

# PRELIMINARY REPORT OF AL-ḤUMAYMA EXCAVATION PROJECT, 2000, 2002

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## Introduction

Large-scale excavation continued at al-Ḥumayma (الحميمة) — Nabataean Hawara and Roman Havarra — in 2000 and 2002<sup>1</sup>. In keeping with the rich and continuous history of the small caravan stop and agricultural centre, most likely founded in the 80s BC by the Nabataean King Aretas III, a wide variety of structures from every cultural period was probed or excavated (Fig. 1). Since commencing excavation in the habitation centre in 1991, we have tried to recover information that will allow a well-rounded reconstruction of the settlement's social, economic, and political history. This strategy is now producing remarkable results. Hawara, located in a large basin of light, sandy, but arable loess 80km north of 'Aqaba, on or near an ancient route linking the Red Sea with northern Trans-Jordan, was the only significant settlement in the Ḥismā. Surrounded by the ash-Sharāh escarpment, dramatic mountain ranges and colourful sandstone jabals, Hawara evolved through the processes of Nabataean sedentarization, administration by Roman frontier forces, Christianization and extensive

church construction in the Byzantine period, and occupation by Abbasid pre-revolutionaries (Oleson 1997; 2001; Foote 1999). We present here a brief account of the major results of two fruitful seasons of excavation, organized by culture and chronology<sup>2</sup>.

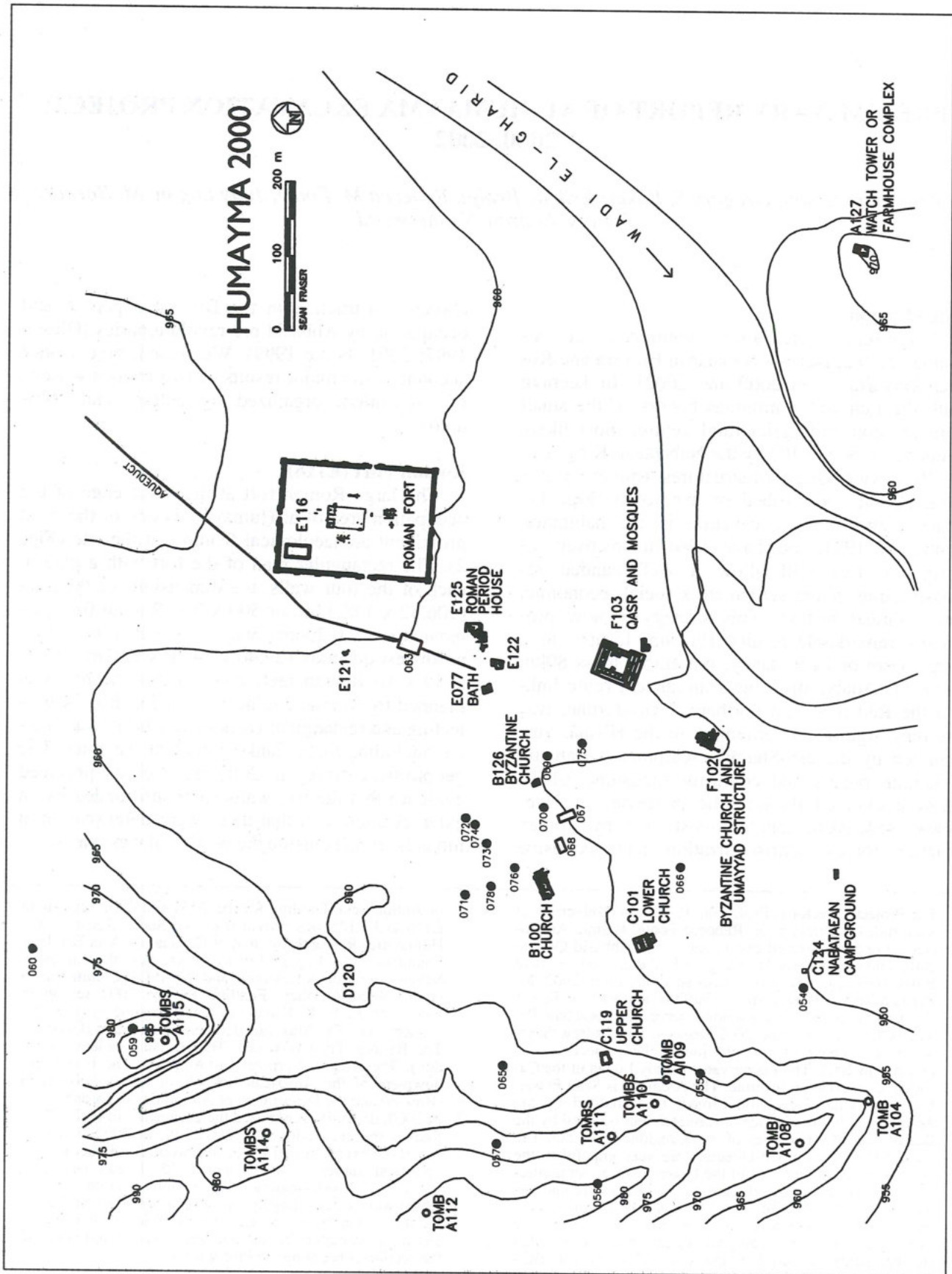
## Roman Fort (E116)

The large Roman fort at the north edge of the occupation area of al-Ḥumayma is one of the most prominent archaeological features at the site (Fig. 2). The rectangular plan of the fort with a gate in each of the four walls, the dimensions of the plan (206.32 x 148.32m, or 500 x 700 Roman feet; *pes monetalis* of 0.296m) and of the reservoir in its northwest quadrant (29.40 x 14.20 x 3.05m, or 100 x 50 x 10 Roman feet) confirm that the fort was planned by Roman engineers. The fort had 24 projecting and rectangular corner and curtain wall towers, including those flanking each of the gates. The geophysical survey in 2003 (see below) provided evidence that the fort walls were surrounded by an external ditch, and that there were defensive earth mounds (*tituli*) outside the north and west gates.

1. The Project Director is Prof. John P. Oleson (University of Victoria). Co-Director Dr. Rebecca Foote, Islamic Art Society (London) directed excavation in the Abbasid Qasr in 2002, and Co-Director Dr. Gregory S. Baker (University at Buffalo) directed the geophysical survey team in 2002. M. Barbara Reeves (University at Buffalo) and Erik de Bruijn (University of British Columbia) served as Assistant Directors for the 2000 and 2002 seasons. Dr. Andrew Sherwood (University of Guelph) joined the project as Co-Director in 2002. The Conservator is Judy Logan of the Canadian Conservation Institute. The Architect is Sean Fraser. The Ḥumayma Excavation Project is accredited by the American Schools of Oriental Research and licensed by the Department of Antiquities of the Kingdom of Jordan. The Project Director and Co-Directors are very grateful to the Director General and staff of the Department of Antiquities for their assistance with the project, to Drs. Pierre and Patricia Bikai and Mr. Kurt Zamora of ACOR for their enormous help with the practical arrangements necessary for carrying out our work. The geophysical team also included Heather Ambrose and Matthew Pelc (University at Buffalo), Mr. Jamal Safi and Mr. Sate Massadeh (Department

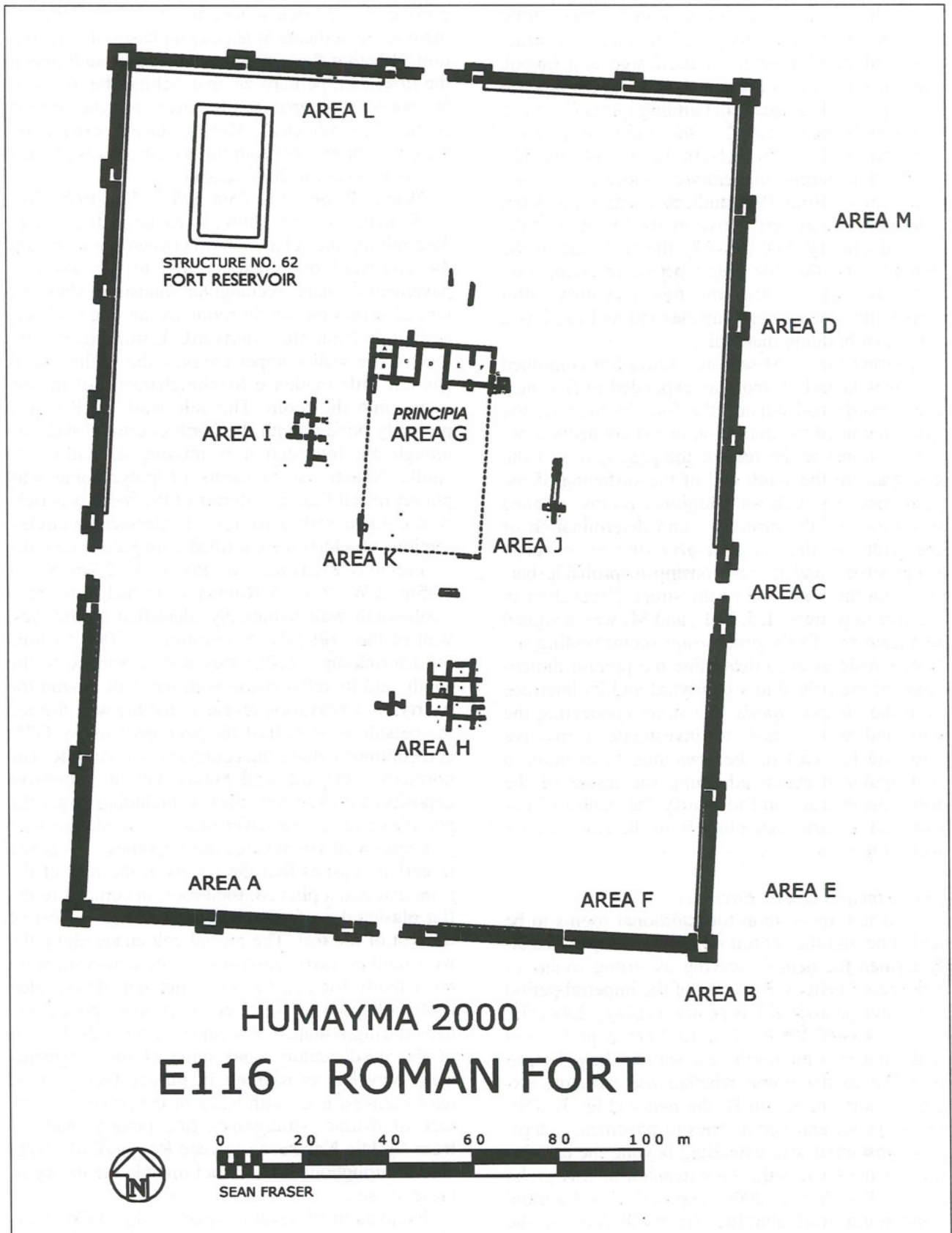
of Antiquities). Funding for the 2000 and 2002 seasons in E116 and E125 was provided by the Social Sciences and Humanities Research Council of Canada, the Van Berchem Foundation, the Taggart Family Foundation, the American Schools of Oriental Research, and the ASOR Committee on Archaeological Policy. Funding for the 2002 season in F103 directed by R. Foote was made possible by generous support from The Max van Berchem Foundation (Geneva), The Barakat Trust (Oxford), The British Academy (London), The Aregon Corporation (Amman), The Harris Endowment of the American Schools of Oriental Research (Boston) and the Department of Antiquities of Jordan.

2. In 2000, de Bruijn supervised the excavation of Field E116, Reeves the excavation of Field E125. In 2002 Foote directed the excavation of F103, Sherwood and Baker the geophysical survey of E116 and E125. Logan was conservator for both seasons. The various sections of this report were written largely by these supervisors on the basis of their notebooks and field reports. Oleson, overall project director, edited the text and wrote the introduction and the section concerning the inscriptions.



1. Plan of site with indication of ancient structures.





2. Plan of the Roman Fort (Field E116).

Earlier excavation seasons (1993, 1995, 1996) focused on the chronology of the fort's construction and development, on its design and layout, and on some of its interior structures, notably the *principia*, or headquarters building (Area G), and a barracks block (Area H) in the southeast quadrant (Oleson *et al.* 1995: 321-30; 1999: 414-19). The substantial corpus of ceramics found in the barracks area during 1996 indicates without a doubt that the fort was very active by the first half of the second century AD, possibly the first part of the century, and that the major period of occupation extended only through the fourth century, after which the structure was abandoned and used as a source of building material.

During the 2000 season, excavation continued in Areas G and H and was expanded to five new areas inside and outside the fort. In Area G, the goals included the definition of the connection between rooms at the rear of the *principia* and the courtyard to the south and of the surfacing of the courtyard, a search for additional rooms attached to the rear of the *principia*, and determination of the width of the *via praetoria* (the main north/south street) and its relationship to probable barracks on the west side of the street. Excavation in the five new areas (I, J, K, L, and M) was designed to locate the fort's *praetorium* (commanding officer's residence) to determine the precise dimensions of the *principia*'s courtyard and its interface with the *via principalis* (the street connecting the east and west gates), to investigate a massive structure just east of the *principia*, to examine a rectangular structure adjoining the inside of the fort's north wall, and to clarify the nature of extramural features extending from the east exterior wall of the fort.

#### *The Principia and its Environs*

It is not uncommon for additional rooms to be added behind the central room of *principia* (usually termed the *aedes*), serving as strong rooms or unit record offices. *Principia* of the imperial period may have an apse at this position (Blagg 2000: fig. 11.3; Johnson 1983: 131). In 1995 a probe was laid out across the north, rear wall of the *principia* in E116 to determine whether the structure extended north of Room D, the *aedes* (Fig. 3). Part of this probe exposed a series of pavements, steps, or a substantial wall extending beyond the exterior face of the back wall. An extension of this probe (Sq. G41) during 2000 exposed a substantial north-south wall abutting the north face of the *principia*'s rear wall, and two levels of pavement. The wall had a flat upper surface, perhaps sup-

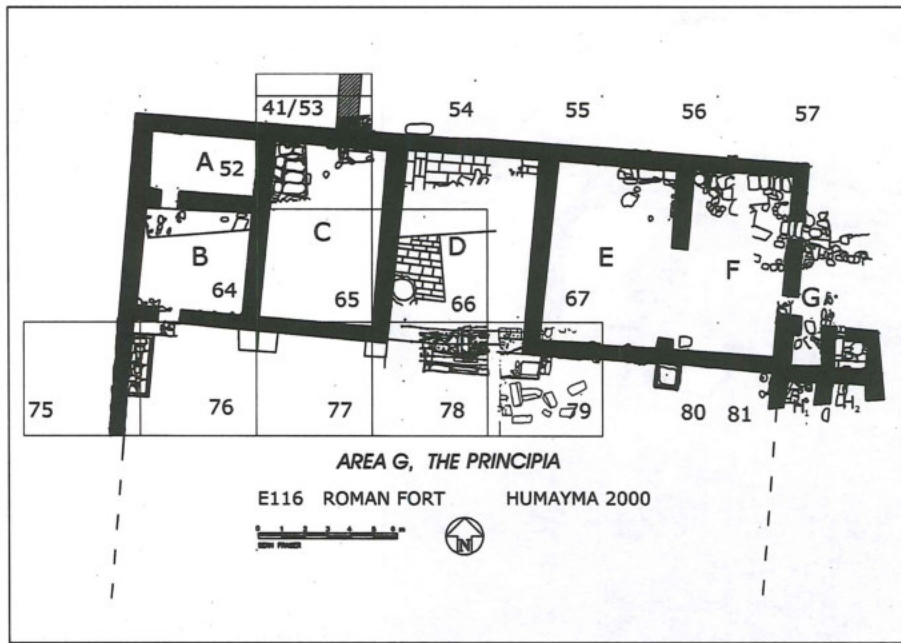
porting a mud-brick superstructure, while the pavement levels indicate at least two phases of construction. Whether these features were later additions to the *principia*, perhaps an apse behind the *aedes*, or are portions of separate structures constructed to its north is not yet clear. More extensive excavation, including probes beneath the pavements, is planned in this area for the 2004 season.

Within Room D (7.75m N/S, 5.72m E/W, 26 x 19 Roman feet; Sq. G66), excavation focused on determining the relationship between the room and the courtyard or parade ground to the south. A pavement of neat, rectangular sandstone slabs extended across the whole room, as far as a wall separating it from the courtyard. Unfortunately, the loss of the wall's upper courses above floor level has left little evidence for the character of the entrance into the room. The side walls of Room D probably bonded with the north courtyard wall, although the intersection is missing or within the baulk. Numerous fragments of polychrome wall plaster reveal that the interior of the room was richly decorated with a pattern of intersecting circles, sections of which were infilled with green and red.

Previous excavation in Room A (2.7m N/S x 4.45m E/W, 9 x 15 Roman feet) had exposed a north-south wall tentatively identified as the west wall of the *principia*. Excavation in 2000 focused on determining whether this wall continued to the south, and its relationship with the wall around the courtyard. Excavation revealed that the wall formed the outside west wall of the *principia* (in Sq. G75) and continued along the courtyard into Area K. The northern courtyard wall bonds with it. Extensive deposits of broken roof tiles — including large, flat pan tiles and curved cover tiles — outside the west *principia* wall strengthens the hypothesis proposed in earlier seasons that the rooms at the rear of the *principia* had a pitched, tiled roof, in contrast to the flat plastered roofs that must have been typical of the rest of the fort. The roofed colonnade along the west (and probably east) side of the courtyard were most likely tiled in the same manner. These tiled roofs collapsed or were rebuilt at some point, perhaps during a hiatus in occupation towards the end of the third century, and some of the fragments were recycled as packing in plaster facing on at least the west and south walls of the *principia*. The lack of distinct stratigraphy and pottery readings from Middle Nabataean to Late Roman/Early Byzantine throughout the soil loci impede the dating of these phases.

Excavation of several squares (Sqs. G76, G77, G78, G79) along the presumed course of the north courtyard wall revealed the location of entrances





3. Plan of Principia.

into the rooms flanking the *aedes* and the architectural treatment of the transition between the courtyard and the *principia*. A single doorway connected the courtyard with Room B (4.40m N/S x 4.45m E/W, 15 Roman feet square; Sq. G76) and with Room A via Room B. Traces were found of a similar doorway into Room C (7.72m N/S x 4.80m E/W, 26 x 16 Roman feet?), along with indications that the room was paved with sandstone flags like those of Room D. Judging from the absence of lateral doors that clearly belong to the initial phase of use, east-west communication through the rooms along the back of the *principia* was not considered necessary.

In 1996, a large inscribed base most likely designed to hold a life-size statue, was found at the south end of the wall dividing Rooms E and F (Sq. G80; Oleson et al. 1999: 417; Oleson et al. 2002: 110-12). Further excavation along the north courtyard wall has shown that similar bases were used to mark the south end of each of the north-south walls separating the rooms inside the *principia*. If these bases, made of reused Nabataean sandstone blocks and mouldings partially or wholly plastered, carried images of military and political leaders or gods, they represent an attempt to monumentalize the façade of the *principia* and confirm its ceremonial importance. Unlike the base found in 1996, none of the bases uncovered in 2000 preserved any traces of an inscription, although it is possible that inscriptions were painted on a plaster finishing surface that has since been lost. Statues lining the portico in front of the *aedes* are a feature of imperial *principia* (Johnson 1983: 113).

The placement of two abutting blocks to form a particularly large base south of the wall dividing Rooms B and C forms a symmetrical balance with the inscribed base south of the wall separating Rooms E and F. The recently discovered base abuts the plaster facing the *principia* wall behind it but bonds with the earliest floor in this part of the courtyard, suggesting that already at the initial phase of construction there was an attempt to finish and monumentalize the courtyard with statues. A large rectangular base composed of reused sandstone blocks and crowned with a reused Nabataean quarter-round moulding was built against the west wall of the courtyard, just south of its northwest corner (H 0.73m, L 2.75m, W 0.94m) (Fig. 4). This feature may have served as a tribunal, similar to those at either end of the rear colonnade of the Lajjūn *principia* (Parker 2000: Figs. 10, 11), but its height, narrowness, and the absence of steps make its interpretation as a statue base more likely.

Although the north courtyard wall had been robbed out south of Room D (Sq. G78, G79), a sandstone pavement was found just south of the line of the wall, along with traces of a possible stepped threshold forming the transition from the beaten earth surface of the courtyard. The statue bases flanking Room D frame these steps and provide a formal entrance to the *aedes*.

The damaged state of the remains of the front wall and central portion of the back wall of the *principia* may indicate that an attempt was made at some point to create a more open effect in the rooms located near the center of the *principia* by means of large entrances. Although these features





4. Statue base or Tribunal in principia.

may represent the original design of the *principia*, it is possible that major reconstruction took place during the early Byzantine period, or that sections of the north courtyard wall and the *principia's* rear wall were removed to facilitate traffic flow once the structure was no longer used for military purposes.

Excavation in Area K provided information about the south end of the *principia* courtyard (Sq. K01), and in conjunction with the excavation in Areas G and J determined its dimensions: 40m N/S x 27m E/W (135 x 90 Roman feet) (Fig. 2). In contrast with the beaten, pebbly earth surface exposed at the north end of the courtyard, this area was paved with a flagstone pavement, with traces of a capping layer of plaster. Although the pavers beneath the plaster were in relatively good condition, the absence of plaster over the traces of pavement exposed elsewhere in the courtyard suggests that the plaster here formed part of a later phase of development or a locally restricted enhancement. Excavation in the central area of the courtyard exposed only a gravel surface, but since that probe was very small (1 x 1m), it is possible that the whole courtyard was paved with stone, as well as the lateral colonnades.

The southern end of the west courtyard wall (Sq. K02) reflects two phases of construction. A low platform of plaster or mortar (W 0.98m, L 1.40m, H 0.23m) abutting the wall was constructed by pouring the mortar into a form. The function of the feature is not clear, but it resembles the low stand for a sentry post or structural support more

than a statue base.

Excavation in Area J at the south-east corner of the *principia* courtyard (Sq. J02) exposed the inside faces of the east and south courtyard walls. The portion of the courtyard revealed had a plastered floor, although only scant remains survive. A doorway through the south wall allowed passage between the east colonnade and a paved sidewalk facing the *via principalis*, the main east/west road. In a later phase, the door was blocked up, and a fire pit and ash deposits in the southeast corner of the courtyard suggest the space was devoted to domestic use.

Although the *via praetoria*, the main north-south road, was paved with sandstone slabs in front of the barracks in Area K (Oleson *et al.* 1999: 420), no evidence of paving was found on the *via principalis* in Area J. At this point the road surface was composed of compacted cobbles, pebbles, and sand. A terracotta pipeline was discovered running east to west beneath a step or raised sidewalk between the south courtyard wall and the street. (Fig. 5) Although the pipes were laid with the joints facing west, the pipeline slopes down to the east. The pipes were embedded in a packing of mortar, indicating that the pipeline was designed as part of a pressurized system, so the contents could have flowed in either direction. The reservoir located at a higher level in the northeast quadrant of the fort is the most likely source of water, and the orientation and level of this pipeline suggests that it was designed to satisfy some need in the south-east quadrant, perhaps a fountain, bath, or latrine.





5. View of pipeline in Area J.

A small probe (Sq. J04) was laid out to locate the south side of the *via principalis*, estimate its width, and find its intersection with the north end of the *via praetoria*. The north face of a structure framing the south side of the *via principalis* was exposed, indicating a street width of 8.0m, or approximately 27 Roman feet, and a width from building to building across the street of 8.9m or 30 Roman feet, the same width as that of the *via praetoria*. Due to limited time, excavation did not reach the presumed intersection of the north/south and east/west streets.

#### *Barracks and Via Praetoria*

Excavation in Area H in 1996 uncovered a section of the *via praetoria* (central north/south street) and the barrack rooms and workshops lying to its east, but the whole width of the street was not exposed. During 2000, a probe (Sq. H40) was completed across the *via praetoria*, and the drain underneath it was investigated. The wall forming the west side of the street was exposed, and the street was found to have the same dimensions as the *via principalis* (8.0m, see above). The drain below it was planned and constructed as an integral part of the roadway, and dates to the initial phase of the fort's construction. A later wall, the foundation of which lies well above the street level and which runs at a different orientation than earlier walls, belongs to a structure that encroached upon the street and was built when the *via praetoria* no longer served as an unencumbered thoroughfare, probably

during the phase of re-occupation in the fourth century.

Further excavation (Sq. H39) was carried out across and to the west of the wall along the west side of the *via praetoria* to determine whether barracks and workshops similar to those found east of the street were located here as well. Parts of two rooms were exposed. Room A was constructed first, as its foundations lie well below street level in sterile soil; the east wall separates it from the *via praetoria*. The east-west wall that separates Room B, to the north of Room A, appears to have been constructed in two different phases, as its foundation is much higher on the north than on the south. While no convincing floor was found in Room A, Room B has a distinct Early Byzantine occupational level with bins and a tabun oven. Moreover, it partially overlies a pottery dump containing second and third-century ceramics, similar to those found in the rooms to the east of the *via praetoria*, indicating that this room belongs to a later phase of occupation or re-use. No entrances were found in the portions of the rooms excavated.

#### *Praetorium*

During 2000, excavation commenced in Area I, a new area located west of the *principia* courtyard and associated with a large oval depression tentatively identified as the courtyard of a large house. Excavation of a series of squares (Sq. I01, I02, I04, I06) exposed parts of seven rooms with mosaic or flagstone floors and walls finished with poly-

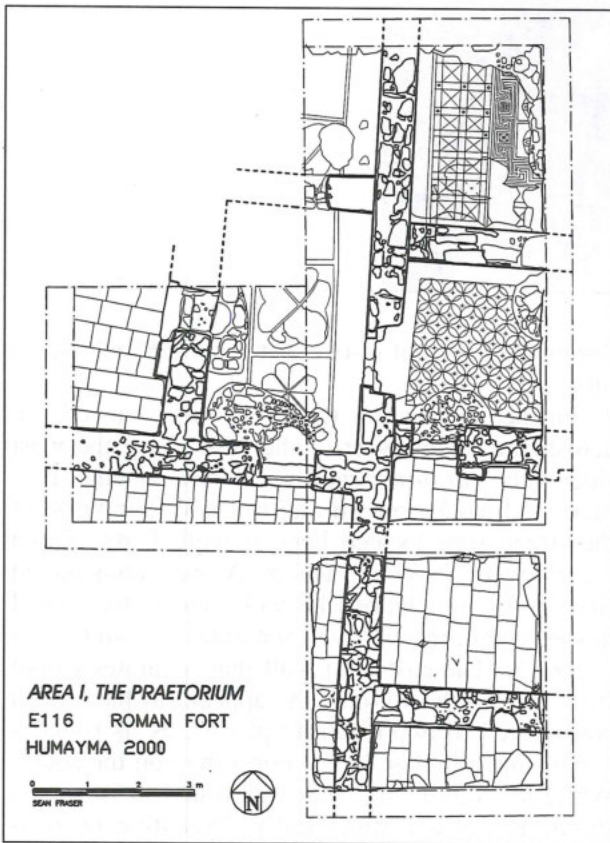


chrome fresco, extending north and east of a large courtyard (Figs. 6, 7). To judge from the arrangement at other Roman forts and legionary fortresses, such a substantial and ornate courtyard house located immediately to the west of the *principia* is almost certainly to be identified as the *praetorium*, the residence of the commanding officer (Johnson 1983: 139; Webster 1985: 215-22, 224-25).

Although not completely excavated, the courtyard (Room H; >6.60m N/S x 5.90m E/W), paved with carefully laid sandstone slabs, is estimated to cover an area of nearly 40.0m<sup>2</sup>. Two of the rooms

to the north (Rooms A and B; Room B 4.53m N/S x 2.98m E/W, 15 x 10 Roman feet) have entrances opening onto the courtyard, while Room F (L 4.0m) does not. Not enough of Room G has been excavated to determine whether it also had access to the courtyard. In addition, doorways connect Room B with Rooms A, C, and E, while Room E (L 3.6m N/S) in turn is connected with Rooms D and F. Both Room B and E may have served as passageways or anterooms. Room D, which was furnished with a high quality polychrome mosaic floor and ornate *faux* marble wall frescoes, may have served as the *triclinium*, or dining room (Fig. 8). The edge of the mosaic consisted of squares filled with opposed white and red-brown triangles, framed by white and blue bands and red-brown squares at the intersections. The rectangular panel occupying the centre of the floor, still not uncovered, was framed by a Greek maeander and swastika motif in dark reddish brown tesserae on a white background, framing isolated reddish brown squares with central quincunx or X patterns. Room E, paved somewhat less carefully with a mosaic consisting of overlapping white circles infilled with dark reddish brown tesserae, was well placed to serve as a reception room for the guests. Both mosaics are virtually identical in colours and motifs with mosaics of the mid to late first century AD found in Nabataean villas at Petra (Kolb 1998: 261-62, fig. 5) and in the as-Sūq area of Wādī Mūsā ('Amr 1997: 516, fig. 18; 'Amr and Momani 2001: 266, fig. 18). In consequence, they show that the Roman conquerors were not adverse to hiring local schools of artists to decorate official structures within a Roman frontier fort.

Many of the rooms were decorated with polychrome painted wall plaster, not unlike that found in the *principia* in the 1995 and 1996 seasons (Oleson *et al.* 1999: 416). The designs across the whole



6. Praetorium, Plan.



7. Praetorium, view.



8. Mosaics in Room D, Praetorium.



*praetorium* must have been very similar, since thick lines in various shades of red on a white/cream intonaco dominate the fragments recovered throughout. The south and east walls of Room A retained a considerable amount of fresco *in situ*, and revealed evidence for at least one phase of renovation (Fig. 9). On the south wall a small area of plaster imitates mottled stone veneer, while the east wall preserved at least two layers of fresco with broad red bands surrounding large white panels. In addition, fragments were found with broad white, black, yellow, and red lines probably also once part of panel designs. In Room D, a small section of green painted plaster has remained *in situ* high up on its west wall, which was also decorated with an imitation marble panel, painted a mottled yellow and light reddish-brown, associated with tendril patterns in various shades of green. A layer of white plaster later covered all this. The areas of green in this room and others often show layers of repainting, either indicating multiple phases of decoration or a process used to create a richer, more verdant design. Room D also produced fallen fragments of plaster painted with red bands, some with a wavy interface between the yellow and red areas, and some with radiating red and pink bands, as well as a plaster moulding with red, yellow, and black lines forming a dentilated pattern on a white background. Room H yielded remains of an interesting figural fresco design in green and orange, although the patina over the fragments made it impossible to identify the underlying images. In addition, a number of fragments carried painted Greek or Latin letters, perhaps from labels that once identified mythological personages, and Greek *graffiti* had been scratched into some of the red bands. Unfortunately, all are now fragmentary.

The use of unpainted white wall plaster in



9. Frescoes in Room A, *Praetorium*.

Rooms F and G along with plain flagstone floors rather than mosaics, suggest a more utilitarian function for these spaces than that of the highly decorated rooms to the north. Such a differentiation in decor is also seen in the rooms at the rear of the *principia*.

Surface remains suggest that the east wall of Rooms D, E and F lies about 1.50m east of the excavated squares, and that a north-south street separated it from the *principia*. Imposts for arches to support the roof so far have been found only in Room A, but the recovery of ceiling plaster and large stone roofing slabs from soil loci within the structure, and the absence of roof tile fragments, suggest that the *praetorium* had a flat roof supported by arches throughout.

All the rooms with painted wall plaster show evidence of periodic repainting or replacement of designs. As well, the mosaic floors in Rooms B, C, D, and E were patched or repaired in places with a gray mortar. These repairs appear more indicative of ongoing maintenance related to continuous use than of distinct occupational phases. The only architecturally significant change that appears to have occurred in the excavated area was the separation of Rooms B and C by the construction of a mudbrick east-west wall built on top of the mosaic floor with blue rosette motifs found in both rooms.

Relatively little pottery was found in the soil loci within the rooms, and it consistently ranged from Middle Nabataean to Late Roman. No Byzantine or later pottery was found. The soil consisted of homogeneous tumble and wind/water deposited soil, with no evidence of any later occupational levels or activity. It appears that the *praetorium* was continuously occupied from the time of the fort's construction until the end of its use by the military in the late third century. It was then abandoned, and subsequently collapsed, probably as the result of an earthquake. No later attempt was made to clear or reuse the building.

#### *Possible Granary or Stable*

In Area J, east of the *principia*, visible wall lines and the elevation indicate the presence of a substantial multi-roomed structure. Excavation of two squares (Sq. J01, J03) uncovered portions of four rooms belonging to a long, wide structure that extends beyond the excavated area in all four directions. (Fig. 2)

The two northern rooms, Room A to the northwest and Room B to the northeast, lie on either side of a long north-south wall (W 1.60m) that extends for 11m from Square J01 through J02 and continues further to the north of the square. A se-



ries of arch imposts (0.30 x 0.60m, 1 x 2 Roman feet) abuts both faces of this wall, which has been carefully built of heavy blocks and rubble and finished on both sides with a coarse, white unpainted plaster. Curiously, the imposts are mostly staggered, rather than placed symmetrically to provide maximum resistance to lateral thrust. The absence of roof tiles suggests that the arches supported a flat, plastered roof. Room B was paved with neat sandstone flagstones similar to those found in the *principia* and elsewhere within the fort, while Room A was floored with thick, square bricks (0.30 square, 1 x 1 Roman foot; Th 0.04m), one of which bore a human footprint. A layer of plaster over the north end of the exposed floor area may reflect either later repairs or an original finish that has been lost elsewhere.

The only doorway exposed in the course of excavation connected Room A with Room D to the south. Rooms A and B were filled with a homogeneous mix of tumble from the walls and arches and wind and water-deposited soil. Unlike the two rooms to the south, there is no evidence of re-use or later occupation.

The southern rooms, Room C to the southeast and Room D to the southwest, had sandstone flagstone pavements, although that of Room D had been substantially disturbed or partially removed. The north wall of Room C, which abuts the wall separating Rooms A and B and is of a different type of construction, clearly belongs to a later phase of construction. The wall separating Rooms C and D may belong to the same phase.

The original function of the two southern rooms is not certain, but both show evidence of later substantial domestic occupation and food preparation. Room C contained much more ash than Room D, indicating that it went out of use first and served as a dumping area. A bronze coin of Maxentius (306-312AD), an emperor whose coinage is rare in the east, was found in the debris, along with a bronze coin of Constantine. These rooms, like those exposed in Area H, provide evidence for domestic reuse of some buildings in the fort, possibly by civilians who moved in after military occupation of the structure had ended.

Further excavation to clarify the extent and original function of this large structure will take place in 2004. Given the size and solidity of the building, its location just east of the *principia*, the brick floor of Room A, and the plastered walls, one likely function would be that of the fort's granary (*horreum*). Storage of the garrison's primary food supply required conditions of maximum protection against vermin and moisture, requirements that this struc-

ture would have met. In this case, the staggered buttresses along the east side of the main wall may have been intended to support a projecting roof designed to keep rain water well away from the walls, as in military *horrea* in Britain (Webster 1985: 203). The brick floor, so far unique in the fort, implies a special function. A stable for horses or camels is another possibility, although one might expect stables to be located closer to the fortification walls for reasons of traffic control, odor, and waste disposal.

#### *Structure by North Gate*

Probes in Area L exposed a structure built up against the inside face of the north curtain wall 20m west of the north gate (Fig. 2). Two squares (Sqs. L01 and L02) were opened to determine whether two short north-south walls visible on the surface were part of a structure contemporary with the initial phase of construction at the fort or a later addition. It appeared that the structure would have impeded movement along the north parapet walk and access to the north gate.

Excavation revealed that the two north-south walls (Th 0.65-0.73m) abutted the curtain wall and formed the side walls of a one-room structure (interior 3.30 m N/S, 3.35 m E/W). The south wall is only partially preserved, and the entrance door must have been situated in the missing portion. There were traces of a plaster floor, and an ash deposit probably derived from a cooking installation. Large amounts of ashy soil to the east of the room represent dump from this installation, suggesting a significant period of occupation.

The soil within and immediately surrounding this structure showed little stratigraphic differentiation and appears to have been deposited mainly by wind. A Byzantine bronze follis, possibly issued by Justinian (527-565AD), was found in a soil locus just below the surface (Locus 03), the latest datable artifact so far found in the fort. Although the coin cannot be conclusively associated with the square structure, the structure clearly is later than the first phase of occupation in the fort, and it may have been in use as late as the sixth century. Perhaps, for reasons we can only guess at, a squatter built this structure in the now otherwise completely deserted fort sometime in the first half of the sixth century.

#### *Extramural Features East of the Fort*

Wall lines visible on the surface outside the northern end of the fort's east wall suggested the possible presence of extramural structures such as stables or civilian houses (Fig. 2). Investigation in Area M was designed to determine whether these walls were ancient or modern. Excavation of Sqs.



M01 and M02 revealed that the walls, unlike those of the fort's structures, had been built haphazardly of un-worked fieldstones, cobbles, and soil. They consisted of only one course, and were not built on a foundation. It is very likely that these are recent field walls built within the last century to retain water and soil for cultivation.

### **Roman Vicus (E125)**

Investigation into the Nabataean town and Roman vicus continued in 2000 in Field E125, located 90m southwest of the southwest corner of the fort. Excavation in this area in 1996 and 1998 revealed a Late Roman building constructed in the late second or early third century AD that showed two cycles of damage and reuse before a final abandonment following a late third or early fourth century collapse (see Oleson *et al.* 1999: 421-26 for detailed phasing). At the end of the 1998 season, ten rooms were fully or partially exposed, providing information about the construction, decoration, functions, and phasing of the building, but the overall size and shape remained undetermined. The goals of the 2000 season were therefore to provide a more comprehensive plan of the structure and to complete excavation of Room H, where a probe had detected large quantities of polychrome fresco fragments.

Excavation in 2000 revealed the outlines of a large (at least 800m<sup>2</sup>) multifunctional building constructed of mudbrick walls on coursed cobblestone foundations, containing more than 24 rooms (Fig. 10). Six rooms were spanned by stone arches that supported stone-slab roofs (Rooms A, C, G, H, I, T), four were paved with flagstone floors (Rooms A, D, H, O), and five were decorated with frescoes (Rooms A, B, C, G, H). The northeast corner of the building was exposed, along with stretches of the north and east exterior walls. These walls were no different in construction and appearance than the interior walls, and attempts to delimit the southwest corner of the building were unsuccessful. In this area walls had been robbed down to their foundation course, possibly during the construction of (subsequently robbed out) Ottoman structure that ran from Area W to Room H. As the pottery from the 2000 season requires further study, full discussion of the phasing of the structure and the numerous assemblages trapped under collapsed walls is not yet possible. This report will focus on the shrine room, the pipeline, and a Nabataean predecessor to the Late Roman building.

Building E125 appears to have been multifunctional, combining living space, possible industrial space (see Oleson *et al.* 1999: 423), and a

small shrine. The shrine was only in use during the Roman building's first phase of occupation (late second to mid-third century). It consisted of a single room (Room H, ca. 6 x 6m) located in the center of the southern side of the building and oriented towards the east (Fig. 11). Two mudbrick bins and a shelf were built along the western wall and a cult image and votives were placed along the western side of the room facing east. Evidence suggests only the eastern half of the room was roofed, leaving the space above the cult objects open to the sky, an arrangement similar to that in contemporary house shrine at Mamphis (Negev 1988: 107-8).

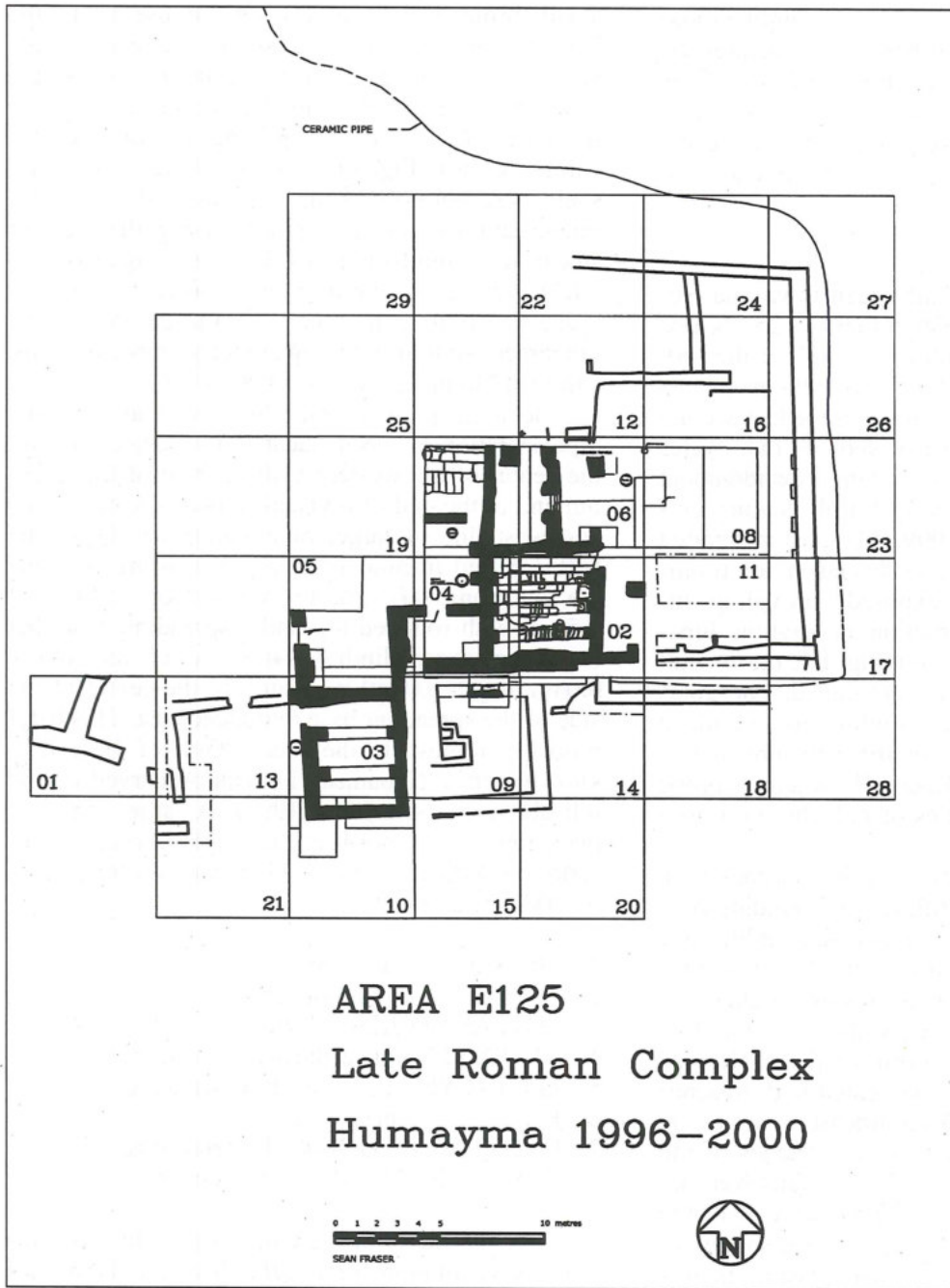
The focal point of the shrine was an aniconic representation of a Nabataean deity, located toward the center of the western wall in front of the larger bin and at the end of a visual runway created by an east-west line of large, blue sandstone slabs. The betyl, carved from a single piece of white and purple sandstone, takes the form of a short column (H 0.58m) with rounded top and a spreading base that rests on a square plinth (0.44m<sup>2</sup>). A vertical slot (W 0.04m, depth 0.08m) was cut into the centre of the side of the spreading base that faced east. This betyl probably represents the local "God of Hawara", known from a Nabataean inscription carved on the hill above the site (Graf 1992). A large altar was placed just to the north of the betyl, carrying an inscription dedicating it to Jupiter Ammon (Oleson *et al.* 2002: 112-16).

- |   |                    |                                 |
|---|--------------------|---------------------------------|
| 1 | PR - SAL -         | Pr(o) Sal(ute)                  |
| 2 | AVGG -             | Aug(ustorum)                    |
| 3 | IJOVI AMMO         | [I]ovi Ammo                     |
| 4 | NI VEXILL -        | ni vexill(atio) or vexill(arii) |
| 5 | LEG III CYR        | Leg(ionis) III Cyr(enaicae)     |
| 6 | FEL -              | Fel(icis ?)                     |
| 7 | Q - D - F HAV      | Q(?) D(?) F(?) Hav(arrae)       |
| 8 | CVM IVL[I]O PRISCO | cum Iulio Prisco                |

"For the safety of the emperors, to Jupiter Ammon. A vexillation (or *vexillarii*) of the Third Legion Cyrenaica, Fortunate, (dedicated) the gift that it (or they) made at Havarra, along with Julius Priscus."

This inscription, dated by palaeography and its contents to sometime in the first half of the third century, provides the first evidence for the identity of a legionary detachment stationed at Hawara. The auxiliary unit of *Equites sagittarii indigenae* mentioned by the *Notitia Dignitatum* (Or XXXIV.25) most likely was stationed in the fort in the third or fourth century. The Iulius Priscus mentioned in the last line may be either the famous brother of the emperor Philip the Arab or an unknown individual





10. Late Roman Complex (E125), Plan.

with the same name.

Fragments of a truncated sandstone column carrying a Greek inscription dedicated to Zeus Serapis were found north of the altar; the column, already fragmentary at the time the room collapsed, probably rested on the edge of the small bin (Oleson *et al.* 2002: 117-19).

1	ΑΠΟΛΛΩC	Ἀπολλῶς
2	ΔΙΟCΚΟΡΟΥ	Διοσκόρου
3	ΜΩΡΟCΥΠΕΡ	Μῶρος ὑπέρ
4	ΕΥΧΑΡΙCΤΙ	εὐχαριστί

5	ΑCΑΝΕΘΗ	αC ἀνέθη
6	ΚΕ[ΝΔ]ΙΕΙ	κε[ν Δ]ίει
7	CΕ[Ρ]ΑΠΠΙ[ΔΙ	Cε[ρ]άπι[δι

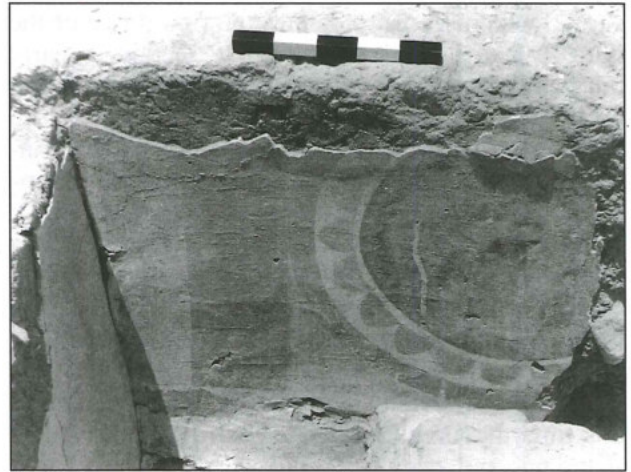
“Apollos, son of Dioskoros, (called?) Moros, in thanksgiving dedicated (it) to Zeus Serapis.”

It is interesting that the unit dedication was in Latin, the official language of the army, while the private dedication was in Greek, the common language of the soldiers, and that the Roman-style dedications were set next to an aniconic and anepigraphic representation of a local god. A faience





11. Shrine room, E125, view.



12. Shrine room, E125, fresco on bin.

ram's head amulet found in the debris of Room I in 1996 probably represents Jupiter Ammon, and may have been displaced from the shrine. The alabaster statuette of a nude female found in a pit in Room T may also have been associated with the shrine.

The walls of the shrine and the vertical surfaces of the bins and shelf were decorated with polychrome fresco (Fig. 12). The section adjacent and just north of the large bin was well preserved because it had been held in place by the small bin, which was added soon after construction of the room. Above a red dado, this panel carried a geometric design composed of a large black circle surrounded by red semi-circles on a white background surrounded in turn by purple band. The yellow background was highlighted with red veining in imitation of marble revetment. The rest of the fresco had been reduced to fragments showing traces of red, green, blue, black, yellow, and white paint. The blue, yellow, purple, and white sandstone slabs used in the pavement of the room probably reflect the same interest in bright colour. Most of the slabs, except for those in front of the cult image and under the bins, had been broken and patched with small cobbles and mud-plaster, suggesting that the floor originated in an earlier Nabataean building (see below).

The door to the shrine has not yet been found, but it is most likely located in the unexcavated north end of the west wall, where a disturbed door jamb was observed. This door was accessed via corridor X, which led to the outside of the building and to a rectangular basin (W 0.40m; L 0.90m; deep 0.49m) where worshippers could have washed before entering the shrine. The basin was constructed of large sandstone slabs coated on the interior with a white plaster.

Water reached the basin through a ceramic pipe-

line that discharged over the northeast corner. This pipeline was traced upstream through area V and beneath corridor U, at which point it turned abruptly northward through an elbow joint and ran outside the eastern edge of the structure to the NE corner. At this point it curved to follow an irregular northwest route for 25.6m until it was lost in a modern destruction level. At its final surviving upstream point, just west of the modern dirt road through the site, the pipeline is 0.40m higher than the section on the east of the road, and it angled sharply downwards through a complicated elbow joint. This orientation suggests that the pipeline was designed to dip under an ancient road beneath the modern track, possibly the *Via Nova*. From this point the pipeline presumably continued north to the aqueduct discharge or the pool it fed.

The pipeline was constructed of wheel-made ceramic pipes with an external diameter of ca. 0.095m. The pipe sections varied in length from 0.14 to 0.30m; for the sample of 58 sections the mean length was 0.227m (standard deviation 0.039m). Except for the special-purpose pieces, each pipe had one male and one female joint, which were plastered over with white or light gray mortar. Most sections of the pipeline were bedded on gray mortar or mud plaster laid directly over the sandy ground. At points of maximum stress such as the elbow-and Y-joints, the pipe was packed with small cobbles and mud on either side and below. It is odd that the male ends of the pipes pointed towards the flow of water rather than away from it. Within the E125 structure the pipeline ran directly below the floor level and was covered and protected with small slabs of stone; outside the building it was covered by either a thin coating of mud plaster or by water-deposited soil.

The pipeline and basin are an integral part of the



shrine, which seems to date to the first phase of the Late Roman Complex — the late second or early third century AD. A coin of Philip the Arab found on the floor of the sanctuary shows that it was in use until at least the mid-third century, a date consistent with the content and letter forms of the inscriptions found in that room (Oleson *et al.* 2002: 112-19). The room was abandoned or destroyed at a time when the rest of the building was undergoing crude renovations (Oleson *et al.* 1999: 424-26). It is likely that the abandonment of a shrine containing a military dedication should be associated with the departure of Hawara's garrison. In any case, around this time the Greek inscription fell to the floor and shattered, and twenty to thirty centimeters of soil built up over the paving. Finally, in the late third century the ceiling collapsed, breaking both the aniconic betyl and the Latin altar and leaving a thick layer of tumbled stones.

The excavation of E125 provides us with valuable information about the activities that took place outside a Roman fort in the centuries immediately succeeding Arabia's annexation. It is particularly interesting that many features of this civilian structure resembled those of contemporary structures in the fort: the walls carried polychrome frescoes displaying typical Greco-Roman motifs such as pedestalled birdbaths and Muses, and its water was supplied by a pipeline. At the same time, in detail the underlying workmanship was of consistently lower quality than that in the military structures. The walls were built of mudbrick rather than stone, their foundations were not set into the ground, the pipeline was only crudely protected from damage, and the pipeline's receptacle was lined with wall plaster instead of hydraulic plaster.

In addition to providing information about both Nabataean and Roman Hawara, E125 has also provided clues about the preceding Nabataean settlement. Hawara was founded at some point in the first century BC. Given the large numbers of Nabataean dressed stones, mouldings, and column drums found in reuse in the Roman fort and elsewhere at al-Ḥumayma, it is clear that impressive stone structures existed in Nabataean Hawara. Except for the remains of a few walls beneath the Roman bath, the location of these structures was previously unknown. The presence of walls constructed from finely cut stone blocks of Nabataean design found beneath the Roman bath and E125 indicates that a Nabataean settlement was located in the region later occupied by the Roman *vicus*. The destruction and partial dismantling of these walls before the construction of the later structures suggests that the Nabataean community was destroyed before the

construction of the Roman fort. The transition from Nabataean to Roman rule at Hawara, as at Petra (Schmid 1997; 2001: 139-46), was marked by resistance and suppression. Signs of later amalgamation and possibly reconciliation can be seen in the E125 shrine. Three gods are honored: Jupiter Ammon and Serapis (two Romano-Egyptian gods associated with the Legio III Cyrenaeca) and an indigenous god. Significantly, the Nabataean dedication was the focal point of the room, testimony to the continued appeal of indigenous culture in the Imperial period.

During the next two seasons of excavation we hope to learn more about both the Nabataean and Roman communities at Hawara. Excavation in E125 will focus on locating the door to the shrine room, investigating the shrine's association with the room to its west, and locating the entrance(s) to the E125 complex. Other explorations will be guided by the results of the geophysical investigations, which it is hoped, will provide us with a diverse selection of Nabataean and Roman structures to explore.

#### **Geophysical Survey of Roman Fort, 2002**

In collaboration with an archaeological team directed by Oleson and Sherwood, a small geophysical team headed by Baker conducted the initial field component of an archaeological geophysics survey at al-Ḥumayma from 21 June through 11 July 2002. The objectives of the work were identification of buried structures to assist in future excavation and site conservation, determination of the strengths and weaknesses of each geophysical technique at the site in preparation for future work, and development of innovative methods for synthesizing and displaying complex three-dimensional images generated during a geophysical survey. Three separate techniques were used to collect the data: electrical resistivity, magnetic gradiometry, and ground-penetrating radar. Because of the potential for interference among the devices, simultaneous collection of data in a specific area was not attempted.

The electrical resistivity survey was conducted with a Geometrics, Inc., OhmMapper TR1 capacitively coupled resistivity meter. This unit collects electrical resistivity data significantly faster than the traditional galvanically coupled (DC) resistivity systems. Utilizing a transmitter and a receiver separated by a distance of 1.25m, the device measures the amount of electrical resistance in the sub-surface. One data point was collected every second while towing the array along a profile line, and "marks" at regular spacing along the profile, which were input by the operator, were used to locate the



data in space. Magnetic surveying employed a Geometrics, Inc., G-858 MagMapper cesium-vapor magnetic gradiometer attached to a non-magnetic cart; the vertical separation of the magnetometers was 0.75m for all data. As with the resistivity survey, one data point was recorded every second while moving the cart along a particular profile, and "marks" recorded by the operator to locate the data in space. A Sensors and Software, Inc., Noggin Plus 250 system was used for the ground-penetrating radar survey. This unit includes an odometer wheel to control the data collection rate, which was set for 0.25m along the profiles.

Surveys were conducted both inside and outside the walls of the Roman Fort (E116). To facilitate the location of stone structures and features inside the Fort, the interior was divided into nine small zones, with boundaries extending to the interior edge of the fortification walls and to the edges of existing excavations, rock piles, dirt mounds, and other significant barriers. To reduce error and missed features of structures, which are oriented roughly north-south/east-west, each zone had a baseline parallel or perpendicular to a main diagonal axis formed by joining the interior corners of the Fort. Zones 01-05 were designed to capture the maximum total area within these constraints, and Zones 06-09 were positioned to include as much of the remaining areas as possible.

Outside the fort, the survey's main objective was to locate stone and mud-brick structures associated with the *vicus*, the civilian settlement associated with the fort. Areas on the south, west, and north sides of the Fort, subdivided into five zones (Zones 10-14), were surveyed to boundary lines located 70m from the inside edge of the fortification walls. Additional surveying was also conducted south of the Roman houses (E125) and Roman Bath (E077) southwest of the Fort.

Within the nine zones inside the Fort, GPR and magnetic data were collected along a series of profiles spaced 1.0m apart. Data along crossing profiles were not taken since the one-metre spacing made the coverage redundant. Resistivity data were not gathered since preliminary investigations with the device proved the zones too small to provide adequate data density for interpretation. Data collected by all three methods outside of the Fort were along profiles spaced 2.5m apart. Here, the resistivity and magnetic data were taken both along the profile lines and across them, while the GPR data were taken only along the profile lines.

The exact positions of the baselines and profile lines for each zone were created using measuring tapes and marked string. Coloured spray paint was

used on small rocks to act as guides during the process. Major corners and crossing points were marked with rebar posts and surveyed using a TOPCON digital total station theodolite, with elevations recorded every 10m in each zone.

To prepare for the surveys, all rocks larger than 0.05m were moved into rows along the profile lines (Fig. 13). Besides increasing the ease and speed with which each tool could be pushed/pulled along the profile lines and providing guidance for the operators, the removal of the stones improved data quality, since rocks wedged between the radar antennas of the GPR and the ground decreases coupling and generates noise, and large-sized surface rocks increase noise on the magnetic data. Surface metallic debris, which would significantly interfere with the magnetic gradiometer were also removed from all zones. After initial site preparation on Zones 01 and 02, surveying by part of the team began while the other team members continued site preparation in other zones.

Once the operators had collected the data, preliminary processing steps were performed to permit some initial interpretation. The steps necessary for preliminary processing of magnetic gradiometer data are as follows: data transfer from the instrument console to laptop computer; input of spatial geometry, which indicates where each data point is located in a coordinate system; removal of spurious data, such as data spikes and zeroed data; and generation of a shaded relief map of the magnetic gradient amplitudes. When processing the data from outside of the fort, the magnetic data were displayed using a colour-shaded relief map (instead of grayscale) because the dispersion of data values was more significant. The results are now being enhanced by integrating the magnetic data with the



13. Mr. Jamal Saffi pushing GPR unit in cleared lanes, E116.



TOPCON survey data to position more accurately the zones relative to each other, including orienting the data to true north. Other enhancements include removal of step functions within the data caused by time delays during collection, removal of short- and long-wavelength noise, determination of the depth of investigation through forward modelling, and editing of specific profiles that fluctuate and cause "striping" in the data parallel to the profile direction.

The GPR data required significantly more digital processing to render it into usable preliminary form. The following steps were performed to generate depth-slices of the data: data transfer from the console to laptop computer; input of spatial geometry; scaling to enhance small amplitudes from deeper reflections; editing of "bad" data and noisy profiles from within each zone; determination of velocity by analysing point diffractions within the data profiles; polarity rotation of 180 degrees on every other profile line because they were alternatively run in opposite directions during data collection; migration of data to collapse diffractions and shift reflectors to their proper sub-surface position; conversion from time to depth using the calculated velocity of 0.12m/nanosecond; merging the profiles in each zone into a data volume; "slicing" the data volume to examine the horizontal distribution of reflectivity at specific depths. The following procedures are being performed to enhance the GPR data: integration of the data with TOPCON elevation and spatial data to improve their positioning; re-analysis of the data to improve the velocity estimate for improved depth control; generation of a specific colour palette for plotting the data; development of an innovative methodology for integrating the GPR data with the magnetic gradiometer data; merging of several depth-slices back into a data volume for 3-D visualization.

The steps necessary for preliminary processing of the electrical resistivity data are as follows: data transfer from the instrument console to laptop computer and input of spatial geometry; removal of spurious data; generation of a colour-shaded relief map of resistance (colour is generally necessary because of the broader dispersion of values). At present the resistivity survey data are being enhanced through integration with the TOPCON survey data to more accurately position the zones relative to each other, including orienting the data to true north, by removal of short- and long-wavelength noise and "striping," and by determination of the depth of investigation through forward modelling.

The deepest penetration of signal at the site was 2.5m, with an average maximum penetration of

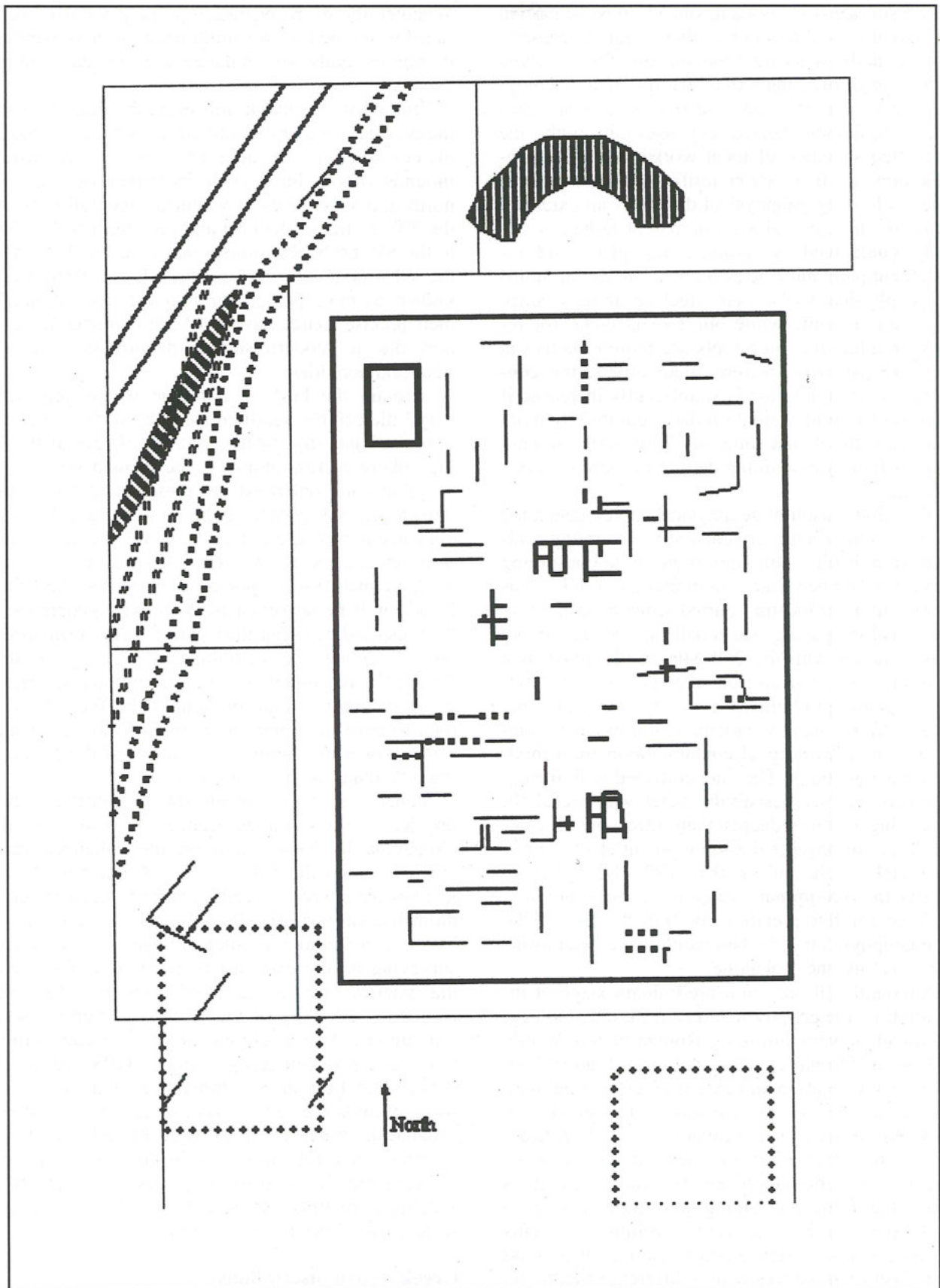
about 1.5m. Although the individual GPR profiles are high quality and can be useful in identifying buried structures, the development of depth—slices by combining the profiles within a zone yields the best results. These preliminary interpretations of the information from the 2002 geophysical campaign should be enhanced substantially in the near future. At present the interpretation of the magnetic gradiometry data consists of identifying coherent, linear anomalies. Interpretation of the GPR data is quite straightforward, and only structures yielding clear radar returns are indicated. A composite interpretation of all data from the season's work is shown in Figure 14.

Overall, the interpretations of the data outside the Fort are less specific than those presented for the data inside the Fort, mainly because the 2.5m profile spacing did not allow for detailed coverage. Some areas are simply highlighted as likely having buried structures. The data quality is high outside the Fort, however, and some indications of anomalies on the GPR data have signatures very similar to those of buried structures identified within the Fort.

The features indicated on the composite plan (Fig. 14) represent either significant anomalies visible on only one type of data or less obvious anomalies identified through evaluation of data from more than one geophysical tool. In addition to visible modern features, several features were identified that do not have a substantial surface expression. In the western zones, the dotted parallel lines represent a modern vehicle track, which generated some anomalies on the magnetic and GPR data. The diagonally striped ellipse, which is very visible in the magnetic gradiometry data, encloses a region of slightly raised earth probably created during road repair or ploughing in the adjacent field. In addition to these modern features, several anomalies exist in the data from one or more geophysical tools that may represent buried features: ancient tracks and roads, aqueducts, or structures (Fig. 14, solid and dashed parallel lines). There are also indications on the magnetic and GPR data that the semicircular mound outside the north gate of the Fort, the vertically striped region on Figure 14, may extend below the modern land surface, indicating that this is part of an earth wall designed to protect the north gate.

A substantial amount of geophysical data was collected over a three-week period. This first large-scale use of multiple geophysical tools at the site has yielded a number of considerations relevant to archaeological geophysics elsewhere. Site preparation time at an archaeological site with a rock-





14. Composite map of results of geophysical survey.



strewn surface is significant, since it must be carried out largely by hand rather than with machinery. Typical daily working time on site for a survey crew is generally longer than that for an archaeological excavation team, because field time is at a premium, equipment-related expenses are high, the contracted schedule of local workers is not a consideration, and there are no artifacts to be processed. When collecting geophysical data over an extended period of time, occasional equipment failure is virtually guaranteed, so contingency plans and replacement parts must be available. The use of multiple geophysical tools is an effective strategy, since work can continue while one tool is down for repairs. In addition, some tools are more effective at detecting particular features than others, the confidence of interpretation is significantly increased if features can be identified on data acquired by more than one method, and some subtle features can only be identified by examining data from more than one method.

This first season of geophysical survey generated several important conclusions regarding al-Ḥumayma itself. Although more time-consuming because of the necessary site preparation, GPR was the best tool for locating buried structures, but only if the profile spacing was small (1.0m). The depth of penetration with the 250 MHz GPR unit was a maximum of 2.5m and an average of 1.25-1.5m. The magnetic gradiometer generally was only able to detect fairly shallow targets within the upper metre, and there was signal contamination from modern surface features. The data collected with the capacitively coupled resistivity meter was useful for identifying features deeper than 1.0m, but this device does not provide the same potential vertical or horizontal resolution as the GPR. Nevertheless, even at this preliminary stage more information is available for interpretation through the use of the three geophysical tools than would have been available from any one tool alone.

Although still only in a preliminary stage of interpretation, the geophysical data have much to suggest about Hawara during the Roman period. Within the Fort, additional evidence has been found which confirms the location and extent of the internal road network as well as the existence of structures in quadrants within which excavation has not yet taken place. The orientation of their identified walls matches the orientation of excavated structures within the Fort, confirming that they belong to buildings of the Roman period. Preliminary results also hint at the existence below the east-west road in the Fort of structures with a different orientation, possibly pre-dating the construction of the Fort.

Whether these are Nabataean structures that were razed when the Fort was built needs to be confirmed by further refinement of the geophysical data and by excavation.

Immediately outside the Fort, the data indicate the presence of a dry moat with possibly two phases of construction. In addition, possible defensive mounds (*tituli*) have been identified outside the north and west gates. Two linear anomalies W of the NW corner of the Fort and running from the NE to the SW probably correspond to the *Via Nova* and the substructure of the aqueduct. Both of these are known to have passed through the site, although their precise routes have not been identifiable until now due to modern surface disturbance and agricultural activities.

Around the Fort, in a region where generally very little can be identified from the surface, the geophysical data suggest the presence of several buildings likely corresponding to the Roman *vicus*. Excavation had confirmed the presence of the *vicus* outside the SW corner of the Fort, but geophysical evidence now suggests that there were further structures around the N, W, and S sides of the Fort as well, a conclusion supported by pottery scatter. The E side will be surveyed in 2004. The geophysical data also indicate that there was a large open space outside the south gate, framed by buildings on the W and E. This area may have accommodated a market, a common feature of forts in the Western Roman Empire (Sommer 1999: 86-7, 90), or a parade ground, or it may simply be a result of the ploughing which has disturbed the soil.

Plans are being developed for further geophysical survey and associated excavation at al-Ḥumayma in 2004, based on the enhanced data available from the 2002 season. A number of objectives have already been identified: magnetic gradiometric surveying 700m W of the Roman Fort to locate a potential kiln site; multi-tool geophysical surveying on the east side of the Fort to complete the exterior survey begun this season; GPR and magnetic surveying in the civilian settlement surrounding the Fort where indications of buried structures have been suggested; detailed GPR surveying outside the Fort in the immediate vicinity of existing excavations, which have indications of buried Nabataean structures; detailed multi-tool surveying in areas slated for excavation in order to document in detail the ability to locate precisely and identify specific structures (roads, building, cemeteries, stone vs. mud-brick construction).

### Greek Grave Inscriptions

Two new Greek inscriptions were found in 2002,



during examination of a probable cemetery area 740 m W of the fort (Field D128), across the low run-off catchment that fed the Nabataean reservoir. Although no tomb cists or structures can be seen at present, there has been extensive clandestine digging in this part of the site, much of it dating before 1981. A small house was constructed from re-used blocks, most likely on the walls of an ancient structure, at some point after aerial photographs were taken in 1953 and before the 1970s. Inscription no. 2 is built into the north wall of the rebuilt structure. Inscription no. 1 was found loose among tumbled blocks within the wall stubs of a second ancient structure, a few metres north of the rebuilt one. The content and rough character of the inscriptions, and the presence of at least four blocks carrying equal-armed crosses in the same area, reinforces the impression that they served as grave markers in a cemetery located nearby in the Byzantine period. Although not particularly informative, the inscriptions are welcome additions to the meager epigraphic record of Hawara (see Oleson *et al.* 2002). A search of the immediate vicinity did not reveal any further inscriptions, but there are undoubtedly more to be found in this area.

Inscription no. 1 occupies one side of a large block of white, ad-Disa sandstone (L 0.61m, H 0.24m, W not preserved) carefully finished with typically Nabataean diagonal trimming. Both ends of the block have been damaged, but it appears that only the first letter of the first line is missing. The letters (H 0.05-0.06m) have been pecked into the stone with a punch, neatly but unprofessionally.

ΚΛΑΥΔΙC            Κ]λαυδης  
 ΤΑΥΡΙΝΟC        Ταυρινος  
 Klaudis (= Klaudios) / Taurinos

The name Klaudis, the most likely reconstruction (Hansen 1957: 182), can be found in inscriptions and papyri as a variant of Klaudios (Pape and Benseler 1911: I Pp. 668; Foraboschi 1967-71: 37), although no published reference was found linking it with Taurinos. Taurinos was a common name in the eastern Mediterranean world in the Late Roman and Byzantine period, particularly in the Egyptian papyri (Foraboschi 1967-71: 311; Pape and Benseler 1911: II, Pp. 1495; Enßlin 1932: 2546; *L'Année Épigraphique* 1993 no. 1619, Caesarea, AD 135-212). In Roman Arabia, a local notable by that name is recorded at Adraa (*IGRR* III, no. 1287, AD 262/3), and a legionary veteran with the variant Taureinos at Sahouit al-Khudr (*IGRR* III, no. 1301). The inscription is too brief to allow any further deductions.

Inscription no. 2 was cut into an irregular block

of red Umm 'Ishrin sandstone (H 0.35m, W 0.24m), broken at its lower end. The top two-thirds of the block are occupied by an equal-armed cross with terminal cross bars. The first line is clear and should be complete, given the configuration of the block, but only the tops of two illegible letters survive from a second line. The letters are deeply cut, but awkward (H 0.05-0.06m).

ΓΑΛΕ/[... Γαλέ/[ριος?... or Γ(αίος) Αλέ/[ξανδ / ρος?...  
 Galerios... or Gaios Alexandros...

The name Alexandros appears in inscriptions twice at Petra and once at Khirbat at-Tannūr (خربة التنور) (Sartre 1993: nos. 10, 58, 95) and is fairly common in Roman Syria and Arabia (*IGRR* III, nos. 1044, 1056, 1222, 1246, 1305, 1316). There do not seem to be any examples linked with Gaios. Galerios would suit the Late Roman or Early Byzantine period and is probably the more likely conjecture.

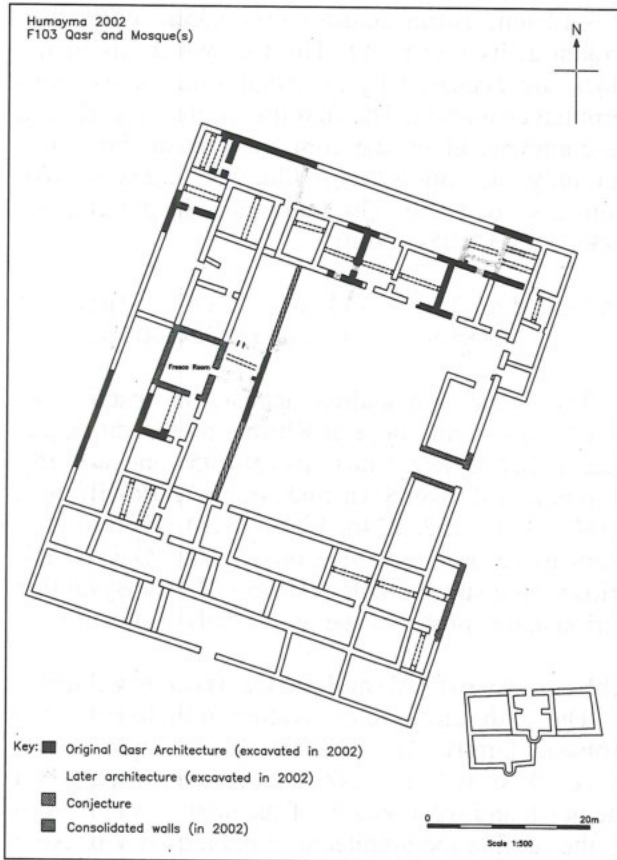
#### Abbasid Qasr (F103) and the Carved Ivory Panels

The sixth season of excavation in Field F103, the Abbasid family *qasr* and mosque complex, took place 19 April-1 June 2002. Excavation focused on the north and west sectors of the *qasr* in an effort to further define the architectural plan, clarify phasing and identify room functions. Previous excavation had demonstrated that the complex was the Abbasid family home during the mid-late Umayyad period (late seventh-mid eighth century AD), before the Abbasids assumed the caliphate in 749/50, and that it was occupied from time to time thereafter, with a major remodeling during the Ottoman period (see Foote 1999; Oleson *et al.* 1999: 436). This season's work furnished new information on architectural construction techniques, superstructure supports, wall and floor treatments, and the intercommunication of rooms. Evidence was also unearthed of structures that pre-date the Abbasid foundation, as well as for multiple phases of later occupation in the *qasr* (Fig. 15). A few rooms yielded information that helps to identify original room functions. N. Zaban carried out conservation of exposed architecture at the *qasr* using the same substances and techniques employed previously at al-Ḥumayma: a mix of lime, local sand, pebbles and water, which provide a strong but reversible bond. All four walls of the Fresco Room, the east *qasr* entry corridor (in Sqs. 82 and 83), and the east perimeter walls (in Sqs. 96 and 97) were conserved.

#### Qasr Plan and Phasing: Courtyard

The most significant architectural feature relating to the initial *qasr* plan was a north-south wall

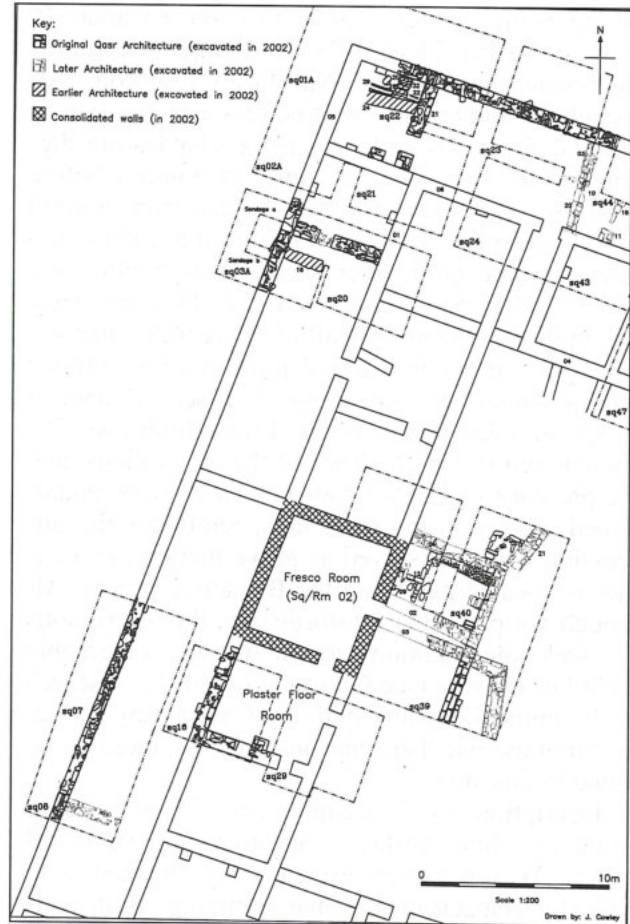




15. Abbasid Qasr complex (F103), plan.

located east of what had been considered the west-delimiting wall of the courtyard (Sq 39, Wall 17) (Fig. 16). The two deepest courses of Wall 17 appear to date to the original eighth-century building and extend the length of the courtyard. The limited load-bearing capacity of the courses and the remnants of an abutting column base suggest that the original eighth-century courtyard had a colonnaded portico along its west side.

At the time Wall 17 was first exposed in 1992, it seemed to be a late wall delimiting the east perimeter of the so-called Courtyard Room, visible on the surface and projecting into the courtyard just north of the door of the Fresco Room (Room 02). Probing south of the Courtyard Room's (presumed) south wall (Probe Sq. 01, Wall 02) revealed another east-west running wall (Probe Sq. 01, Wall 05) roughly parallel and just south of Wall 02. Excavation of Wall 02 and 05 to foundation level in 1992 determined that they were both later than the *qasr*'s initial phase of construction because their foundation courses are laid at significantly higher levels than the west wall (Wall 19) of the Courtyard Room (which is the east wall of the Fresco Room), they abut Wall 19, partially blocking the Fresco Room's



16. Abbasid Qasr (F103), plan of western section.

east entrance and converging at their east extents, and their foundation pottery dates to a later Islamic period.

Excavation within the Courtyard Room and east of Wall 17 in 2002 revealed that while the uppermost courses of Walls 02 and 05 bond with Wall 17, the lower courses abut, and, moreover, that Wall 17, rests on two further courses which are both deeper than Walls 02 and 05 and of a different construction than either the courses above or of Walls 02 or 05. The deeper courses of Wall 17, consisting of only two facing courses with no core, cannot have been intended to bear much weight. Furthermore, they appear to extend the full length of the courtyard, and south of the Courtyard Room the lowest course was laid at the same level as the lowest course of the Fresco Room's delimiting east wall (Wall 19). While further excavation is necessary, the discovery that each end of Wall 02 rests on a large worked marl block abutting Walls 19 and 17, respectively, provides evidence to suggest that the two lower courses of Wall 17 served as a retaining wall that supported the columns of a portico. The block abutting Wall 17 would have been one col-



umn base of many in an arcade supporting the front of a roofed-portico with the deepest course of the column base (below the marl block) in turn supported laterally by the deepest course of Wall 17. The block abutting Wall 19 is enigmatic, and may have been moved from its original location along the arcade when Wall 02 was built or was the base for a single decorative arch along the west face of Wall 19, over the Fresco Room entry.

While the Courtyard Room still appears to be a later modification to the *qaṣr* courtyard (Sqs. 27, 40, Walls 04, 17, 02, 19), taken together the data suggest that during construction of the later Courtyard Room, Wall 17 was built on top of a stretch of an eighth-century wall which was a low submerged retaining wall for a porch fronting the west side of the courtyard, rather than an elevated stylobate. The original floor levels in the Fresco Room (Room 02) and Plaster Floor Room (Sqs. 16, 29) just off the courtyard at the west are at 955.04-08, 955.12 and 955.01-07m asl, respectively, approximately the same level as the original pavement/floor in the Plaster Floor and Wall Room (Sqs. 68-69) and Domestic Manufacturing Room (Sq. 47) just off the courtyard at the north (955.16 and 955.13m asl, respectively).

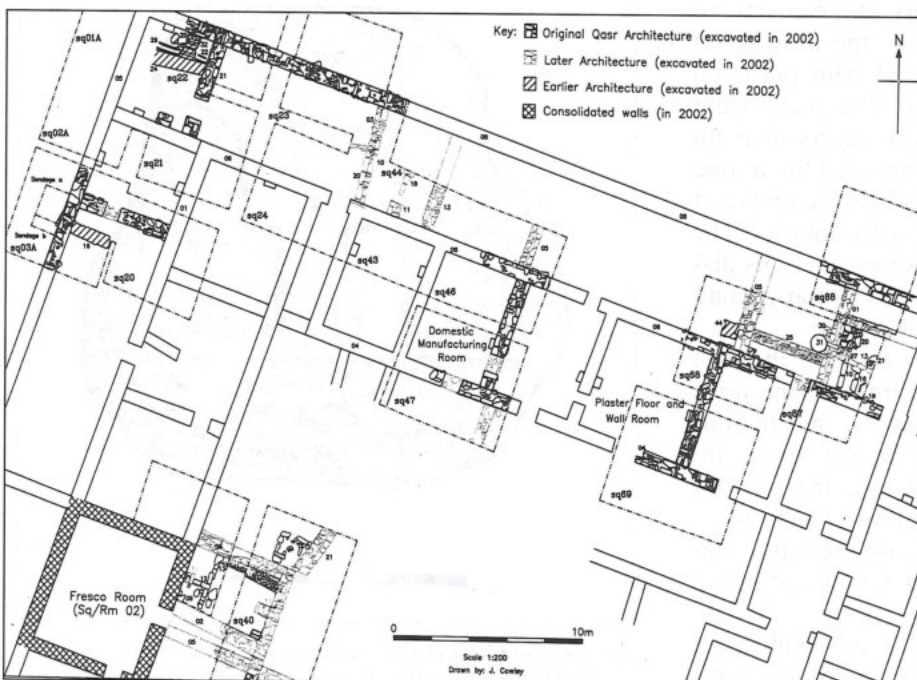
#### North and West Perimeter Walls and Crosswalls

Excavation in Squares 03, 07 and 08, in the *qaṣr*'s west sector, and in Squares 22, 23, 68, 87 and 88, in the north sector, furnished information to posit that the west and north perimeter walls of the

*qaṣr* and their parallel interior walls all date to the original eighth century building (Figs. 16, 17).

The foundation of the west perimeter wall (Wall 05) rests at a bottom elevation ranging from 954.72 (in the S) to 954.84 (in the N), which is 0.29m deeper than the parallel interior wall foundation level in the south (Sq 16, Wall 01) and virtually the same in the north (Sq 03A, Wall 01). The foundation of the north perimeter wall (Wall 08) rests at a bottom elevation averaging 954.98 (with minimal variance), which is 0.25m deeper than the parallel interior wall (06) foundation level in the east (in Sq 68), and 0.09m deeper than Wall 06 in the west (in Sq 43). While upper courses of the *qaṣr*'s west perimeter wall are in poor condition, the lower courses are well built, comprised of large sandstone and limestone ashlar, like the north perimeter wall. The parallel interior walls in the west and north of the *qaṣr* also have large well-worked blocks, and are laid in a similar method of construction. While final analysis of the ceramic evidence is pending, preliminary reading of the stratigraphy appears to confirm the indications in the foundation levels and construction techniques, that the perimeter and interior parallel walls in the west and north sectors are contemporary and date to the eighth century.

No external entrances to the *qaṣr* have been found in the west or north perimeter walls. Four doorways have been identified in the parallel interior wall (06) in the north (Sqs. 24, 65, 87, 90), each of varying widths but all less than 1.0m. The presence of doorways of varying but small dimensions in the inner wall, suitable for domestic access to the



17. Abbasid Qasr (F103), plan of northern section.



rooms behind, further suggests that the north perimeter wall was a part of the original construction.

Few east-west cross walls to the *qaṣr* have been exposed in the western sector of the building. Wall 06 in Square 08 was the only cross-wall discovered in 2002; it abuts the west perimeter wall (05) at a higher level (in Square 03A, however, pre-Islamic cross walls running east/west beneath the *qaṣr* were found, discussed below).

In the northern sector of the *qaṣr*, six new cross walls oriented north/south and two new east-west walls were identified during the 2002 season (Sqs. 21/22, Wall 21; Sq 23, Wall 03; Sq 43, Wall 13; Sq 46, Wall 05; Sq 68, Wall 05; Sq 88, Wall 01), greatly expanding our understanding of the plan of complex. Preliminary reading of the stratigraphy, and the fact that most of the cross walls were laid at significantly higher foundation levels and abut Walls 06 and 08, suggest that probably only Wall 21 (Sqs. 21/22), which delimits the east extent of the bakery discovered in 1998, was built in the initial *qaṣr* phase. At least three phases of building activity beyond the first phase have tentatively been identified.

#### *Qaṣr Rooms, Finds and Functions*

The room directly south of the Fresco Room, first opened during the 1998 season, was almost completely excavated in 2002. A door in the northeast corner connects to the Fresco Room, and a door in the east wall leads to the courtyard. A large stone mortar and a marble column fragment were found on the well-finished plaster floor.

A room with carefully plastered walls and floor was exposed on the north periphery of the courtyard in Squares 68 and 69. This is only the third room with a plaster floor and the second with plastered walls to be identified in the *qaṣr*. The walls were finished with several distinct, thick layers of plain white plaster, while the floor consisted of a fine white plaster with many pebble inclusions, laid over a thick, well compacted bed of ashy mortar. The walls were not decorated with frescoes, and this distinctive room unfortunately did not yield any small finds that might help elucidate its function.

A room with two cross arches to carry the roof was excavated in the northeast corner of the *qaṣr* (Sq. 87-88). Occupational soil layers, installations and architectural modifications in the room indicated six distinctive phases of use, the greatest number yet identified in a single room in the *qaṣr*, although precise dating of the phases remains elusive. A corroded iron chisel was found resting on the original floor.

A room excavated in Square 47, adjacent to the north edge of the courtyard, yielded animal bone,

handmade vessels and other ceramics, a whetstone, and an oil press resting on a stone-paved floor. The contents suggest that the room was used for domestic industries during the initial phase of occupation.

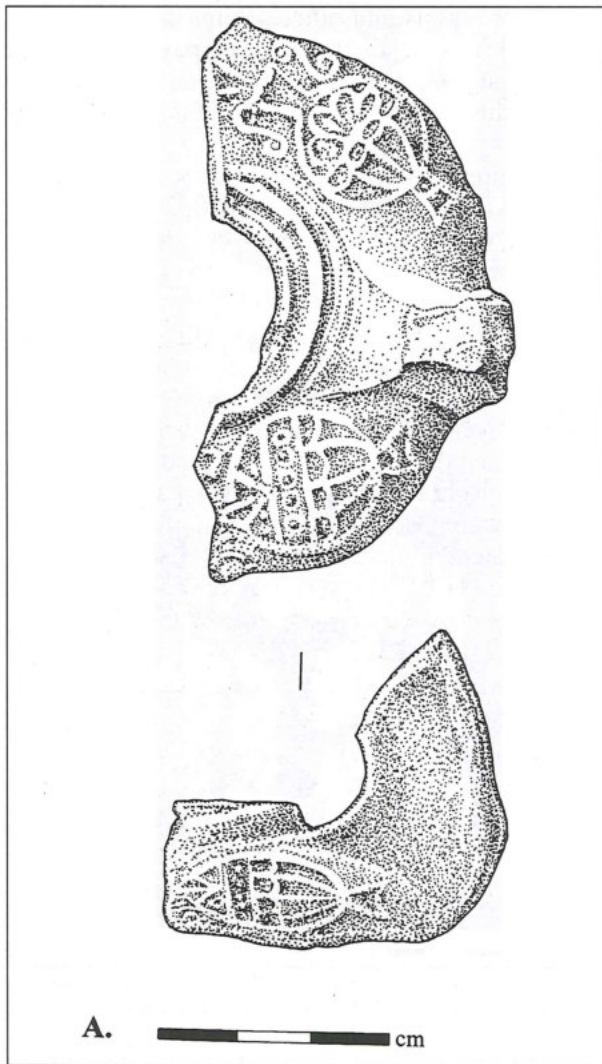
As in previous seasons, few coins were found at the *qaṣr*. The five recovered in 2002 were fourth-century Byzantine bronzes in very poor condition and from a variety of contexts.

Some of the most noteworthy small finds this season were recovered just outside the *qaṣr*, west of the west perimeter wall. A carved stone relief, possibly part of an architectural cornice or fountain wall, was recovered in tumbled surface fill (Sq 08). The fragment depicts part of an arched arcade framing trees or shrubs (Fig. 18). Two partial ceramic oil lamps were also found (Fig. 19a, b): a partial relief-decorated, moulded, Islamic-period lamp near the surface (in Sq 07), and the upper half of a Late Byzantine-Early Islamic moulded lamp excavated from loose drifted fill less than half a meter from

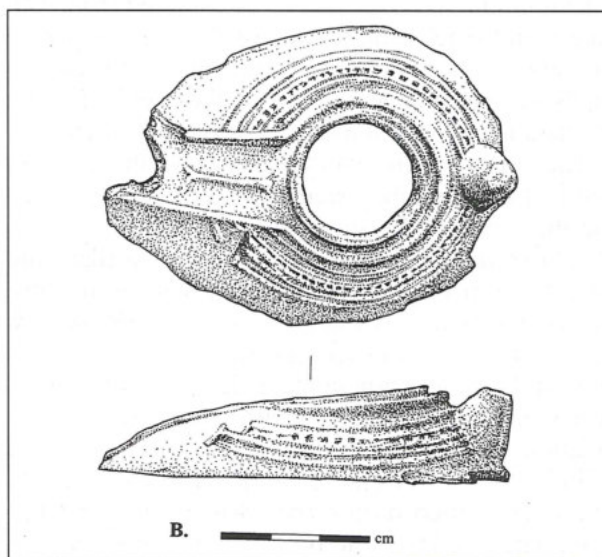


18. Abbasid *Qaṣr* (F103), relief carving (Square 08, Locus 00) (Brian Seymour).





19 A. Early Islamic lamp fragment (Square 07, Locus 00);



19 B. Late Byzantine/Early Islamic lamp fragment (Square 03A, Locus 07);

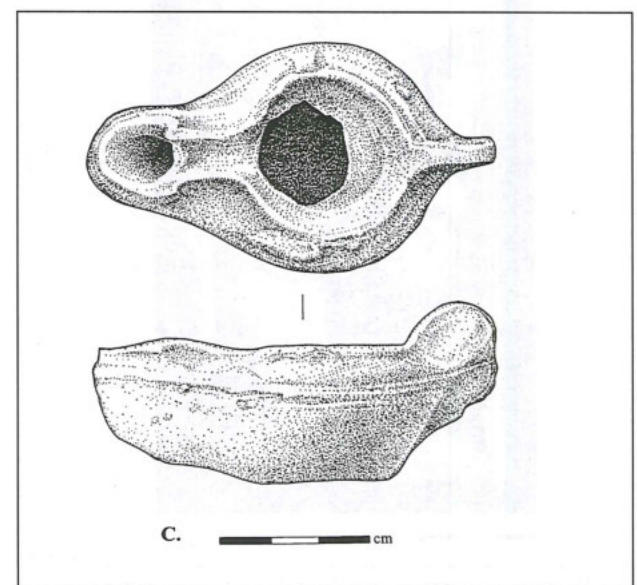
the surface (in Sq 03A). These are the first significant lamp fragments to have been recovered from the *qaṣr* or its environs.

#### *Superstructure Supports*

Imposts for arches supporting the roof had been discovered in eleven rooms of the *qaṣr* and in the mosque prior to 2002. To of these rooms had two arches. During the 2002 season, arch supports were revealed in six more rooms, two of which had a pair of arches. It is likely that many of the rooms in the *qaṣr* were roofed in this manner, a single arch or a pair of arches supporting palm trunks or supports of other types of wood that in turn supported plaster roofs. As in many of the earlier domestic structures at Hawara and Petra, the absence of long roofing slabs indicates that the roofs were not finished with stone (Kolb 2001: 295). The local stones simply are not capable of long spans. Even the rooms without cross arches probably were roofed with palm-wood beams, as were documented by the carbonized remains found in the Fresco Room (Oleson *et al.* 1999: 441).

#### *Pre-Islamic Use of the Site*

A surprising discovery was the presence of three or possibly four walls in the northern half of the *qaṣr* that belong to the pre-Islamic period (Sqs. 03A, 22, 40, 68), and a water channel in association with one of these walls (Sq 22, Wall 24) (Fig. 17). Unlike the fourth-century wall found in 1998 under the southeast quadrant of the *qaṣr* and mosque, these walls appear to have been ruinous but visible when the *qaṣr* was built. Like the early wall in the southeast quadrant, however, they were not incorporated into the *qaṣr* construction. A dump consisting large-



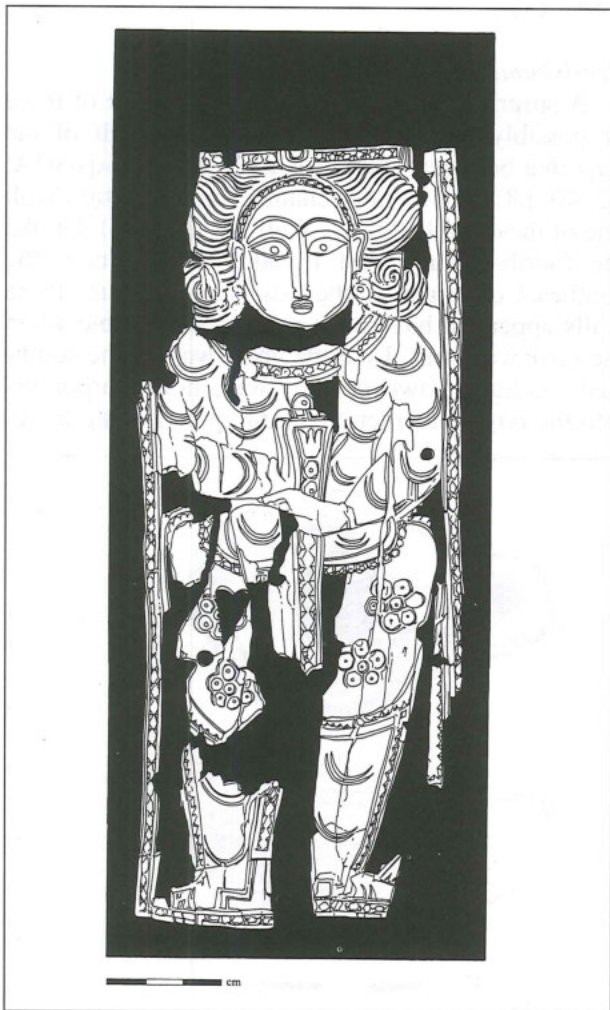
19C. Nabataean lamp (Square 03A, Locus 26) (Brian Seymour).



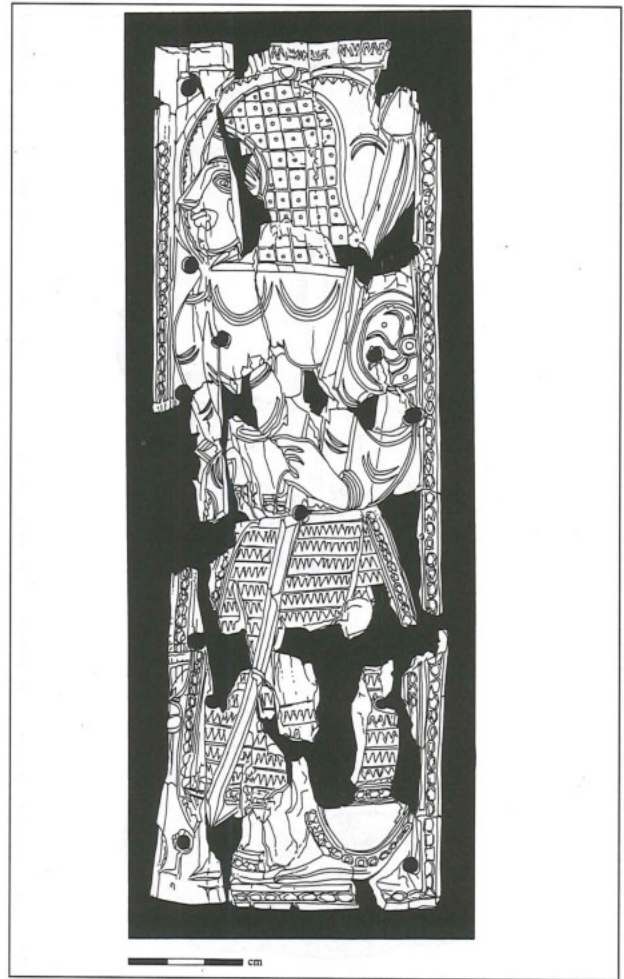
ly of ceramics was exposed nearby in Square 03A, just west of the *qasr*'s west perimeter wall. The deepest strata contained ceramics dating no later than the first century AC, including an intact Nabataean lamp (Fig. 19c) and a large fragment of a Nabataean painted bowl.

*Restoration and Documentation of the Ivory Fragments*

The last remaining baulk in the Fresco Room was excavated during the 2000 season, in order to complete recovery of the carved ivory furniture panels first exposed in 1992. J. Logan has supervised conservation and reassembly of the fragments since 1993, and for eleven weeks during 2001 N. Zaban concentrated on the restoration of panels from the complete corpus of fragments. Most of the original ivory panels that survive have now been reconstructed, with stunning results. Six of the panels, each originally measuring H ca. 0.30m, W ca. 0.10m, Th ca. 0.003-0.005m, depict human figures, including two mirror image pairs of soldiers, and a



20. Drawing of reconstructed panels with representation of standing figure (Room 02, Locus 13) (Brian Seymour).

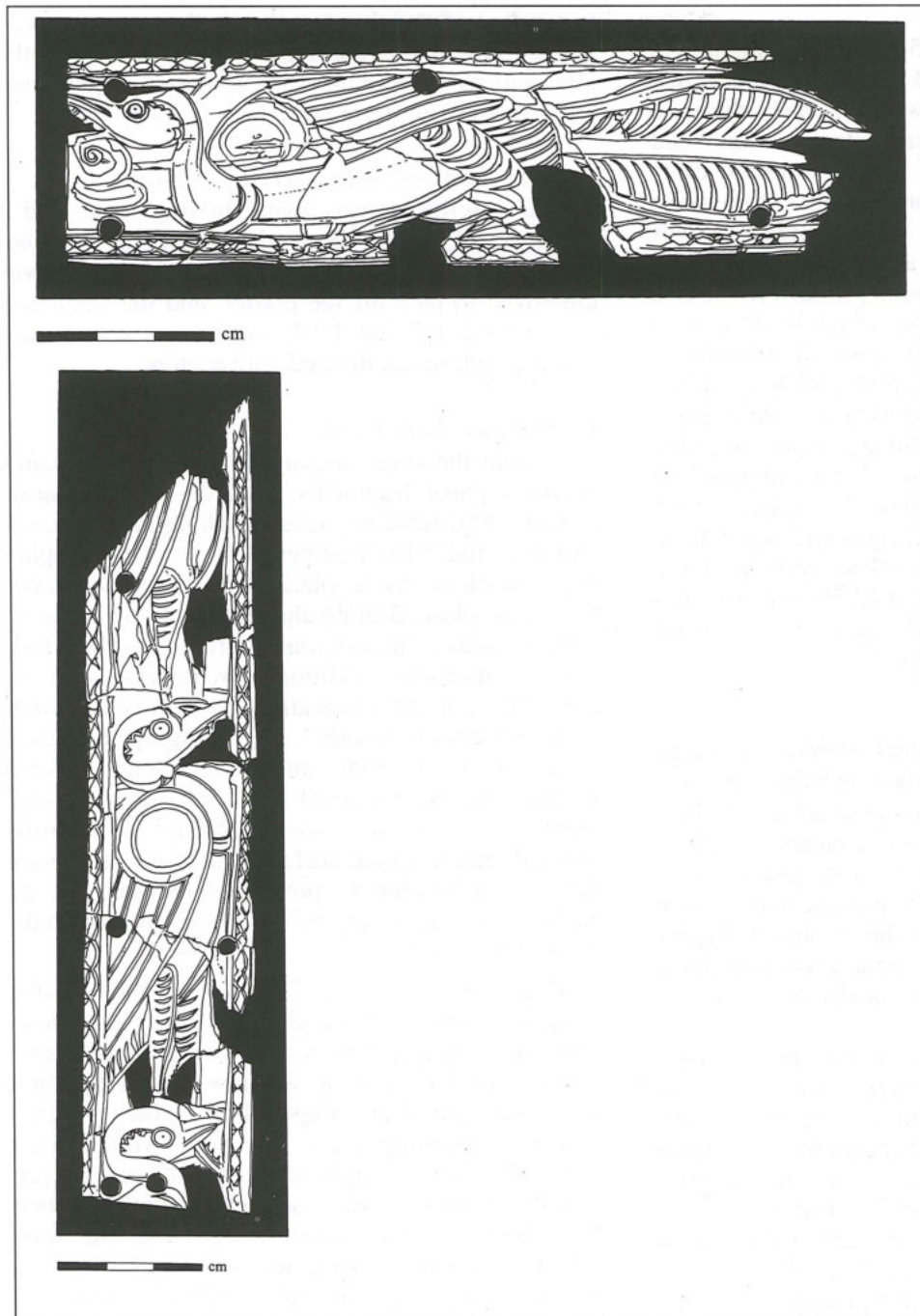


21. Drawing of reconstructed panels with representation of armed figure (Room 02, Locus 13) (Brian Seymour).

pair of identical staff-bearers. (Figs. 20, 21) Many subsidiary frieze panels bearing birds, fish floral and vegetal motifs have also been reassembled (Fig. 22). Hinges and other fittings suggest that the flat panels decorated some kind of cabinet, but a few curved panels suggest that the some of the carvings were designed to decorate a rounded chair back or chest.

The origin of the ivory panels and the wooden object[s] to which they were affixed is certainly outside the Levant. The surviving, carbonized wood is ash (*Fraxinus*), which is not native to Jordan, the ivory is from elephants (either African or Indian), and the facial features and dress of the figures are Persian in style. Archaeologically, there is no material in the destruction context (Locus 13) to date it more precisely than "early Islamic", and stylistic associations or military iconography of the panels are as limited to aid in dating. While the ivories could have been crafted during the 740s in or near Khorasan, where seditious activities led to the success of the Abbassids taking over the Caliphate, the ivories could also have been crafted somewhere between





22. Drawing of reconstructed panels with representations of birds (Room 02, Locus 13) (Brian Seymour).

Khurasan and Baghdad (even Raqqa) after the Abbasids came to power. Khurasani soldiers were important for all Abbasid caliphs until the middle of the ninth century AD and deployed throughout their empire, not least in Greater Syria (see discussion in Cobb 2001: 21-42, 46, 116 and Kennedy 2001). If the ivories are post 750 the presence of such high quality material culture may be evidence of al-Ḥumayma's continuing importance to the family or a high-ranking officer, which has not been conveyed in the extant written sources.

### Conservation

Small finds were treated as described in previous reports (see Oleson *et al.* 1999: 443-46). Of particular interest with regard to conservation in 2000 were an inscribed Roman altar, a fragment of an inscribed column, and a wall fresco, all from one room in E125. In 2000 the last deposit of carved ivory panels was excavated from the remaining baulk in the Fresco Room of the Abbasid Qasr (F103). Cleaning and cross mending of the entire collection or fragments continued through 2002.



*Fresco from E125*

A frescoed panel (ca. 0.75 x 0.80m) painted with a geometric motif was found *in situ* on a mud-brick wall (Fig. 12). The plaster was extremely thin and fragile and had begun to separate from the mud brick. Since the panel could not be protected in its original position, the decision was made to remove it for conservation and safe storage. Removal was accomplished by applying a protective facing of cheese cloth impregnated with primal AD-33x, a water soluble acrylic emulsion, which held the fresco together as it was eased off the wall. The plaster was then backed with cheese, cloth and Acrysol WS 24(r) (an acrylic polymer dispersed in water). Since a dry film of acrylic is not soluble in water, once the backing had dried, it was possible to remove the cheese, cloth facing by softening its adhesive with water. The backing remained rigid and was left on as a permanent support. The clean surface of the fresco was then brushed with a 12.5% vol/vol solution of Acrysol and distilled water, which should maintain the richness of the colours.

*Altar with Latin Inscription*

The altar, carved from a block of very soft, white Disi sandstone, was found broken in half on the slab floor where it had fallen (Oleson *et al.* 2002: 112-16). The stone is fragile, and has a sugary feel at the fractures. Porous stone can be damaged by salts such as gypsum, which may be present in the soil at E125. Gypsum is not readily soluble, but it is hygroscopic, and the crystals can expand when exposed to high humidity. In porous sandstone, this will cause the surface to spall.

The Latin inscription, which had red pigment rubbed into the letters, was cleaned by picking off surface dirt. Other areas without lettering or pigment were washed with water after removal of large lumps of dirt. The stone was friable at the main break, around the letters of the inscription, and around chips. Acrysol WS 24 at a 25% vol/vol dilution with distilled water was brushed on friable areas. The stone was kept cool and protected from the sun while this was done, to prevent a "skin" of consolidant from forming on the surface.

In August 2000, the altar was moved to the 'Aqaba Museum, where the bottom half was deposited in storage and the top half left on display in the enclosed courtyard. Several letters of the top half of the inscription suffered further damage during transport, or possibly as a result of the transport of salts to the surface. In June 2002 the condition of the altar was evaluated, and measurements were taken to allow the design of a bracket that will hold the

two halves of the altar together in their original configuration and provide support. Reassembly of the altar and its reassignment to an indoor display area will provide long-term protection.

*Column Fragment with Greek inscription*

The inscription was found in fragments, and a thin layer of plaster obscured the lettering (see Oleson *et al.* 2002: 117-19). A needle in a pin vise was employed to pick off the plaster, and the fragments were mended using UHU (polyvinyl acetate copolymer adhesive), thinned with acetone.

*Ivory Panels from F103*

During the study season of 1999, the thousands of ivory panel fragments from the Abbasid *qasr* (Foote 1999) were re-packed, making the collection easier to study. The fragments are now on Coroplast trays, stacked inside pizza-style boxes fabricated from Coroplast. Sorting the fragments on trays facilitates pattern recognition. During the 2000 field season, numerous additional fragments were recovered from the excavation of the baulk. Some were borders or "frames", measuring up to 22.3cm in length, 1.5cm wide, and 2-3mm thick. Several hundred pieces of a floral motif, resembling a stylized iris, were also found. Many were badly cracked, had lost their surface lustre, and felt rough. This could be due to prolonged exposure in the baulk, or to varying intensities of the fire, which destroyed that room.

Over the winter of 2001-2002, Na'if Zaban worked on the ivories and found many significant joins. Two panels with frontal-facing figures, each with a bouffant hair style, are now complete enough to measure and draw (Figs. 20-21). Much progress was made finding joins on two warrior panels, which are mirror images of figures standing in profile. Two smaller panels, each representing a crouching feline, are also mirror images. Several more joins were found on flat grape/vine panels, the longest measuring approximately 33.7cm x 4.0cm, 5-6mm thick. Various bird motifs appeared, including several different renditions of peacocks, and substantial curved pieces with a grape/vine pattern were assembled. The panels and larger fragments were drawn by Brian Seymour.

Panels and curved pieces were backed with Japanese tissue [Aiko 821 Tengujo (r)], adhered with a solution of Acryloid B 72 (r). If more joins are found, it will be easy to remove sections of the backing to fit pieces in. The backing serves to hold the pieces together and protect fragile joins.



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