

THE 2002 FINNISH JABAL HĀRŪN PROJECT: PRELIMINARY REPORT

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The Finnish Jabal Hārūn Project (FJHP) carried out its fifth fieldwork season between August 3 and September 5, 2002. The project was directed by Prof. Jaakko Frösén, University of Helsinki. The archaeological excavations were supervised by Dr. Zbigniew T. Fiema, Dr. 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, 28 archaeologists, conservators and cartographers from Finland, Italy, Sweden and the United States took part in the 2002 fieldwork. Two DoA representatives assisted the fieldwork and up to 21 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, at a plateau ca.1250m asl., there is a Byzantine monastery/pilgrimage center dedicated to St. Aaron, and preliminarily dated to the later fifth through the seventh/eighth 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 2002.

CARTOGRAPHIC REPORT (J. Latikka and J. Jarvinen)

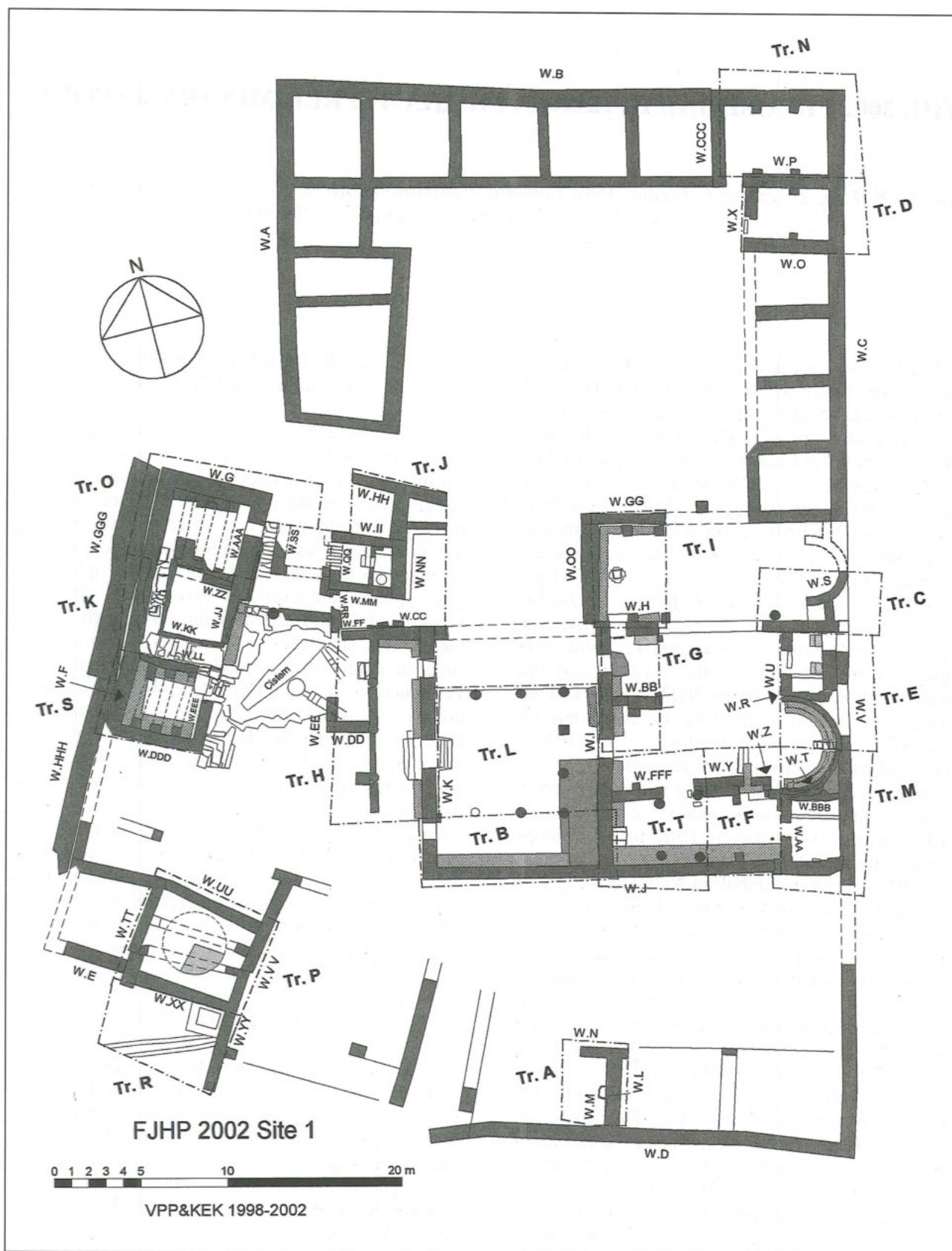
During the 2002 field season, the cartographic team continued to provide assistance in the recording of the excavated entities. The recording system based on the use of a tachymeter, with 3D readings downloaded every afternoon to the Project's database, was supplemented by digital imagery taken regularly in the excavation area. This year, special attention was given to the 3D documentation of the arch remains in Trench S, and the diverse structures in Trench T. Also the soil strata in Trench R were modeled. 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 2002, was to gather additional data in the excavated trenches, which could be used later, either in modeling 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 act also as a visual diary of the excavations.

EXCAVATION REPORT

The 2002 excavations at Jabal Hārūn were carried out in four trenches; one located in the church proper, one on at the western ridge of the site, and two in the SW and NE corners of the site, respectively (**Fig. 1**).

Trench N (A.Rajala, K. Hinkkanen, T. Tenhunen and M. Whiting)

This trench, located in the NE corner of the site,



1. Plan of the monastery, 2002 Season (by K. Koistinen and J. Latikka).

contains a room, which is a part of the complex of rooms surrounding the so-called North Court. These rooms probably served as a pilgrims' hostel. The excavation of Trench N had already begun in 2000 when the topmost layers were removed.

Phase I: Construction and Early Use

The room consists of four walls: Wall P (locus 5, southern wall), Wall C (locus 7, eastern wall), Wall CCC (locus 6, western wall), and Wall B (locus 8, northern wall). Walls C and B, probably the earliest, are bonded and together form the outer NE corner of the entire complex. Wall P abuts Wall C on its lower 5 courses and is bonded with it in the top course. Wall CCC abuts the three lowermost courses of Wall B, while bonded farther up. The doorway to the room is in the SW corner of the room, in Wall P. The lowest course of Wall P, which forms a step and a threshold (locus 34) made of sandstone blocks, bond with Wall CCC. Three surviving doorjambs projecting from Wall P indicate that the door opened inwards. Abutting Walls P and B are two pairs of corresponding pilasters (loci 9, 10, 11 and 13), which must have supported N-S arches carrying a roof over the room. The walls and the pilasters have been built on the bedrock with a thin layer of mud mortar in-between. Due to the uneven surface of the bedrock, a thicker layer of mud mortar and some flat, leveling stones were used in the construction of Wall P and the pilasters abutting it. The bedrock was leveled with a layer of hard packed soil with pebbles (locus 31), presumably forming a bedding for the original floor. The floor itself was already removed in antiquity.

Phase II: The Remodeling

A possible seismic (?) destruction caused damage to the room after which the upper courses of the walls were rebuilt so that Walls P and CCC were now bonded with Walls B and C. It is likely that the doorway still served as a passage to the neighboring room in Trench D and to the other parts of the complex. The pilasters were still standing though it is uncertain whether they were used as before, or remodeled as in the room in Trench D, where the arch springers were probably built only after the first destruction. The remains of the original floor were removed and replaced with a beaten earth floor (locus 30), which served as a living surface while leveling the bedrock. Characteristic of this phase are series of thin, tightly packed occupational surfaces (loci 21, 25 and 28) with evidence of food preparation and consumption, such as bones of mammals and birds. Two table-like structures, made of sandstone and roof tiles, were ex-

posed next to Wall P (loci 22 and 29). A circular fire pit (locus 27) was also found located in the centre of the room as well as a quite extensive fireplace (locus 24) next to Wall CCC. Ceramic material included sherds generally dated to the fifth and sixth centuries AD.

Phase III: Disuse(?) and Later Occupation

Possibly, the area was temporarily abandoned for unknown reasons. The structure had probably lost at least parts of its roof in this phase, as indicated by the thick layers of wind-blown soil (loci 17 and 18). Concentrations of ash and charcoal and traces of possible fireplaces (locus 20) were encountered, as well as scattered specks of charcoal mixed with soil. Concentrations of bones were found in both loci 17 and 18; a quite extensive deposit was situated next to Wall P (in locus 18). Perhaps, the dirt was swept aside after food preparation as most of the ashy patches of soil were found near the walls. The bone material consisted mainly of fish bones and scales, as well as bones of birds and fragments of eggshells. The finds from loci 17 and 18 included some metal objects such as a spatula and a badly corroded spearhead. Three circular (ca.0.2m in diameter) stone plates were found, probably related to food preparation. The doorway was probably still used though not its original threshold. Instead, it seems that the soil in the passageway had accumulated over time at the same pace as the floor levels (loci 17 and 18) inside the room. Corresponding with the top level of locus 17, there was also a beaten soil layer (locus 26) in the passageway, with some flat stones on the top, which seemed to form a roughly leveled passage to the room in Trench D where the floor and threshold levels had also risen over time.

Phase IV: Temporary Occupation

An unknown destruction affected the room causing the upper parts of the walls to collapse both inside and partly outside of the room. The passageway in the SW corner of the room was blocked by a stone tumble (locus 19). The arches also collapsed then. Compared to Phase III, fewer fireplaces and traces of food consumption were found. Bone material consisted mainly of fish in loci 15 and 16.

Phase V: Latest Activities and Abandonment

During this phase, the room was apparently used as a wind shelter. A buttress (locus 2) was built to keep Wall P (locus 5) from collapsing. It is also possible that the upper slabs of the buttress served as some kind of passageway to the southern parts of the complex. Wind-blown sand (locus 1) and eroded

stone material formed the uppermost deposit within the trench.

Trench R (R. Holmgren, M. Holappa and K. Juntunen)

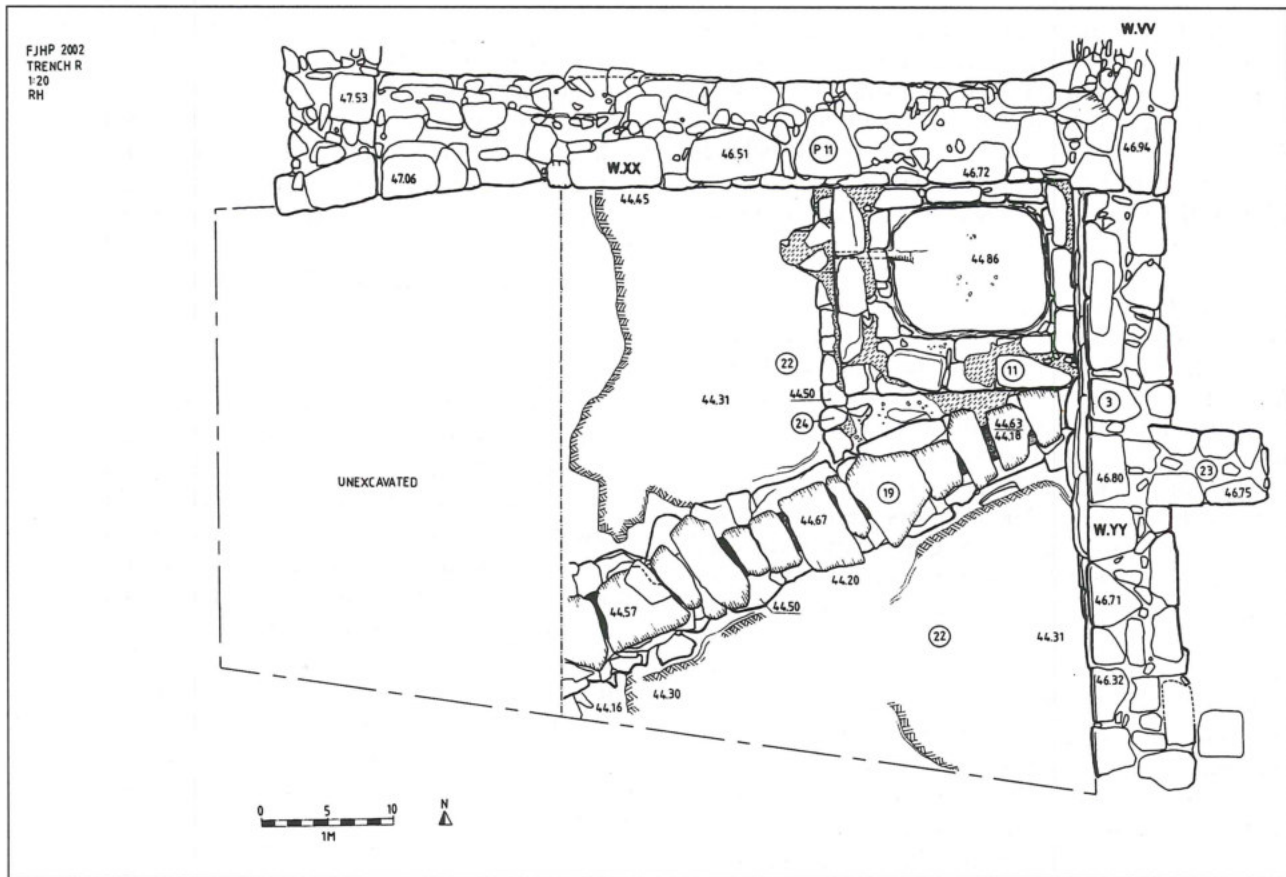
Trench R is situated in the SW corner of the monastic complex, partly along and west of Wall YY (locus 3), framing one of the supposed major entrances to the complex. The trench is directly south of Trench P, separated from it by a still high standing Wall XX (locus P.11). The selection of this excavation unit was largely influenced by the finds from Trench P in 2001 — large and noteworthy amounts of fish bones and scales found in the upper strata of an ancient midden, which was only partially excavated then. It is still difficult to determine whether Trench R is located outside the main walls of the monastery but the accumulations of rubble in this area seem to make a L-shaped turn along the walls further west, connecting it to the rubble that covers the scarp of the western facade. After removing the topsoil and exposing a vast number of fallen stones deriving from Wall XX, the size of the trench was reduced to ca.5.25m E-W by ca.3.7m N-S (Fig. 2).

A channel cut into the bedrock is the first evidence of activities in this area. It runs in a NE - SW direction. Its original purpose is uncertain but should indicate that there might be an installation for collecting water further to the SW and still undetected. At this point of time, the channel might have been an open trough cut in the bedrock, differing from the capped and stone-lined water conduit it became later on.

Phase I (a, b, c): Early Constructions

The earliest construction here was Wall XX (locus P.11), built in an E-W direction. Phase Ia refers to its lower courses, while Ib marks the rebuilding of its upper courses, all built using relatively well-hewn sand- and limestone blocks directly on the bedrock. Probably, the wall constituted the original SW limit of the monastery.

Sub-phase Ic marks the erection of the eastern wall (YY, locus 3), immediately followed by the construction of a platform (locus 24) supporting a basin (locus 11) built in the corner of Walls XX and YY (Fig. 3). At the same time the eastern part of the rock-cut channel was modified by adding capstones and internal lining slabs (locus 19). The



2. Top plan of Trench R (by R. Holmgren).



3. Basin and water channel in Trench R (by J. Vihonen).

eastern, modified part of the channel and the platform were abutting each other in a manner indicating their contemporaneity. The platform, a limestone and mud mortar construction, supports a basin ca.1.6 x 1.82m. The latter has a small, piped outlet in the central bottom of its western wall to empty the contents through its western side. The interior of its rather thick walls is covered with remains of watertight plaster, and the quite sturdy construction suggests some kind of industrial use. South of this installation are traces of plaster on the ashlar of Wall YY. The plaster seems to have lipped out onto a feature that was once located here but is now missing. Since there are indications that Wall YY forms the western frame of a major access to the site, further excavations towards the west and east are needed to verify the relative construction chronology of Phases Ia, b, and c.

Phase II: Modification of the Channel

With the basin seemingly still in use, a further modification of the channel took place. A part of the early channel (Phase Ic) seems to have been removed, leaving only the segment built together with the platform, locus 24. A large foundation trench (loci 18 and 14), partially cut through loci 17 and 21, was dug along the northern and southern sides of the channel. For unknown reasons earlier stones Channels were replaced by oblong boulders standing on the edge of the trough to support larger capstones (locus 19). Apparently, the interior of the channel was meant to be accessible as the capstones do not feature any clay or mud mortar. Locus 18 is also connected to the base of the platform, suggesting that this construction was also

modified.

Phase III: Latest Use of the Basin and its Abandonment

The basin went out of use sometime in Phase III, even though the channel might have continued to serve its purpose beneath the accumulated layers covering it. Greenish soil, locus 15, is the first deposit around this installation, probably containing material or substances related to the last use of the basin. Within and on top of this stratum, broken parts of the basin were found indicating that the installation could no longer hold any contents. It may be that the latest use of the basin involved dyeing cloth. Vast amounts of purple colored seashells were found accumulated in locus 15, directly west of the basin. Only the inner and spiral core of the seashells are present and the rest appear to be deliberately cut away.

Phase IV: General Disposal Place

Sub-phases IVa and b clearly indicate that, after the final industrial activities, the area was became a general disposal place.

IVa - Soil locus 10, ca.0.5, thick, covers the entire trench leaving only the upper edges of the basin visible. The material found in this locus is particularly important for the general phasing of the church and the entire site as it represents evidence for intentional dumping of destruction and demolition material, such as large amounts of charcoal, plaster fragments, and iron nails besides burnt fragments of glass lamps and marble pieces. Visually, the mixture of these and pottery is identical to the fill found inside the partition (Wall I) erected to di-

vide the church after the first major destruction. The contents of locus 10 imply that the collapsed and burnt roof construction was partly dumped here before restoring the church. If so, Phases I-III in the history of area contained in Trench R would coincide with Phase I in the history of the church (for the preliminary phasing of the church, see Fie-ma and Holmgren 2002).

IVb - During this sub-phase, loci 9 and 5 (almost ca. 1.3m thick altogether) were dumped on top of locus 10, covering almost the entire space in the trench. The strata should be interpreted as the refuse disposed of during Phase II of the church. Locus 9 shows no distinct change in the matrix compared with locus 10 below and locus 5 above it, although the finds decreased in intensity. For this reason, much of the destruction material is found in lower locus 9 and the slow alteration of the finds between these loci imply a longer time-lapse with no crucial changes. Large quantities of pottery and bones dominate both these loci, although an intensification of pottery finds begins in locus 9. Many fragments of burnt cooking pots were found in these loci in addition to large numbers of unburned mammal bones. The latter is perhaps the most significant change, more comparable to the material deposited later (Phase V), when bones of fish dominate.

Phase V: Fish Bone and Scale Midden

Loci 6 and 7, clearly of a midden character, contained a vast amount of bones besides some basic food preparation installations. Fish bones from Parrotfish (*Scaridae*) dominated beside some other fish bones and eggshells. Locus 6 can probably be interpreted as representing sub-phase Vb while locus 7 would relate to Va. But in order to better understand the nature of deposition and its interpretation, it is instructive to describe locus 6 first, which is the later of these two deposits. During the 2001 field season, the excavations of the southernmost part of Trench P produced great quantities of fish scales and bones. These appeared at a depth of about 0.5m from the surface, close to the southern face of Wall XX. The location near to the surface of these finds indicated that the last use of this midden should be connected with the later phases of the monastic complex, perhaps even extending into the post-monastic period at the site.

The 2002 expansion into the midden (in Trench R) revealed the remains of a simple installation, parts of which were already visible in 2001. It consists of four flat stones forming a small platform, and leaving a flat, rectangular space in the middle. Two

boulder stones were attached to its eastern side. At the same level, ca. 2m SE, a similar but smaller construction could be seen along Wall XX. The interpretation for these installations (all in locus 6) besides the concentration of other flat boulder stones (some with a 0.4 x 0.2m cupped hollow) indicates some kind of food preparation installations and activities. The fish bones and scales were all scattered around these installations. A tentative interpretation of locus 6 would suggest that pilgrims brought ritual meals of fish and eggs during pilgrimages to Jabal Hārūn, either toward the end of the monastic occupation at the site, or when the monastery was no longer in use. Notably, fish bones mixed with eggshells in connection with fireplaces are documented elsewhere at the site and are usually associated with the phase immediately before the final collapse of the main walls. This is also supported by the fact that the upper layer of locus 6 is resting against the third and highest standing level of stones in Wall XX. These must represent the latest repairs to the wall, strikingly different from the lower parts of the same wall, which represent Phases I a and b. Apparently, the food preparation activities must have lasted for some time as locus 6 entirely covers the installations mentioned above. The top of locus 6 is relatively even — probably the last attempt to keep the surface horizontal before the subsequent natural depositions of soil created a slope.

Locus 7 is the earlier part of the midden, which represents the same activities performed before locus 6 was deposited. Locus 7 was first visible only in the NW part of the trench, surrounded by the lower strata of locus 6. However, locus 7, which, incidentally, contained even larger quantities of fish bones, also produced two separate concentrations of ash and scales/eggshells. This earlier part of the midden stretched over the entire E-W length of the trench. In fact, a reversed accumulation was created through the deliberate leveling of the surface of the upper deposition (locus 6), in order to facilitate the food preparing activities. Loci 6 and 7 thus remain contiguous farther south in the trench even through locus 7 is earlier in date.

The larger content of mammal bones in locus 7, as compared to locus 6, is notable. No traces of fire were detected on the bone fragments and therefore it seems likely that the meat was cooked in vessels, an observation supported by large quantities of cooking pots and ashy deposits in locus 7. If locus 6 is regarded as representing a phase with monastic activities no longer attested, locus 7 probably relates to the last formal occupation of the complex when fish dominated the monastic diet.

This may also be reflected in the quantities of cooking pots and the mammal bones contained in locus 7.

Phase VI: Final Abandonment and Collapse

Besides the colluvial material (locus 1), the two uppermost strata are loci 2 and 4, both containing stones fallen from the surrounding walls. If locus 6 is indeed the final human-made deposition, related to the latest pilgrim traffic, then locus 4 and the subsequent locus 2 have both accumulated after the abandonment of the site. However, within the windblown and silt material of locus 4, some boulders were lined up in an N-S direction, probably remains of a casual visit. The remains of the collapsed Walls XX and YY were found in two distinctive concentrations along the respective and still standing lower parts of these walls, with the associated pottery (no later than the seventh century AD) originating from their interior fills.

Trench S (N. Heiska, P. Miettunen and H. Kuisma)

Trench S is located on top of a NE-SW high ridge at the western part of the site, directly south of Trench K excavated in 2000. The structure uncovered in Trench S forms a part of a composite building complex (Trenches K and O), which possibly represents the oldest standing structure at the site, presumably dated to the Nabataean-Roman period. Unfortunately, even the relative dating of the structure in Trench S is still unclear in relation to the structures on the western ridge, although the structural connection among these is apparent. To expose the western wall (F, locus 6), the trench was expanded westwards, and another wall, apparently supporting Wall F, was discovered. This new, composite wall consists of a sloping stone facade (loci 43 and 44; marked as Walls GGG and HHH respectively) and a fill (loci 42 and 45) between it and Wall F. In the south, the wall is narrower (1.1m), but after a right-angled offset, it protrudes by ca. 1.6-1.7m from Wall F. The depth of the sloping wall is unknown; so far it is ca. 1m deep. The angle between the horizontal and the face of the wall is 55 degrees. This wall may be the first monumental late structure uncovered at Jabal Hārūn site, as it resembles a *glacis*, the sloping lower part of a defence wall, typical of the Crusader period. The purpose of such structures was to strengthen the main walls against earthquakes and siege engines (Kennedy 1994: 158). Wall GGG-HHH was definitely built after Wall F as a layer of plaster originally covered the western face of Wall F. Its

close proximity to the edge of a deep precipice of the plateau would largely exclude its purely defensive character. It is more likely that this wall was erected to reinforce the existent Wall F against natural destructive phenomena, such as earthquakes. At this point, it is impossible to date the wall, but its construction might have been associated with Phases III or VII.

Phase I: Initial Construction and Use

The room in Trench S included four walls: DDD, F, LL, and EEE (loci 5, 6, 7, 15 and 38), the triangular corner support (locus 23) connecting Walls F and DDD, and three arches represented by the remains of the arch springers (loci 9, 10, 11, 12, 13, and 14). Remains of plaster surfaces were detected on all walls. These were well preserved on the eastern surface of Wall F directly above the bench (locus 30) and behind it, where at least four separate layers were counted. The bedrock was leveled with a fine rubble layer, ca. 0.4m deep in places, but in the NE corner, the stone floor (locus 32) was laid out directly on top of the bedrock. The floor covered all the area within the walls, and the entrance to the room was located in the NE corner, in Wall EEE. The building might have had a second floor. The function and the date of construction are unclear, as the finds were scarce and difficult to date.

To the east of the room, some additional building activity could have already taken place during this phase or later. The surface of the courtyard was leveled with soil (locus 41) and paved (locus 40), and a staircase (locus 17) descending northwards was constructed adjacent to Wall EEE. However, the top of the staircase was destroyed and thus its purpose is unknown. Still later, for some unknown reason, the courtyard was paved again (locus 18) with a soil fill (locus 39) between the two stone pavements.

Phase II: Construction of the Benches

At some point, three benches or bed platforms (loci 29, 30, and 31) were built against Walls LL, F and DDD, on top of the floor. Their integrated structure suggests that they were built together. Their width is ca. 0.8m and the height varies from 0.35 to 0.5m. They seem to be too wide for benches and thus could have been used as beds. Hirschfeld (1993: 366-367) suggests that a similar room type with two adjoining beds found in the monastery of St. Euthymius might have been an infirmary, which was common in larger monasteries. However, this suggestion cannot be confirmed.

Phase III: Remodelling and Continuing Occupation

Phase II appears to have ended with some kind of disaster — perhaps resulting in a partial destruction or intentional demolition of a part of Wall EEE, in the NE part of the room. Seemingly, the function of this space was now altered to be that of a shelter and/or cooking space. This phase can be further subdivided:

IIIa - The doorway in Wall EEE was blocked (locus 37) and the doorjambs, if present before, were removed. The blocking, together with loci 35 and 36, was used as part of the foundation of a new staircase (locus 8), which ascended westward from the central courtyard to the bottom landing of staircase (K.09) through the NE corner of the room in Trench S. To access the room, one had to step one or two steps downward from the staircase through the gap in Wall LL in order to reach the floor level. The eastern end of the bench (locus 29) could also have been used as a step. On the eastern side of Wall EEE, a support structure (locus 16) was erected to strengthen the wall. It is partially on top of the staircase (locus 17) narrowing its lower part, but not preventing its use. The rest of the room continued without major changes.

IIIb - The floor of the room might have been damaged at the end of Phase II. At any rate, it was now broken and not repaired again. Instead, the center of it was used as a convenient place for large fireplaces, first locus 33 and later locus 25. It is also possible, that the floor was still undamaged and the heat eventually broke it. Flat small stones were used in both fireplaces, possibly to form surfaces for pots. The depth of ash deposits was ca.0.15m (locus 33) and 0.4m (locus 25), so the fireplaces appear to have been in use for a longer period. The other parts of the floor were not swept clean, and the soil layer (locus 26) accumulated there. Still later, a small fireplace (locus 28) was constructed directly adjacent to Wall EEE, some of the stones of which show signs of burning. Then the landing of the staircase (locus 8) was destroyed or partially demolished and a roughly built stone structure (locus 27) built adjacent to Wall EEE. Although lower than the benches/beds, it has the same form, so it may have served as a fourth bench by a fireplace. The access to the room was still from the NE corner. The roof must have been at least partially destroyed at this point or earlier, for the smoke produced by the fireplaces needed an outlet. Only very few roof slabs and almost no voussoirs were found in the upper collapse layers, perhaps because these had been already cleared away by this stage. Again,

the finds were scarce and the few pieces of pottery seem to be mixed.

Phase IV: Abandonment and Gradual Deterioration

The room was abandoned during this phase. A layer of fine wind-blown soil (locus 22) accumulated on the floor. A small fireplace (locus 24) in the NE corner indicates some activity, but in general the surrounding structures began to deteriorate, as demonstrated by the presence of occasional stones in the soil layer. This process soon intensified, as represented by a layer of fallen stones (locus 21), and a loosely packed layer of wind-blown sand (locus 20). The edges of the stones were rather sharp, so it seems likely that they were not exposed to the weather for long.

Phase V: Major Collapse

A great part of the structure, including some or all arches, came down forming a thick, rather intensive stone tumble, locus 19. As only a couple of voussoirs and very few roof/ceiling slabs were found, they must have been taken away and reused elsewhere, probably already in Phase III.

Phase VI: Natural Deposition

A thick (1.3m max.) layer of wind-blown sand (locus 4) accumulated on top of the stone tumble, while the structure itself continued to deteriorate. There were very few finds, indicating minimal human presence. The ceramics found seem to have originated from the interior fill of the collapsed walls.

Phase VII: Casual Occupation or Construction Material Dump?

By this phase, the accumulated soil and collapse layer inside the structure was almost 2m thick but some sort of human activity seems to have occurred on top of this deposit. An enigmatic installation was constructed in the NW corner and an oil lamp was found in the vicinity. The curious E-W running stone ridge (locus 2) detected on the surface of the trench may be the remains of a wall or stone material dump accumulated here for the construction of Wall GGG-HHH. On the other hand, both loci 2 and 3 may represent the remains of the last collapsed structures and thus the new wall might have been erected already during an earlier phase.

Phase VIII: Latest Deposits

The topsoil (locus 1) is a naturally deposited,

medium-hard layer. There were no further signs of human occupation.

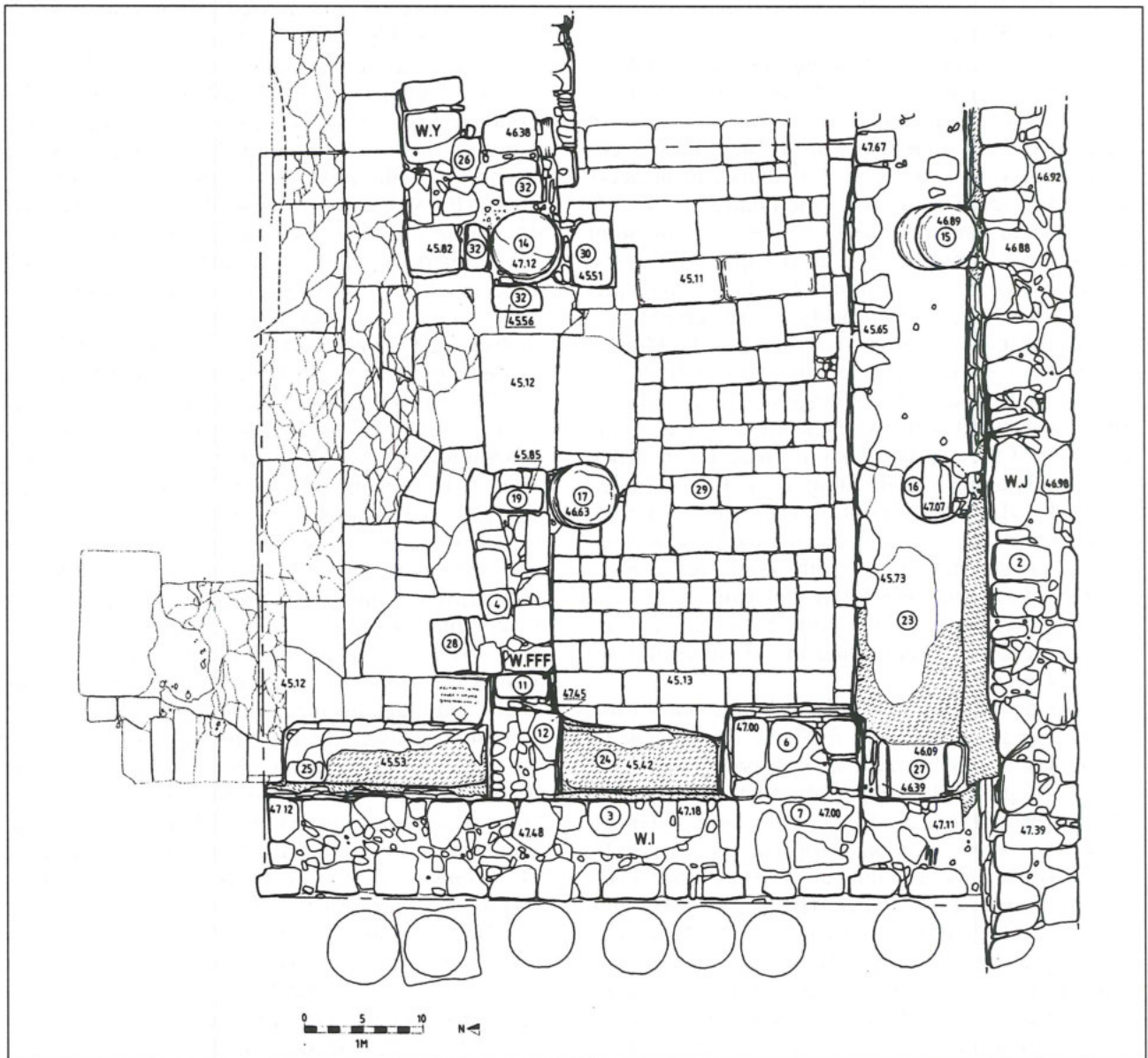
Trench T (A. Lahelma, V. Holmqvist and S. Santavuori)

Trench T was opened in an area limited by the previously excavated Trenches F and G, in the east and north respectively, and in the west by the wall which later subdivided the church (*infra*). The trench falls mainly within the southern aisle of the church, also including, however, the southern part of its nave (Fig. 4). The total size of the trench was ca. 6 x 7.1m. In addition to the confirmation of the basic phasing of the church, as previously developed, the fieldwork in Trench T has produced a wealth of information concerning the finer details

of the building history of the church.

Phase I: The Early Church

Phase I represents the original construction and use of the church. The still visible structures from this phase in Trench T are the southern wall of the church (J, locus 2) and parts of the marble floor (locus 29). The floor bears evidence of several repairs, but the original pavers were large marble slabs (ca. 1 x 0.6m) arranged in straight rows running E-W. The roof would have been supported by two colonnades likewise running E-W. Two columns of the southern colonnade should have stood in the area of Trench T. A sounding made in the place where the easternmost of these would have been located produced no meaningful results, probably because the



4. Top plan of Trench T (by R. Holmgren).

floor in this part has been repaired on several occasions. A second sounding, made in the bench now visible along the southern wall, produced evidence of an earlier bench which was narrower than the extant one, and probably built in Phase I, as the large marble slabs of the floor have been laid out abutting the earlier bench. Phase I ended with an earthquake, probably associated with a fire that brought down the columns, broke most of the marble floor and in general, left the church in ruins.

Phase II: The Later Church

The damaged structures were repaired in Phase II. However, the church in that phase was shorter and, with the rich marble furnishing now mostly broken and reused in secondary places, probably more modest in appearance. Phase II can be divided into two sub-phases.

Ila - The church was divided into two parts by Wall I (locus 3) separating the church proper from an open courtyard (atrium). Among the three doors in this wall, the southern lies in Trench T. The colonnades were replaced by the pillars and pilasters that supported E-W arches. One pilaster (locus 12) and one freestanding pillar (locus 19) were found in this trench. Curiously, the third support from the west turned out to be a column (locus 14), not a pillar. Neither this column nor the entire support system in this phase is on the same line as the Phase I columns, as the line was now moved slightly to the north. The reason for this change will, hopefully, be fully understood with the excavation of the northern aisle of the church. Also in Phase Ila, benches were built along the dividing wall; two of these (loci 24 and 25) were built on each side of the pilaster (locus 12). The damaged marble floor was repaired, where necessary, with small rectangular marble slabs, undoubtedly cut out from fragments of the broken Phase I floor. Numerous fragments of this material were also found in the fill of the dividing wall.

Iib - Relatively minor additions were made to the supporting structures later, in Phase Iib. Similar to the situation in Trench G, an extension (locus 11) was built against the supporting pilaster (locus 11) with a fine, curving plaster covering both. Whether it served as an additional support for the arch, which had become unstable, or for some other (decorative?) purpose is unclear. The stone installation (locus 32) built around a column (locus 14) is most probably associated with this phase. This consists of three stones, plastered on the outside, and placed so that they form (in horizontal perspective) a decorative, cruciform base for the column. The fourth

stone of the "cross" is missing. Perhaps it was removed later on to make room for the pilaster (locus 30) that now stands there. Phase II ended in a destruction, which, again, brought down the arches of the building.

Phase III: Late Remodifications and Non-Ecclesiastical Occupation

Like the previous phase, Phase III represents a period of rebuilding after a destruction and can be divided into two sub-phases: IIIa and IIIb.

IIIa - The major change was the redirection of the roof supports. Instead of following the previous E-W line, the arches now run N-S. The pillars of the previous phase were abandoned and new supports for the arches built. The supports were made rather unsystematically with reused material such as column drums (Fig. 5). Four of these lie in Trench T - three columns serving as pilasters (loci 15, 16 and 17) and one pilaster built of ashlar (locus 30). The southern aisle of the church was now turned into a separate room by building two dividing walls (loci 4 and 26, Walls FFF and Y) between the pillars of Phase II, with a doorway in the middle (between loci 19 and 32). The blocking (locus 7) of the Phase Ila southern side-entrance to the church is probably associated with this phase. Again, repairs were made to the floor (locus 29). As large-sized marble slabs were no longer available, sandstone and limestone slabs were used. Furthermore, a pilaster (locus 28) was built on the western side of the new dividing wall (locus 4). Its corresponding pilaster, for a 3.9m long, N-S arch spanning the nave, stands in Trench G. Finally, a bench (locus 23) was built along the southern wall, around the columns-cum-pilasters erected there. This bench is both higher and wider than the Phase I bench, and possibly having a different function, perhaps as a sleeping rather than sitting installation.

IIIb - The only major structure to be built in Phase IIIb is the installation, locus 6 — a robust "cupboard" built against the door blocking (locus 7). As it is built abutting the door blocking and partly on top of the plastered surface of the bench (locus 23), the "cupboard" must be later than these two, but its size and a certain quality of building technique associate it with Phase III rather than the following one. Finds from the soil (locus 20) inside the "cupboard" included large fragments of plaster and pieces of broken glass but nothing that could shed light on the original purpose of the installation.

Possibly associated with Phase III is the buttress or revetment (locus 31) built against the exterior of the southern wall of the church. It could be related



5. Trench T-the southern aisle of the church, view from E (by J. Vihonen).

to seemingly similar buttresses in the area of the church: a buttress built against the dividing wall of the church and a revetment built against the northern wall of the chapel. It may, therefore, be a part of an anti-earthquake support system. It appears that Phase III ended with a partial destruction of the building. The damage was not extensive, for at least the arches of the southern aisle were left standing and the floor here was not much damaged. However, the arches that spanned the nave do seem to have collapsed directly onto the marble floor.

Phase IV: Temporary Occupation

The destruction that ended Phase III probably ended the permanent occupation of this part of the monastic complex. Some collapsed stones in the nave were cleared, but the floor was not repaired again. Several depressions in the floor mark places where stones fell, and one stone near the eastern balk was found still embedded in the floor. There was practically no soil between the stone and the pavers, meaning that the building was probably still in use when the earthquake hit. The following occupation has all the characteristics of temporary occupation. The ruins still provided some shelter and at least parts of the roof were still standing. Fireplaces were found directly on the floor in the southern aisle and the nave. Fine soil began to accumulate on the floor (loci 21 and 22). In places, this soil was very hard packed, perhaps through trampling. The few finds include some flints (used for making fire), pottery and bones related to the fires made on the floor. Probably associated with

this phase is a poorly built, unidentified installation made of mud mortar, marble and sandstone slabs (locus 27) in the SW corner of the southern aisle. Like elsewhere in the church, some reusable material (marble and glass fragments) were collected and stashed in this phase. Some of this material was found inside the “cupboard” (locus 6). A large marble slab resting on top of the bench (locus 24) was probably also placed there in this phase. Approximately 0.1-0.15m above the floor level was remains of charred roof beams both in the southern aisle and the nave. These may relate either to a fire at the end of Phase III, or that the previously burnt roof beams had finally collapsed onto the floor. Soon afterwards the area was finally abandoned.

Phase V: Abandonment

Phase V represents the accumulation of thick layers of stone and soil inside the church. Two sub-phases can be distinguished.

IVa - Relatively sterile soil (loci 13 and 18) accumulated on top of the layer with charred roof beams. Some large stones among the soil testify to the slow decay of the surrounding structures.

IVb - A major earthquake hit the already decayed and weathered ruins of the building, producing a thick layer of intensive stone tumble (loci 5, 8 and 10). The arches spanning the southern aisle fell now, as did the column (locus 14), which had been standing to its full height (3.8m) up until now.

Phase VI: The Latest Deposits

This phase represents the final deposition of

wind-blown soil and some stones (locus 1) falling from the decaying ruin. A fireplace (locus 9) in the SW corner of the southern aisle testifies to some fleeting human activity, as do some finds of bones and pottery. However, most finds made from locus 1 probably derive from the fills of the walls, in particular that of the western wall.

Inscription from Trench T (J. Frösén)

An inscribed marble slab was found *in situ* integrated with the floor of the nave in Trench T (Fig. 6). Its location implies that the slab should belong to the original flooring of the nave, associated with Phase I. Specifically, the slab is in the corner between the pilaster (locus 12, Phase IIa), its later extension (locus 11, Phase IIb) continuing farther westward as Wall FFF (locus 4, Phase IIIa), and the bench (locus 25, Phase IIa) built against Wall I. The pilaster and its extension (loci 12 and 11) partially stand on the inscribed slab, and the plaster applied to the side of the bench is lipping out on the surface of the slab.

The location of this slab is mirrored by the location of another inscribed slab found in Trench G in 1999 (Frösén *et al.* 2000: 411). Both slabs feature a circular depression on the surface, associated with small semicircular extensions at each of the four cardinal points. The depression was probably carved for facilitating the attachment of a metal object, a cross or a bowl (*infra*), rather than to attach a lifting ring to the slab. The slab in Trench G is also only partially visible (obscured by later, secondary walls) and of approx the same size (ca.0.5 x

0.45m). Thus both slabs seem to form a meaningful pair, symmetrically located on each side of the main E-W axis of the church. Contrary to previous suggestions, the slabs do not seem to have been originally tombstones, later reused as parts of pavement. They appear to be in their original position even if their text is readable looking from the east, and not from the west, as is usual to facilitate reading by people entering the church. The text from Trench T features three lines in Greek, rendering a part of the Septuagint version of Psalm 29:3 (= 28:3. in the Septuagint).

†ΘΘCTHCΔOΞHC E
BPONTHCHNKETII
YΔATONΠOΛΛON†

There are some misspellings of the short/long vowels: ll. 1–2 EBPONTHCHN for EBPONTHCEN and l. 3 YΔATON ΠOΛΛON instead of YΔATΩN ΠOΛΛΩN. The horizontal abbreviation line of the *nomina sacra* has been omitted on l. 1 ΘC = θ(εὸ)ς and l. 2 K = κ(ύριος).

†θ(εὸ)ς τῆς δόξης ἐβρόντησεν, κ(ύριος) ἐπὶ ἰδάτων πολλῶν.†

†“The God of glory thunders. The Lord over many waters”†

The script can be securely dated to the fifth century, if not to the latter half of the fifth century, according to Dr. Erkki Sironen (2003, pers. comm), who also identified the text. This dating would fit perfectly the previously proposed dating of Phase I



6. Inscription from Trench T (by J. Vihonen).

of the church.

Quotations from Psalm 29:3 (= 28:3. in the Septuagint) are epigraphically attested 15 times, sometimes together with the passage from Isaiah 12: 3 (or a part of it): και ἀντλήσετε ὕδωρ μετ' εὐφροσύνης ἐκ τῶν πηγῶν τοῦ σωτηρίου. "With joy you will draw water from the wells of salvation." Only twice has the latter been found without the Psalm 29: 3 (Feissel 1984: 226, 229, 1976: 168-172; 1980: 338)¹. The text from Trench G cannot be a part of the Isaiah citation, as corresponding to the inscription from Trench T. So far, the Trench G text cannot be identified as a specific Biblical passage, while it may somehow refer to the same topic. Notable in the inscription from Trench T is the fact that the first sentence of Psalm 29:3, φωνὴ κυρίου ἐπὶ τῶν ὑδάτων, "The voice of the Lord is upon the waters;" is missing whereas it is always present in the epigraphic parallels, and in most cases is the only sentence cited. The second sentence, ὁ θεὸς τῆς δόξης ἐβρόντησεν, "The God of glory thunders" is attested only twice; on one occasion together with the first sentence, on a bronze vase in Florence (CIG 8938), and the second time, on a stone slab from a baptismal font from Caesarea in Palestine in the Haifa Museum. The third sentence, κύριος ἐπὶ ὑδάτων πολλῶν "The Lord over many waters". has been attested before only in one inscription, in a cistern at Salamis (Cyprus). Among the 17 parallels, 7 had been written on cisterns and basins (3 from Palestine, 1 from Cyprus and 1 from Asia Minor) and 10 on vases. Out of the latter, five were on large marble vessels probably originating in Constantinople and the other five on smaller bronze or lead vases. There are also some unpublished examples in the Metropolitan Museum, New York, in the Hermitage Museum, St. Petersburg, and in Berlin (Feissel 1984: 226, 229; 1976: 168-172; 1980: 338)¹.

The function of the incised slabs from Trenches G and T is enigmatic. However, the reference to water and the possibility that there might have been vessels set in the depressions in these slabs are significant. An intriguing parallel is provided by the marble crater with panther handles found in the Petra church (Fiema 2001: 89-90; Herrmann 2001: 337-9). This vessel was found broken, apparently *in situ*, in the fourth intercolumnar space, i.e., almost in the same location as the inscription in Trench T. It is impossible to decide whether or not it was its original location; at any rate, the crater stood there before the fire, which destroyed the Petra church. Although such vessels in the early Christian

churches were usually located in the atrium, narthex, near the door or close to the altar area, the Petra crater could theoretically have been used as *cantharus*, *sacrarium* or *thalassa* for blessing and/or storage of holy water, or for ritual hand washing. If the inscribed slabs in the Jabal Hārūn church served as bases for some kind of water containers, these could have had a similar function.

SURVEY REPORT

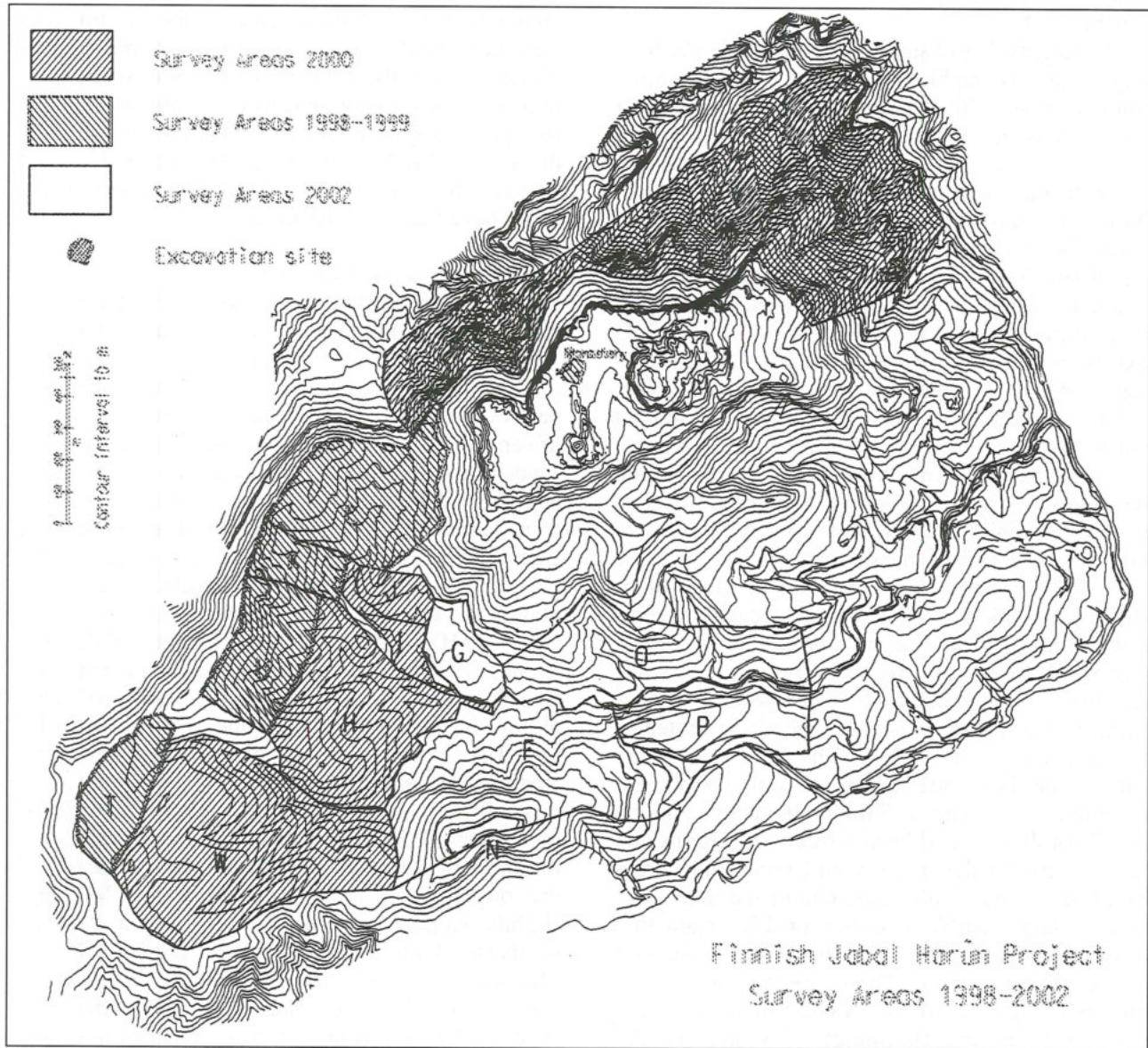
(M. Lavento, H. Haggrén, P. Kouki, E. Hertell, S. Silvonon, H. Ynnilä, M. Huotari, H. Jansson and A. Mukkala)

The survey area in the 2002 season included part of the SW (Area G) and southern (Area O) lower slopes and foothills of Jabal Hārūn, with the sandstone massif of Jabal al-Farāsha (جبل الفراشة) and the ridge of al-Farāsha stretching eastwards from Jabal al-Farāsha between Wādī an-Naqb (وادي النقب) and Wādī al-Muqāblayn (وادي المقابلين) (Area F), (see Fig. 7). Because the bedrock in the area is mainly the massive Umm 'Ishrīn (أم عشرين) sandstone (GMD 1995), the overall character of the area is very different from these previously explored (see Frösén *et al.* 1999; 2000). The slopes of Jabal al-Farāsha are mostly steep and covered with debris. The summit of the mountain (Area N) is separated from the eastern high plateau by an almost vertical cliff, several meters high. Towards the east, the slopes of Jabal al-Farāsha are somewhat gentler, joining with the ridge of al-Farāsha. The top of the ridge forms an area of relatively flat land, slightly sloping towards the east (Area P). The southern slope of the ridge towards Wādī al-Muqāblayn is somewhat steeper. On the northern side of the ridge, the slope drops off suddenly to Wādī an-Naqb, forming at many places an almost sheer cliff face. It seems that the differences in bedrock and topography in the areas surveyed so far have influenced the distribution of both prehistoric and later sites.

Because flint is not as easily available in Areas F, P and O, as in Areas T and W, it was expected that the number of Palaeolithic sites might also have been smaller. Furthermore, several research questions have been formulated and their answers sought through the fieldwork. One was the apparent lack of sites in the area dated between the Palaeolithic and Nabataean periods, and the reason for this phenomenon. The other was the overwhelming abundance of Nabataean period sites vs. the general scarcity of Byzantine period sites. The 2002 season has not yielded any evidence for Neolithic, Bronze

1. The inscriptions of the *Aquileia nostra* articles have been republished in *Bulletin épigraphique* [=Bull. ep.] 1977, 26,

27, 292, 304 and in *Supplementum epigraphicum Graecum* [SEG] 26: 789-792.



7. Survey areas 1998-2002 (by K. Koistinen).

Age or Iron Age material in the survey area, and it again confirmed the general scarcity of Byzantine sites. New methodological issues included the application of new documentation methods for documenting the large number of barrages and terrace walls, and thus new photogrammetric methods were tested in 2002.

Geomorphological Research and Sampling

A preliminary mapping of Wadi terraces along the Wādī al-Maḥaṭṭah (وادي المحطة) and the Wādī al-Farāsha was carried out. At least four terrace levels can be separated, but more work is needed to reliably combine different terrace levels. Three vertical profiles of two wadi terraces of presumably different age were cleaned and documented in two

locations along the Wādī al-Farāsha. Several layers representing varying fluvial conditions were recognized in both terraces. In the presumably more recent terrace, a well-developed palaeosoil was also recorded, indicating a period of stability. The palaeosoil was sampled for calcium carbonate content determination. In addition, soil samples were taken from all the profiles for grain size and provenience analysis. Both locations were also sampled for OSL (optically stimulated luminescence) for dating the fluvial sediments in the area. The OSL datings will be carried out in the Dating Laboratory of the Finnish Museum of Natural History. The results are expected to provide datings for the hydraulic structures and information about the episodes of more severe erosion, possibly indicative of climatic and

vegetational changes as well as human activities, which are likely to have had a considerable impact on the environment.

Palaeolithic and Epipalaeolithic Sites

Four lithic scatter sites were located during the 2002 season. Site 127 is a small concentration of lithics situated around a hillock at the foot of Jabal al-Farāsha on its NW side. The finds contain large flakes with faceted platforms, some Levallois points and Levallois cores. A Middle Palaeolithic date can be suggested for the site. Site 111 is situated in the SW foothills of Jabal Hārūn next to the modern track. The lithic material has an expedient character consisting of small flakes and irregular small cores, all similar to Site 140, situated ca. 200 meters NE of the “village” (Site 128). Both sites contain hundreds of artifacts of (probably) post-Palaeolithic date. An Epipalaeolithic site (138) was found ca. 100 meters NNE of Site 128. Lithic material includes single platform cores and core fragments, bladelet fragments, microburins, backed bladelets, a Helwan lunate, burins and some large scrapers. Parallels can be found in the nearby Natufian site of Sunakh (cf. Hoffmann Pedersen 1995: fig. 18-21). On the top of the ridge, there are three small bedrock mortars, the largest being 0.12m in diameter and 0.1m deep while the others are smaller. Whether the mortars are associated with the lithics, threshing floors or something else is difficult to say. Bedrock mortars, and mortars in general, seem to be mostly missing from the Natufian sites in the Greater Petra area, e.g., al-Bayḍā (البيضا), Ṣabrā (صبرا) I and Sunakh (Byrd 1989: 76; Schyle and Uerpman 1988: 55-63; Hoffman Pedersen 1995: 11). However at Site 2, Wādī al-Maṭāḥa (وادي المطاحة), Petra, bedrock mortars were found together with lithics dating to Natufian period (Johnson *et al.* 1999: 254-255).

Nabataean Sites

The predominance of the Nabataean sites in the survey area is again very strongly illustrated by the 2002 finds. Several small building remains with concentrations of Nabataean-Roman pottery were documented as well as two major sites: the building remains (Site 124) on top of Jabal al-Farāsha and the “village” or “hamlet” on the NE bank of the Wādī al-Muqāblayn.

Site 124 represents a sizable building (7 x 12m) on the eastern plateau on top of Jabal al-Farāsha (**Fig. 8**). The eastern end of the building is well preserved with clearly visible wall lines while the western end is a stone tumble including some

worked stones. The walls are ca. 2m thick, built in a double-wall manner of large boulders with sandy rubble between the wall lines. Nabataean diagonal dressing is still visible on some stones. Surface pottery was mainly Nabataean-Roman ware with some slightly later sherds. Four small soundings in the interior and the wall fill of the building yielded the same types of pottery. The building was most likely constructed in Nabataean times and occasionally used later. No cistern or other water storage installation was found (although rainwater may have been collected in a rooftop cistern). The mountaintop location seems impractical for a dwelling but ideal for a watchtower, although the building might also have had some cultic function. The visibility is excellent in all directions. From west to north, the ancient road to Wādī ‘Arabah, the watchtower in Area T, and the Nabataean building near it can be clearly seen (see Frösén *et al.* 2000: 418; 2001: 389-391). To the north, the *weli* on top of Jabal Hārūn is clearly visible, and farther to the east are the Snake Monument and the outskirts of Petra. Visibility to the south, the direction of Ṣabrā (صبرا), is also good.

The “village” (Site 128) is a large multi-structure site on the NE bank of Wādī al-



8. Site 124-the possible watchtower on the top of Jabal al-Farāsha (by P. Kouki).

Muqāblayn, which crosses the gently sloping eastern foothills of Jabal al-Farāsha. The size of the site is ca.50 x 75m. The building remains are poorly preserved, mostly forming large stone heaps, but 14 more or less clear wall lines could be discerned and mapped. The site could have been one large household complex or a hamlet of several independent smaller buildings. Some building stones are diagonally dressed and the majority of the pottery collected was Nabataean. Two soundings near the inside corners of buildings (**Fig. 9**) revealed that the

lower walls and floor bases of the buildings were carved into the sloping sandstone bedrock (as at Jabal al-Quṣayr (جبل القصير), see Lindner *et al.* 1996: 142). The third sounding, against the outer wall of another building, revealed a water channel, ca. 0.1-0.15m wide and 0.1m deep, again carved into the bedrock. This site may be compared to the recently excavated agricultural village of Khirbat an-Nawāfla (خربة النوافلة) in Wādi Mūsā. Although the latter is a multi-period site, its main occupation began in the Nabataean period ('Amr *et al.* 2000: 233). Similar sites are also known from as-Sādah (السادة), 13km south of Jabal Hārūn (Lindner *et al.* 1988: 84) and Abū-Khushayba, 7.5km southwest of Petra (Lindner 1992).

Site 136

This site is a broadly rectangular stone structure located on the eastward sloping ridge of al-Farāsha, less than 40m north of Site 128. The size of the structure is ca. 6 x 8m (Fig. 10). The structure was cleaned of tumbled stones and loose earth to uncover the wall lines. One small sounding was made in the SW corner of the inner wall and another in the SE corner. The lines of the outer walls are relatively visible. The lowest course of wall stones still remains in most parts of the structure, and, in a few places, two courses are visible. The outer walls seem to be made of two rows of stones with small stones and earth in-between. The outer walls are ca. 0.8m thick, with local sandstone (some dressed, others irregular in shape and size) used in construction. The inside of the structure and the space between the outer and inner southern walls is filled with sand and pebbles and was relatively free of larger stones even before the cleaning of the structure.

The inner wall is partially preserved, visible only in the southern and SE part of the building. It is at a distance of 1.25m from the southern outer wall, leaving a corridor-like space between the walls. The structure of the walls is remarkably different. The inner wall is composed of one row of large undressed sandstone slabs standing upright on their long side. The sounding in the SW corner of the inner wall revealed that the wall is built directly on the bedrock. It seems probable that the outer and inner walls of the structure are not contemporary, the inner wall being a later addition. A few sandstone slabs similar to those forming the inner wall also occur in the northern and western walls, probably indicating repairs to the other walls at the time when the inner wall was constructed.

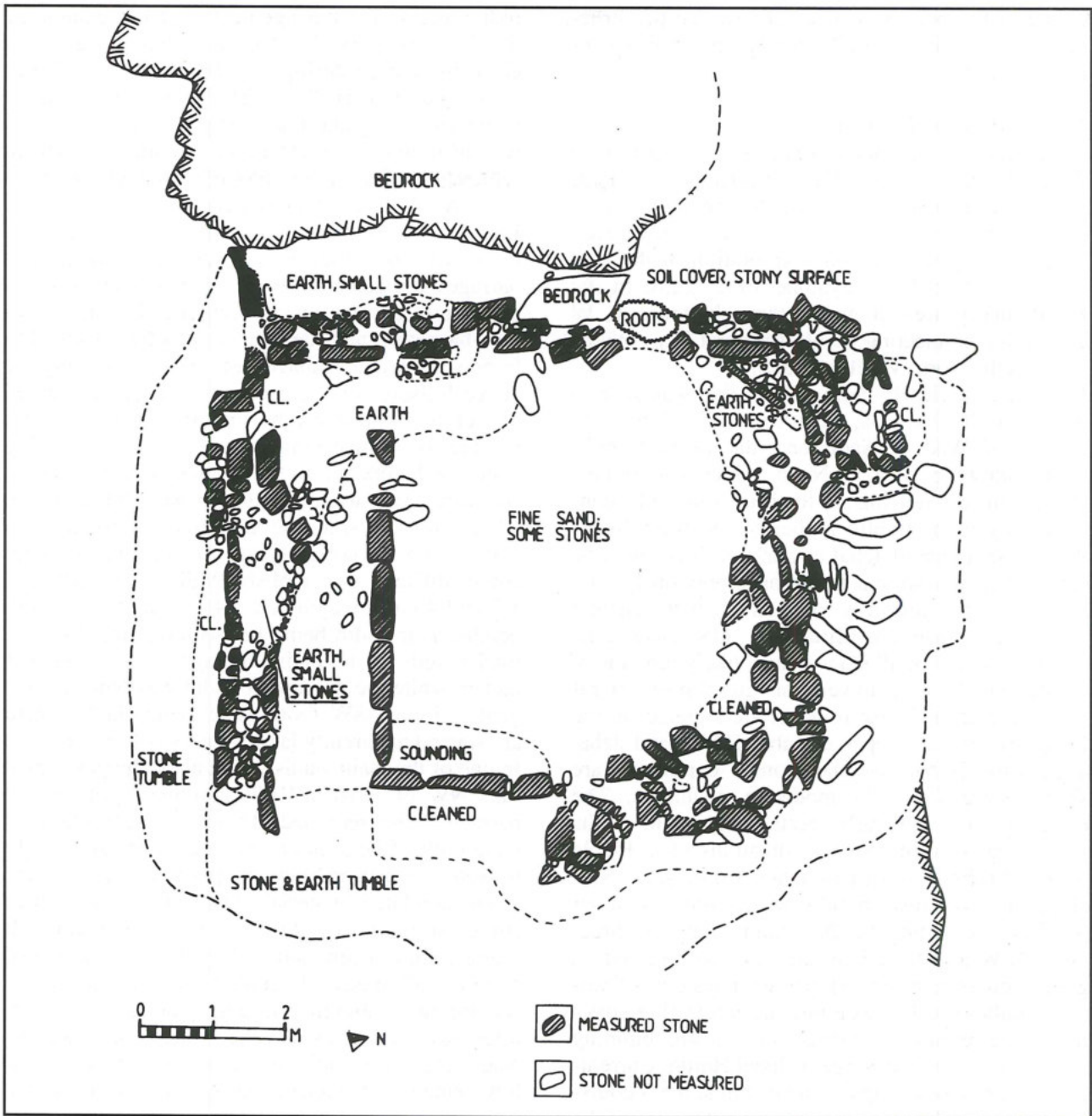
In the rounded NW corner of the structure there is a



9. Site 128-the "village" Sounding in the corner of one of the houses (by P. Kouki).

curious feature formed of three thin slabs of sandstone that stand upright to separate a triangular area in the corner. In the eastern wall, there is a niche-like protruding part, measuring ca. 0.75 x 1m, built of large stones. It is on the same level with the present day floor of the structure. There is also another, not so readily apparent protrusion, 0.5 x 1.5m, in the southern outer wall near the SW corner. Surface ceramics were scarce; more were found during the wall clearance but there were only a few sherds from the two soundings. All pottery was of the Nabataean-Roman type common in the survey area, dated to the first - early second centuries AD.

The structure at present bears considerable resemblance to the open mosques known from the Negev (Avni 1992: plans on Pp. 71, 74; Sharon *et al.* 1996: plan 2, p. 109). Rothenberg has dated the open mosques to the Early Islamic period, seventh-eighth centuries AD (according to Sharon *et al.* 1996: 107-108). They were built in connection with both sedentary and nomadic settlements. There is evidence in the architecture of the open mosques and adjacent settlements that the mosques were cultural successors of an earlier stele cult structures existing in Nabataean and Byzantine times (Avni 1992: 179-180). Although the walls of an open mosque may be either double wall built of dressed stones or just outlines of walls (Avni 1992: 179), the plan of the structure is easily recognizable. The niche in the east wall of the structure of Site 136 could be a mihrāb, representing the *qiblah*, the direction of prayer, of the early Muslims in Syria and Egypt (Sharon *et al.* 1996: 109, 112-113). At a later date, the *qiblah* was fixed towards Mecca, and in some examples from the Negev, a southern mihrāb was added at that time (Sharon *et al.* 1996: 109,



10. Site 136-a possible "mosque". Top plan (by P. Kouki and H. Ynnilä).

112-113, Avni 1992: plans on Pp. 71, 74). It is unclear whether the protruding part in the southern wall of the structure of Site 136 could also be a miḥrāb. The lack of finds from later periods is not necessarily surprising; these are also lacking from many open-air mosques in the Negev (Avni 1992: 179). Notably, there is good visibility from the site toward the top of Jabal Hārūn, which might have influenced the selection of this site for a mosque. Although no open mosques are known from the Petra area so far, it would not be surprising if there

were some considering that in the Negev they are common in the Nabataean areas (Avni 1992: 179-180). One open mosque is known from Wādī Shira in southern Jordan (Haiman 1995: 37). Although no finds point to the use of Site 136 in later periods, the possibility that the structure has later been converted into an open mosque, similar to those known from the Negev, should not be overlooked. The close proximity of the structure to Site 128 on one hand and to the possible course of the ancient caravan route to Petra on the other, together with the

dating of the pottery, would suggest that the structure was originally built during the Nabataean-Roman period.

Road and Related Structures

A stretch of an ancient road towards Petra from Wādī 'Arabah through Wādī Abū-Khushayba (وادي ابو خشيبه) was surveyed during the 2000 season (Frösén *et al.* 2001: 389-390). The road had already been noted in the previous exploration of the area (Lindner 1992: 263; Zayadine 1992: 225). In the FJHP survey area, it passes through Areas T, W and H to a connecting point of several large Wadis that together form Wādī an-Naqb.

However, no clearly defined road line was spotted during the 2002 season, either the road followed the bottom of Wādī an-Naqb and the recently built track following Wādī an-Naqb, which has obliterated all ancient remains, or the road followed a contemporary path slightly higher in the foothills on the northern side of Jabal al-Farāsha. Nevertheless, some structures similar to the ones previously documented and generally associated with ancient roads were observed. (Sites 118, 119, 141). Currently these are small stone heaps, likely remains of typical small watchtowers or guard-posts (Graf 1995: 243,252). These remains are situated on the lower part of the slopes of Jabal Hārūn and Jabal al-Farāsha. Nabataean and Roman common ware sherds were found in moderate quantities. The buildings are generally rectangular with walls measuring 4 to 7m. Some indications of a double wall and rubble construction can still be seen. Notably, most of these buildings are oriented rather precisely according to the major compass directions, E-W and N-S. Sites are often located with a good view over nearby slopes with systems of water installations. For example, an interesting structure is the remains of a small, ca. 4 x 4m. building (Site 118) on the SW slope of Jabal Hārūn. Currently, it is a pile of collapsed stones but some 5 courses of stones still form the walls on both sides of the presumed doorway. Although farther from the road itself, this site is well suited for observing the traffic. It is probable that this building is more recent than the Nabataean-Roman period, yet earlier than the 20th century.

Water Management Installations

Due to the steep gradient of slopes in the 2002 survey area, the water installations, barrages and combined barrage-terraces were generally smaller and more eroded than those recorded in Wadi (bottoms) (Frösén *et al.* 1999; 2000; 2001a). Although

individual water management systems cannot be dated, it is possible that they have been synchronously used during the Nabataean period (Laventio and Huotari 2001). The same types of large water collecting and harvesting systems have been widely found elsewhere in the Middle East and in Africa (see Graf 1983: 654-655; Mayerson 1962: 231-246; Regner 2002: 267-278).

In the 2002 survey area (ca. 1km²), 18 barrage systems were documented as sites, comprising 201 barrages altogether. Also 7 terrace wall systems and single barrages were recorded. Barrages, terrace-barrages, and terrace walls often formed a large-scale water management system covering the entire hillside. In these cases, barrages continued farther to both sides, beyond the tributary flow, serving as barrage-terraces to slow down flowing water and conduct it to farming terraces. These structures were usually found broken in the middle where they crossed the tributary. Many tend to curve, both inward and outward, making the total length difficult to establish. Walls varied between 1.7 and 40m in length and 0.4 and 2.7m in present height, their width being between 0.3 and 3m. The total length of the entire barrage system was 315 meters while the maximum width was 65m. On the gently sloping SW foothills of Jabal Hārūn, there are several apparently later terraces still in use.

In one of the main wadis, Wādī al-Maḥaṭṭah, which runs NW of Jabal al-Farāsha, remains of several barrages were recorded. These massive structures were built of large boulders. They were also partly broken by water pressure and partly covered by water-accumulated material. One of the structures curves strongly to follow the wadis orientation. It seems to have been modified by the construction of a new wall made of smaller stones, thus representing two different building phases. The structures have served as a water conduit. In Wādī an-Naqb, the main wadi leading towards Petra, only a few remains of ancient barrages are seen on the wadi (bottom).

Threshing floors

Two threshing floors were located on an E-W oriented ridge in Area P. They are roughly circular and ca. 5 meters in diameter. In both cases, the floor area has been surrounded on the downhill side by a crescent-shaped stone structure. The structure of the western threshing floor is made of stone slabs piled horizontally, whereas the eastern floor is made of stone slabs in an upright position. The slabs positioned upright seemed to be so eroded that they cannot be considered as recent. Following

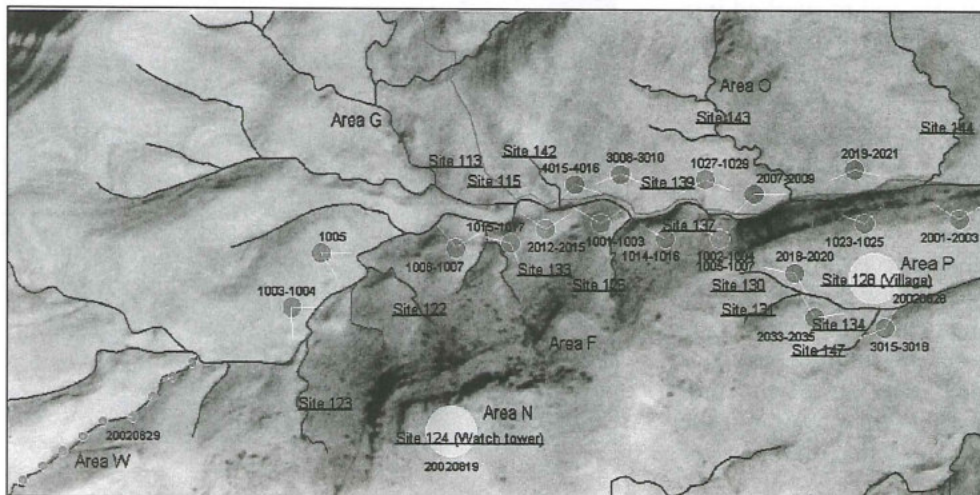
the same ridge system towards the NE of Jabal al-Farāsha, two additional, possible threshing floors were noted. Earlier, a possible threshing floor has been located in Area C (Frösén *et al.* 1999: 399). In addition, a threshing floor west of Jabal Hārūn, but just outside the FJHP survey area, has been reported by (Lindner *et al.* 2000: fig 9). As threshing floors are and have been an important part of traditional agriculture (e.g., Cheetham 1982), and as the most active phase of agricultural land use in the area clearly dates to the Nabataean-Roman period, some of these floors are probably of the same date. For functional reasons, threshing floors were often placed on ridges near villages (Whittaker 2000: 68). The “village” (Site 128) is only ca.100 meters from the floors.

Photogrammetric Documentation (H. Haggren)

Specific photographs have been taken to test the photogrammetric application in the survey area (Figs. 11, 12). These were used for the doc-



11. The view of the area documented by photogrammetry in 2002-the terraces (by H. Haggren).



12. Map of the sites and structures documented by photogrammetry in 2002 (by H. Haggren).

umentation of field survey sites in Areas F, G and O, and for the documentation of the “village” (Site 128) in Area P and the watchtower (Site 124) in Area N, both at Jabal al-Farāsha. Additionally, a site within Area W was recorded to complete the documentation of the 2000 fieldwork. Photos were taken with an Olympus CL-1400 camera having an image resolution of 1280 x 1024 pixels. The approximate locations of all shots were recorded with GPS. Additionally, four new geodetic ground control points were established and measured (0201-0204).

The documentation photography of sites in Areas F, G and O was primarily done for 3D recording of the barrage systems and terrace walls on the slopes. The stereo photography was done as panoramic image sequences, each usually consisting of three single images. The base was generally about 15-20 meters, forming an approximate base-to-distance ratio of between 1:10 or 1:15. The control points selected were natural features like corners or edges of stones, and recorded simultaneously with maximal zoom. The identification of the control points was made in the field and their coordinates were measured by tachymeter. Because of the occasional obstruction by bushes and trees and long distances, most parts of the barrage systems were additionally recorded by close-up stereo photography, i.e., within a distance of some 10-20m.

The watchtower (Site 124, Area N) on the top of Jabal al-Farāsha was photographed as five panoramic stereo pairs. The base was about 1m. Additionally, two wider panoramic sequences were recorded in order to document the view toward Wādī al-Farāsha, and the area between the Wādī ‘Arabah and Petra through Jabal Hārūn. The village (Site 128, Area P) was photographed as four panoramic stereo pairs. The base of the photography was about 1 meter. No ground control was available. Addi-

tionally, two close-up stereo views were recorded in order to document the excavations at the site. The barrage system at a site in Area W was recorded as a consecutive chain of 21 stereo pairs upwards along the tributary wadi. The base of the photography was about 1 meter.

CONSERVATION REPORT

(Ch. Danielli)

During the 2002 FJHP fieldwork season, conservation work has concentrated mainly on the consolidation of architectural elements, particularly in Trenches T and S, where the original fabric of the structures was extremely weak. Other repairs concerned local consolidation of areas, which had suffered from exposure to the harsh climate. The mortar used for these repairs was composed of local clay soil, which is highly reversible but stable in such climatic conditions.

A preliminary study of the building techniques of the complex carried out during the previous seasons revealed that, while most of the earliest buildings were constructed using a lime/gypsum mortar, in subsequent phases the stones were fixed with a clay mortar mixed with debris and pottery. This kind of mortar becomes dry and powdery after only a few days of exposure, considerably weakening the structures. Although these architectural features needed to be strengthened after excavation, it is very difficult to intervene without altering the historical phasing of the complex. After testing different types of mortar, the most effective solution resulted in the application of a type of clay mortar similar to the original.

The material for the mortar was collected from the environs of the excavated areas only above one meter from the floor level to avoid salt-impregnated soil. The walls were cleaned of all the dry soil and debris as far as possible, while the soil remaining in the wall was sprayed with water and re-worked into a paste with a spatula. The removed dry soil was cleaned of all organic material and sifted, then mixed with water and re-applied to the masonry. The finished surfaces were then sprayed a few times with a 10% solution of a silica-based consolidant (Syton X 30) in water to strengthen the surface and to inhibit erosion.

This type of mortar becomes quite strong when dry and has a good resistance to the local climate. It is also easy to remove mechanically, as there is no strong chemical bond between the mortar particles. For this reason, it has been used on all the precarious masonry structures where the phasing or the actual position of the stones was uncertain, or for

temporary repairs in areas of unfinished excavation.

Structural Consolidation

Some of the structural elements excavated during the 2002 season were in such precarious condition that careful dismantling and reconstruction was necessary in order to preserve them from imminent collapse. The most significant of these interventions pertain to the perimeter walls of the complex, specifically the areas of the NE corner and the eastern section behind the apse (Figs. 13, 14). In both cases, the walls had partially collapsed and were unable to buttress the interior walls, which were gradually leaning outwards. In these areas, the wall was dismantled and rebuilt: original blocks were re-inserted in their places with the help of digital photos taken before the dismantling of the walls. Eroded or powdering blocks, which had to be discarded were replaced by stones of similar shape taken from the *lapidaria*. The walls were ce-



13. Wall supporting the apse, before the restoration (by Ch. Danielli).



14. Wall supporting the apse, after the restoration (by Ch. Danielli).

mented using mud mortar. A finishing layer of lime mortar was applied between the joints and the upper surface to avoid water infiltration.

Another problematic issue was faced in Trench T where the body of a collapsed column was found lying horizontally across the trench (Fig. 15). Since the drums of the column were all in place, and the base of the column was also found nearby, the possibility of the vertical resetting of one of the site's columns in its original place was clearly possible. The weight of the drums and their condition, as well as the difficulty of obtaining proper scaffolding and cranes, limited the number of drums that could be lifted. As the general height of the excavated site is rarely above two meters, it was decided not to reconstruct the column completely but to raise only five drums, which were repaired and consolidated before being placed on the base using lime mortar.

Resetting of Arches

The arch springers of the northern and southern walls in Trench S were extremely unstable, as the mud mortar cementing the stones had completely eroded. Since the risk of collapse was imminent, due to the ongoing excavation below the level of the springers, the soil was slowly removed while the walls and springers were gradually cleaned of debris and filled with lime mortar. Currently, the springers are held in place by iron jacks until a proper solution for the resetting of the arches is found.

Wall Plaster

Two very similar layers of plaster were found covering the southern wall of the structure in Trench T, one covering the other. Both layers had a very smooth surface and similar aggregate. There were no signs of indentation typical of a preparatory surface on the under layer, nor any signs of later pick marks for the placing of a second layer of plaster. Thus it is very difficult to interpret the significance of such a superposition of plaster. This created a problem concerning the choice of consolidation materials, as it was important to maintain the distinction between the two layers. Each layer was consolidated individually with injections of a 15% solution in water of Syton X30 into the edges and where the matrix was powdering. The lower layer was re-attached to the wall by grouting with Microlite, a liquid hydraulic mortar. The second layer was partially re-attached to the base layer in areas where the plaster was threatening to collapse, by using a 20% solution of Syton. A protective, tent-like shelter was built to cover the area during the winter season.

Small Finds Conservation (A. Karakoski)

Registered small finds found during the 2002 season consist of fragmentary pottery, glass, marble, one mother-of-pearl object, and metal objects: an iron spearhead, a knife and coins. The state of preservation of a particular object depends on the qualities of the material itself and the characteristics



15. Fallen column in Trench T before the restoration (by Ch. Danielli). The same column, after the restoration can be seen on Fig. 5, center.

of its context. At Jabal Hārūn, the pH of the soil is fairly neutral, and due to the large granular size of sand, the infiltration of the oxygen is good, creating a rather even corrosion process. Registered finds were brought to Finland after the season to undergo conservation treatment.

Iron objects are found usually heavily corroded, with little or no metal core left, and their shape deformed because of the expansion of the corrosion products. In some cases of copper alloy objects, a protective copper oxide layer was formed on the surface. Coins have been found to contain mostly copper and with little iron, zinc, lead and tin as alloys. The more heavily corroded metal objects are x-rayed before cleaning in order to identify their original shape, metal content, joints and other information on how the artifact has been made, and also the potential pattern on the surface. This information helps in choosing the conservation method. After cleaning, a corrosion inhibitor BTA (Benzotriazole) is used for stabilization. By forming a chemical bond with cuprite, a thin protective layer is formed. Finally, Inctalack laquer is applied on top to protect the surface.

Two thirds of a large ceramic vessel broken into several pieces was found in Trench N. The vessel was soaked in water (which was changed twice a day) for two days to remove most of the soluble salts. When dry, the pieces were glued back together using 20% Paraloid B72 1: 1 in acetone: ethanol.

PRELIMINARY OBSERVATIONS

(Z. T. Fiema and R. Holmgren)

The 2002 season has further provided significant evidence concerning the phases of existence and the economy of the monastic complex at Jabal Hārūn. The evidence, which relates to the earliest phases is exemplified by the channel and the basin uncovered in Trench R. It is likely that the trough of the channel predates the entire complex and is perhaps associated with the Nabataean-Roman phases at the site. The channel itself would, however, coexist, although with modifications, with Phase I of the church. The function of the basin is more enigmatic. Apparently, it was constructed to hold liquids, as the waterproof mortar indicates. The basin has an outlet, which would allow the draining of the liquid down and away, to an unknown and currently un-preserved installation. As such, the basin might serve as trampling floor for production of oil or wine. Alternatively, and in relation to the channel nearby, the basin might have served for dyeing cloth, as indicated above and further reinforced by the finds of seashells (molluscs?). The location of

the channel — probably outside of the main walls of the monastery — is also indicative. Such a location would support an industrial function of the basin. Similar locations and installations were noted at the Monastery of the Shepherds (Khirbat Siyar al-Ghanam) in Palestine. There is a basin or vat (No. 41) is located outside — but directly against — the main wall of the monastery. Nearby is a channel (No. 55) interpreted by the excavators as a drainage conduit (Corbo 1955: 39, 54). Although neither the function nor the specifics of these installations are provided, that monastery also possessed presses and vats for producing oil or wine.

Whatever industrial or food-producing activities were conducted in the area of Trench R, these apparently ceased at the beginning of Phase II of the church when the area became the general disposal ground. The well-stratified finds, including the ceramics, are still in the process of analysis and dating, yet it is evident that this material will provide some significant dating indicators relevant for the history of the entire monastic complex. Notably, the later phases of the utilization of this area as a midden witnessed a substantial increase in fish remains. It is not suggested that the fish consumption began rather late in the history of the complex. Rather, it appears that the food-preparation activities must have been shifted from some other previously utilized and still unknown location to be conducted in the area of Trench R. It is significant that the stratigraphy indicates that the fish processing and consumption at the site probably continued even after the monastery seemingly went out of use yet the site was still frequented.

Finally, the 2003 season provided interesting evidence concerning the very late periods in the history of the monastic complex at Jabal Hārūn. The massive scarp-like wall (GGG-HHH) located directly west of the monumental building on the western ridge is undoubtedly an important structure seemingly associated with these periods. Admittedly, sloping revetment walls are attested in the Byzantine structures in southern Jordan and the Negev. Such revetments, which reinforce walls of the churches, apparently as a protection against earthquake impact, are, for example, known from the North Church at Shivta/Sobata and the North Church at Rehovot/Khirbat Ruhaybah (Tsafirir *et al.* 1988: 77). Notably, such structure-reinforcements are also present at Jabal Hārūn. It appears that at least the southern wall of the church and the northern and western walls of the chapel were reinforced by scarps built of irregular stones set in a matrix of soil.

However, Wall GGG-HHH is much more superior in construction and magnitude. Its location is also not without significance. The multi-roomed building on the western ridge of the complex, although probably the earliest (Nabataean-Roman) at the site, could seemingly represent the longest occupation span due to its massive, well-built structure, which would have provided more security than any other building at the site. It is not unlikely that this building could have been occupied even after the monastic church and other structures at the site were already abandoned. Therefore, it is not unreasonable to review some specific architectural installation types, characteristic for the Crusader-Ayyubid-Mamluk periods. Many Crusader castles and fortified cities possessed reinforcements to their outer walls in the form of *glacis*, or stone scarps. These were massive ashlar or cut-from-bedrock supports inclined against the walls, on top of which vertical walls might have continued. Examples are numerous, such as at al-Karak, ash-Shawbak or 'Ajlūn in Jordan, or Caesarea and Belvoir castle in Palestine. Such a well-preserved *glacis*, featuring 70 degree inclination, was excavated and studied in detail at the Crusader castle at Belmont (Harper and Pringle 1988: 104).

As stated above, *glacis* served as additional defensive installations against battering rams but their function was equally to support the main walls against seismic phenomena. Earthquakes were a constant menace to settlements and buildings in the southern Levant, as the sources related to the Byzantine (Russell 1985) and later periods (Amiran *et al.* 1994) indicate. For example, records indicate heavy damage inflicted on the fortifications of the al-Karak castle by periodic earthquakes, and a need for constant reinforcement and rebuilding of the fortifications done by the Mamluk rulers (Brown 1989: 290). It is unlikely that Jabal Hārūn *glacis* – if indeed Wall GGG-HHH can be termed as such – served any specific defensive purpose. But it definitely would have been a practical and useful reinforcement of the western building against earthquake impact. Such a well-protected building could provide shelter and security for pilgrims even after the monastic complex went out of use. Considering its appearance and the longevity of occupation in the western building, it is reasonable, lacking other datable means, to associate this installation with the Crusader-Ayyubid-Mamluk periods. This association is also supported by the active interest of the rulers from these periods in the holy place at Jabal Hārūn.

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