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Early Metallurgy and Social Evolution: Jabal Hamrat Fidan

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Introduction

Southern Jordan possesses one of the most important sources of copper ore in the eastern Mediterranean. The area is called the Faynan district and is located some 50 km southeast of the Dead Sea and ca. 50 km north of Petra. It is a spectacularly beautiful area that contains thousands of archaeological sites, a canyon riddled with ancient copper mines spanning the Chalcolithic through Islamic periods, and is home to four main Bedouin tribes. The Royal Society for the Conservation of Nature in Jordan has established a wonderful nature reserve in the area. Upstream, in the main Wadi Faynan valley, British archaeological teams under the umbrella organization of the Council for British Research in the Levant (CBRL) have initiated a series of major archaeological landscape studies. Downstream, along the Wadi Fidan, the University of California, San Diego (UCSD) and the University of Bristol (UK) have initiated a major study focusing on the clarifying the role of early metallurgy on social evolution in the southern Levant. The Wadi Fidan cuts through a ridge of hard red granite hills called the Jabal Hamrat Fidan (JHF) which dominates the ca. 240 km^2 research area discussed here.

The Jabal Hamrat Fidan (JHF) project, initiated in the summer of 1999, is the first 'Deep-Time' study of the role of copper ore procurement and early metallurgy in the evolution of societies in the Near East. Excavations span the Neolithic through Iron Age. Located in the Faynan district, the largest source for copper ore in the Levantine mainland, the JHF is the "gateway" to this rich copper ore resource zone in southern Jordan. The senior principal investigator of the JHF project is Thomas Levy (UCSD) and co-principal investigator, Russell Adams. Mohammad Najjar of the Department of Antiquities of Jordan serves as a co-director. In 1997, preliminary excavations were initiated in the JHF at the Early Bronze I (ca. 3600-3400 B.C.) metal

Final product casting molds from Khirbet Hamra Ifdan, EB III

Aerial view of Wadi Fidan 1, PPNB (ca. 7500-6500 B.C.)

production site of Wadi Fidan 4 when only six sites were known in the study area. This site proved to be the earliest metal production village in the Faynan district. The valley of Faynan is currently the focus of a major British investigation being carried out by teams from the

Aerial view of Wadi Fidan 4, Early Bronze I (ca. 3600-3400 B.C.)

United Kingdom. What distinguishes the JHF from Faynan is the abundance of rich single period sites, which provide an ideal setting to test anthropological models (see http://weber.ucsd.edu/Depts/Anthro/classes/tlevy).

Recent Surveys, GIS and a 'Digital Dig'

To reconstruct the social landscape in which Wadi Fidan 4 and other sites evolved, an intensive survey was carried out in the spring of 1998. During the 10-day survey, a total of 125 sites spanning the Middle Paleolithic through Islamic periods were recorded. To lay the groundwork for a totally digital-based recording system for the JHF excavation project, the 1998 survey team mapped each of the sites with a Total Station operated by surveyor James Anderson of North Island College B.C. (Canada). As will be shown below, our field team now records all excavation data with a series of Total Stations. This enables us to download the spatial data into a Geographic Information System (GIS) program (ARCview) monitored by GIS analyst Mark Waggoner of UCSD. Mark helps us to construct 3-D models of the excavations and supervises the production of daily distribution maps of artifacts and architecture found during the course of the excavations. To ensure that the mass of digital data is organized and archived, Maia Engle of Washington State U. serves as the data manager for our field project. Data from the field passes through a 'dirty' field lab which is supervised by Lorna McDaniel. To help pull all these strains of data together, Sol Kuah, now a UCSD medical school student, has been instrumental in helping us establish an on-line interactive database with links to digital photographs and other data (see http://weber.ucsd.edu/~skuah/Database/fidan).

1999 Excavations

This past summer excavations focused on the Pre-Pottery Neolithic B period (Site 1, ca. 7500–6500 B.C.) when the earliest sedentary life-ways were established in the JHF region; the Late Neolithic/Early Chalcolithic period (Site 51, ca. 4500–4200 B.C.) when the roots of political scale or chiefdom societies emerged; and the Early Bronze II–IV (Khirbet Hamra Ifdan or Site 120, ca. 3000–2000 B.C.) when the first 'urban revolution' occurred in the southern Levant. Finally, the JHF project aims to investigate the role of early metallurgy in the rise of the first historic Iron Age (ca. 1200–586 B.C.) kingdom in Edom. This work will be carried out in 2001 at the Iron Age site of Khirbet en-Nahas, located 4 km northeast of the Wadi Fidan in 2001. In this sense, the JHF project examines the full range of social transformations in the Near East from cultures based on domestic modes of production (tribes or segmentary societies), through politically organized cultural systems, to the rise of the first commercial or state organized societies. Located in the desert zone of ancient Edom (known from Biblical texts), the JHF research area is situated on the periphery of the main Mediterranean settlement zone of Levant. Thus, central to the project research design is the investigation of interaction models between the center and periphery of settlement in the ancient Near East that can help explain how the control of metal production influenced the growth, stability and destabilization of social relations through time.

Aerial view of Khirbet Hamra Ifdan, Early Bronze II-III (WF 120, ca. 2000-3000 B.C.)

Largest Ancient NE Metal Production Site Discovered

This past season, the 1999 JHF expedition was one of the largest archaeological research projects in Jordan with a team of 100 students and 20 staff members from UCSD, Bristol U. (U.K.), North Island College (Canada) and other universities. Astounding results were achieved through the excavation of broad horizontal exposures at two sites intimately connected with the birth of systematic copper ore extraction (PPNB) and the growth of the first full-blown Bronze Age industrial metal production system in the Levant. The latter excavations revealed the largest Early Bronze (EB) III (ca. 2700–2200 B.C.) metal

Aerial view of 10th c. B.C. Iron Age Cemetery at Wadi Fidan 40

production site in the ancient Near East. The quantity of metallurgical finds dwarfs contemporary sites in Turkey, Greece, Oman and other countries. Excavations at Khirbet Hamra Ifdan produced the largest assemblage of metal production tools and installations of any site in the Near East known to date. These include over 700 beautiful clay casting molds, copper tools, crucible fragments, and other finds. The other primary excavations were carried out at Wadi Fidan Site 1, a massive PPNB village settlement located where the Wadi Fidan debauches into the Wadi Arabah. Beautifully preserved architecture made of chinking stones came to light in all areas of the 350 m^2 excavation confirming the geophysical maps produced by geophysicist Alan Witten's (U. of Oklahoma) Electromagnetic Induction survey. Work on the Neolithic site produced widespread evidence of the on-site production of beads made from local Faynan malachite ores. The most interesting find was perhaps the earliest evidence of copper smelting in what seems to be an accidental burning of one portion of the PPNB village. Four clusters of rooms were found associated with an assemblage of over 60 animal figurines that may provide insights into clan affiliation and other cognitive-processual issues.

Plans for Now and the Future

As this goes to press we are shipping all the casting molds and related metallurgical finds to the UCSD archaeology lab. The ingots and other metal objects will be sent to Bristol for conservation. The spatial data analysis is being done in San Diego by students in several steps: a) the creation of typologies for the Neolithic figurines and the unique EB assemblage of casting molds for metal ingots, axes, pins and other products; 2) coding the typological and spatial data on Excel spreadsheet files and then transferring them to 3) a Geographic Information System program (ARCview) to examine spatial patterns in relation to the ancient architectural layout of the excavation sites; and, finally, 4) linking the artifactual data to an on-line data base with hotlinks to digital photographs, aerial photographs, maps and other data on the internet. One of the main goals of this project is to work with Jordanian officials to incorporate the JHF region into a much-expanded Dana Nature Reserve. Our excavation work, which includes the construction of dry-stone boundary walls around the excavations and visitor trails, will hopefully help promote Ecotourism to the Faynan district. This fits in with Community-Based Conservation concepts where, in the case of the Faynan District, the local Bedouin are actively engaged in the preservation and utilization of the reserve.

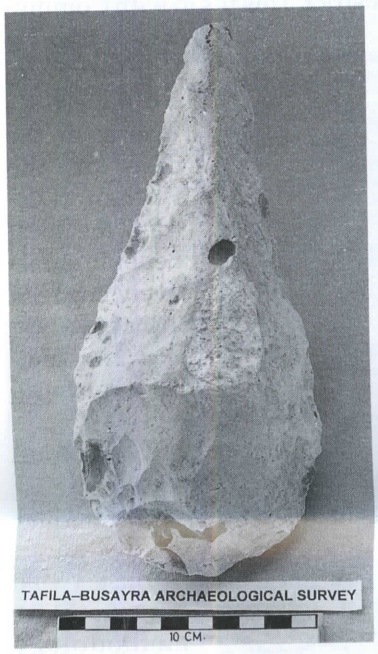
Aerial view of Khirbet en-Nahas, Iron Age (ca. 1200-586 B.C.). All photos courtesy of JHF Project.

Going completely digital in 1999 was an extremely difficult task. While our excavation methodology has been finely honed over the past 20 years and is aimed at obtaining broad horizontal exposures to facilitate social analyses of our sites, going digital in the Jordanian desert meant entering uncharted territory this past summer. Linking the Total Station data to archaeological typologies and then transferring it to GIS in the same day in the Bedouin village of Grig'gra was sometimes difficult, as power was sporadic. We recorded over 20,000 data points providing x, y and z coordinates for every significant artifact and architectural element on our sites. Fine tuning the digital system often meant adding 3 or 4 extra hours to the already arduous days of our field staff. However, by going digital, our excavations in Jordan are taking advantage of the new opportunities offered by digital technologies. This includes the streamlining of on-site analysis of spatial data, the recording of excavations through digital photography, and the rapid preparation of archaeological data for publication. In 2000, we will focus all our efforts at Khirbet Hamra Ifdan with a sampling strategy aimed at locating the domestic or nonproduction quarters of the EB III-IV village. Come join us!

Field Projects

Tafila-Busayra Survey

The Tafila-Busayra Archaeological Survey (TBAS) is a three-year project (1999-2002) that will survey an area of ca. 480 km^2 in the region from just west of Tafila and Busayra to Jurf ad-Darawish in the east. It will connect geographically with the territory of both the Wadi al-Hasa Archaeological Survey (1979-1983) and the Southern Ghors and Northeast 'Arabah Archaeological Survey (1985-86), areas immediately to the north and west respectively. With one exception, the first season of work concentrated on the western and central segments of the survey territory.



Paleolithic tool from Site 112 at Wadi Juheira Lake

The TBAS territory is divided into three topographical zones: Zone 1, the gorges or deeply cut wadis in the west that generally flow in a northwest direction from the plateau in the neighborhood of Tafila and Busayra to the Southern Ghors and Northeast 'Arabah; Zone 2, the plateau, actually part of the Transjordanian Plateau, in the center; and Zone 3, the basalt and desert region around Jurf ad-Darawish in the east. In addition, the area within a 3-km radius of Busayra, the capital of first millennium B.C. Edom, is designated Zone Busayra. This zone, which incorporates topographical features of both Zones 1 and 2, provided TBAS team members with the opportunity to carry out a 'hinterlands' survey of the site in question. The purpose in making such topographical divisions is to obtain a statistically valid sample of archaeological sites and artifacts in each zone. Within each zone, random squares were chosen on the basis of a Geographic Information Systems database design and cartographic composition by Peter S. Johnson, Center for Applied Spatial Analysis of the U. of Arizona, Tucson.


6.25 m high wall at Tell Busayra, Site 132

During the 1999 season, the TBAS team sampled, by means of pedestrian transects, six of 11 random squares (500 x 500 m) in Zone 1. The remaining five squares are in areas where the gorges are very precipitous and dangerous. Technical, mountain-climbing expertise and equipment would be required to transect these squares. In addition, TBAS team members investigated seven of 70 random squares (500 x 500 m) in Zone 2 and 29 of 33 random squares (200 x 200 m) in Zone Busayra. The remaining 63 squares in Zone 2 will be investigated next season. Four squares in Zone Busayra could not be accessed for the same reason as five squares in Zone 1. The six survey plots of Zone 3 will be transected next season.

On the basis of the preliminary analysis of the lithics, ceramics, and glass collected in the random plots of Zones 1 and 2 as well as at sites adjacent to these plots, TBAS team members have identified Paleolithic, Lower/Middle Paleolithic, Middle Paleolithic, Late Chalcolithic, Chalcolithic/Early Bronze, Iron Age, Late Iron I, Iron II, Persian/Hellenistic, Early Roman (Nabataean), Late Roman, Byzantine, and Early, Middle and Late Islamic materials. Relative to the 'hinterlands' survey of Busayra, team members have identified materials from the same archaeological periods.

Survey team members 'ground-proofed' 63 potential sites that D. Kennedy, U. of Western Australia, Perth, identified on nine aerial photos (1:25,000 scale). As a result of this work, they concluded that 14 percent of these sites have been lost, 41 percent are archaeological sites (n = 26) that are now numbered among the 151 sites of the survey, and the remaining 45 percent are field clearance in the form of stone lines and stone piles, exposed bedrock, and animal pens/corrals that are not archaeological sites.

TBAS team members surveyed half of Wadi Juheira Lake, a Pleistocene lake that K. Moumani, Natural Resources Authority, Mapping Division, Amman, found and mapped in the region of Jurf ad-Darawish. This work resulted in the identification of 26 sites that date to the Paleolithic, Middle Paleolithic, Middle/Upper Paleolithic, Upper Paleolithic, Early and Late Epipaleolithic, Neolithic-Chalcolithic, Early Bronze, Roman-Byzantine, Byzantine, and possible or probable Late Islamic periods. On the basis of the artifacts collected, TBAS team members are of the opinion that the oldest materials come from the northern and central segments while the more recent materials come from the southern segments of the lake. This could indicate that the later continued

in existence and/or contained water, at least seasonally, long after the former had dried up.

In addition to the 42 random squares transected this season and the 26 sites of Wadi Juheira Lake indicated above, survey team members investigated, by means of a purposive methodology, 125 additional sites. Forty-seven of these sites are major architectural ones, many of which have not been previously reported. Additional architectural sites are in the form of stone circles and/or rectilinear structures. These could be camping and/or seasonal sites. Some of the sites surveyed are lithic and/or sherd scatters.

The periods most commonly represented in the territory covered—approximately half—in the 1999 season include Middle Paleolithic, Epipaleolithic, Neolithic-Chalcolithic, Iron II, Roman, Byzantine, and all Islamic periods. Periods poorly represented or not represented at all include the Early Bronze, Middle Bronze, Late Bronze, Early Iron I, Persian, and Hellenistic.

Burton MacDonald
St. Francis Xavier University

Survey of the Dhiban Plateau

In July and August, 1999, a third season of archaeological survey was conducted in the region of the Dhiban plateau in order to understand the settlement pattern and occupational history of the region between the Wadi al-Mujib and the Wadi al-Walla. During the five-week survey, 206 sites were visited and registered; these 206, when added to the 215 sites visited in 1996 and 1997, bring the Dhiban Plateau Survey site total to 421. In 1999, the survey team covered approximately the western half of the Dhiban Plateau, which extends from the Wadi al-Walla in the north to the Wadi al-Mujib in the south, and stretches west to the Wadi al-Haydan from Rujm Salim in the east. One of important purposes of the 1999 fieldwork was to examine and corroborate the results of the previous surveys in the Dhiban Plateau, and to compare the settlement pattern and occupational history of the western Dhiban Plateau with those of the eastern region. The results showed that the settlement pattern and history of the western region is very similar to that of the eastern region.

Within the area surveyed in 1999, sherds of the Early Bronze period were found at eight sites, and the Late Bronze period was represented at three sites. No Middle Bronze pottery was collected. The population size seems to have increased during Iron I (six sites) and reached a high point during the Iron II/Persian period. Note that Iron II/Persian pottery were collected at 37 sites, or 17.96 percent of the sites explored. After a decline during the late Persian period, the population seems to have rebounded in the Hellenistic period to a slightly higher level than during the Iron II/Persian period. The Roman period continued the occupational increase, which reached its apex during the Byzantine period. Hellenistic and Roman sherds were present at 46 and 72 sites respectively, whereas Byzantine sherds were collected at 121 sites. The Islamic period witnessed a decline in settlement: Early and Mid-Islamic sherds were represented at 39 and 29 sites, respectively.

Some of the noticeable sites are Rujm Qattar, Khirbat al-Musheirfa, Rujm Umm Shajara, Khirbat Biadah, and Rujm Qula'mmah. In detail, Rujm Qattar includes at least four Nabataean structures. This site must have been the center of a large Nabatean agricultural complex in the Wadi Qattar. Khirbat al-Musheirfa is situated ca. 5 km southwest of Umm ar-Rasas and 5 km northeast of Khirbat al-Lehun and is characterized by large buildings, caves, and cisterns, most of which are dated to the Nabatean, Byzantine and Islamic periods. Rujm Umm Shajara includes a large building complex associated with about 15 cisterns. The central structure of this building complex appears to be the ruins of a church oriented east to west. On either side of the church buildings are multiple rectangular rooms, some of which were used for burials during later periods. In the middle of the complex is an open courtyard that includes a stair leading to three underground square rooms. Khirbat Biadah is situated on the edge of large promontory ca. 5 km northwest of Dhiban. This site seems to be the remains of a strongly-walled rectilinear fort that was related to the ancient road from the Dhiban plateau to Qariyat in the region of 'Ataruz. Khirbat az-Zaqeebah commands an excellent view over the region of Sahl Mustah. The site consists of at least two large building complexes separated by a possible courtyard. The southern complex includes at least nine rectangular rooms and one possible inner courtyard. The walls are still preserved up to 1 m high. The northern complex covers an area of ca. 35 x 35 m. At Rujm Qula'mmah, the ruins include distinctive defense wall lines which apparently represent two fortresses, one of which was built on top of the earlier one. The northern walls of the later fortress remain standing more than 10 courses high, suggesting a fairly strong fortification system. The location, plan and size of this early fortress suggest a stronghold of some sort, possibly related with the defense system of Moabite King Mesha.

Chang-Ho C. Ji
La Sierra University

Tell el-Kheleifeh

Renewed excavations at Tell el-Kheleifeh began in June 1999, sponsored by Carleton U. and the U. of Ottawa. Twelve students and the director investigated the dating of the site and remapped it.

History of work at the site

Tell el-Kheleifeh was identified with biblical Ezion-Geber in 1933 by Fritz Frank, and excavated between 1938 and 1940 by Nelson Glueck. He described the settlement as a copper smelting site of the Solomonic period, defended by a casemate wall, but later revised his description, recognizing that his excavations sup-

ported neither the Solomonic date nor the smelting of copper. The site was not visited again by archaeologists until 1980 when Gary Pratico surveyed it. Pratico produced a comprehensive reappraisal of Glueck's work, but was unable to excavate. Most current textbooks would describe the site as an Edomite or Judean border fortress or a grain storage facility.

Current Project

Re-mapping corrected the grid of published plans 2.00 m to the west and 1.00 m to the north, and established a new datum. We re-excavated some key areas of the tell ("four room" building, gate, crossing fortifications walls) to investigate Glueck's phasing of the site, and hoped to excavate the northern casemate wall to obtain stratified ceramic material for dating purposes. Glueck had suggested that the northern casemate had been destroyed by wind and erosion, but Pratico believed it lay beneath Glueck's northern dump. The project also investigated the existence of earlier and/or extramural settlements.

The major structure excavated by Glueck has variously been described as a four-room building, a granary, a smelter, or the "headquarters" of the fortress. Three sides (north, south and west) of this building, and the central room, room 7, were re-excavated. The "four room" building and the fortifications proved to be interrelated in a manner different than perceived by Glueck. The walls of the main building are constructed of fired brick, not mudbrick burnt in the destruction of the building. The bricks are evenly fired within the walls and below ground level. However, it does appear that the building was subject to damage or destruction by fire. Some bricks within room 7 are dark red in color, suggesting exposure to fire. The distinctive green remnants of copper smelting in the room described by Glueck may actually be evidence of over-firing of the bricks when the structure burned.

The rooms all had deep foundations (approximately 1.00 m) suggesting subterranean rooms, though it is possible that these "rooms" were filled in to strengthen the structure. The walls were not only sunk into virgin soil, but enveloped by a red clay-like soil with heavy calcite inclusions. This "red mud" surrounds the "four room" building, sloping away from it toward the "inset/offset" wall, and lapping against the western leg of that wall. The "red mud" was capped by unfired brick, one or two courses deep. It was traced northward to the presumed line of the casemate (the northern casemate was not found) and eastward within 5.00 m of the eastern line of the inset/offset wall, while it laps against the western stretch of that wall. To the south it has been traced as far as the casemate wall, running under it.

The famous "flues" of the building are still visible, but it appears unlikely that the lower row was ever above ground. The second row is 0.70 m higher and if both held beams, a crawl, or storage, space could be created. However, the upper holes are smaller and may have served a different purpose.

In 1940, Glueck identified a "mastabah" tomb north of the "four room" building. He described it as having been set into the dry moat north of the "inset/offset" wall. The 1999 project located a similar, damaged structure to the east of Glueck's. It is cut into virgin soil and covered by the "red mud" around the "four room" structure, thus predating it.

Work on the "three" fortification walls revealed extensive trenching and cutting by Glueck. The northern "inset/offset" is cut before it meets the casemate wall. The insets themselves were cut by Glueck. The thin wall at the southeastern corner of the site may be a mudbrick capping on the external glacis. It may have been capped, as was the area surrounding the four room building.

East of the settlement, a hearth was identified, lying on the external glacis. It may have been in use after the "inset/offset" wall was abandoned. Mudbrick walls which may be part of this extramural settlement were identified to the south of the settlement, suggesting Tell el-Kheleifeh is much larger than traditionally thought. This phase is the latest ancient occupation identified. Initial analysis of the pottery identifies nothing earlier than the 7th century or later than the 6th century.

Mary-Louise Mussell
Carleton University

Tall Jalul

Excavations were conducted at Tall Jalul near Madaba by Andrews U. in consortium with the Madaba Plains Project. The excavation lasted from June 14 to July 28, 1999. Randall W. Younker and David Merling were co-directors and over 45 individuals participated in the excavations.

Excavations in Field A (the north side of the tall) were conducted in four squares. This was the area in which the Late Iron II (7th century B.C.) tripartite building was found during the 1996 season. Excavations this season revealed part of a pavement of flagstones dating to the 8th century B.C. This pavement ran north under the north wall of the 7th century tripartite building to the 8th century B.C. wall that was found in 1992. Further south in Square A7, a small stretch of flagstones (more of the pavement from the north?) ran south to the corner of a building that also dated to the 8th century B.C. (Iron II). Below the 8th century building were debris fills from the 9th and 10th centuries B.C. The 10th century (and earlier) fills consisted of fine ashy lenses seen in previous seasons. They contained typical Iron I pottery including collar rimmed jars, carinated bowls, and flanged cooking pots. Some Early Bronze, Middle Bronze (Chocolate on White ware), and Late Bronze sherds (Myceneaen) were found in small quantities in these ashy lenses as well. The lenses appear to represent a post Iron I occupational phase.

Excavations in Field B (the gate area on the east side of the tall) were conducted in seven different squares. The most important finds were in the threshold of what

appears to be the inner gatehouse. The oldest phase dates to about the 9th century B.C. (Early Iron II) and includes two pylons of the gate chamber and the curb of the pavement that goes through the gate as well as a few flagstones of the pavement. This entrance road is related to the lower approach road found to the north in 1992. The next major phase is a pavement of flagstones dated to the 8th century B.C. These go through the area of the gate threshold. This entrance road goes with the later phase of the outer gatehouse found in 1994. The next phase is a flagstone pavement dating to the Late Iron II or the 7th/6th centuries B.C. The final phase of the entrance road is a repaving that dates to the Late Iron II/Persian periods (6th-5th centuries B.C.).

Excavations in Field C (the area of the Late Iron II/Persian Buildings) uncovered a cave in the floor of the building this season. Collapsed roof debris of the Late Iron II/Persian building (late 6th to 5th centuries B.C.) sealed the cave. Fourteen skeletons were found in this cave crushed by the debris. It appears the individuals were killed and their bodies thrown into the cave, after which debris was thrown on top of them. The skeletons included 5 children, one baby and 7 adults. Late Iron II/Persian pottery, a horse and rider figurine, fragments of basalt vessels and an Iron Axe were found in the debris in the cave. In Square C5 the corner of a Late Iron II/Persian period building was found. Some flagstones of the floor pavement were found in the north west corner. Pavement of a earlier Iron II floor was found at a lower level in this building in Square C5.

In Field D, excavations reached roof collapse and other fallen debris on top of a large Late Iron II/Persian period building (6th/5th century B.C.). The building seems to have consisted of a number of rooms surrounding a central courtyard. Pillars seem to have supported the ceiling of this building. A number of objects were found in this field including a small female plaque figurine and a Late Iron II seal depicting a winged griffin.

Randall W. Younker and David Merling
Andrews University

Karak Resources Project

In 1999 the Karak Resources Project (KRP) completed its third season of research on central Jordan's Karak plateau. During KRP's first season of excavation, in 1997, the team expanded its study beyond the surface survey of 1995. In June and July of 1999, 43 participants followed a multidisciplinary approach, which included 1) regional archaeological survey; 2) regional scientific studies; and 3) systematic excavation at al-Mudaybiʿ, an Iron Age fortress along the region's southeastern desert fringe.

KRP's primary purpose is to document ways in which inhabitants of this 875 km^2 section of tableland have exploited natural resources, including site location, water, soils, and surface geology. The project's "Contemporary Studies Team" studied the interaction between villagers and the plateau's migratory Bedouin, while other team members conducted an ethnoarchitectural study of Smakieh. KRP's regional survey team worked on two kinds of sites. One group located and examined 81 prehistoric sites, which ranged in age from the Palaeolithic to Neolithic periods. Many of these sites were found between the Fajj al-ʿUsaykir and the Desert Highway. A broad range of stone tools were collected in this first extensive study of the plateau's prehistoric sites. Another survey party concentrated on 29 historic-period sites and their environmental contexts. Twenty-two of these locales were beyond the range of both the Miller-Pinkerton and earlier KRP surveys, and seven Miller-Pinkerton sites were revisited to determine their current state of preservation. One especially interesting site, Kh. al-ʿAskar (#459), a large complex of buildings near the intersection of the Fajj and the Desert Highway, yielded pottery from Roman through Middle Islamic times.

KRP is also excavating the site of Mudaybiʿ as a case study in resource utilization; the project wants to determine the precise function and occupational history of this settlement, which measures 83.5 m N-S x 88.75 m E-W. A total of eight squares were excavated in the summer of 1999; four of these squares continued work begun in 1997 and four of them were new. After two seasons of excavation, the three squares in Field A (inside the northern part of the fortress) have yielded evidence of occupation from Iron Age II to the Middle Islamic period. A wall that runs parallel to the northern defense

Al-Mudaybiʿ, Field C, Square H-13, showing stone-lined silo in the southwest corner. Photo by Reuben J. Bullard, Jr.

wall and a smaller wall that links these two creates a room in I-3 that demands further investigation, as does evidence of industrial activity in this same square. Bedrock was reached beneath an Iron II surface in Square I-4, and excavation continued in a complex of rooms from the Late Byzantine/Early Islamic transition in I-5.

Field C, facing E

In Field B, excavation of the site's eastern gate complex, which included massive lintels and volute capitals, continued in 1999. Five squares have been worked during KRP's two excavation seasons in this field, and all evidence points to an Iron II foundation for the gate. This four-chambered structure measured 14.5 m E-W by ca. 19.7 m N-S, and its passage was just over 4 m wide. The gate's roof was supported by cypress beams, whose charred remains were mixed with baked mud and reed impressions on the floor of this passageway. This area yielded evidence of later use from the Late Byzantine until the Middle Islamic period.

Field C was opened in the "plaza" southwest of the monumental gate. Both squares in this field hit bedrock beneath Iron II deposits, but the area was used as recently as the Late Islamic period. The area included no significant building remains, but pits yielded substantial amounts of pottery. A well preserved stone-lined pit or silo was dug into the bedrock of H-13. KRP will resume excavation at Mudaybi^{c} and other regional studies in the summer of 2001.

Gerald L. Mattingly
Johnson Bible College, Knoxville, TN

Tell Madaba

The 1999 Tell Madaba Archaeological Project (TMAP) field season was the second year of full-scale excavations in Field B on the western slope of Tell Madaba, and continued the effort to document the extensive archaeological sequence preserved on the tell acropolis begun in 1998. The primary goal of the 1999 season was to gain greater horizontal exposure of each of the principal stratigraphic phases uncovered in 1998 in order to develop a more extensive record of each cultural horizon, before probing deeper into earlier strata. This was accomplished by opening five new 5 X 5 m squares to the north, east and south of the 1998 excavation area, bringing the lateral extent of Field B to 250 sq. m. By the end of the season, excavations had uncovered substantial new material from each cultural phase identified in 1998, and delineated a second substantial Early Roman/Nabataean phase, bringing to six the field phase sequences excavated to date.

The earliest depositional activity excavated during the 1998 season consisted of a sequence of soil layers (trash deposits/abandonment debris?) that sealed against the inner face of the city fortification wall (Field Phase [FP] 6), and which clearly dated the final use of the wall as a freestanding structure to the Iron IIB period. The wall itself proved to be considerably larger than initially thought. Its external face had been exposed previous to our excavations, and was originally constructed directly on bedrock. The wall is preserved to almost 5 m in height along its external face, and reaches ca. 7 m in width at its greatest extent. A probe was excavated during the 1999 season against the inner face of this wall. By the end of the season, it had reached a depth of approximately 2 m, and had exposed more than six courses of the wall, bringing the total depth of the Iron IIB deposit excavated to date in Field B to more than 3 m. At the very end of the season, excavations in the probe uncovered the corner of an unhewn stone structure extending from the east balk, possibly signaling the bottom of the deposit. During the 1999 season, further clearing in Field C (see below) along the outer face of the wall brought the exposed length of this monumental structure, clearly the western fortification line of the Iron II (and possibly earlier) town, to approximately 25 m. In addition to this deep probe, limited exposures of Iron IIB levels were reached in other parts of Field B during the 1999 season.

The three-phase sequence spanning the Late Hellenistic-Early Roman/Nabataean period excavated in 1998 was expanded with the discovery of a second Early

Roman/Nabataean phase (FP 3) in 1999. The phase was found sandwiched between architectural remains from the later of two Late Hellenistic phases (FP 4) and what in 1998 was believed to be a single horizon marking the presence of Nabataean pottery at Madaba (FP 2). The complex consisted of a courtyard paved with heavily worn flagstones bordered on the north by a walled structure entered by way of a stepped threshold. Late Ottoman pitting activity (FP 1) had removed much of this standing structure. However, our excavations were able to delineate a series of thinly laminated floors, and a cluster of three or four ovens in the southwest corner of the building.

Excavations also continued along the exterior face of the Iron Age fortification wall. Due to the stratigraphic break created by the wall, and in order to provide greater flexibility to the excavations, this area was assigned a new field designation, Field C, in 1999. The two-phase architectural sequence spanning the Late Byzantine/Early Islamic transition (6th-7th/8th centuries A.D.) hypothesized in 1998 was confirmed by this season's excavations, and considerable architectural remains (including several mosaic pavements; one preserved on a second story floor) were uncovered.

Timothy P. Harrison
University of Toronto

Petra: Great Temple

Under the auspices of the Jordanian Department of Antiquities, the seventh season by Brown U. archaeologists took place at the Petra Great Temple from June 5 to August 6, 1999.

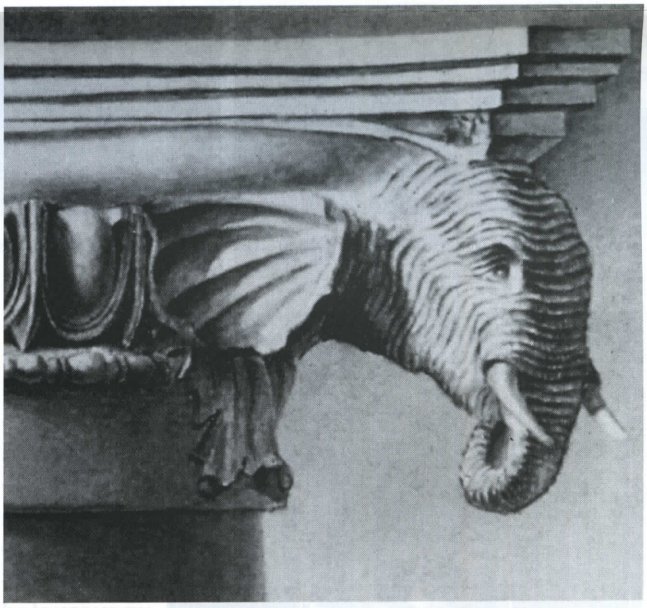
Although the architectural remains are remarkably well-preserved, annual consolidation measures have been taken; this year they included the re-erection of the Temple West Corridor doorway, and six columns in the Lower Temenos—the northernmost stands to an approximate height of 7 m including the elephant-headed capital. Additionally, measures to preserve the frescos in the Temple West Corridor were undertaken by Ueli Bellwald.

Although the 1999 excavations concentrated on the Great Temple, the Lower Temenos was completely cleared of overburden and exposed the Hexagonal Pavement and defined the East Triple Colonnade. Not only did we find another bust of a Fortuna pilaster, but we also recovered the first complete elephant head from an elephant-headed capital in the west Lower Temenos where it had fallen in antiquity. Added to this were several more elephant parts, bringing the total number of sculpted elephant elements to 191 fragments.

Also excavated on the Temple West was the entire West Walkway, which measures some 36 m in length by 3.85 m in width. The depth of deposit was approximately 4 m in the Walkway South and, although the four doorways leading from the West Walkway into the West Corridor were initially thought to have been damaged in antiquity, they were found to be in excellent condition and require only minor consolidation.

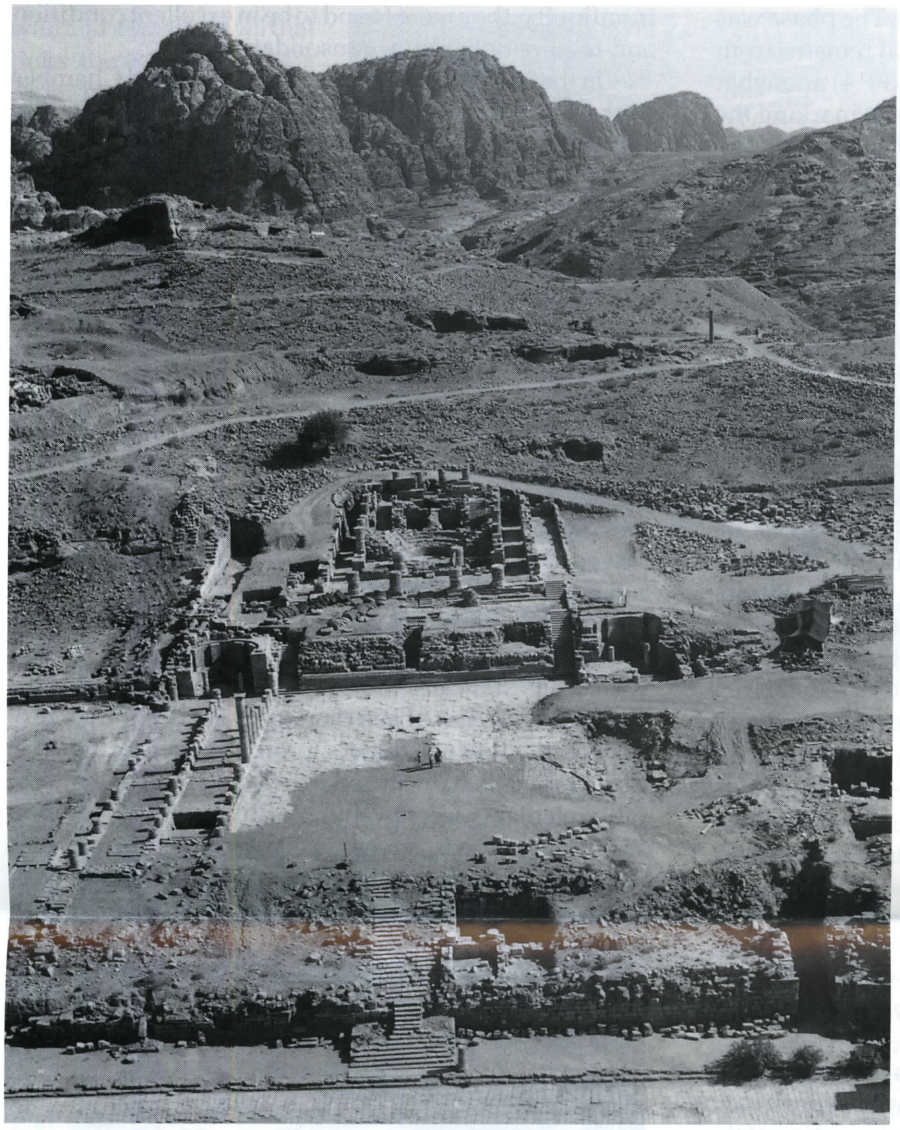
On the Temple East, the inner East Vaulted Chamber of the Great Temple was cleared and a branch of the Subterranean Canalization System was revealed. This system was analyzed in detail and its path continued into this vaulted room from the Central Arch excavated in 1998. Of greatest significance, however, was the continued and completed excavation of the East Theatron, which now has completely exposed this structure in its entirety. Revealed here were the stairways, the lower six courses of seats and the stage building (*scaenae frons*) which has been found to have survived in better condition in the east than in the western area which was excavated previously. This Theatron truly is the most extraordinary structural component of the Great Temple. Recorded here were hundreds of fragments of superbly carved architectural sculpture fallen in the building's collapse.

Additionally, a section of the East Walkway was excavated, as well as the entire Temple East Corridor with walls standing to 6 m. Although this Corridor's frescoed walls have been damaged, the decorative program of the East Corridor is found to replicate the West Corridor walls with stucco panels and wall relief decorative elements accented by colorful architectural representations in reds, greens, yellows and browns. This decorative scheme can be dated to the first century A.D.

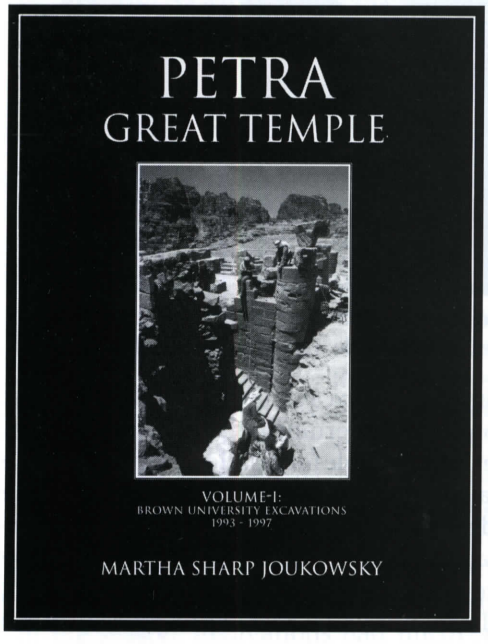


Hypothetical restoration drawing of an elephant-headed capital from the Great Temple. Drawing by Jean Blackburn.

The most interesting excavations of the Temple east revealed not only the Subterranean Canalization System to the north set into a pebble foundation platform for the Temple, but also lying farther to the east was a large section of bedrock which, in antiquity, had been quarried by the Nabataeans and paved with limestone pavers. This large plaza (5 x 25 m) served as the staging platform for the monumental East Perimeter Wall of the



Arial view of the Great Temple at the end of the 1999 season. Photo by Artemis Joukowsky.



Temple Precinct, which connects in the north to the arched 'cistern' excavated in 1998 and to an as-yet-unexcavated area in the south. Measuring more than 10 rows of ashlars in width by 34 m in excavated length, its eastern face is 14 courses high, and the depth of deposit at its highest point is 10 m. Set into the wall is a half-excavated doorway, which in antiquity stood to a 3.39 m height. Covered for 2000 years, its simple entablature and interior variegated sandstone ceiling remain in pristine condition and exhibit Nabataean workmanship at its best.

The awesome height of the East Perimeter Wall includes two interrelated parallel walls—the inner East Perimeter Wall which was cleared, has, lying approximately 1.5 m farther to the east, a higher more eastern arched extension. We suspect that the interrelationship between these two walls is more complex than we can see at present and tentatively posit that between them on the north there is either a stepped passage or perhaps a conduit for water. Lying just outside the East Perimeter wall was discovered a reservoir or water catchment system, which may relate to its functional purpose. The future excavation of this area holds great promise.

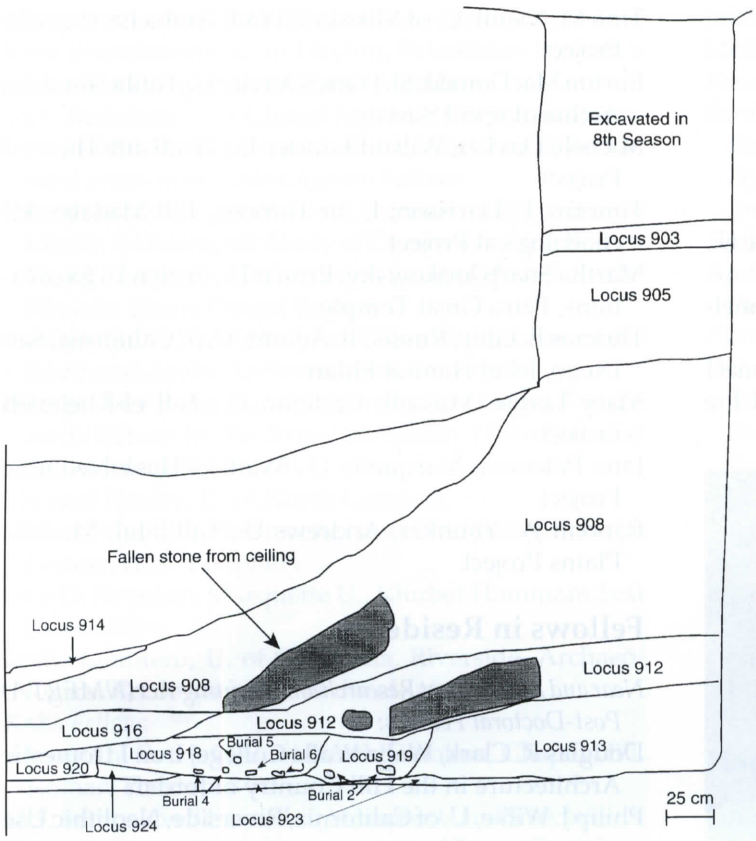
In additional to the complete elephant head and the inset pilaster of Fortuna, an additional relief pilaster—perhaps of an Amazon—was recovered, as well as numbers of painted stucco fragments, several with gold leaf still adhering to their surfaces. Also unearthed were fragments of several figurines, a crude Deity block representing the frontal female figure shown in a temple, as well as large amounts of Nabataean pottery that have been dated by specialist Daniel Keller from the early 1st century B.C. to the early 2d century A.D. Small artifacts include 34 coins, fragments of several lamps, glass, a bone cosmetic spoon and a needle.

Finally, we are very pleased to announce publication of our report on the first five years of excavation.

Martha Sharp Joukowsky
Brown University

Petra: North Ridge Project

During the last few days of the 8th season of the Petra North Ridge project, a possible rock-cut tomb was discovered while clearing overburden to the south of the Ridge Church. The tomb was cut into the natural sandstone bedrock, with a shaft of ca. 3.76 m in depth opening to a chamber measuring 5.50 m x 5 m. A small room measuring 2.25 m x 2.60 m opened through a doorway



Section through North Ridge Project Tomb 2

off to the north.

Complete excavation of the tomb was held off until the 9th season of the project, lasting from April 9–30 and from June 6–22 June, 1999. Excavation revealed that the tomb was originally constructed and used during the 2d century; however, it was never completed. A portion of the northwestern corner of the small room was left uncut, and a large amount of rubble from the tomb construction was left within the small room and just outside, in the area leading towards the shaft. In addition, no other elements of the tomb, *e.g.*, loculi, were constructed, which is odd for such a large structure and for this time period.

A total of eight articulated burials were recovered *in situ*, in addition to a large amount of skeletal material scattered in the tomb as a result of an intrusive episode dating to the 6th to 8th centuries. These individuals were interred directly on the sandstone bedrock, although there is evidence that one or two of the burials were enclosed within wood coffins. All of the deceased, with the exception of a 18 to 20 year-old female, were buried with one or two other individuals simultaneously, as with the case of a 20 to 24 year-old female and a 6 month old infant, a 45 to 49 year-old individual and a newborn infant, and a 35 to 39 year-old female, a 25 to 29 year old male, and a 55 to 59 year-old female. No "grave goods," with the exception of one complete bowl, were found associated with the intact burials. It is apparent that these groups of individuals were interred within a short period of time. Thus, one hypothesis is that the construction of the tomb was halted as the tomb had to be used to inter a large number of deceased due to a catastrophic event, such as an earthquake or an epidemic. No signs of perimortem trauma were noted on the skeletal material, and generally acute epidemics such as the plague leave little to no bone pathologies. Samples of the skeletal material have been retained for carbon-14 dating, ancient DNA (aDNA) extraction, and for other chemical analyses used to determine diet and migration patterns.

As noted above, the tomb was reentered some time during the 6th to 8th centuries by individuals who were occupying the area surrounding the Ridge Church. Architectural elements and artifacts associated with the Ridge Church, such as wall and floor mosaic tesserae, pieces of marble chancel screen, broken glass chandelier pieces, along with storage jar fragments dating to the 6th to 8th centuries were discovered within the shaft of the tomb and the upper layers in the chamber itself. In addition, within these layers were fragments of human skeletal material, presumably from the burials within the tomb, which suggests that the intruders disturbed the burials within the tomb, in addition to using the shaft as a garbage dump. However, the intact burials described above were mostly or entirely spared from the later disturbance. At some point before the tomb was reentered, a large portion of the ceiling broke off and fell to the exposed surface in the tomb. The later visitors then skirted around the ceiling stone, leaving the burials underneath and directly behind it more or less intact.


Megan Perry in the ACOR Conservation Laboratory

The discovery of this tomb is exceptional in that it is one of the very few tombs within Petra that has produced intact burials. The condition of the tomb and the deposition of the burials also raises interesting questions regarding events of the 2d century in Petra, at least for the citizens that were using this tomb.

Megan A. Perry
ACOR

Director's Report: January through June 1999

Pierre M. Bikai

ACOR Projects

Petra, Petra Mapping Project, ACOR and Hashemite U., USAID Petra Endowment

Petra, Petra Documentation Project, Chrysanthos Kanellopoulos, USAID Petra Endowment

Petra, Petra Church Project, Atrium Cistern and Chancel Pavement Restoration, Nazeh Fino, USAID and the Ministry of Tourism and Antiquities

The Great Temple, Amman Citadel

Petra, North Ridge Project, Patricia M. Bikai, USAID Petra Endowment

Amman Citadel, Great Temple, Landscaping and Presentation, Pierre Bikai and Jihad Kafafi, USAID and the Ministry of Tourism and Antiquities

Petra Papyri Publication Project

U. of Michigan: Ludwig Koenen, Traianos Gagos, William Short, Robert Daniel

U. of Helsinki/Academy of Finland: Jaakko Frösén, Antti Arjava, Maarit Kaimio, Jorma Kaimio, Marjo Lehtinen, Mari Mustonen, Tiina Rankinen, and Marja Vierros

ACOR-Assisted Field Projects

John P. Oleson, U. of Victoria, Humeima (study season)

Ted Banning, U. of Toronto, Wadi Ziglab

Guido Vannini, U. of Florence, Medieval Petra

Tina M. Niemi, U. of Missouri, Wadi Araba Earthquake Project

Burton MacDonald, St. Francis Xavier U., Tafila/Busayra Archaeological Survey

Michèle Daviau, Wilfrid Laurier U., Wadi ath-Thamad Project

Timothy P. Harrison, U. of Toronto, Tell Madaba Archaeological Project

Martha Sharp Joukowsky, Brown U., Brown U. Excavations, Petra Great Temple

Thomas E. Levy, Russell B. Adams, U. of California, San Diego, Jebel Hamrat Fidan

Mary Louise Mussell, Carleton U., Tell el-Kheleifeh Project

Jane Peterson, Marquette U., Wadi el-Hasa Neolithic Project

Randall W. Younker, Andrews U., Tall Jalul, Madaba Plains Project

Fellows in Residence

Near and Middle East Research and Training Act (NMERTA) Post-Doctoral Fellows:

Douglas R. Clark, Walla Walla College, Iron I Domestic Architecture in the Hill Country of Jordan

Philip J. Wilke, U. of California, Riverside, Neolithic Use of the Desert Margins

Douglas C. Comer, U. of Maryland, Three Dimensional Mapping of Environmental and Prehistoric Cultural Features in the Beidha Region with Spaceborne and Airborne Imagery

Near and Middle East Research and Training Act (NMERTA) Pre-Doctoral Fellows:

Brett Hill, Arizona State U., Long-Term Human Impact on the Environment

Ellen Kenney, Institute of Fine Arts, New York U., Power and Patronage in Mamluk Bilad al-Sham: The Architecture and Urban Works of Governor Tankiz (1313-40)

Some of the Spring 1999 fellows: Brett Hill, Philip J. Wilke, Leslie Quintero, Michael M. Homan with Therese Homan and Junior Fellow Kalypso Homan, Karen Borstad, Ellen Fleischmann, Andrew Smith, and Douglas Clark

National Endowment for the Humanities Fellows:
Ellen Fleischmann, U. of Dayton, Palestinian Women's Movement during the British Mandate
Gary Rollefson, 'Ain Ghazal Research Center, Stratigraphy and Architecture at Neolithic 'Ain Ghazal, Jordan
United States Information Agency Fellows:
Karen Borstad, U. of Arizona, Reconstructing Ancient Roads: A Diachronic Study of Communication Routes Using Geographic Information System Models for the Madaba Plains Project Region
Andrew Smith, U. of Maryland, Final Publication of the Southeast Araba Archaeological Survey.
Michael M. Homan, U. of California, San Diego, Tensile Architecture in the Syro-Palestinian Historical and Archaeological Records
Michael Neeley, U. of North Carolina,
Greensboro, Late Pleistocene Land Use Strategies in the Eastern Hasa Periphery
Jane D. Peterson, Marquette U., Khirbet Hammam Test Excavations
Leslie Quintero, U. of California, Riverside, Archaeological Reconnaissance of the al-Jafr Basin.
Kress Fellow:
Alexandra Retzleff, U. of North Carolina, Chapel Hill, Roman Theaters
U.S. International Council on Monuments and Sites Interns:
Brian M. Lione, Petra Documentation Project
Nazeh Fino, Site Presentation, Fort Davis National Historical Site, Texas
Jennifer C. Groot Fellows:
Valerie Batt, U. of California, San Diego, Jebel Hamrat Fidan
John Dekle, U. of Florida, Tell Jalul, Madaba Plains
Melissa N. Nevills, U. of Toronto, Tell Madaba
Kenneth W. Russell Fellow:
Sarah E. Whitcher, U. of Edinburgh, Jebel Hamrat Fidan Faunal Remains: A Diachronic Investigation of the Dynamics of Human-Animal Relations in Southern Jordan
Harrell Family Fellow:
Andrew J. Graham, U. of Toronto, Tell Madaba Archaeological Project Digital Archives
Pierre and Patricia Bikai Fellow:
Deirdre Grace Barrett, Brown U., Eliciting Patterns of Trade in Petra by Examination and Interpretation of the Terracotta Oil Lamps found within the Precincts of the Ancient City
ACOR-Affiliated Council of American Overseas Research Centers Fellow:
Michelle Bonogofsky, U. of California, Berkeley, Early Neolithic Burials
For information on ACOR's fellowships contact: ACOR, 656 Beacon St., 5th Floor, Boston, MA 02215-2010, Tel.: 617-353-6571, Fax: 617-353-6575, e-mail: acor@bu.edu.

Happenings at ACOR

Jan. 6. Pierre and Patricia Bikai leave for Cape Town, South Africa, to attend the World Archaeological Congress. Among the 800 delegates from 70+ countries are Gaetano Palumbo (with Anna and Nicolò), former ACOR fellow Julia Costello, and excavator Tom Levy.
Jan. 28. At ACOR, fellows from the Albright present their projects to a packed house.

Donors to ACOR

From January through June 1999, the following friends of ACOR donated to the endowment: Mr. Henry Christensen, Mr. Nicholas Clapp, Dr. Seymour Gitin, Mr. Artemis Joukowsky and Dr. Martha Joukowsky (Joukowsky Family Foundation), Mr. Randolf Old, Dr. S. Thomas Parker, Mr. Paul L. Scham and Mrs. Sandra Arnold Scham.

General Donations were made by: Mr. Henry Christensen, Dr. and Mrs. Vincent Hunt, Mr. Artemis Joukowsky and Dr. Martha Joukowsky (Joukowsky Family Foundation), Dr. Jerry and Mrs. Pamela Mattingly, Mr. and Mrs. Henry McCamish, Jr., Mr. Peter D. Pelham, Jr., Dr. Walter E. Rast, Mr. Lewis and Mrs. Margaret Reade, Mr. Robert J. Risser, Jr. and Mrs. Martha Boling-Risser, Dr. Jimmy Schmidt and Ms. Genie Alfano-Schmidt, Ms. Lee R. Seeman, and Dr. Alan H. Simmons.

Petra Papyri were adopted by Mr. and Mrs. Henry McCamish, Jr., and Mr. Neil M. Silverman

The Jennifer C. Groot Endowment received contributions from Mr. Bruce R. Gould and Dr. S. Thomas Parker.

The Russell Trust received a donation from Ms. Nicola R. Zwaschka.

The Bikai Endowment received donations from Pierre and Patricia Bikai.

Donations to the library endowment were received from Dr. Roger Borass, Dr. Jack R. Lee (Basilian Fathers of East Rochester), and Mr. and Mrs. Tony Vander Heide.

Donations of books and journals were received from: Mr. Jonathon Addleton, Dr. Jon Anderson, Drs. Pierre and Patricia Bikai, Mr. Thomas A. Dailey, Ms. Rochelle Davies, Ms. Edith Dunn, Export and Finance Bank (Courtesy of Ms. Amani Ayoubi), Mr. Dan and Mrs. Nancy Gamber, Dr. Seymour Gitin, Dr. Joseph Green, Mr. Mohammed Hafez, Dr. Larry Herr, Dr. David Hopkins, IFAPO (Courtesy Dr. J.M. Dentzer), Dr. Jihad Kafafi, Dr. Thomas Kay, Mr. Rami Khouri, Dr. Guntram Koch, Mr. and Mrs. William Lancaster, Dr. Zvi Ma'oz, Mr. Robert Mittelstaedt, Dr. Michael Neeley, Ms. Anne Cabot Ogilvy, Dr. John Oleson, Dr. Wayne T. Pitard, Dr. Yorke M. Rowan, Dr. Susan Slymovics, UNDP (Courtesy of Ms. Ibtisam Dababneh), Mr. Peter Warnock, and World Affairs Council (Courtesy of Dr. M. al-Bakhit).

Dr. Linda K. Jacobs donated a substantal part of her personal library to ACOR.

Jan. 30. A contingent from the BBC arrives to prepare for the filming in April of a documentary on ancient water technologies.

Feb. 9. Mohammed Adawi has an operation (he's fine), leaving Pierre and Sa'id in charge of lunch for the next three weeks.

Feb. 15. Sa'id and Pierre outdo themselves in the kitchen. The presentation would make any 5-star French chef proud!

Feb. 23. Pierre meets with Lewis Reade. It was during his time as USAID director in Amman that the Temple of Hercules project began.

Feb. 23. Megan Perry returns from the U.S. and becomes acting assistant director again.

Feb. 26. Pierre departs for Petra to give a tour to a group from the U.S. Embassy.

March 3. Pierre and Patricia take off for Petra. Over the next six days, Pierre will lecture to three tour groups. During the course of this, two scrolls are adopted.

March 4. There is a new government in Jordan. ACOR Trustee Mohammed Asfour becomes Minister of Industry and Commerce. He joins another trustee, Dr. Michel Marto, who is asked to continue as Minister of Finance.

March 20. Pierre gives a presentation at the U.S. International Council on Monuments and Sites (US/ICOMOS) conference in Washington.

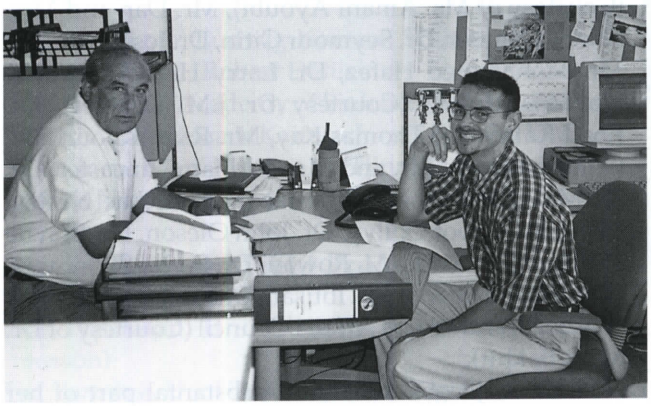
March 23. Virus-infected e-mail attachments come in from the Boston office. This sets off a tedious round of updating our anti-virus software.

March 26. Having met with officials from American Schools and Hospitals Abroad, the National Endowment for the Humanities, the World Monuments Fund, and the United States Information Agency, Pierre returns to Amman.

March 29. Pierre, Sa'id, and Abed sort through more of the accumulation in the garage. They wind up excavating materials excavated in the foundations of the ACOR building.

March 30. Two tour groups come by in the evening, one from ARIT, our sister school in Ankara.

April 1. Word comes in that the U. of Michigan scroll team has received another 2-year grant from the National Endowment for the Humanities.



Pierre and Kurt Zamora in the front office

April 2. Pierre goes off in a helicopter with U.S. Ambassador William Burns to give a tour of Petra to a congressional delegation: Reps. Benjamin A. Gilman (R-NY); Bernard Sanders (I-VT); Bob Filner (D-CA); and Earl Hilliard (D-AL). Rep. Gilman joins Pierre in singing Greek songs!

Pierre and the Congressional delegation at Petra. Congressman Gilman is in the center and Ambassador Burns at the far left.

April 3. The original architect of the ACOR building, Farid Habib, comes by to discuss possible modifications.

April 5. Megan gets an amazing response to her requests to former fellows for lists of their recent publications. The citations just pour into ACOR.

April 7. Pierre gives a tour of the Citadel to James Dyer and John Shank, staff members of the House Committee on Appropriations.

April 13. Kurt Zamora arrives to begin work as ACOR's new assistant director.

April 19. H.M. Queen Noor takes Barbara Walters to visit the Petra Church.

April 24. Joe Greene and a group from the Harvard Semitic Museum tour ACOR.

April 26. Joe Greene and his group tour Petra. Patricia

Adopt a Mosaic

ACOR has begun an endowment campaign to ensure the long-term preservation of the Petra Church mosaics. Contributors can choose a specific small panel for $1000 or one of the large ones for $5000. A plaque at the site will honor the donors.

and Megan show them what they are doing—excavating a 2d century Nabataean tomb. Later a member of the group says it was the highlight of his whole trip!

May 3. Nazeh Fino wins an internship from US/ICOMOS. He will be working with the National Park Service in Texas.

May 5. The celebration of "Five Decades of the United States/Jordan Development Partnership" at USAID opens. ACOR's exhibit panels display archaeological projects that were funded by USAID.

May 7. At 6 pm, the Jordan Committee of the ACOR Board of Trustees meets at ACOR.

May 9. In the subbasement, Pierre hands over the finds from the Temple of Hercules excavations to the Department of Antiquities.

May 9. In the conservation lab, Humeima's conservator, Judy Logan, is sorting out the spectacular ivory pieces found at the site.

Terry Christensen, Wesley Egan, Artemis and Martha Joukowsky with Tom Parker behind, Patricia Bikai, Virginia Egan and Connie Christensen gather around the two ACOR medals given to the Egans at the May board meeting

May 9. Former Assistant Director Scott Quaintance arrives to work on a survey with Burton MacDonald.

May 9. Kurt Zamora is supposed to be having a day off, but every time he walks through the lobby someone thinks of something for him to do. Patricia advises him to get out of the building.

May 10. It must be high season—everyone wants everything. Kathy is packing for Hawaii!

May 24. Patricia visits Don Keller at the Boston office. It's a nice office!

June 5. There is a reception in honor of Lee Seaman who donates two original David Roberts lithographs, "Petra" and "The Arch Crossing the Ravine." They now hang in the ACOR Library.

June 15-20. In Petra there is a conference on the archaeology of water in the Middle East—an appropriate topic this dry, dry summer. Pierre's paper is on the water installations at Madaba.

On behalf of ACOR, H.R.H. Prince Raad bin Zeid accepts the David Roberts prints from Lee Seaman

June 17. Kurt gives his first ACOR tour and survives.

June 21-23. In Petra there is a conference on "Nabataean Research and Studies." Pierre presents a paper on the Petra Church.

June 30. ACOR hosts its annual Independence Day/Canada Day luncheon BBQ (a bit early). Ambassadors Michel Molloy, Canada, and William Burns, U.S.A. join in.

ACOR's Ecosystem

Many archaeological sites become ecological preserves since both goats and ploughs are kept away from them. As the area around ACOR developed, Khirbet Salameh, an ancient farmstead last used in the Byzantine period and which is just across the street, became just such a preserve.

Last year, two U. of Jordan students documented 66 plant species at the site. This year, fellow Brett Hill developed a list of the visiting birds. He spotted: Blue Rock Thrush (*Monticola solitarius*); Black-eared Wheatear (*Oenanthe hispanica*); Black Redstart (*Phoencurus ochruros* semirufus); Hoopoe (*Upupa epopos*); Greenfinch (*Carduelis chloris*); Chaffinch (*Fringilla coelebs*); Yellow-vented Bulbul (*Pycnonotus xanthopygos*); Blackbird (*Turdus merula*); Laughing Dove (*Streptopelia senegalensis*); and House Sparrow (*Passer domesticus*); Hooded Crow (*Corvus cornix*) and the Linnet (*Carduelis cannabina*). There is also an as-yet-unidentified hawk (probably a goshawk).

Now we need someone to identify the reptiles and insects!

ACOR Publications

The Mosaics of Jordan by Michele Piccirillo. Large format, cloth-bound volume includes 303 pages in full color with 824 illustrations, plans, and aerial photographs. $175.

The Great Temple of Amman: The Architecture by Chrysanthos Kanellopoulos. The architecture of the temple that was excavated and partially restored by ACOR. Large format, cloth bound. $80.

JADIS: The Jordan Antiquities Database and Information System: A Summary of the Data, edited by Gaetano Palumbo. Basic information on nearly 9,000 archaeological sites from all periods, plus 117 maps. This 453-page, hard-bound volume is xerographically reproduced. $40.

The Great Temple of Amman: The Excavations by Anthi Koutsoukou, Kenneth W. Russell, Mohammad Najjar, and Ahmed Momani. Description of the 1990-93 excavations undertaken by ACOR and the Department of Antiquities. This hard-bound volume has 180 pages and 3 fold-out plates. $65.

Madaba: Cultural Heritage edited by Patricia M. Bikai and Thomas A. Dailey. Catalogue of the remains from the Early Bronze Age through late Ottoman vernacular houses (113 pages, paperbound) Over 150 illustrations, five in color. Includes a separate large map. An Arabic translation is available at no additional cost. $35.

Ancient Ammonites & Modern Arabs: 5000 Years in the Madaba Plains of Jordan edited by Gloria A. London and Douglas R. Clark. Life across the centuries in the area excavated over the past 30 years by the Madaba Plains Project. $27.

The 150th Anniversary of the United States' Expedition to Explore the Dead Sea and the River Jordan by Robert E. Rook. An assessment of the Lynch expedition in 1848. Hard-bound volume of 32 pages. Many reproductions of Lynch's illustrations, including his three maps. $20.

All prices include shipping.

ACOR's Web Site: www.bu.edu/acor

ACOR and its *Newsletter*

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Madaba Map Centenary 1897-1997

With assistance from ACOR, the proceedings of the international conference on the Byzantine map have been published, edited by Michele Piccirillo and Eugenio Alliata. This well illustrated volume 278 pages, hard bound is available from ACOR for $125, inclusive of shipping.

ACOR Trustees Meet in Providence

On May 21, 1999, the ACOR Board of Trustees met in Providence. A major topic of discussion was expansion of the building to accommodate ACOR's growing needs, particularly for workplaces. At the luncheon that followed, former U.S. Ambassador Wesley Egan spoke on "Archaeology and Diplomacy." He and Virginia Egan were each presented with ACOR medals (photo on previous page).

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