

THE 1998-2000 FINNISH HĀRŪN PROJECT: SPECIALIZED REPORTS

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The first three seasons (1998-2000) of fieldwork conducted by the Finnish Jabal Hārūn Project — at the mountain known as Jabal Hārūn (جبل هارون) in Petra and its vicinity — have yielded a considerable amount of cultural material which is currently being analyzed. Although the preliminary reports on each fieldwork season published so far (Frösén *et al.* 1999; 2000) included summarized information pertaining to specific topics and artifact classes, the diversity of topics and so far accomplished results of analyses deem it necessary to publish a separate text containing specialized reports which will attract the attention of specialists in these fields. Some of these reports specifically relate to the 2000 fieldwork season and thus to the FJHP 2000 preliminary report published in this volume. Others are preliminary interpretations of finds from the previous seasons as well. The following text includes the reports on the inscriptions, pottery, glass, lithics, animal bones, macrofossils, conservation activities and the ancient road investigated in the FJHP survey area.

FJHP 2000 - Inscriptions (J. Frösén)

The 2000 season has produced some interesting epigraphic material. Two small fragments of Greek inscriptions were found in Trench L. On a fragment of a white marble plate (Reg. No. 195), there are three preserved letters]NAPI[most probably from the verb *ἀναπαύω* or the noun *ἀνάπαυσις* or *ἀνάπαυμα* meaning “to rest” or “resting place” respectively, often found carved on tombstones. However other interpretations cannot be excluded, as e.g.]ν ἀπ[. Another fragmentary inscription on a white marble plate (Reg. No. 202) preserves traces of four letters] .ΟΥÇ[the first letter being probably an *iota* or a *nu*. On the back of this fragment, which is ca. 5.5cm thick, there is a hole for a fastening plug. A sandstone slab (1L09/11) from Trench L had a carved cross and the abbreviation letters around it— I(ησοῦ)ς Χ(ριστὸ)ς Υ(ἱ)ὸς Θ(εο)ῦ “Jesus Christ Son of God”.

Several fragments of painted plaster were found in Trench I, but with only few letters or parts of them preserved on each of them. The lime and gypsum plaster layers with painted red letters (ca. 6cm high) on the latter, were still attached to four sandstone slabs. The first stone (1I.10/13) contains the beginning of the line, reading ΠΡΟΔΡΟΜΟ[which can be interpreted as the epithet of John the Baptist — Πρόδρομος “the Forerunner” (Fig. 1). Only 1cm above the line, there is a small remnant of the same red color, probably a fragment of a letter on a previous line. The plaster on another stone (1I.12/09) features letters] .ΟΥΤΟΥÇ[. The dotted fourth letter could also be the lower part of an *iota*. The 3 + 3 letters on the plaster on a third stone (1I.16/14), where only the lower parts are preserved, cannot be identified. The plaster on the fourth slab (1I.16/15) has] .ΟΘΕΙΩΟCΟΡΚΟ[where the first letter could be a *mu* or a *nu*, and the fifth dotted letter could also be the lower part of a *tau*. Notably, *rho* and *kappa* had been written close to each other, slightly overlapping. There are no parallels for a θεῖος ὄρκος “divine oath” in the Byzantine inscriptions, and such a phrase in an inscription on wall plaster appears peculiar. The reading θεῖος οἶκος “divine house” does not help much either because it does



1. Plaster fragment with painted text ΠΡΟΔΡΟΜΟ[, from Trench I (by J. Vihonen).

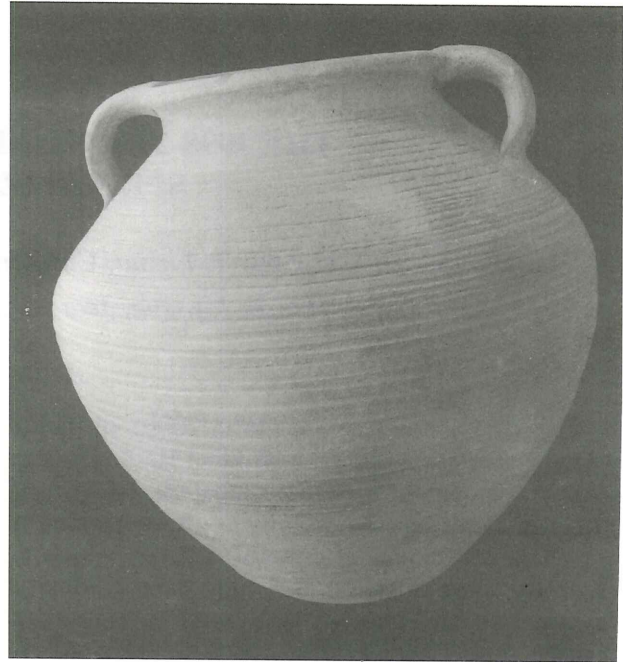
not explain the previous letters and the loop of the *rho*, even if the latter slightly overlaps the following *kappa*. An adjective or participle ending with *-οθητος* and connected with *ῥρκος* or *οἶκος* is unparalleled as well. The reused plastered stones most probably belong to Phase 1 of the structure (the chapel) in this trench, and the epithet of John the Baptist well corresponds to the baptismal font found there. Palaeographically, the script can be dated to the end of the fifth century or later (for difficulties in palaeographically dating Byzantine Greek inscriptions, see Mango 1991).

FJHP 1998-2000: Observations on the “Post-Byzantine” Pottery at Jabal Hārūn (Y. Gerber)

The phenomenon already observed during the two previous FJHP campaigns (1998-99), i.e. loci which contain both Byzantine pottery and lamps considered Abbasid in date, was also noted during the 2000 season in Trench I, locus 12, and Trench M, locus 27. Previous FJHP reports expressed uncertainty whether or not pottery found together with the so-called Abbasid lamps should also be dated as late as the lamps. Thus a general question was raised concerning the ability to distinguish Byzantine common ware from the later, Umayyad or Abbasid period, pottery. However, Trench J yielded chronologically conclusive pottery assemblages which should now allow to resolve this stalemate.

One will recall that Trench D, excavated in 1999, produced ceramic repertoire (forms, types, fabric) which can be dated to the Byzantine period, with a closing date in the sixth century (Gerber 2000: 410). It was noted then that while some types from Trench D assemblages had close parallels in those found in the Early Byzantine houses on az-Zantūr or in the shops at the Roman Street in Petra (dated there to the fourth-sixth centuries AD), other types could not find parallels in any published Petra types. It needs to be stressed here again that the locally produced common ware in Trench D were found together with African Red Slip ware, but not with any fragments of the so-called Abbasid lamps, or with painted pottery of the Umayyad/Abbasid period. This strongly supports a Byzantine date for the Trench D ceramic assemblages. Many of the pottery types from Trench D, also including those which did not have parallels from Petra, appear again in Trench J. Particularly important is locus 17 there which yielded a large pottery assemblage (e.g. Fig. 2) which permits the formulation of the following remarks.

The types concerned here are mainly large vessels, jars and basins, all of which have bright, red



2. Large jar recovered from Trench J and dated to the Late Byzantine-Early Islamic transition (by M. Mustonen).

fabric:

- a basin with an outwardly turned rim, with incised wavy lines and two horizontal handles attached to the body (similar to Walmsley 1993: 216, fig. 23.5);
- a jar type which is represented by samples of various heights, diameters, and wall thicknesses. The rim may have a triangular-like form (see Gerber 1999: 391; MacDonald 1992: 222, pl. 24.4) or be turned into a simpler form which gets progressively thicker;
- cooking casseroles with sharply drawn grooves on their exterior (Frösén *et al.* 1999: 386, fig. 10.8), and horizontal handles attached to the body below the rim. This specific casserole type is usually dated to the Umayyad, even Abbasid period, thanks to the insightful interpretation offered by K. ‘Amr and B. Walker (during “The Workshop on Classical Pottery” held in Amman, IFAPO, August 2000).

The pottery assemblage from locus 17 is not only abundant but also includes sherds which preserve more of the vessel’s form than just its rim. Among these is a jar type with horizontal loop handles attached to the shoulder of the vessel. Notably, jar types with such handle attachments are known from the Late Byzantine and Umayyad contexts, not only from Jordan but also from Palestine. So far these types are not attested in Petra. Furthermore, lids from locus 17, which are ribbed on the exterior, have parallels in the Early Umayyad material (e.g., Watson 1993: 207, fig. 20.5).

On the other hand, various rim types of cooking pots, either of grayish, greenish, or dark reddish fabric, are very rare in locus 17. The assemblage composition in this locus is similar to assemblages from several other loci in that trench. Therefore, although one may argue that the scarcity of cooking pot rims may be due to the functional context of the pottery assemblage, this is apparently not the case here. Rather, one may observe a distinctive shift from pottery types and repertoires of the Byzantine/Late Byzantine period to those datable to the Umayyad period. Because the ceramic assemblage from locus 17 appears relatively homogeneous, it is proposed here to consider locus 17 assemblage as representing the “transitional” Late Byzantine-Early Umayyad (or even very Early Umayyad) period. Consequently, the idea that the assemblage from locus 17 is a mixed context, with Late Byzantine elements on the one hand and Umayyad elements on the other, is rejected here. It is particularly striking that the pottery fabric from this transitional period is a high quality, well-burnt, bright red ware, comparable to the fabric of types dated to the fourth century, but not to those dated to the fifth and sixth centuries AD.

Nevertheless, two cautionary notes should be included here. First, specific vessel types, such as the ones mentioned above (e.g. jars with a “triangular” rim form, or the cooking casserole with the sharp grooves) were already produced and distributed in the later Byzantine period (sixth-early seventh century AD), as evidenced by the material from Trench D. Furthermore, these pottery assemblages from Trench J, which represent the transitional Late Byzantine-Early Umayyad or even Early Umayyad period, include some vessels of the same form and fabric as those from Trench D, but the overall composition of the assemblages slightly differs between these trenches. It is then apparent that in order to correctly assign a Late Byzantine or Early Umayyad period dating label to the pottery assemblage from a particular locus, large assemblages are required for investigation. In the same time, the dating of the entire assemblage will be strongly influenced by the statistically-measured frequency of presence or absence of specific types.

Second, it is not possible to differentiate between Byzantine/Late Byzantine commonware pottery and Early Umayyad/Umayyad pottery solely on single rim/body sherds, or on single forms/types, because some rim forms and vessel types continue unchanged from the Late Byzantine into the Umayyad period. Probably, quite a long “transitional ceramic horizon” existed, with common forms and types for both periods. Furthermore, de-

spite notable political changes in the Early Islamic period, including new administrative arrangements, and the emergence of a new upper class, it is apparent that populations living away from the large centers retained the same local tradition, including pottery types and technology. The presence of imported ceramic types, including fine ware, may reflect certain political or economic changes, such as the emergence of new trade routes and disuse of the earlier ones. But the ceramic assemblages from Jabal Hārūn are primarily of local production and reflect local traditions, while imported ceramics are rare so far.

A fragment of the so-called Abbasid lamp was found in Trench J, locus 20, together with pottery datable to the transitional, or the Early Umayyad period. A chronological gap between the pottery and the lamp dating is still apparent. Probably, it would be useful to seriously review arguments for dating these lamps to the Abbasid period. Trench J also yielded two painted Umayyad/Abbasid sherds. One came from locus 8, together with some Nabataean fineware from the first century AD, and some common ware from the fourth-fifth centuries AD. The other sherd, from locus 10, is a straight rim of a light olive gray ware with painted wavy lines (the painting similar to Walmsley 1993: 216, fig. 23.2).

Noteworthy are also fragments of small handmade bowls found in Trench L, loci 9-11. The ware is gray to light gray with a black core, and the wall thickness is relatively insignificant. Similar bowls were also found at al-Ḥumayma. The dating of these handmade unpainted bowls is still uncertain, but seemingly before the Mamluk (?) period. At any rate, these bowls do not find parallels in the plain handmade bowls known from Gharrandal, near at-Ṭafila, or from elsewhere (Walmsley 2001: 153-158).

FJHP 1998-2000: Glass Report (D. Keller and J. Lindblom)

More than 1400 identifiable glass fragments were found so far during the FJHP fieldwork (1998-2000), half being glass lamps. The other half is divided into window glass and other vessels. Around 25% of the material was found in Trench J. Each of Trenches C, D, E, I and K produced around 10% of the glass material, and Trenches F, L and M around 5% each.

The window glass distribution may indicate which structures of the monastery at Jabal Hārūn had windows with glass panes. Not a single fragment was found in Trench D — probably a pilgrims' hostel room. But certain strata of Trenches J

and K where glass panes were abundant appear to be refuse dumps. As for the church and the chapel, window glass was abundant in Trench E, followed by Trenches C, F, I and M, with only a few fragments in Trenches B, H, and L. This is not surprising as the latter three cover the area of the atrium and the narthex respectively, where glass windows are not expected. A concentration of window glass was found in the north pastophorion, a relatively small room, which may indicate that either that room had window glass, or it became a collecting point of glass sherds for further reuse. Abundance of window glass in Trenches C and I may indicate that the chapel also had glass window panes.

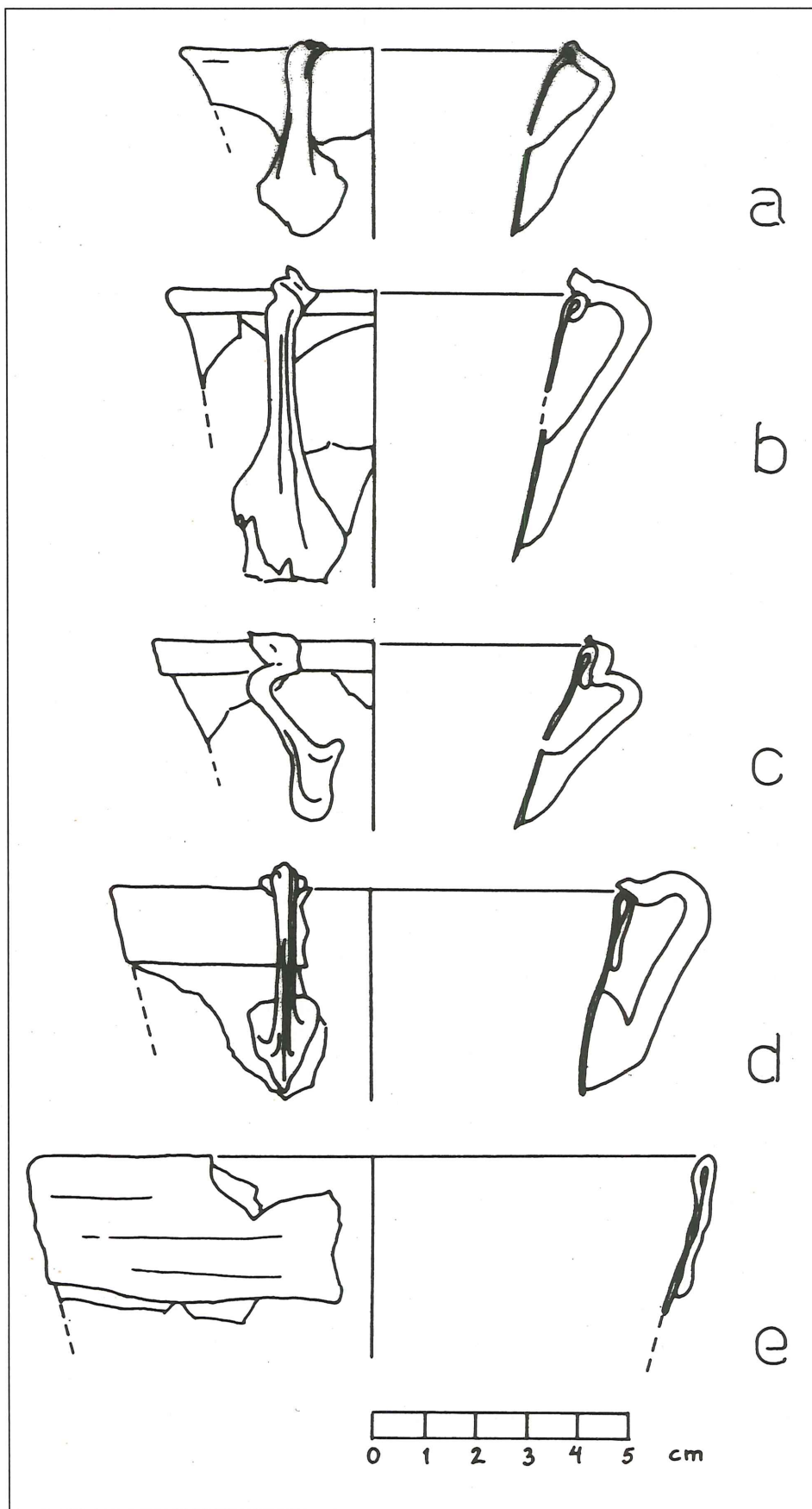
The glass lamps belong to two main groups: hanging lamps with three handles, and polycandela lamps with a stem. Lamps with three handles can be divided into the type with rounded rims (Fig. 3a), and one with outfolded rims. With regard to the fold of the rim, the latter can be further subdivided into lamps with narrow rounded folded rims (Fig. 3b), with narrow flat folded rims (Fig. 3c), with medium-sized folded rims (Fig. 3d), and with broad folded rims (Fig. 3e). Lamps with broad folded rims are generally larger in size than those with rounded or narrow folded rims. Each of these subtypes had wick holders, often found in the same loci with these rims. As for the stemmed lamps, these divide into the knobbed stem type, and hollow stem type, the former being scarce. The hollow stems belong to lamps with a cup-shaped bodies and straight rounded rims.

Lamps with three handles and rounded rims were found only in a sounding below the floor level in the church apse (loci E.26 B-C), appearing there together with small lamps with narrow folded rim (loci E.26 A-C). The later type was also found in the lowest levels in Trench D which provides the best stratigraphic sequence of glass lamps at Jabal Hārūn. In the strata (loci 20, 22) below the original floor level, there were only small size lamps with narrow outfolded rims, either round or flat. Above the original floor, in loci 18, 18w, 18 A-Cw which represent the reoccupation of the room, there were lamps with narrow folded rims, but also the first fragment of a lamp with middle folded rim and two sherds belonging to polycandela lamps with hollow stems. In the following loci (17, 17w, 13 and 13w), lamps with middle folded rims were more numerous than the ones with narrow folded rims, and the polycandela lamps with hollow stems were still relatively few. Also, two fragments of lamps with broad folded rim appeared in loci 17 and 13. The lower loci 12-13 and 15-17 in Trench I show a slight shift in proportions between the sizes of the

rim fold, as the broad folded rims become more common than in the aforementioned loci of Trench D, but the middle folded rims are still in the majority. In the fill of the baptismal font (loci 25A-B), there were only two narrow folded and one middle folded lamp rims, indicating that the fill could be contemporary with the first reoccupation in Trench D. Hanging glass lamps with three handles and middle or broad folded rim are more numerous in Trench J (loci 17, 18, 20, 21 and 48), where broad and middle folded rims appear side by side in the same quantity. Therefore these loci seem to represent a later occupation period than the upper levels in Trench D and the lower layers of Trench I because lamps with broad folded rims are more common in Trench J. Polycandela lamps with hollow stems are few in Trench J.

All these glass lamp types also occur in similar proportions in some loci which also yielded fragments of glass vessels which are not of the Byzantine glass tradition. Instead they belong to a new style represented by two decorated glass vessel types: vessels with incised scratch-decoration, and bowls or beakers with pinched decoration made with a tong-like instrument. Fragments of an incised plate were found in Trenches C (loci 03a, 10, 15) and E (locus 21), a sherd of an incised cup came from Trench K (locus 08), and fragments of the beakers or bowls with pinched decoration were found in Trenches B (loci 07, 09), C (loci 03, 03a, 10, 14, 15), E (loci 08, 17), G (locus 16), H (locus 05), K (loci 08, 11) and L (locus 05). All these loci seem to represent a later period than the loci in Trench J, although each of them still has the same types of Byzantine glass lamps as well as the same proportions between the amounts of those types.

Only a preliminary absolute dating of these glass lamps and other glass vessels at Jabal Hārūn can be currently proposed. The earliest contexts with glass lamps (E.26A-C and D.20, 22) contain the same types of glass lamps as the early fifth century AD contexts on az-Zanṭūr and in the Roman Street Project (Kolb and Keller 2000: 366-370). In loci D.18 and 18w (i.e. above D.20, 22), there were cups with rounded inverted rims and cups with rounded rims and blue trails, which seem to date to the late fifth and early sixth century AD, while the material from upper layers in Trench D (loci 17, 17w, 13 and 13w) seems to date to the sixth century AD. Parallels were found in Rooms XXVII and XXVI of the Roman Street Project which were occupied during the sixth century AD (Fiema 1998: 420-421). The glass material from the lower layers in Trench I (loci 12-13, 15-17) can probably be dated to the late Byzantine period (late sixth/



3. Hanging lamps with three handles from Trenches D and E (by J. Lindblom).

early seventh century AD), and the glass lamps from Trench J seem to be later in date, i.e., from the seventh century AD, thus including the Early Umayyad period. The appearance of new decoration techniques in loci which still contain Byzantine lamps suggests that this last phase in the sequence of the glass vessels at Jabal Hārūn dates to the later Umayyad period (early eighth century AD), indicating that the new early Islamic style in decoration of glass vessels was slowly introduced beside the still continuing Byzantine tradition.

The best parallels for the glass finds at Jabal Hārūn come from Petra and the Negev ('Aujah al-Ḥafir/ Nessana, Khirbat Ruḥaybah/ Rehovot), as glass lamps and vessels found in northern Jordan are markedly different from the southern material during the Byzantine period. For example, the hanging lamps with three handles have always a wick holder in the Petra region, while there is little evidence for that in the North. The polycandelon lamps from Jabal Hārūn have rounded straight or slightly inverted rims, but in the North (e.g. at Umm Qays), these have rounded flaring rims. Hanging lamps with three handles and broad outward folded rims are characteristic of Jabal Hārūn only, as no exact parallels are known from elsewhere. Although glass lamps in a monastic or ecclesiastical context are common, the finds from Trench D indicate that they were also used in small hostel rooms. The glass from the sounding below the floor of the church apse and in the levelling layers below the original floor in Trench D may provide a good *terminus post quem* for the construction of the monastic complex, and they strongly indicate earlier occupation at the site.

FJHP 2000: The Prehistoric Finds (H. Jansson)

Several prehistoric sites were located and documented during the 2000 season. While the principles of the FJHP survey methodology have been presented elsewhere (Frösén *et al.* 1999; 2000), it suffices to mention here some key concepts utilized by the FJHP survey in studying the prehistoric land-use patterns in the environs of Jabal Hārūn. These are defined as off-site (Foley 1981), non-site (Rhoads 1992), and regional or siteless survey (Dunnell and Dancey 1983; Kvamme 1998). These concepts endorse the assumption of underlying spatial continuity of archaeological materials as well as that the basic unit of observation is the artifact, not the site or settlement (Foley 1981: 10-11; Dunnell and Dancey 1983: 272). The term "site" in this report is therefore only used for a cluster or concentration of lithic artifact that has not been caused by geomorphologic or other nat-

ural processes. The total amount of lithic artifacts collected by the FJHP during three field seasons is approx. 16,600 artifacts. During the 2000 season, seven sites or clusters with a total of 6521 artifacts were documented. In this report, only artifacts from sites and their surrounding were analyzed, 13,040 in total.

Site 75 (413 artifacts) is located on top of a cone-shaped hill. The artifacts were collected in an area approximately 150m² in size. Some more recent structures and one recent fireplace in the middle of the site might have disrupted the intra-site artifact deposition pattern. The assemblage is dominated by a greyish, fine-grained chert. All artifacts show fresh edges and ridges and a partial, white cloudy patina. Predominant are small flakelets/chips (<25mm max.); the ratio flake : flakelets being 1:3.9. Sixteen artifacts are classified as bladelets and 4 as blades. This is only 6.2% of the total amount of debitage. A total of 75 cores, of which 53 are single platform small flakelet cores, were recorded. The assemblage contained only one cortical flake (>90% cortex on dorsal surface). The secondary products or tools are dominated by scrapers and fragments of scraper bits (15 artifacts) but also one burin and one perforator. The character of the assemblage appears to be post-Palaeolithic.

Site 77 (167 artifacts), approx. 200m² in size, is located on the southeaster end of a ridge between two deep wadis. The lithics concentrated in an area where the slope was covered with natural chert cobbles. The prevailing forces there are a down-slope movement and the erosive influence of the wadis. The edges and ridges of the artifacts are very fresh and show little evidence of stream abrasion or rolling, possibly because the site is close to its original position — on the steepest part (10-12 degree) of the slope. Dominant here are greyish-brown and fine-grained local chert artifacts, partially patinated. Large bulky flakes dominate the assemblage, the flake : flakelet ratio being 42:1. Many artifacts are classified as core trimming elements (CTE) and the ratio flake : CTE is 2:1. Of the CTE, 89% are cortical flakes. There are 24 cores, dominated by single platform flake cores. Five were Levallois point cores. The assemblage contains only one large side scraper. Because of the Levallois technology used, the site be can tentatively considered as Middle Palaeolithic.

Site 78 (1204 artifacts), ca. 1200m² in size, is located on a fragmented ridge which forms a larger

flat area where prehistoric activities took place. The surface is sandy silt covered with cobbles and boulders. The preservation of the deflated site is quite good. The assemblage is dominated by a dark brown chert which naturally occurs as cobbles in an indurated carbonate-rich sediment. This type of chert does not occur in the bedrock in the area. The majority of artifacts are flakes, with a flake : flakelet ratio of 1.6:1. Overall, the debitage is not as bulky and large as at Site 77. Almost 5.7% of the debitage are blades and 1.6%, bladelets. The debitage : CTE ratio is 15.6:1. There are 34 cores and, as at Site 77, these are dominated by single platform flake-cores. Some thick flakes have been reused as cores and they show clear double patination. Three cores and some flakes show the application of Levallois technology. Among 8 tools found at the site, 3 are scrapers, 1 burin and 1 perforator. Levallois point cores were found but no points. The Levallois elements suggest a Middle Palaeolithic date but the assemblage is much more heterogeneous than at Site 77, and some artifacts show clear double patination.

Site 86 (111 artifacts), ca. 150-200m² in size, is located on a slope below Site 91, ca. 50m away, but featuring an assemblage of a different character. The area is heavily eroded here and the site itself has been cut by a watercourse that has eroded into a gully. A path which runs through the site has probably affected the spatial pattern of the artifacts. The site is located on top of indurated carbonate-rich sediments that so far have not been located elsewhere in the area. This sediment could be a remnant of an erosive occurrence in geological time that left only pockets of originally more extensive sediment cover. The surface is covered with chert cobbles that do not occur in the bedrock of the area. The chert is similar to that found at Site 78. The artifacts are all very bulky and large and the assemblage is dominated by large flakes. The debitage : CTE ratio is 2.1:1, and 92.3% of the CTE are cortical flakes. About 27% (30 artifacts) of the assemblage are cores dominated by large single platform flake-cores. Some cores seem to have been tested only few times and then discarded. None show large amounts of hinges, stepped negatives, or core rejuvenation. Two are Levallois point cores. The site contained no tools, but because of the heavy patination and the Levallois core technology it should be considered as Middle Palaeolithic in date. The large number of cores and the bulky character of the assemblage could be a result of heavy erosion which has washed away smaller artifacts.

Site 91 (1036 artifacts), ca. 1500m² in size, is located on top of an E-W ridge, above Site 86. Although the uppermost part of the ridge is relatively flat, the site is located on a slight convex rise, with the surface of sandy gravel littered by limestone cobbles. The site has been deflated but its original location is relatively intact. The assemblage is dominated by the same dark brown chert found at Site 86. Some artifacts are very large and bulky, as at Site 86, but mostly there are smaller flakes and flakelets. The assemblage is little patinated, due to the specifics of the environmental context, and of raw material. The flake : flakelet ratio is 1.7:1. In the debitage, 29 (2.7%) artifacts are blades and 9 (1.1%), bladelets. The debitage : CTE ratio is 5.2:1, and 96.9 % of CTE artifacts are cortical flakes. Cores are 2.4% (26) of all artifacts and at this site they are also dominated by single platform flake-cores. Five are classified as Levallois point cores. Six tools were found on the site, 1 asymmetric biface (or handaxe), 1 fragment of a pointed biface, and 4 large scrapers. The bifaces and Levallois technology suggest a Lower/Middle Palaeolithic date, but there is a remarkable dichotomy between artifacts that are heavily patinated and smaller flakes and flakelets that show only slight patination and much fresher edges and ridges.

Site 92 (2548 artifacts), ca. 2000m² in size, is located in the southernmost part of the surveyed area, on a saddle-like, sandy sandstone formation where no natural flint is available. The area features natural rocky terraces on the slope. Compared with other sites, Site 92 produced the most material. The artifacts are predominantly of the greyish, fine-grained chert available in the local bedrock. The flake : flakelet ratio is 1:1.9. No large bulky flakes were found. About 2.6% (59) of artifacts are classified as bladelets and ca. 2.1% (47 artifacts), as blades. The debitage : CTE ratio is 19.3:1, 72.9% (86 artifacts) of the CTE are cortical flakes, 17.8% (21 artifacts) edge-of-core removal flakes/blades, and 4.2% (5 artifacts) are core tablets. The number of core tablets and edge-of-core removal flakes/blades is by far the largest among all documented sites. This indicates more core modification, rejuvenation and primary reduction on the site. Also, 71 cores were found and of these 39 are single-platform flake cores, and 23 are single-platform bladelet cores. One very exhausted bi-directional naviform core was also found. Many artifacts show thermal alteration; perhaps a consequence of later Bedouin campfires in the area. The assemblage contains the largest number (82) of tools and the largest variation among the tools. Scrapers are pre-

dominant but there are many burins (11%), rather small in size, and perforators (18.3%), some being drills made on bladelets. There are also 4 small truncated flakes and 1 transversely truncated blade. One of the tools can be classified as an arched backed bladelet. This material gives very strong indication of Epi-Palaeolithic/Neolithic dating. The bladelets and the many bladelet cores are made of a partly translucent, very fine-grained chalcedony not available in the area. The presence of a naviform core should point to the presence of the PPN technology in the assemblage. However, the presence of the informal flake-dominated material that is made of local chert is more difficult to explain.

All these sites are surface scatters which makes the dating particularly difficult. Apparently, beside Palaeolithic sites there are also ones which should be dated to later periods. The evidence of reuse of older artifacts is interesting. The thick patinated and abraded flakes are particularly suitable to be used as cores for reduction into smaller artifacts. The most apparent Palaeolithic/Middle Palaeolithic sites are all located in a slope setting, except for Site 91, which might be a part of Site 86. The artifacts which indicate the Middle Palaeolithic presence at Site 91 have a very thick patination while there also seems to be present there a smaller flake/flakelet technology with single platform core technology and almost unpatinated. Whether or not this phenomenon relates to chronological differences depends on further studies, also on the effects of post-depositional forces on the assemblages. The location of the Palaeolithic sites on a slope may relate to the time factor, i.e. the longer deposition time would have caused more lateral movement while the more recent material would still be *in situ* on top of the ridges. However, this is contradicted by the fact that at least Site 86 seems to be related to the raw-material procurement of the local chert source on the slope, and initial production. This is shown by the high ratio of expedient and tested cores, a very high ratio of cortical flakes and the absence of tools. In Area H, where the site is located, a total of 26 Levallois points were collected, but none on the sites themselves. This indicates that the tool production was carried out somewhere else.

In addition to the ridge vs slope location issue, there are also other dichotomies in the assemblages. All sites on the ridges and hilltops feature the fine-grained greyish raw material derived from the local bedrock. This may relate to the differing behavior of the raw material when knapped, but should be further investigated. Even without

metrical analysis, it is clear that the ridge- and hill-sites have much smaller artifacts. Some sites have a microlithic component, and on one site (92) there are strong indications of Epipalaeolithic presence. If the sites preliminarily dated as Palaeolithic could have been procurement and primary production sites, the sites on a hilltop and ridge location could also have had other functions. At least at Site 92 much more extensive core rejuvenation had taken place, as shown by the high number of core tablets and edge-of-core removal flakes/blades there. To better understand the land-use patterns around Jabal Hārūn, new research directions are required. For example, experimentation with chert raw-material behavior during the reduction, and the effects of post-depositional forces on the artifacts, such as trampling, will be conducted. The proper understanding of the context and environmental processes affecting the sites, assemblages and single artifacts is vital for the culture-behavioral interpretation. These subjects will be pursued in the future by the FJHP survey team.

Observations on Animal Bones from Jabal Hārūn (J. Studer)

The following preliminary observations on animal bones recovered from the Byzantine monastery at Jabal Hārūn are exclusively based on the material from Trench D excavated during the 1999 campaign (Frösén *et al.* 2000: 396-398). A room, ca. 3.3 x 4.5m in size, uncovered in this trench is the only one so far excavated out of 14 rooms located around the North Court of the monastery. Because of their large size, they have been interpreted as hostel rooms for pilgrims rather than monk's cells (Frösén *et al.* 1999: 403). The assemblage from Trench D comprised a total of 4682 faunal remains, all hand-collected. The bones analyzed to date originate from the following loci (from lowest up): 19 (buildup for the early floor), 18 (beaten earth floor), 17 (occupation level), and 13 (casual, temporary occupation). Ceramic and glass material associated with these strata were predominantly of the late fifth through the sixth century, although the early seventh century cannot be excluded. The loci listed above should all represent some kind of occupation of a differing nature. The abundance of animal remains may also indicate the presence of refuse concentrations at these strata. The following description includes the comparison with fauna from the Nabataean-Late Roman site at az-Zanṭūr in Petra. Although the Jabal Hārūn and az-Zanṭūr sites represent different time periods, the comparison serves to underline the extent to which animal remains from the monastery differ from

those derived from a secular/domestic, urban site. In the future, comparative studies will be extended to include bone assemblages collected from other monasteries in the region.

Faunal Remains. The 4682 identified bones are primarily those of fish (51%, 2401 bones), followed by mammals (43%, 2010 bones). Birds are represented by only 271 bones (6%), but remains of eggshell are present in all loci. Additionally, molluscs, still being analysed, were also found in all loci. Notable is the predominance of fish in this assemblage, despite the fact that their bones — as well as those of birds — are much more fragile and smaller than those of mammals. Although fish bones have been largely collected without sieving of the sediments, they still form the largest portion of the assemblage. Undoubtedly, this high frequency reflects the important role played by fish in the diet of monasteries, while that of birds and mammals was less important. Differences noted between loci with regard to the relative frequencies of the three classes represented will be further investigated in association with the other archaeological remains.

Fish. The majority of fish remains belong to *Scaridae* family — parrotfish — and comprise more than 80% (760 bones) of the identified fish bones. Members of this family, which includes 19 different species, extract the organic contents from corals, and are commonly found in the Red Sea (Goren and Dor 1994: 56-57). In the Mediterranean Sea, too cold for the formation of large coral reefs, parrotfish are rare and only one species is found. Well represented are also *Serranidae* (groupers), ca. 15% of the fish remains, which also inhabit the coral reef. Together, these two families comprised the vast majority of fish remains in the monastery. Species from other families, such as *Lethrinidae* (emperors), *Scombridae* (tuna, mackerel etc.), *Labridae* (Wrasses), and *Sparidae* (seabreams) were statistically insignificant in the assemblage.

The high proportion of fish remains is surprising, considering the fact that Jabal Hārūn is a three day walk away from the harbor of al-'Aqaba. In Petra, fish appear in the diet in the earliest Nabataean occupation strata at az-Zanṭūr (first century BC), but they are markedly less abundant than at the monastery (Studer 1996). Another difference is the relative proportion of the species. During the Late Roman period at Petra, groupers predominated (36%), and emperors and parrotfish followed with 20% (Desse-Berset and Studer 1996: 382). The interpretation of these inter-site differ-

ences requires further comparative studies of the economy of Byzantine 'Aqaba as well as of other contemporaneous monasteries in the Middle East.

Mammals. About 47% of the mammal remains could be identified to species (951 bones). As expected, sheep and goat remains are the most common (95%, 893 bones). Cattle is the only large-sized mammal identified (3%, 25 bones) and pigs comprise only 2% of the assemblage (18 bones). The bones of these four domestic species undoubtedly represent discarded animal remains following consumption, as illustrated by the numerous cut marks and pattern of fragmentation. A cat (probably domestic), represented by only one bone (upper jaw), should not be considered as part of the diet of either the pilgrims or monks. Notably, no bones from the monastery exhibited carnivore damage, while several bird bones — from immature individuals — appear to have been gnawed by humans. Evidently, dogs did not have access to the assemblage found in the room of Trench D, possibly due to the prohibition of their presence within the monastic complex, or at least in the excavated room. A few small-sized bones show evidence of acid etching (gastric damage) resulting from digestion. Two of them are bird bones; most probably eaten by humans.

The abundance of sheep and goat ribs at the site is noteworthy and probably indicates that pilgrims brought with them caprine rib-racks as food to be consumed in the monastery. The frequency of skeletal elements will be discussed in future publications.

Generally, there are some important differences between the mammalian assemblage from the city of Petra and the nearby Byzantine monastery:

1. During the Nabataean and Roman periods at Petra, camel served as the main source of meat of large-sized mammals while cattle and donkey remains were extremely rare. Apparently, camel was not eaten in the monastery, even if it was the case in Petra during the Byzantine times; camel bones are as numerous as cattle in the assemblage from the Roman Street Project.
2. Surprisingly, no bones of gazelle were found in the monastery while this species is well evidenced among bone remains from Petra.
3. The discovery of a cat maxilla in the monastery deposit is also unique. To date, no felid remains have been recovered at az-Zanṭūr, despite the large size of the analyzed assemblage (about 40,000 bones from regularly sieved sediments). But the terraces excavated by the Swiss team represent only a small part of the entire town. It

may be possible that the cat was introduced into the area by the Byzantine inhabitants of the monastery.

4. As for the state of preservation of the bone remains, there are skeletal remains of dogs in Petra as well as numerous gnaw marks on the bones which attest to the presence of this species in the town. In contrast, dogs and carnivore derived gnaw marks are absent in the monastery sample.

Birds. Of the 271 bird remains recovered from Trench D, 161 have been identified to species. The vast majority represent chicken (86%, 141 bones). Remains of wild birds are primarily those of chukar partridge (*Alectoris chukar*; 12%, 19 bones), which could have been hunted in the vicinity of Petra. A small diving duck (*Aythya* sp.) is represented by only one bone. But the three species of *Aythya* recorded nowadays in Jordan are uncommon (Andrews 1995: 60-61). The chukar and the diving duck represent the only hunted animals eaten at Jabal Hārūn. The chukar partridge was also the most common wild bird eaten at Petra during the Nabataean and Roman times. But there is no diving duck in the assemblage from az-Zanṭūr. The "aquatic" (in a broad sense) wild birds hunted by the Nabataeans and the Romans, live in marshy areas, for example, the water rail (*Rallus aquaticus*) and the moorhen (*Gallinula chloropus*).

FJHP 2000: Macrofossil Analysis (T. Tenhunen)

Macrofossil analysis, an analytical method of paleoethnobotany, is increasingly recognized as an important tool in comprehensively defined archaeological research (e.g. Hasdorf and Popper 1988: 1-160; Renfrew 1973; Warnock 1998). Through this method, vital information is provided which allows the determining of ancient patterns of land use, dietary practices, and past environmental changes (Crawford 1985: 691). Macrofossil analysis is an integral part of the interdisciplinary research carried out by the FJHP. On-site collaboration between archaeologists and the paleoethnobotanist, herself a trained archaeologist, is particularly emphasized. All strata at the site are systematically sampled, and their interpretation results from the combination of archaeological data and the macrofossil analysis. As such the macrofossil samples are also treated as archaeological artifacts which help to determine the nature of occupational and depositional processes at the site, and which ultimately contribute in the reconstruction of the history of the site. As demonstrated below, the samples may also provide specific data concerning organic materials used in

constructions and installations.

During the 2000 season, samples were collected from all seemingly sealed deposits and from each strata which appeared not substantially disturbed by later activities or deposition processes. In this report, only the results from Trenches J and K will be briefly presented. Both trenches have yielded remains of non-ecclesiastical structures characterized by long-term occupation and by many discernible changes in the nature of occupation. With few exceptions, the soil samples taken were approx. 2 liters in size. Organic material was separated from the soil at the site, using saturated saltwater flotation and wet sieving method, the latter using 0.125mm mesh.

In Trench J, altogether 38 soil samples were collected from 21 loci, but only locus 17 and locus 46 (contents of a large ceramic vessel dug into the soil layer) have yielded botanical samples related to past human activities. In locus 17, a very heterogeneous stratum, samples were taken from small ash pits and ashy patches which, during the excavation, were thought to indicate fireplaces. In most of the cases, the soil in the samples was either a very fine silt or silty sand. Organic material from locus 17 includes charred olive stones, barley and lentils, none in great quantity. *Cupressaceae*, *Juniperus phoenicea* or *Cupressus sempervirens* leaves, well preserved in clay matrix, were the only identifiable uncharred plant parts. Probably, these small branches with leaves derive from the typical ancient roof construction used in the area — wooden roof beams further reinforced and waterproofed by smaller branches and leaves set in clayish soil. The uncharred preservation of this material should relate to its original covering with clay. The analysis of wood remains excavated in the Petra Church showed that juniper was one of the main construction materials in the church, including its furniture and roof construction (Warnock, forth.). Therefore, at least some fine ashy sub-layers and patches in locus 17 could represent parts of the roof construction which burned and collapsed on top of the occupational layer which had remains of cultivated plants. As such, the extensive locus 17 most probably includes both occupational and destruction-related material. As for the organic material from locus 46, its composition is somewhat similar to that from locus 17: olive stones and barley, but not tree leaves or branches. Possibly, there is a relationship between loci 17 and 46 in terms of occupational character. Past human activities should be at least partially responsible for the formation process of these specific loci.

In Trench K, twenty-five soil samples were col-

lected from ten loci. Locus 23 (ashy layer above flagstone floor) has yielded interesting evidence of human activities. Ashy soil is most probably from fireplaces and, like in Trench J, the identified species (olive stones, barley, date and grape pips), although charred, have still survived well enough to allow for identification. *Cupressaceae* leaves, apparently ancient judging from their stratigraphic position, were the only uncharred plant material found. The interpretation proposed above (elements of roof construction) would then well apply in the case of locus 23 in Trench K. Other interesting evidence came from the fill between the upper and lower stone pavement levels, east of the monumental structure in Trench K. Although there is no doubt that the sandy buildup (locus 33) for the upper stone floor was intentional, none of the three samples taken from that context showed any remains suggesting human occupation, and sample K-42 from locus 33 was totally devoid of any organic material. This could mean that the fill (i.e. the buildup for the upper pavement) was brought in from an area at or near the site where such activities as cooking or food preparing did not take place.

The results of macrofossil analysis from the FJHP excavations appear promising in providing further information on past human activities in the area. Considering the climatic conditions prevailing in the area of Jabal Hārūn, it is expected that ancient plant material can survive until recent times only if charred, and that uncharred plant parts found at the site will most probably be modern. The exception would be parts of juniper preserved uncharred in clay, as described above. No signs of contamination from upper levels or from recent activities on the site (e.g. uncharred plant material), was found in any significant amount. This is a promising indication for further analysis because it increases the evident value of charred plant material found in the samples. Furthermore, because of the large quantities of bones, found for example in Trench J, it was expected that the amount of plant material would also be very significant there. As this turned out not to be the case, two explanations for a fairly small amount of charred plant material can be proposed. First, the state of preservation (charred plant material being heavily affected by fire) and the occurrence in the samples of material which would survive heavy burning under normal circumstances, would indicate that the fire which affected the plant material would indeed have been very intense, and thus would have completely destroyed other, less-durable, plant material. A second explanation would assume the apparent lack of such activities

at the site, where plant material could have been exposed to fire, or the possibility that some foodstuffs were not used during the time when relevant depositions were formed.

Notable are samples with the evidence of basic plant food and staples — barley, olive, lentil, date, grapes — the occurrence of which is otherwise attested for the Petra area. Also, the presence of these foodstuffs would be compatible with what is known about monastic diet (Hirschfeld 1996: 149-150). The presence of barley and the absence of wheat could probably be explained by the fact that, considering local soil and climatic conditions, the former is more efficiently produced locally as food for both humans and animals, a conclusion also reached in the plant remains analysis at al-Lajjūn (Crawford 1987: 701-702). According to the information provided by the local population, barley and lentils have been cultivated in the areas surrounding Jabal Hārūn for the last 100 to 120 years, while olives and grapes have been cultivated mainly in the Wādī Mūsā area. As for cypress/juniper tree material, it has also been attested in the Petra area. The results above represent only an initial step in the paleoethnobotanical research which will be conducted by the author towards the presentation of a comprehensive view of the dietary practices at the Monastery of St. Aaron at Jabal Hārūn.

FJHP 2000: Conservation Report (C. Danielli, S. Pouta and A. Karakoski)

Conservation work during the 2000 season was primarily concerned with the stabilization and treatment of previously excavated architectural elements. The areas to be treated were chosen according to their condition and their importance of their integrity within the site. Small local repairs were carried out on the masonry, and a general assessment of the state of conservation of the architecture was conducted in order to estimate the amount of work to be undertaken during the following season. Due to the difficulty of ordering and transporting materials from abroad, preference was given to local materials and traditional techniques using very few chemical products. All materials used and their proportions were recorded in a database. The conservation and treatment plan was illustrated with the use of graphic documentation.

Masonry. The general condition of the masonry was quite stable. Problems of erosion and breakage due to exposure and weathering were present, but the main structures were not compromised. Yet in some areas of the site, several walls and corner

stones were threatening to collapse. Where it was possible, supporting buttresses of dry-laid ashlar were built to temporarily reinforce the walls. In more precarious situations, the wall was dismembered and reconstructed using a thin layer of mud mortar to bind the ashlar. Limestone blocks were substituted for eroded sandstone blocks which were compromising the stability of the walls. All the repairs have been carried out taking into consideration the fact that the masonry did not have exposed mortar joints, and the ashlar were bound to each other by different types of mortar and ancient mortar repairs.

Plaster. Although fragmentary, small areas of plaster were present on almost every wall of the main church area. A few sandstone blocks contained in the apse wall were supporting fragments of plaster which were loose and brittle. These blocks showed evident signs of erosion and delamination thus needed to be strengthened in order to support the plaster repairs. The ashlar were treated separately with ethyl silicate applied by spraying. After a general stabilization of the area, the mortar repairs were carried out on the plaster. Broken and loose sandstone blocks were secured by using a mortar composed of sifted local soil which contains clay particles, and sand mixed with water. In the areas where it was necessary to prevent water infiltration, the gaps were filled with a lime-based mortar, using local sand as an aggregate. The plaster was cleaned using soft brushes to loosen the soil accumulated on the surface, and forced air to remove the rubble in the gaps between the plaster layer and the sandstone blocks. A liquid hydraulic mortar (Microlite) was injected in the gaps and around the edges of the plaster to secure the fragments to the blocks. After this operation, mortar repairs were carried out around the edges and in the cracks and fissures on the surface. Powdery plaster surfaces were treated with a 5% solution of Syton X30 in water, to avoid further weathering. Where the surface was severely abraded, revealing the coarse aggregate layer, the areas were treated with injections of a 20% solution of Syton X30 in water. In this case it was possible to use Syton as a consolidant, avoiding acrylic emulsions. During the last week of excavation a cruciform baptismal font was uncovered in Trench I. The structure was covered with a fragmentary plaster layer which needed immediate consolidation. Due to the discovery of this structure at the end of the season, an emergency treatment had to be carried out. Ethyl silicate in solution with ethanol was sprayed twice on the entire surface. After drying, the font was backfilled

with local sand.

Painted plaster. Numerous fragments of painted plaster were found while excavating Trench I. Several of the smaller pieces were found in the soil around collapsed blocks which still supported larger fragments containing lettering and decorative patterns of foliage and geometric designs. The plaster consisted of a thin layer (5 to 8mm) of compact rendering with very little sand aggregate. A red iron oxide pigment was used for the lettering and decoration, applied on a lime-wash base over the render. After initial cleaning of the surface with soft brushes, a thin strip of gauze was applied to bind the loose fragments with a 20% solution of Paraloid B67 in acetone. Detachments around the edges were secured with lime-based mortar repairs to prevent further loss of material. Due to the fragility of the plaster and the high risk of deterioration if left *in situ*, it was decided to detach the most significant fragments with 'stacco' technique and carry them to Finland for further conservation work and study. Several virgin samples were also taken for analysis. After removal, the fragments were packed between polyethylene sheets lined with acid free paper. Later in the season several other painted plaster fragments were also found in the south pastophorion (Trench M). Some of these fragments were painted with inscriptions in red pigment, while others presented traces of dark green, yellow and black. The plaster was much more abraded than that found in Trench I, but strong enough not to need consolidation. These pieces were cleaned with a soft brush and packed in acid free paper in cardboard boxes.

Marble. The remaining floors in the church area were paved with large slabs of Proconnesian marble. Most of the flagstones were broken and cracked in many places, damage possibly caused by earthquakes during the time of occupation or later. Sand currently carried by strong winds is deposited on the surface and it deeply penetrates into the cracks creating further cleavage. Although the amount of rainfall is low, the enlargement of these fissures creates a dangerous opportunity for water infiltration and plant life, which would increase the damage and finally dismember the fragments. Since the marble is lying on a bedding of hydraulic mortar which is in good condition, it was decided not to interfere with the original setting but only fix the surface cracks with a lime based mortar. Where the flagstones were still in place and only cracks and fissures were present, they were only cleaned with water and brushes and the cracks cleared of

remaining sand and debris. The exposed bedding was consolidated with ethyl silicate by spraying.

Small finds. Most of the registered objects were cleaned, documented and transported to the Petra Museum. The objects that needed stabilization were treated *in situ*. Registered metal finds were transported to Finland for conservation. The finds were cleaned mostly with a dry brush and wrapped in acid free tissue paper and packed into cartons or perforated plastic bags. Fragile objects were placed in carved polyethylene foam lined with acid free tissue and packed into cartons. Two broken ceramic vessels were fixed in the field. The ceramics were cleaned and joining edges were sealed with 5% Paraloid B-67 in acetone. The pieces were glued together with 25% Paraloid B-67 in acetone to ethanol ratio of 4:1. Paraloid B-67 was preferred, due to the climatic conditions at the site. The other vessel needed more support and large fractures in its surface were filled with modeling gypsum. The metal finds are copper or copper alloys, mostly coins, and one gilded iron object. The copper finds were packed in the same way as the previous objects, adding silica gel in airtight plastic boxes. Conservation work was done in Finland at the University of Helsinki. After cleaning, an active stabilization treatment was carried out to avoid further corrosion. The gilded iron was treated separately in a vacuum with 3% Benzotrazole in ethanol. The surface of the object with BTA film was supported against UV-light and mechanical stress with two layers of diluted Incralak AE.

FJHP 2000: The Ancient Road in the Survey Area (E. Hertell)

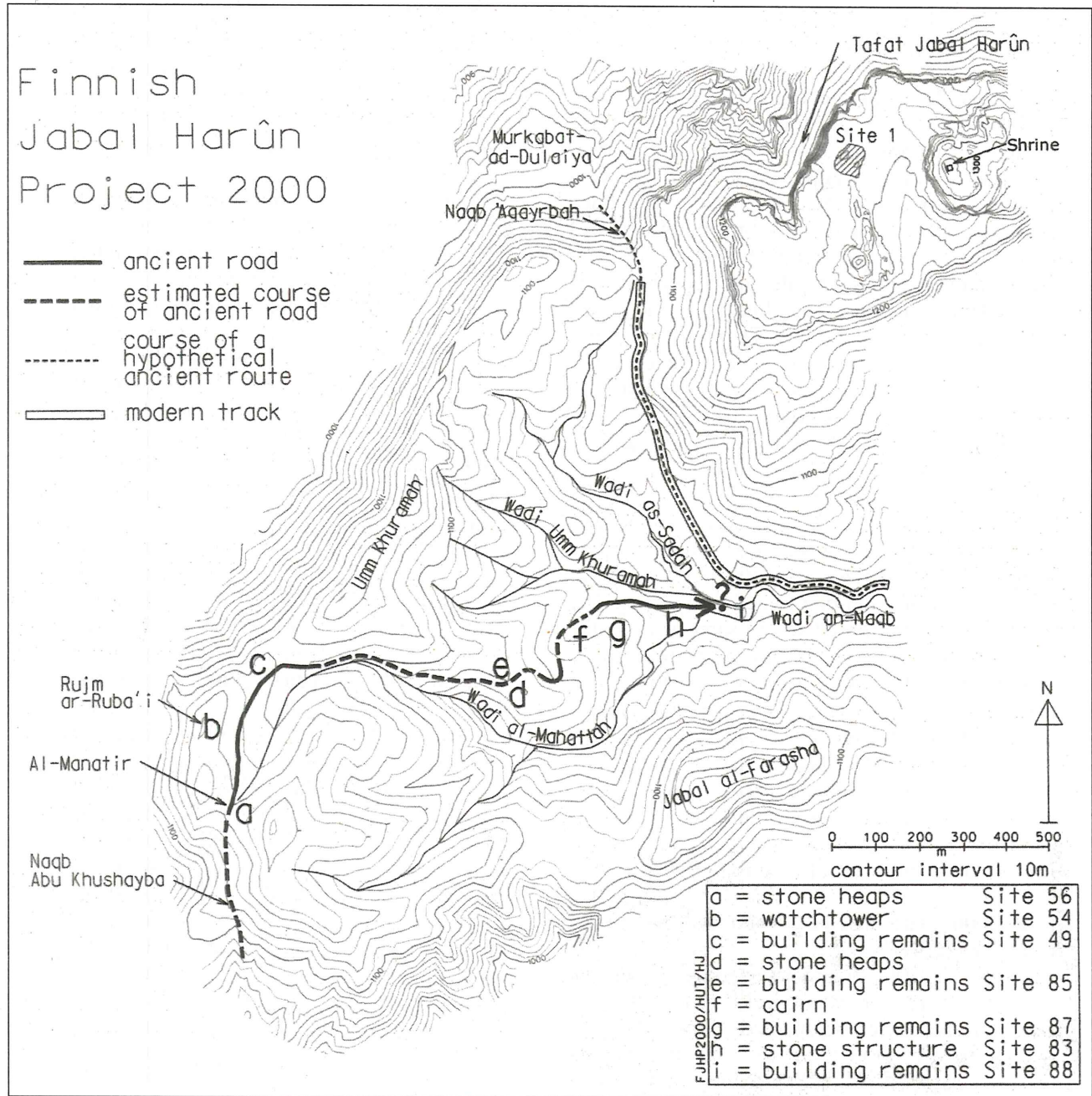
During the 2000 fieldwork season, an ancient "road" with some pavement sections, and sites located alongside were documented by the FJHP survey. The road follows the route from Wādī 'Arabah (وادي عـرابة), ascending through Wādī Abū Khushayba (وادي أبو خشيبه), crossing the FJHP's survey area, and eventually leading to Petra (Fig. 4). The road and the ruins along it were already noted by previous explorers (see Brünnow and Domaszewski 1904: 427-428; Lindner 1992a: 263; Zayadine 1992: 225). The road is one of several known in the Greater Petra area (e.g. Lindner 1992a; 1992b; Lindner *et al.* 2000; Zayadine 1985: 163, 1992). Fig. 4 also presents a hypothetical course of another route, located on the western side of the foot of Jabal Hārūn. This route is not dealt with in this report; its ancient course is probably partially covered by the modern track.

Starting from the survey Area T (see Frösén *et*

al. 2000), the ancient road continues eastward, roughly following the Wādī al-Maḥaṭṭah (وادي المحطة) until it reaches the top of the ridge. Three piled stone heaps there mark the observation point from which the shrine on top of Jabal Hārūn can be seen for the first time (point d in Fig. 4). The remains of a small, poorly preserved building (Site 85, point e in Fig. 4), approx. 6 x 3m in size, with a terrace extending 10m to the NE, were found 20m NW of the stone heaps. Plaster attached to stone and sherds of Nabataean/Roman common ware were found when small soundings were opened there. Notably, such small structures along the *Via Nova Traiana* have been interpreted as guard-posts or watchtowers monitoring the road traffic (Graf 1995: 243, 252). Similar structures located on the ridges in the Wādī al-Ḥasā survey area were considered as Nabataean signaling stations (MacDonald 1988: 212, 292). Site 85 may be similarly interpreted.

A cairn (point f in Fig. 4) of unknown date, ca. 4 x 4m in size, found next to the path on a slope, is apparently connected with the road as well. An almost circular stone structure (Site 87, point g), ca. 2.5 x 3m, situated on the slope nearby, was associated with Nabataean/Roman common ware sherds. The road itself is quite visible there (Site 82). It consists of a badly preserved terrace wall, some pavement, and a low bordering wall serving as a curbstone line. Moving eastwards, the wall becomes clear and continuous. At the foot of the ridge and next to the road, there is a small (2 x 2.5m), badly ruined rectangular stone structure (Site 83, point h), probably a guard-post or watchtower, with Nabataean pottery associated. Farther east, the remains of the road are the best preserved, featuring bordering road walls on both sides of the paved surface (Fig. 5). Similar constructions, often with associated building remains, are well known in Jordan (e.g. Eadie 1984: 216; Graf 1995: 243-244, 246, 249; MacDonald *et al.* 1982: 128-129; MacDonald 1988: 226; Smith *et al.* 1997: 59-60). Also in the Petra area, remains of road constructions were noted west and below the Naqb ar-Rubā'ī (نقب الرباعي massif (Lindner *et al.* 2000: 542) and in the Ṣabrā (صبرا area (Lindner 1992b: 203).

Two narrow trenches were cut across the road to clarify its structure. Its pavement has eroded away from the middle section of the road, thus it is not certain whether or not the road originally had a central ridge. Next to the curbstone walls, remains of uneven pavement (ca. 0.8m wide) were still *in situ*. Under the pavement was a layer of cobblestones, ca. 0.15m thick. The road walls, ca. 4.20m apart, were constructed of large stones and the in-

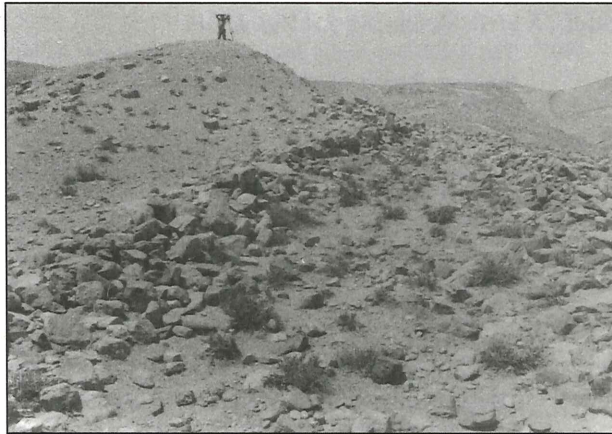


4. The ancient road in the survey area (by H. Junnilainen).

side was filled up with cobbles and silt. Compared to the published photos of some other ancient roads in Jordan (Smith *et al.* 1997: fig. 12; Kennedy 1995: fig. 2-3; 2000: fig. 9.17), the curbstones here are more protruding and wall-like.

The area northeast of Wādī as-Sādah (وادي الساده) was not surveyed in 2000, therefore the course of the road is unclear there. Possible remains of a bridge seem to indicate that the road originally did cross the wadi. Site 88 (point i in Fig. 4) is located at the junction of the Wādī as-Sādah and the Wādī al-Mahattah, in the vicinity of the modern track.

The building remains there, ca. 10 x 10m, are situated on a small hillock and are better preserved than the other structures described above. Remains of inner walls indicating rooms were noted, and Nabataean pottery was found around. The size of this building and its topographical location near the junction of two routes suggest that it might have functioned as a small road station rather than a watchtower. Notably, Sites 83, 85, 87 and 88 (points h, e and i in Fig. 4), all located directly or near the road, have yielded Nabataean pottery. It most probable that the route itself was already used



5. The best preserved remains of the road, near Site 83 (by. M. Mustonen).

during Nabataean times, although the extant paved road sections may date to the later periods (compare MacDonald 1988: 292).

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References

- Andrews, I.
1995 *The Birds of the Hashemite Kingdom of Jordan*. Dundee.
- Brünnow, R.E. and Domaszewski, A.
1904 *Die Provincia Arabia I*. Strassburg.
- Crawford, P.
1987 Food for a Roman Legion: The Plant Remains from

- el-Lejjūn. Pp. 691-703 in S.T. Parker (ed.) *The Roman Frontier in Central Jordan*. BAR Int. Ser. 340 (ii). Oxford.
- Desse-Berset, N. and Studer, J.
1996 Fish Remains from Ez Zantur (Petra, Jordan). Pp. 381-387 in A. Bignasca et al., *Petra, Ez Zantur I. Ergebnisse der Schweizerisch-Liechtensteinischen Ausgrabungen 1988-1992*. Terra Archaeologica II. Mainz.
- Dunneil, R.C. and Dancey, W.S.
1983 The Siteless Survey: A Regional Scale Data Collection Strategy. Pp. 267-288 in M. Schiffer (ed.), *Advances in Archaeological Method and Theory*, Volume 6. New York.
- Eadie, J.
1984 Humayma 1983: The Regional Survey. *ADAJ* 28: 211-224.
- Fiema, Z.T.
1998 The 1997 Roman Street in Petra Project - A Preliminary Report. *ADAJ* 42: 395-424.
- Foley, R.
1981 *Off-site Archaeology and Human Adaptation in Eastern Africa. An Analysis of Regional Artefact Density in the Amboseli, Southern Kenya*. BAR Int. Ser. 97. Oxford.
- Frösén, J., Fiema, Z.T., Lavento, M., Koistinen, K. and Holmgren, R.
1999 The 1998 Finnish Jabal Haroun Project. 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 Haroun Project: A Preliminary Report. *ADAJ* 44: 395-424.
- Gerber, Y.
2000 Observations on the 1999 Pottery. Pp. 409-411 in J. Frösén et al., *The 1999 Finnish Jabal Haroun Project: Preliminary Report*. *ADAJ* 44.
- Goren, M. and Dor, M.
1994 *An Updated Checklist of the Fishes of the Red Sea*. Jerusalem.
- Graf, D.F.
1995 The Via Nova Traiana in Arabia Petraea. Pp. 241-265 in I.J. Humphrey (ed.), *The Roman and Byzantine Near East: Some Recent Archaeological Research*. Portsmouth, RI.
- Hastorf, C.A. and Popper, V.S.
1988 *Current Paleoethnobotany*. Chicago and London.
- Hirschfeld, Y.
1996 The Importance of Bread in the Diet of Monks in the Judean Desert. *Byzantion* 66: 143-155.
- Kennedy, D.
1995 The Via Nova Traiana in Northern Jordan: A Cultural Resource under Threat. *ADAJ* 39: 221-227.
2000 *The Roman Army in Jordan*. London.
- Kolb, B. and Keller, D.
2000 Swiss-Liechtenstein Excavations at az-Zantur, Petra. The Tenth Season. *ADAJ* 44: 355-372
- Kvamme, K.L.
1998 Spatial Structure in Mass Debitage Scatters. Pp. 127-41 in A. Sullivan III (ed.), *Surface Archaeology*.

- Albuquerque.
- Lindner, M.
 1992a Abu Khusheiba - A Newly Described Nabataean Settlement and Caravan Station Between Wadi Arabah and Petra. Pp. 263-267 in *SHAJ* 4. Amman.
 1992b Survey of Sabra (Jordan) 1990 Preliminary Report. *ADAJ* 36: 193-216.
- Lindner, M., Hübner, U. and Hübl, J.
 2000 Nabataean and Roman Presence between Petra and Wadi Araba Survey Expedition 1997/98: Umm Ram. *ADAJ* 44: 535-567.
- MacDonald, B.
 1988 *The Wadi el Hasa Archaeological Survey 1979-1983, West-Central Jordan*. Waterloo, Ontario.
 1992 Byzantine Period Sites. In B. MacDonald *et al.*, *Southern Ghors and Northeast Araba Archaeological Survey*. Sheffield Archaeological Monographs 5.
- MacDonald, B., Rollefson, G.O. and Roller, D.W.
 1982 The Wadi el Hasa Survey 1981: A Preliminary Report. *ADAJ* 26: 117-130. Mango, C.
 1991 Byzantine Epigraphy (4th to 10th Centuries). *Paleografia e codicologia greca*. Atti del II Colloquio internazionale (Berlino-Wolfenbüttel, 17-21 ottobre 1983). Alessandria Vol. I, pp. 235-249; Vol. II, pp. 117-146.
- Miller, J.M. (ed.)
 1991 *Archaeological Survey of the Kerak Plateau*. ASOR, Archaeological Reports no 1.
- Renfrew, J.
 1973 *Palaeobotany: The Prehistoric Food Plants of the Near East and Europe*. New York.
- Rhoads, J.W.
 1992 Significant Sites and Non-Site Archaeology: A Case-Study from South-East Australia. *WA* 24 (2): 198-216.
- Smith, A.M. II, Stevens, M. and Niemi, T.M.
 1997 The Southeast Araba Archaeological Survey: A Preliminary Report of the 1994 Season. *BASOR* 305: 45-71.
- Studer, J.
 1996 La faune romaine tardive d'Ez Zantur, à Petra. Pp. 359-375 in A. Bignasca *et al.*, *Petra, Ez Zantur I. Ergebnisse der Schweizerisch-Liechtensteinischen Ausgrabungen 1988-1992*. Terra Archaeologica II. Mainz.
- Walmsley, A.G.
 1993 Area XXIX - The Abbasid Town Centre (1989 & 1990). Pp. 210-18 in A.G. Walmsley *et al.*, The Eleventh and Twelfth Seasons of Excavations at Pella (Tabaqat Fahl) 1989-1990. *ADAJ* 37.
- Walmsley, A.G. and Grey, A.D.
 2001 An Interim Report on the Pottery from Gharandal (Arindela), Jordan. *Levant* 33: 139-164.
- Warnock, P.
 1998 From Plant Domestication to Phytolith Interpretation. The History of the Paleoethnobotany in the Near East. *Near Eastern Archaeology* 61(4): 238-251.
 forth. Plant Remains. To appear in *The Petra Church* volume by the American Center of Oriental Research.
- Watson, P.M.
 1993 Tell al-Husn (Area XXXIV). Pp. 198-210 in A.G. Walmsley *et al.*, The Eleventh and Twelfth Seasons of Excavations at Pella (Tabaqat Fahl) 1989, 1990. *ADAJ* 37.
- Zayadine, F.
 1985 Caravan Routes between Egypt and Nabataea and the Voyage of Sultan Baibars to Petra in 1276. Pp. 159-174 in *SHAJ* 2. Amman.
 1992 L'espace urbain du grand Petra les routes et les stations caravanieres. *ADAJ* 36: 217-233.