in the area of the former basin. It seems that this area became a convenient disposal place for debris from the chapel, periodically deposited there. In the western part of the square, where a large reservoir (?) of water existed in Phase I, natural accumulation of the fluvial material continued, probably due to water channelling in the area (locus 8a).

Phase IV: Casual Occupation

A period of a lower intensity of activities in the area may have followed. Uneven bedrock in the center of the area was coarsely levelled with small boulders (locus 13). Probably some occasional food preparation took place there, indicated by more debris (loci 8b, 11, 12) in the area, including animal bones and ash. Fluvial material continued to accumulate in the western part of the trench. It may be that a seismic episode took place at the end of this phase, seriously affecting the walls in this area.

Phase V: Water Channel and Later Occupation

This phase is dominated by the existence of a large, masonry-built water channel passing through the area of Trench V, from NE to SW. It is possible that the channel collected rainwater from an enigmatic "platform-like" installation built against the northern face of Wall GG, in the area of Trench Y. Two sub-phases have been identified:

Va- a substantial water channel (locus 4a) was constructed. Its structure includes foundation stones laid under the structure and the hard-packed soil layers mixed with demolition material forming the base for the conduit. The trough of the channel was made of flat-laid sandstone slabs at the bottom, and its walls made with rectangular-shaped stones. Originally, the channel had capstones; ca. 2 meters from its SW end, the sandstone capstones are still in situ. The outlet of the channel was in the atrium through a possible opening in Wall H. Notably, the center part (locus 6) of Wall H seems to have been thoroughly reconstructed during this (or the preceding) phase, probably in support of some structures on the southern side (atrium). As such, Wall H has a highly composite appearance.

Areas on the western and eastern side of the channel were used for food preparation, exemplified by find-rich loci 7 and 10. A narrow and generally insubstantial wall (NNN, locus 16) was built on the northern side of the area making it totally enclosed. Wall NNN was constructed partly on top of the bedrock, but the western part of it was standing directly on a soil layer.

Vb- this phase represents the final occupation in the area of Trench V, during which the water channel was probably still in use. Deposits of collected material were made in the area limited by the channel and Wall OO. Extensive concentrations of tesserae (locus 5d) and glass were found there. Small, simple structures of stone were built around the channel, probably serving as fireplaces and windshelters (loci 5a-c). An enigmatic stone (support?) structure (locus 9) was roughly piled up next to Wall NNN.

Phase VI: Abandonment and Natural Deposition

The collapse of the upper courses of most of the walls in the area may indicate another seismic-related destruction. The channel was now covered by a tumble of stones (locus 3). The area was definitely abandoned and the windblown sand accumulated over the tumble through time.

Trench W (R. Holmgren and H. Kelola)

Besides Trenches P and R, Trench W, ca. 5 x 6.5m, is the third one opened in the SW corner of the monastic complex. The room excavated in this trench forms the southernmost extension of the

western facade of the monastery. This room also forms the western, structural extension of the room excavated in Trench P. The latter is connected with the room in Trench W through a blocked doorway and both rooms give the impression of being built outside the compound wall. Notably, the small summit in the area of Trench W overlooks the steep, surrounding landscape to the SW and W. Not surprisingly, one would find in this area remains of a sturdily- built room with a second floor, perhaps related to some kind of defensive or surveillance purpose. There are no traces of any workshop or small-scale industrial activities in this room. The large quantities of fish bones found in the adjacent Trenches P and R did not materialize in Trench W. In fact, bones were almost totally absent there. In contrast, the evidence of the room in Trench P being deliberately filled up with soil and boulders in a later phase might explain its homogeneous stratigraphy of scattered bones. The reason for filling it up seems to be connected to the construction of a stone platform at the same height as that of the second floor of the room in the now excavated Trench W. Since the second floor in Trench W did not stand for long and thus there was no need for backfilling in order to build a similar construction, no bones from any backfill were found.

Phase I: Early Walls in the Area

It is possible that some structures existed in this area in the pre-monastic period. They might have been related to the large Nabataean-Roman period structure excavated in Trenches O, K and S. Some exceptionally large ashlars can be seen in the lower courses of the northern and southern walls (UU and E; loci 5 and 4) framing the room in Trench W. On these courses, Wall UU was constructed in Phase I, making an L-shaped turn northward and bonding with the western perimeter wall of the monastery. Some irregularly laid stones in the upper part of Wall UU indicate that a doorway (locus 16) found beneath them was opened up only when the room in Trench W was constructed. There is no reason to believe that this kind of access would have been constructed within the original main wall. Somewhat west of this doorway, an outlet of a smaller channel further indicates that Wall UU was the southernmost limit of the complex.

At the same time or somewhat later, the eastern wall, (LLL, locus 6) was constructed. It abuts Wall UU and is built with well-hewn boulder stones. It is not yet clear, however, how this wall was then integrated within the structures of rooms in Trenches W, P and R. Traces of repair and removed features have hidden some of its primary function. However, since the wall forms the "backbone" of rooms in Trenches P and W, its position with its later added and abutting feature, makes it clearly one of the first walls in the area, probably chronologically related to an early stage of the early church phase.

Phase III: Construction of the Arched Room

During this phase, a room with two arches supporting the upper floor was constructed in the area of Trench W. Originally, this room was accessed through the doorway opened up in Wall UU, as mentioned above. The room was planned to be longer than the already existent Wall LLL, and therefore the latter was extended southward through the addition (locus 7). The southern wall (E, locus 4) built then, is thus abutting the addition (locus 7) rather than Wall LLL. Notably, Wall E features least two different masonry techniques, suggesting some sort of repairs undertaken in the upcoming phases. Its upper part also shows a blocking of a small and high, light-aperture which again indicates that the wall was the southernmost part of the room-compound in this area. The western wall (MMM, locus 10), also built then and currently exceedingly poorly preserved, is the southernmost extension of the compound wall.

Four pilasters with arch-springers are still preserved. The E-W arches supported a second floor. Nothing of it remains but stratified deposits of its collapsed structure provide a fair indication of its original construction. The arch-springers, together with the ashlars making part of the pilasters, are embossed with parallel rectangular fields. This kind of decoration is also found on the pilasters in the other arched rooms located along the western perimeter wall. The eastern pilasters in Trench W are built on top of a shelf-like structure (locus 21), most likely a support for Wall LLL. The pilasters along the western wall are flanked by even larger supports (?) which are rectangular at the base (loci 14 and 15). The shelf/support structure and the pilasters here are all bonding and they seemingly belong to the same phase. A hard-packed soil layer (locus 20) was laid out in order to level the bedrock, but a stone (?) pavement was not found - a phenomenon relatively common in this monastic complex.

Phase III: Doorways

After some time of occupation of the room, a doorway was pierced in Wall LLL. It is clear that the inserted lintel and the southern frame of the opening bear traces of a later installation which interrupts the original building pattern of the wall.

The northernmost part of the shelf/support structure also shows similar indications of being cut in order to make way for the opening. At the same time, the adjacent doorway in the northern wall (UU) was blocked. The possibility of both doors being used at the same time is untenable due to their adjacent position.

Phase IV: Later Occupation

Later on, the doorway in Wall LLL was carefully blocked with well-fitting stones. The access to the room was now, seemingly, relocated to the area of the western wall. A column drum was placed on top of the northernmost support (locus 15) against the wall, as if creating step-like arrangement together with the shelf/support feature. Apparently, the creation of a new access from the exterior of the monastery rather than the interior, as before, must indicate a new function for this room, probably of lesser importance. Large quantities of pottery were recovered from the soil layer, locus 18, a thin deposition of sand. Locus 18 probably represents the latest occupation inside the room before the collapse of its ceiling. The ceramic deposit is mixed and it gives the impression of a garbage dump although sheltered by the still standing superstructure.

Phase V: Collapse of the Superstructure

During this phase, the arches and the second floor with its paving collapsed inside the room. The collapse was excavated as two major layers, loci 9 and 11, the latter being the lower. These deposits allow for the reconstruction of the original appearance of the upper floor and provide clear indication of the pattern of its collapse. The bulk of the debris is comprised of scattered large slabs that originally stretched across the arches and the tops of the walls. The slabs were in turn covered with flagstones forming the floor of the second storey. Apparently, this construction heavily caved in toward the center of the room while the slabs and the pavers slid down between the arches and landed below, often in an upright position. The flagstones are sometimes found beneath the larger slabs, especially close to the walls. Approximately, 60-70 pieces of the pavers were found. Furthermore, among the debris were also several fragments of wood and iron nails, which provide additional information for the composite character of the ceiling/upper floor construction.

Phase VI: Casual Occupation

A levelled surface could be detected on top of the debris of the collapsed superstructure. Some remains of ash, and scattered sherds were found there. These are likely to be the remains of squatter-like occupation in a place that could still offer some protection from wind and rain. At this point in time, the arches were still standing. A 0.3m thin layer of windblown sand (locus 8) then covered these last traces of human activities in the room. Soon afterward, the arches collapsed, with the voussoirs found embedded partially in locus 8 and the debris above it (locus 3)

Phase VII: Natural Deposition

Under the topsoil, two major stratigraphic layers were found. The lower one, locus 3, features a more than one-meter deep, natural and long-time deposition of material from the decayed walls mixed with windblown material. Locus 2 above it, consists of a dense layer of boulder stones, probably caused by a final destruction of the surrounding walls by a sudden and large-scale earthquake.

Trench X (M. Holappa and K. Juntunen)

Trench X is situated north of Trench L which covered the western part of the nave of the church, later, the central area of the atrium.

Phase I: Early Church

During this phase, the area occupied by this trench was the western part of the north aisle of the early church. As such, the earliest remains in the trench are represented by the northern wall of the church (H), which was then a continuous and homogeneous masonry line, but of which only two parts (loci 6 and 24) are still standing. Wall K, the western wall of the church, must have been built at the same time. Two soundings through the extant (later) floor level revealed good quality mortar bedding (loci 20 and 23) with a flat stone levelling (loci 19 and 22). These elements belonged to the original (marble) pavement of the church. The three columns just south of the trench limits must then have supported the church's superstructure.

Phase II: Later church with the Atrium

Following a probable seismic destruction, the church was divided into the church proper and the open atrium, the NW part of the latter being the area of Trench X. In the east, Wall I (locus 8) was built as the dividing wall between the church and the atrium, with a doorway (locus 26) for communication between these two spaces. Directly south of this doorway, a bench (locus 15) was built against Wall I, an extension of which was also uncovered in Trench L (locus 15) during the 2000 season. Another bench (locus 16) was built against

the eastern part of Wall H. There might also have been a doorway in Wall H to the area north of the church and west of the chapel, but later reconstructions of this wall make it impossible to prove this hypothesis.

Phase III: New Floor

Apparently because of periodical rainwater flooding of the atrium, a new floor (locus 12), made of irregular flagstones, was laid out in the atrium. This floor slopes towards the SW corner of the atrium where an outlet was also built to channel water outside the atrium. In a sounding made in the NE corner of the trench, a soil layer (locus 18) was exposed on top of the remains of the earlier pavement (locus 19). This soil layer, apparently a build-up for the new floor, is remarkably missing in the other sounding made near the NW corner of the trench, indicating the intention to create a gradually sloping floor. The new pavement was laid on top of a mortar bedding (loci 17 and 24).

Phase IV: Major Remodelling

During this phase, the doorway (locus 26) in Wall I was blocked (locus 9), apparently simultaneously with the construction of the large buttress against Wall I in the southern part of the atrium. Wall H clearly suffered badly at this point since a supporting wall (locus 13) was built against the central part of it, on the atrium's side, and partly on top of the bench (locus 16). Seemingly at the same time, a water channel was built in the area north of the Trench X. Its outlet (locus 25) was directed to the atrium either through the possible doorway in Wall H (*supra*) or it was built into the wall at this point. A square flagstone in the new floor in front of the outlet either suggests the existence of a doorway or gap in the wall in this place, earlier or concurrent with the construction of the channel. At any rate, the pavement of the atrium still served for water collection activity. Possibly, the westernmost of the three columns standing just south of the trench limit collapsed at this time, and the column drums were collected and reused somewhere else, perhaps in the construction of the buttress against Wall I.

Phase V: Later Occupation

This phase can be roughly subdivided into two sub-phases. At first, the natural deposition of sand (locus 10) on top of the floor can be detected. However, the atrium bears strong indications of casual occupation there then. A hearth (locus 11) was set against the easternmost of the three columns south of the trench and a simple enclosure structure (locus 14a) was built partly against the supportive wall (locus 13). Inside this enclosure, almost pure ash was dumped (locus 14b). There are also some traces of food preparation in the NE corner, where some bones were encountered in the sand. During the following sub-phase, the indicators of occupation form a more scattered pattern. A short term use of the area is evident from the oil lamp fragments at the bottom of a stone tumble (locus 7), which follows the pure sand deposit (locus 10) as the surrounding walls began to decay and crumble down.

Phase VI: Collapse and Abandonment

Extant remains and their relationships indicate the following pattern of collapse. First, the two remaining columns collapsed on top of each other. Then the remains of Wall K crumbled down (locus 4). As there is not much stone material found in this stone tumble, it is probable that Wall K, might, at this point have been an enclosure, only few meters high. Wall H then collapsed and Wall I fell on top of it creating an extensive stone tumbles (locus 5 and 2 respectively). Following the collapse, the entire trench area was covered by wind-blown sand (loci 1 and 3).

Trench Y (A. Lahelma, K. Hinkkanen and S. Santavuori)

Trench Y covers the central and NE parts of the chapel. The trench forms an L-shaped area between Trenches C and I, previously excavated. Perhaps the most interesting features of the chapel are the two cruciform baptismal fonts found inside it, and a masonry-built altar pedestal, half of which was already exposed in 1998. The first baptismal font, found in Trench I, was situated in the western end of the chapel. It was later replaced by the second font built in the area of the bema. The altar pedestal appears to have been built at the same time as the second baptismal font (**Fig. 3**).

Phase I: Early Chapel

This phase represents the construction of the chapel. The original chapel seems to have been a little longer than the present building. Structures that can be assigned with certainty to Phase I in Trench Y include: the apse wall (locus 2) and a cupboard (loci 10a-d) north of it, the eastern or outer wall of the complex (V, locus 12), the northern wall (GG, locus 3) of the chapel, and the three cupboards (loci 22, 38 and 39) in it. Remains of good-quality plaster associated with Phase I, and still attached to the lowest courses of the apse wall, have some traces of painting left. The construction of

3. General view of the chapel, looking east; the masonry altar base is in the center inside the apse (photo by M. Mustonen).

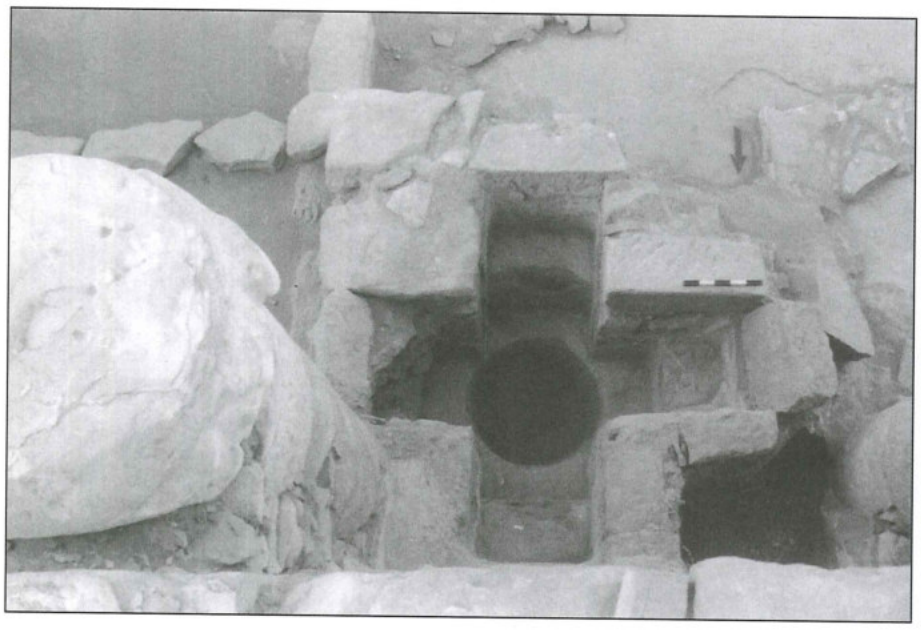
the southern wall (H, locus 16) may, in theory, precede the other Phase I structures. This wall is the northern wall of the church and does not seem to physically bond with the other chapel walls. The entrance to the chapel in this phase was from the northern aisle of the church, through a doorway (later blocked) in the middle of Wall H. As the floor of the chapel was situated lower than that of the church, the two steps (loci 32 and 36) leading down from this doorway also belong to this phase. None of the roof supports encountered in Trench Y can be securely assigned to Phase I. Evidence from Trench I, however, seems to suggest that the roof was supported by pairs of pilasters similar to ones still found standing. Similarly, no trace of the original pavement was found in Trench Y. However, a small sounding made next to the curving apse wall revealed a well-made mortar bedding (locus 25g) that can be associated with the Phase I floor. The phase ended in a destructive event, a fire or an earthquake or both, which brought down the roof supports and obliterated the original floor.

Phase II: Modified Chapel

This phase marks major changes in the appearance and quite possibly also the function of the chapel. The chapel was rebuilt, but apparently somewhat shorter than the original building, through the construction of a new western wall (OO; in Trench I). The new floor (loci 40 and 41) of the chapel was made of reused material (marble and Ma'an limestone slabs) and well-shaped sandstone slabs. Only small fragments of it are preserved, mostly in the area of the bema, which was now raised and separated from the rest of the floor by a low barrier (locus 34). A few remains of marble, alabaster and limestone slab fragments found *in situ*, as well as some remains of a bedding mortar, suggest that a similar floor was also laid out in the rest of the chapel. The roof of the chapel was now supported by two pairs of columns (loci 4, 14, 15, and a column in Trench C) in the east and a row of pilasters on the west (loci 17, 18, 19, 20), all of them built against the walls and supporting N-S arches (**Fig. 3**). A new entrance to the chapel, leading directly to the Phase I baptismal font located in Trench I, was opened in the SW corner of the chapel. The original entrance seems to have remained in use, but was narrowed for some reason. Also associated with Phase II are the benches (loci 30, 31 and 33) built between the pilasters along both the southern and northern walls. Of the cupboards in the northern wall, only one (locus 22) remained untouched: the central cupboard was blocked entirely and left behind a column, while the western one was reduced in size. Phase II also seems to have ended in a destruction. The arches supporting the roof fell, but those between the two pairs of columns may have stayed up.

Phase III: New Baptismal Font

This marks a clear change in the use of the chapel. Two significant, new features were added in the bema area: a cruciform baptismal font (locus 26) and a masonry-built altar pedestal (locus 7). The font, which is remarkably well built, has a round bottom with a water outlet, and two steps leading down from each cardinal point (**Fig. 4**). A small basin for water or oil is located in its northwestern corner. The old baptismal font in the west-



4. The cruciform baptismal font uncovered in the chapel in 2003 (photo by M. Mustonen)

ern end of the chapel now became obsolete. Its upper courses were dismantled and the font was backfilled with soil and left under a new floor paving made of roughly worked sandstone slabs (locus 27). Associated with these changes is the blocking (locus 23) of the original entrance into the chapel in the center of Wall H, so that from this time, the chapel could be entered only through the doorway in the SW corner. The abandonment of the original baptismal font made it possible now to build a bench (in Trench I) along Wall OO.

Phase IV: Gradual Deterioration

Phase IV, marking a clear deterioration in the use of the area, can be divided into three subphases.

IVa- The only significant feature then is the construction of a dry-masonry bench (locus 29) along Wall GG. A similar bench found along the southern wall of the church has been assigned to a post-ecclesiastical phase. Although there is no direct evidence that the chapel had lost its ecclesiastic function by this time, this association with similar events in the church makes it seem likely. The enigmatic installation (locus 13) found outside the northern wall of the chapel is also possibly related to this phase. It consists of a platform made of sandstone slabs and mortar, located rather high up, and somewhat tilted towards the west. It may have been used to collect rainwater into the channel found in Trench V.

IVb- During this time, the chapel had certainly lost its ecclesiastic function and was now used as a wind-shelter by occasional visitors. The roof, or at least the arches, were still standing, but small hearths were utilized inside the chapel. Parts of the floor were removed and fragments of marble and alabaster slabs, probably originating from it, were found scattered throughout the occupation layer (locus 25) associated with this phase. On the bottom side of one of the slabs, found next to a small fireplace, a charcoal drawing was found which seems to represent a rider on horseback approaching something, possibly a mountain. It would be tempting to see here a representation of a pilgrim on his way to Jabal Hārūn. A fair amount of glass sherds were found among the soil of locus 11 inside the cupboard. The second baptismal font and the small basin associated with it were apparently similarly used as dumps for the bottom parts of the soil (loci 28 and 37) excavated inside them contained numerous fish bones. At some point, the font was covered by a large slab (locus 26b), perhaps in order to turn it into a small storage space or cistern. An enigmatic row of stones (locus 35) running E-W in the bema area, also belongs to this phase. The phase was most likely ended by an earthquake which brought down the semidome and all the arches except for the easternmost one. The lower shelf of the cupboard (locus 10c) was smashed into pieces. A heavy stone tumble (locus 9, 24 and the lower parts of locus 8), containing all the fallen voissoirs of the arches in neat rows, was formed in the western and central parts of the chapel.

IVc- Although now in ruins, the chapel still saw some human activity. The apse area seems to have been better preserved than the western part, and at

least some of the stone tumble resulting from the last earthquake was cleared. Reusable material from the ruins was still being collected. As in Trench C, a cache of large limestone tesserae (locus 6b) was found inside the cupboard on the northern side of the apse. Sandstone slabs decorated with crosses and other Christian symbols, possibly once elements of a chancel screen, had been placed to cover the cupboard and the tesserae cache. This phase, and with it all human activity of any significance in the area of the chapel, ended in yet another collapse. The sole arch still standing fell on top of the already collapsed arches to the west.

Phase V: Abandonment and Natural Decay

The last phase, represented by a thick and rather homogenous layer of low-intensity stone tumble and wind-blown sand (loci 5, 6a and 8), marks the abandonment of the chapel. No clear evidence of human presence was found in the upper layers of the trench. Concentrations of ashy soil (particularly in loci 21 and 24), at first thought to represent temporary fireplaces, in fact derive from disintegrated ashy mortar, large quantities of which seem to have been used in the structures of the roof. Much of the stone tumble seems to have formed over a long period of time, probably caused by a slow decay rather than any single tumultuous event. Finally, a natural deposition of wind-blown sand (locus 1) has formed the surface soil of the trench.

OBSERVATIONS ON THE 2003 EXCAVATIONS
(Z.T. Fiema and R. Holmgren)

The 2003 fieldwork season at Jabal Hārūn turned out to be particularly successful in terms of the quantity and quality of new data. The church and the chapel are now fully exposed and thoroughly studied for the preparation of the first volume of the final publication of the FJHP which will specifically concern these entities. The most significant evidence recovered in 2003 concerns the intricate changes in the roof supports of the church. These changes came as a necessity, seemingly following each of the seismic-related destructions, and apparently they reflect the search for the most durable solution for the roofing of the church. Notably, the latest design appears to be strongest. In addition to the traditional E-W load-bearing supports (architraves/arches), the nave and the aisles were now spanned by N-S arches, probably reflecting the builders' trust in this traditional means of roofing a space, well known in southern Jordan. With the gradual isolation of the nave from the aisles, affected by the construction of Walls Y, FFF and OOO, the appearance of each of these entities increasingly resembled that of a dwelling unit.

The second, larger baptismal font in the chapel belongs to the same cruciform type well known from the Negev and southern Jordan. The closest parallels are provided by the masonry-built quadrangular-framed, cruciform fonts at the Petra church (Fiema 2001: 45-8) and at the East Church in Mampsis (Negev 1988: 48-50), both with additional basins or containers. Both these fonts had four columns which seemingly supported a canopy or baldachino over the font, a feature not evidenced at Jabal Hārūn.

The function of the plastered basin integrated in the font's masonry at Jabal Hārūn is puzzling. Such small basins or containers are also known from other baptisteries, often in association with cruciform fonts. Besides the stone jar at the Petra church font and a round basin at Mampsis East, the examples include: three small, trapezoidal basins flanking the main oval font at the Church of St. Theodore at Jarash; the semicircular basin sunk in the masonry of the cruciform font at Oboda/'Avdat North; oval, stone basins beside the cruciform monoliths at Sobata/Shivta North and South; a small plastered pit in one of the arms of the cruciform masonry font in Building D at Magen; and finally, a semicircular basin in the southern arm of the masonry-built cruciform font at the Old Diakonikon of the basilica at Mt. Nebo (all examples discussed and illustrated in Ben-Pechat 1989, figs. 1 and 2). It was suggested that these small basins were auxiliary to the main fonts, and served for the baptism of infants (Bagatti 1984: 307-8). Notably, even the largest known main fonts are not large enough to allow an adult to partake the required rite of total immersion, and certainly the second Jabal Hārūn font, although larger than the first one, would also not allow for such rite. Similarly, the small basin attached to the main font at Jabal Hārūn could hardly accommodate infant immersion, primarily due to its very difficult access restricted by the column standing nearby. Perhaps a rite of external infusion for infants could be performed there, as suggested for some other of these auxiliary basins (Ben Pechat 1989: 177-82). Alternatively, the small basin could have served as an additional water container.

The location of the second baptismal font in the chapel at Jabal Hārūn is important, especially in light of the hypothesis already proposed in 1999 (Fiema and Holmgren in Frösén *et al.* 2001: 405-6). Initially, it was thought that, with the construction of the masonry pedestal for the altar in the

chapel, the first (smaller) font was abandoned and the chapel itself changed its function from a baptismal to a memorial chapel. The latter was postulated on the basis of the compartment inside the pedestal, which appears to have held important relics, perhaps translated to the chapel from the ecclesiastical edifice on the peak of Jabal Hārūn, described by Wiegand (1920: 136-45). Indeed, the altar was most possibly constructed in Phase III of the chapel, at the same time when the smaller font was abandoned. But the same phase had also witnessed the construction of the larger font, discovered in 2003.

Two factors have to be considered here. The early font was indeed of extremely small dimensions. Even if it survived the first major destruction of the church and the chapel and continued its function afterwards (Phase II), it could have been felt that its size was inadequate. Furthermore, the remodelling of the bema area in the chapel, associated with the construction of a new altar, probably with relics inside its pedestal, created a new situation and a new main focus of religious observance. Notably, fonts in side chapels adjacent to the churches, would usually be situated either in the apse of the chapel or in a central position in the chapel. For example, both locations are well exemplified by the fonts in the South Baptistery and in Diakonikon of the Memorial of Moses Church at Mt. Nebo (Alliata and Bianchi 1998: 168-171; 176-7). If a new, larger font was contemplated for the chapel at Jabal Hārūn, it could not be situated in any such locations as it would have obscured the altar and would somewhat have distracted the attention from focusing on that most significant element in the chapel. Therefore, the new font was located to the left (north) of the bema, in a somewhat awkward position, yet unobtrusive for the main cult focus in the chapel. As such, at least in Phase III, the chapel would indeed have become a memorial chapel, yet its baptismal function and practices there were not abandoned altogether. Rather, the proximity of the new font to the bema and the altar indicates that the memorial and baptismal functions of the chapel seem to become even more liturgically interrelated.

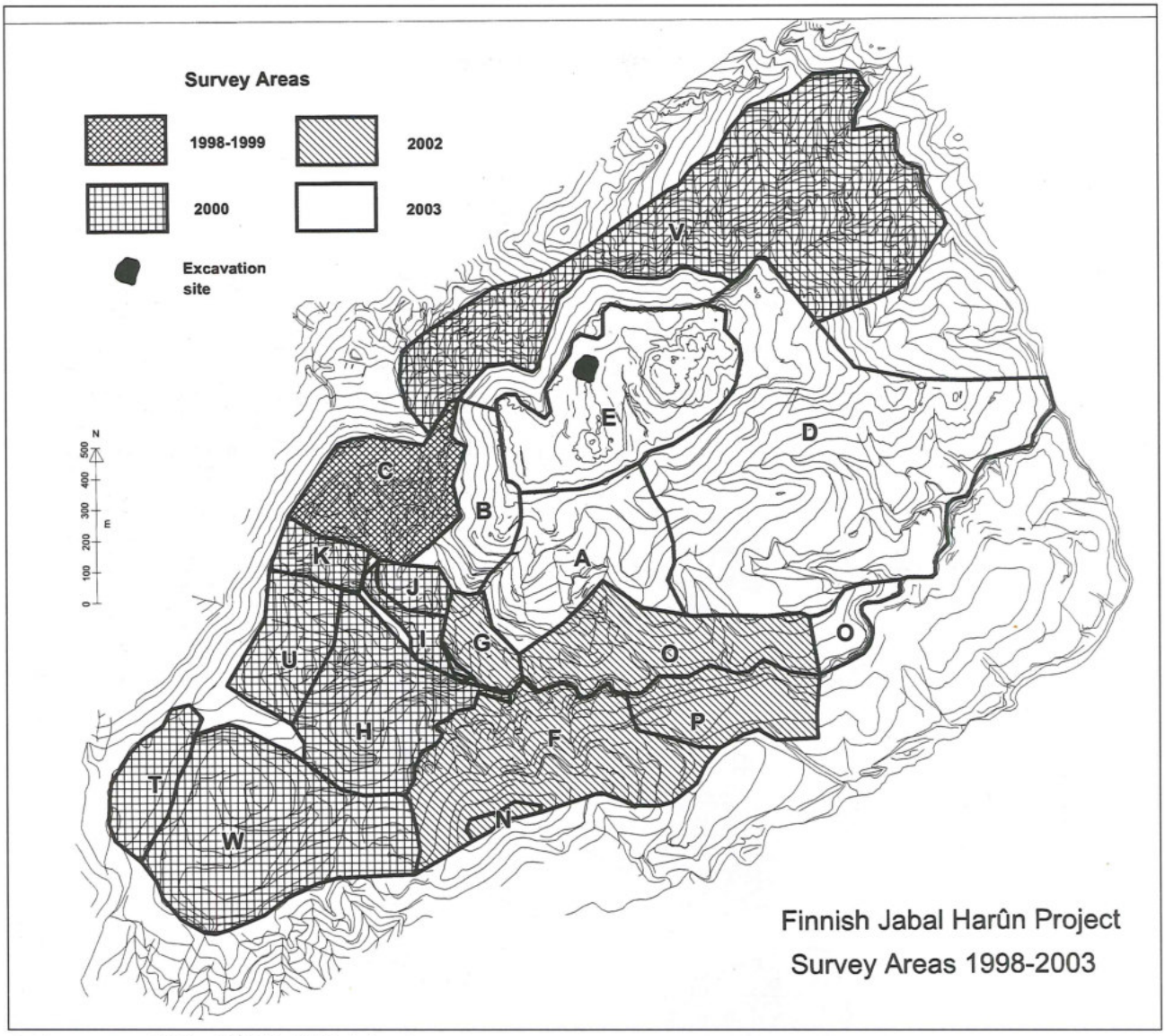
THE 2003 FJHP SURVEY

(M. Lavento, H. Haggrèn, E. Hertell, H. Junnilainen, P. Kouki, A. Mukkala, S. Silvonen, H. Ynnilä, M. Huotari, H. Jansson)

The area surveyed in 2003 was approximately 1.5 km^2 (**Fig. 5**), divided into 69 tracts. A total of 31 sites were documented. The number of finds on the lower slopes was smaller than in the previous years due to the steep topography and heavy erosion in the area. The survey area encompassed southern (Areas A, B and O) and southeastern (Area D) parts of the foothills of Jabal Hārūn, some higher terraces on the eastern side of the mountain (Area D), and the upper plateau of Jabal Hārūn (**Fig. 6**), including the summit of the mountain (Area E). While the work conducted in 2003 has largely accomplished the main surveying goals of the FJHP, further fieldwork – at least one field season – is still required to study the environment and surroundings of the area surveyed so far. In addition to the detailed geological and geomorphological description of the area already presented elsewhere (Frösén *et al.* 1999: 394-396), a few additional words will be in order here. The Jabal Hārūn massif is mainly Cambrian sandstone (GMD 1995), but the SE slopes of the mountain, the volcanic rhyolite underlying the sandstone was exposed and it forms very steep, heavily eroded slopes. In the sandstone area, stretches of relatively even ground alternate with rather steep, eroded slopes. Several tributary wadis cut the slopes, running into the Wādī an-Naqb in the south. Above the Wādī an-Naqb, remnants of several old terraces of the wadi can be seen. To the SE of Jabal Hārūn, Wādī an-Naqb becomes narrower and runs into a gorge that drops several meters between the sandstone cliffs.

The geomorphological documentation and sampling that began in 2002 was continued by clearing one more section of a low and presumably relatively recent terrace of the Wādī al-Farāsha. The sedimentary structures in the section were documented and the sediment layers were sampled for OSL dating and grain size and provenience analyses. The earlier OSL dates indicated a "too high" age of the terrace sampled (over 100,000 years) and for the possible redeposition of sediment. Hopefully, new samples will yield later dates and shed light on erosion phases related to human activities in the area. Additionally, Dr. Majdi Barjous from the Natural Resources Authority of Jordan participated in the survey for three days with the purpose of finding the origin of the flint that occurs in the survey area. The area is rich in flint from different geological periods, and the investigation will be continued in future seasons.

The cartographic team continued documentation in Areas A, B, D, E, O, F, and P. Documentation of terrace walls was mainly done by stereo photographs while other entities were measured by tachymeter. In addition, five geodetic control points (0301-05) were established. During the previous field season, photogrammetric 3-D re-

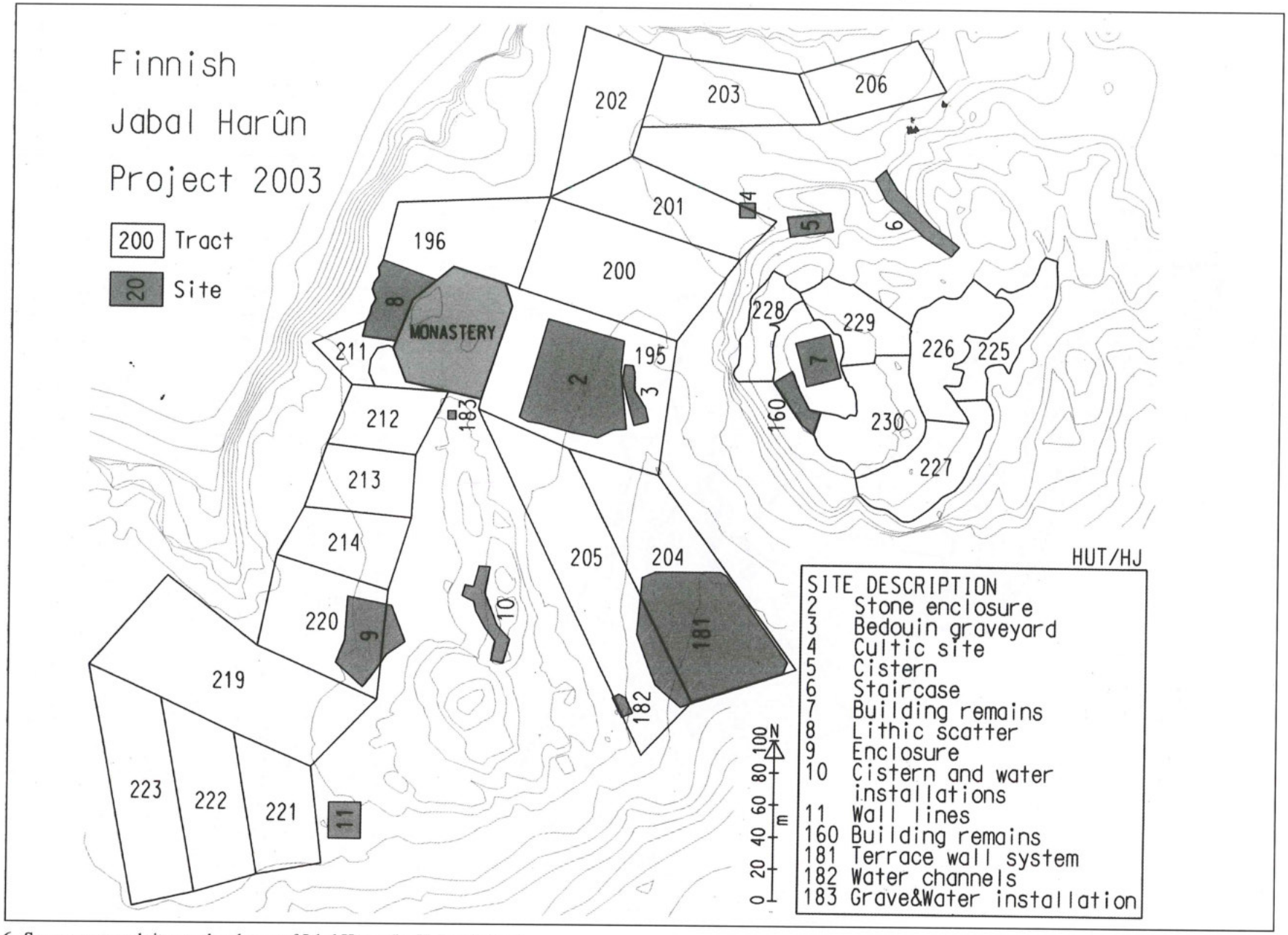


5. Survey areas 1998 - 2003 (by K. Koistinen).

cording of the barrage systems and terrace walls was tested in order to replace some time-consuming tachymeter measurements. Further research at the Helsinki University of Technology proved the stereo measurements of the terrace walls to be successful while the measurements of the barrage systems were troublesome with the software in use: the orientation of close-up stereo photographs, essential for the barrage documentation, has failed. Since the photogrammetric recording was successful, it was continued during the 2003 season. The stereo photographs were taken as panoramic image sequences, each typically consisting of three images. The base was principally about 15-20 meters, forming an approximate base-to-distance ratio between 1:10 and 1:15. Natural control points, like corners of rocks, were chosen and documented concurrently with close-up images. The control points were recognized in the field with interpreted images, and the coordinates were measured by tachymeter. Images were taken with a new digital camera, Olympus Camedia C-4000 Zoom, with an image resolution of 2288 x 1712 pixels. Additionally, the positions of the camera shots were approximately recorded with the GPS.

Lithic Sites

The survey of the plateau and slopes of Jabal Hārūn produced a considerable number of lithics. The collected material was dominated by flakes, flakelets and irregular cores for their production. In the lower part of the slope of Jabal Hārūn, Middle Palaeolithic material was present, but at the upper



6. Survey areas and sites on the plateau of Jabal Hārūn (by H. Junnilainen).

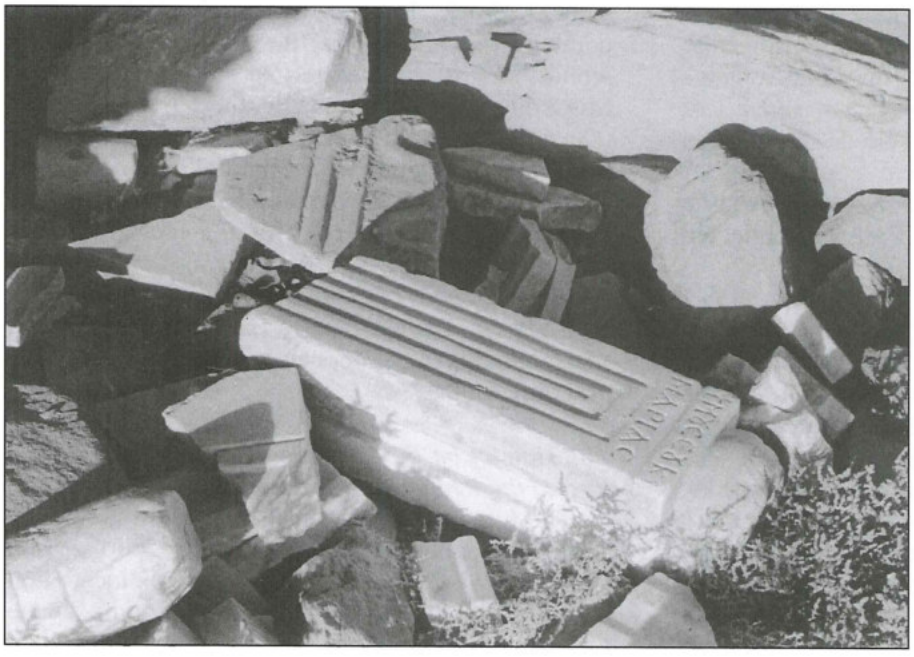
elevations it was relatively scarce. Two lithic concentrations (Sites 8 and 165) were detected during the 2003 season. Site 8 is situated on the top plateau of Jabal Hārūn, immediately west of Site 1. The assemblage is flake-dominated and it contains several tools, including sickles and tabular scraper fragments. These tools suggest a Late Neolithic - Chalcolithic - Early Bronze Age dating for the material (Rosen 1997: 75). Site 165 contains some Middle Palaeolithic as well as later elements. However, the assemblage is dominated by flakes, some irregular flake cores and heavy-duty tools made from older flakes, probably of Palaeolithic origin. This material probably dates from late prehistory.

Several times, a few flints and a core were found together on the slope of Jabal Hārūn. The flint raw material and successful refitting of some artifacts suggest that they were knapped in place from a single core. Taking into account the erosion rate and the effect of the Nabataean activity in the area, it seems unlikely that these lithics are prehistoric. They more likely relate to the Bedouin use of lithic materials during the last centuries (see Kuijt and Russel 1993).

Sites on the Plateau and the Weli Summit

The plateau of Jabal Hārūn (**Fig. 6**) was surveyed by walking 18 tracts. A large quantity of Byzantine and Islamic pottery was collected around the monastic site. In addition, some sherds of glass, mainly from glass lamps, and marble fragments were collected. Below the NE summit, Late Islamic pottery was also found, possibly originating from the top where larger quantities of this type of pottery were collected. In the SW part of the plateau, pottery finds were also relatively abundant. Lithic material was not as plentiful there with the exception of a flint concentration (Site 8). The sites previously noted during the reconnaissance survey in 1997 (i.e., Sites 2-4 and 8-11; see above and Frösén *et al.* 1998: 492-494) were documented in detail. Three new sites were also recorded, including the Nabataean water channels and possible locations of two ruined cisterns (Sites 182, 183), as well as a terrace wall system in the saddle between the summits of the mountain (Site 181). On the *weli* summit, finds consisted mainly of pottery, fragments of marble floor tiles and limestone tesserae, probably originating from the ruined ecclesiastical structure below the present *weli*, described by Wiegand (1920). There is also a cache of carved and inscribed marble fragments (**Fig. 7**) on the bedrock ledge, SE of and below the *weli* (Tract 230), and two large pieces of a round, well-made, polished black granite vessel on a lower ledge to the east of the *weli* (Tract 226). Practically no lithics were found on the weli summit, indicating that the summit area was probably not intensively used during the Stone Age. Most of the slopes leading up to the summit were considered too steep and precarious to be investigated safely, but the ledges and more even areas between cliff walls were walked in six tracts (225-230).

Site 6 (Frösén *et al.* 1998: 493-494) is a long, steep staircase carved into the bedrock in a natural



7. The cache of broken marble furniture located at the ledge below the *weli* (photo by P. Kouki).

ravine between two steep, tall cliffs on the NW part of the summit. The recognizable part of the staircase consists of 73 steps, but these probably continue under the pile of rubble and large boulders that currently fill the lower part of the ravine. This pile might have resulted from one of the ancient earthquakes known to have seriously affected the area. After that, the use of the staircase was probably discontinued. The staircase was most likely constructed and primarily used in Nabataean times since there are indications of Nabataean occupation in the lowest layers of the excavated monastic complex on the plateau, as well as in various places on the NE summit itself.

Site 7 consists of ruins under and immediately around the *weli* at the peak of the NE summit. Several wall lines can still be discerned, but most of the ancient building has been destroyed by the recent construction work on the outer terrace of the *weli*. The walls are probably remnants of the Byzantine church, although it is likely that some kind of structure existed here already in the Nabataean period. Surface sherds ranged from Nabataean to Late Islamic, and fragments of marble floor tiles were also collected at the site. Site 5 is a partly rock-carved, partly masonry-built cistern located at the bottom of the modern staircase from the plateau up to the *weli*. The cistern is entered through an arched doorway with several steps leading down to a quadrangular reservoir measuring approximately 20 x 4m. The ceiling is made of stone slabs supported by 15 masonry arches. The cistern appears to have several phases of construction and remodelling. Masonry details suggest that the cistern was used at least in Byzantine times, and it may have originated in the Nabataean period. Site 160 consists of poorly preserved building remains on a bedrock ledge immediately below and SE of the *weli*. Several wall lines can be discerned, and the building seems to have been supported by or constructed against large bedrock boulders. A large amount of coarse, Late Islamic ware was collected at this site.

Nabataean Remains and Rock Carvings in Area D

On a steep and narrow ledge of the Wādī an-Naqb (SE side), several building remains can be discerned (Site 166), probably Nabataean in origin according to the masonry and overall plan. The natural forms of bedrock and larger boulders may have been utilized as parts of the buildings. Among the 12 wall structures, 2 column drums were found, together with Nabataean fine and coarse ware.

In association with the structures, there is a niche with an anthropomorphic relief, carved on the sandstone rock and facing the opposite bank of Wādī an-Naqb. Mineral residue marks the location of a seasonal waterfall suggesting the possibility of a cultic place associated with water. The figure wears loosely draped clothes but its head is totally eroded away. Similar reliefs have been reported in the Petra area (Lindner 2001: 30), such as at Dushara Sanctuary in Shammāsa, on the NE side of Umm Saysabān (Lindner and Gunsam 2002: 231-234). An antropomorphic rock-carving has also been reported in connection with Jabal Hārūn (McKenzie *et al.* 2002: 472) but its more exact location is unclear. Site 180 consists of Nabataean-style rock carvings. They are quite visible, occurring on small cliffs by the steep rock face on the SE side. An interesting feature among the rock carvings on the continuation of the ledge is a set of three parallel rows of dots which resembles one found in Shammāsa (Lindner *et al.* 2001: 293).

Two stelae were found on the lower run of the Wādī-an-Naqb. Site 184 is situated only ca. 100 meters further to the east, close to the bottom of the deep drop of the wadi ledge. The site is a niche with a small stela. It cannot be reached from above, and the access from the east along the wadi bottom is almost barricaded by a huge block of sandstone as well as oleander bushes. This isolated niche is most certainly connected with the other two that are nearer the wadi. Before the intersection of the Wādī an-Naqb with Sayl Wādī Mūsā, two niches have been carved into the Jabal Hārūn side of the wadi (Site 176). On a small ledge of the Jabal Hārūn side of Sayl Wādī Māsā there is a human-made depression (Site 175) chiseled in the sandstone bedrock. It measures 0.5 by 0.7m with a depth of 0.3m. If it has functioned as a grave, it would have suited a child. On bank of Sayl Wādī Mūsā on the Jabal Hārūn side, there is a Nabataean (?) carved cliff wall (Site 174), ca. 5m in height, forming a right angle with a natural cliff wall there. Two small channels parallel to each other have been carved into the edge of the rock, ca. 0.7m apart. The bedrock surface there is covered by a thin layer of soil, but above there is a low step with masonry continuing towards the edge of the formation. Remains of plaster can be detected on the natural cliff wall.

The Hamlet on the NE Side of Jabal Hārūn (Area V) and the Remains in Area O

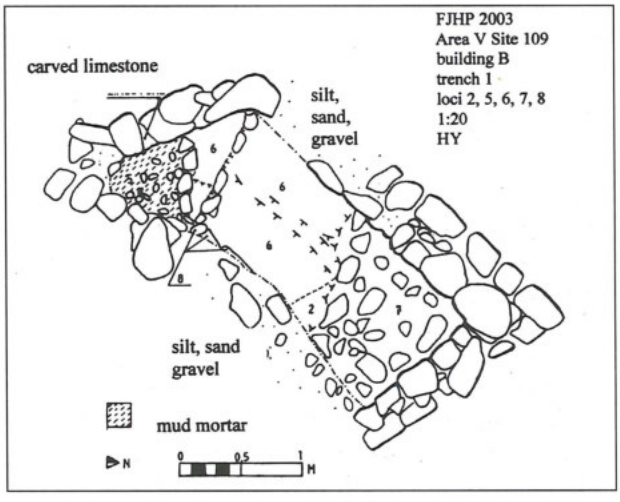
The remains of a small hamlet in Area V (Site 109) were documented during the 2000 season (Frösén *et al.* 2001: 372). The hamlet is located on a steep slope in the middle of the mountain, on the NE side of Jabal Hārūn. The building remains lay

on three natural terraces of a promontory between two ravines. In 2003, test trenches were opened inside two structures: Trench 1 in the NW corner of building B on the middle terrace, and Trench 2 on the N side of building A on the lower terrace. Trench 1 proved to be particularly interesting. The finds in trench 2 were limited to poorly preserved walls.

Trench 1 (**Fig. 8**) measured 2.5 x 1.1m was bordered by the walls on three sides. Locus 1 was a long-term natural deposition. The courses of uncovered walls were weathered and showed no working marks or plastering. Among tumbled stones, pottery and corroded metal artifacts were found, clearly in a secondary context. Locus 2 consisted of packed silty sand which contained bone, glass, shell, metal, pottery and rounded stone objects. Loci 3 and 4 contained small patches of hard-packed clayish soil and small stones, topped with even smaller stones and a mortar binder. Loci 6, 7 and 8 in the southern part of the trench might have belonged to a water reservoir.

During the excavation, it was noted that the masonry of the NW wall was of higher quality than the two other walls. This is rather peculiar, since it is an inner wall, while the other two face outside. The NW wall may possibly be an earlier, Nabataean wall reused during the Ayyubid-Mamluk occupation of the site. In addition to evident differences in the building architecture, pottery finds also support the hypothesis of the multi-period use of the building complex. This could also explain why wall lines are asymmetrical.

Additionally, Sites 149 and 151 (Area O; poorly preserved building remains) situated on the lowermost slopes of Jabal Hārūn, in the vicinity of the Wādī an-Naqb were investigated. Some wall lines can be interpreted as forming square-like structures



8. Site 109, Building B, Trench 1 (by H. Ynnilä).

ca. 3 x 3 and 5 x 5 metres in size. Remains that are similar in size, location and visibility have also been documented during the previous years (Frösén *et al.* 2000: 418). Some are found in connection with an ancient road passing through Areas T, W and H (Frösén *et al.* 2001a: 371, 381). The ancient road may also have passed by Sites 149 and 151, which could have been built in connection with that road.

Water Installations

Due to the steep gradient of the slopes and the heavily eroded environment, the hydraulic installations somewhat differ from those from the earlier fieldwork (Frösén *et al.* 1999; 2000; 2001a). But in general, the same kind of large, water-harvesting system is evident and comparable with systems widely found elsewhere in the Middle East and in Africa (Graf 1983: 654-655; Mayerson 1962: 231-246; Regner 2002: 267-278).

Only 5 clear barrage systems with 54 barrages were documented as sites in 2003. The small number of barrage systems can be explained by the topographical position of tributaries running down from the summit to the Wādī-an-Naqb. Several barrages, which are still visible, were built of huge stone blocks able to resist water pressure. The bottoms of wadis were eroded down the bedrock in almost all cases. The extent and degree of erosion gave the impression that the barrages are not very recent in date. This might support the hypothesis of their dating even to the Nabataean period (Lavento and Huotari 2002). In addition to the apparent barrages, two large terrace-barrages were also documented. Parts of these structures were clearly intended for keeping water in wadis whereas other, larger parts were meant to slow down flowing water and conduct it to terraces while depositing fertile soil there. These structures were usually broken in the middle where they crossed the tributary.

The most common hydraulic installations in the 2003 survey area were terrace walls (a total of 17) which formed a large-scale water management system spreading over the foothills of Jabal Hārūn. Their primary function was to stabilize the soil, but also to preserve water in the soil. It is currently difficult to estimate their total number or length. Because of their number, these structures were photogrammetrically documented and they will be measured later from pairs of stereo pictures. In general, the walls varied between 2m to over 40m in length and 0.5 to 1m in height. The state of preservation was relatively good on the eastern slopes of Jabal Hārūn, which may be due to both the gentle topography and the peripheral position of the

area. It is also possible that, on the gently sloping SW foothills of Jabal Hārūn, there are several terrace walls, which may have been used recently.

FJHP 2003 Survey Pottery

The pottery from the FJHP 2003 survey season can be roughly divided into two groups according to the surveyed areas. The pottery distribution in the lower survey areas, i.e., the southern and southeastern foothills of Jabal Hārūn, follows more or less the same pattern as in the areas surveyed in previous years: sherds are sparsely but evenly scattered throughout the slopes, and the principal types are Nabataean-Roman common ware with small quantities of Nabataean fine ware and later sherds. The foothill area also features large hydraulic installations (barrages and terrace walls) similar to those surveyed in previous years indicating a continuation of the agricultural area used by the Nabataean inhabitants. A preliminary analysis of the painted fine ware sherds collected suggests a dating in the first century AD.

As for the plateau and the NE summit of Jabal Hārūn (Area E), fairly small in terms of surface area, the pottery there was plentiful, comprising 60% of the total pottery collected. The types of sherds vary significantly more than in the lower slopes and foothills of the mountain. Although similar Nabataean-Roman pottery (mainly from the first century AD) was found in Area E, other periods and types were also represented. These include various Byzantine and Islamic types that are known from the excavation of the monastic complex. However, it is interesting to note that, according to a preliminary assessment, the sherds collected immediately around the monastery complex contain samples of imported vessel types that are rare or missing at the excavated site. For example, the survey yielded numerous pieces of African Red Slip ware, contemporaneous with the occupation of the monastery complex but very infrequently encountered within its walls. Further research is needed to determine a reason for this curious discrepancy.

A significant amount of coarse Ayyubid-Mamluk pottery was also collected, mainly in a small area on the NE summit. This type of pottery, characterized by geometric patterns, dates to the 12th century and is commonly found in the Petra area (e.g., 'Amr *et al.* 2000: 251). Another type of coarse, reddish-brown ware with mineral and organic inclusions was also found in rather large amounts and it resembles the Late Islamic "Mu'allaq ware" (Lindner 1996: 124-125). However, many of the Jabal Hārūn sherds feature taeniae marked by small, regularly pierced holes, which does not appear to be typical of Mu'allaq ware.

CONSERVATION REPORT

(Ch. Danielli)

During the past three seasons, conservation activities at the Jabal Hārūn site have been primarily concerned with stabilizing fragile finds and architectural elements uncovered during excavation. The guiding principle has been to treat and protect the most endangered remains while preserving the original building techniques and elements reflecting relative chronological phases. As more of the site is uncovered each year, a better understanding of the construction techniques and their relative chronology, as well as the testing of repair materials opened the possibility for a partial reconstruction of relevant architectural features at the site.

The structures most in danger of collapsing were the eastern wall (V), common to the church and the chapel. The intervention in this area consisted of dismantling the existing exterior eastern wall and re-erecting it by employing used masonry blocks from the site, bonded with mud mortar. Where it was possible, the original blocks were left in place, maintaining the height at the level found during excavation. This has produced an irregular surface line which is indicative of the level found during the excavation.

Other secondary structures, such as the buttress built on the SE corner of the atrium and the western wall of the chapel were also reinforced, as they were closely knit with the masonry of earlier phases and were threatening the stability of the adjoining walls. The method applied was the same used for wall reinforcements during the previous season. The original mud mortar found between the stone blocks was mixed with water and re-applied deep in the joints. After the partial setting of the mortar, a solution of 15% Syton was sprayed on the surface layer. This solution has proved extremely effective in the climatic conditions of the site. The plasticity of the clay, combined with the strengthening effect of an inorganic consolidant such as Syton X 30, allowed for a better stability of the mortar without having to use acrylic resins.

Another important feature of the site are the currently free standing rows of original columns running E-W along the nave of the church. During the excavation, some of these columns were embedded in the excavated soil and thus only partially collapsed, whereas in other cases the drums had already collapsed during earlier phases, and were

found dispersed in the soil or on the floor. As the base drums of these columns were found in their original positions, it seemed appropriate to partially re-erect a few of the drums to better illustrate the original plan of the church. In the case where the columns were found standing, the drums were dismantled and a selection of the least damaged drums was made, trying, where possible, to maintain the original position of the drums. In the case of the atrium columns, where most of the drums had already collapsed, only one or two of the better preserved drums were fitted on the extant base. The drums were cemented using lime mortar mixed with sand and a small quantity of white cement. The facing of the mortar in between the drums was left about 5 to 6mm from the surface to mark the conservation intervention.

Extensive areas of wall plaster were also uncovered during the 2003 season. The most important feature of these large fragments was the diversity of the aggregate and manufacture of the layers very close to each other if not overlapping, possibly indicating different phases. Although most of it was very fragile, it was important to preserve as much as possible the entire extension of the fragments as a whole to illustrate the different typologies of plaster within the same area. Injecting a liquid hydraulic mortar (Microlite) filled the large gaps, which had formed in many areas between the wall and the plaster layer. Where the layers of plaster were adjoining or overlapping, limewater was used to consolidate the fragments in order to maintain the original layers. The small lacunae of the plaster were then filled with a mortar made of lime mixed with local sand. Samples have been taken of the different plaster types and they are being analyzed in order to define a possible chronology of the phases.

The masonry altar pedestal in the chapel was excavated during the 1998 season. Immediately after excavation, the installation was backfilled and its surface protected with sand bags. It was uncovered again this season for a survey of its condition. Although the surface of the plaster covering the altar was in a stable condition, the partial exposure to the outside air caused a strong migration of salts towards the surface, especially in the small hollow compartment opening towards the east. Here the salts had formed very large spiky crystals which were extremely hard to remove mechanically. Moreover, the partial solidification of the salts between the masonry and the plaster layer had caused several large detachments of plaster which had to be carefully consolidated. Where the plaster was powdering behind the surface, a solution of 15% Syton X30 was injected. After the consolidation of the plaster layer (where necessary), the gaps between the masonry were filled with hydraulic mortar and pressed back into place with wooden props.

The correct assemblage of sample sections of architectural fragments back into place has not only permitted the effective protection of several collapsing structures at the site, but it has helped to put in clear relationship the building components and different phases of the site. In this way, the plaster and the related architectural finishing can be treated in situ and remain part of the features of the site.

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Bibliography

Alliata, E., and Bianchi, S.
1998 The Architectural Phases of the Memorial of Moses.

Pp. 150-191 in M. Piccirillo and E. Alliata(eds.), *Mount Nebo. New Archaeological Excavations 1967-1997.* Jerusalem: Studium Biblicum Franciscanum.

'Amr, K., Al-Momani, A., Al-Nawafleh, N., and Al-Nawafleh, S.
2000 Summary results of the archaeological project at Khirbat An-Nawafla / Wadi Musa. *ADAJ* 44: 231-255.

Bagatti, B.
1984 *The Church from the Gentiles in Palestine. History and Archaeology.* Studium Biblicum Franciscanum. Collectio Minor No 4. Jerusalem.

Ben-Pechat, M.
1989 The Paleochristian Baptismal Fonts in the Holy Land: Formal and Functional Study. *LA* XXXIX: 165-188.

Fiema, Z.T.
2001 Reconstructing Culture History of the Petra Church: Data and Phasing. Pp. 7-138 in Z. T. Fiema, C. Kanellopoulos, T. Waliszewski, and R. Schick (eds.), *The Petra Church.* Amman: ACOR Publications.

Frösén, J., Fiema, Z.T., Haggren, H., Koistinen, K., Lavento, M. and Peterman, G.L.
1998 The Finnish Jabal Hārūn Project report on the 1997 season. *ADAJ* 42: 483-502.

Frösén, J., Fiema, Z.T., Lavento, M., Koistinen, K., and Holmgren, R.
1999 Finnish Jabal Hārūn Project 1998: A preliminary report. *ADAJ* 43: 369- 410

Frösén, J., Fiema, Z.T., Lavento, M., Koistinen, K., Holmgren, R. and Gerber, Y.
2000 The 1999 Finnish Jabal Hārūn Project: A preliminary report. *ADAJ* 44: 395-424.

Frösén, J., Fiema, Z.T., Koistinen, K., Studer, J., Danielli, C., Holmgren, R., Gerber, Y., Heiska, N. and Lahelma, A.
2001a The 2000 Finnish Jabal Hārūn Project: Preliminary Report. *ADAJ* 46: 391-408

Frösén, J. Fiema, Z.T., Danielli, C., Studer, J., Gerber, Y., Keller, D., Jansson, H., Lindblom, J., Tenhunen, T., and Hertell, E.
2001b The 1998-2000 Finnish Jabal Hārūn Project: Specialized Reports. *ADAJ* 45: 377-92.

Frösén, J., Fiema, Z.T., Koistinen, K., Lavento, M., Holmgren, R., Gerber, Y., Mikkola, E., Ylönen-Peltonen, R., Heiska, N. and Lahelma, A.
2002 The 2001 Finnish Jabal Hārūn Project: Preliminary Report. *ADAJ* 45: 359-376

Frösén, J., Fiema, Z.T., Lavento, M., Danielli, C., Holmgren, R., Latikka, J., Rajala, A., Heiska, N. and Lahelma, A.
2003 The 2002 Finnish Jabal Hārūn Project: Preliminary report. *ADAJ* 47: 295-318.

GMD
1995 *Lithological map. Petra & Wadi al Lahyana.* 3050 I & 3050 IV. Scale: 1:50 000. Geological Mapping Division. National Resources Authority, Geology Directorate. Ministry of Energy and Mineral Resources, Hashemite Kingdom of Jordan.

Graf, D.F.
1983 The Nabateans and the Hisma: In the Footsteps of Glueck and Beyond. Pp. 647-664 in C. Meyers and M. O'Connor (eds), *Essays in Honor of D.N. Freedman, The Word of the Lord Shall Go Forth.* Winona Lake.

Kuijt, I. and Russel, K.W.
1993 Tur Imdai Rockshelter, Jordan: Debitage Analysis and Historic Bedouin Lithic Technology. *Journal of Archaeological Science* 20: 667-680.

Lavento, M., and Huotari, M.
2001 A Water Management System around Jabal Harûn, Petra – its design and significance. Pp. 93-106 in C. Ohling, Y. Peleg and T. Tsuk (eds.), *Cura Antiquarum in Israel.* Schriften der Deutschen Wasserhistorischen Gesellschaft.

Lindner, M., Knauf, E.A. and Zeitler, J.P.
1996 An Edomite fortress and a Late Islamic village near Petra (Jordan): Khirbat al-Mu'allaq. *ADAJ* 40: 111-135.

Lindner, M., Hübner, U. and Gentz, H.
2001 The Early Bronze Age Settlement of Umm Saysabān North of Petra (Jordan) and its Topographical Context. Report on the 1998/1999 Survey. *ADAJ* 45: 287-310.

Lindner, M. and Gunsam, E.
2002 A Fortified Suburb of Ancient Petra: Shammāsa. *ADAJ* 46: 225-241.

Mayerson, P.
1962 The Ancient Agriculture Regime of Nessana and the Central Negeb. Pp. 211-69 in H. D. Colt (ed.), *Excavations at Nessana*, vol 1. London.

McKenzie, J., Reyes, A. and Gibson, S.
2002 Khirbat at-Tannūr in the asor Nelson Glueck Archive and the Reconstruction of the temple. *ADAJ* 46: 451-476.

Negev, A.
1988 *The Architecture of Mampsis. Final Report. Vol II: The Late Roman and Byzantine Periods.* Qedem 27. Jerusalem.

Regner, H.J.
2002 Historical and Modern Use of Rainwater Harvesting systems in Egypt. Pp. 267-278 in C. Ohling, Y. Peleg and T. Tsuk (eds.), *Cura Antiquarum in Israel.* Schriften der Deutschen Wasserhistorischen Gesellschaft.

Rosen, S.A.
1997 *Lithics After the Stone Age. A Handbook of Stone tools from the Levant.* Altamira Press.

Wiegand, T.
1920 *Sinai.* Wissenschaftlische Veröffentlichungen des Deutsch-Türkischen Denkmalschutz-Kommandos, Heft 1, Berlin.