Caring for the Cultural Heritage Shelters
by Pierre M. Bikai
and Patricia M. Bikai

Too often in the past the question of what happens "after the excavation" has not been an important one for archaeologists. As part of the general environmental movement, however, the profession is catching up. ACOR's work at two of Jordan's major sites, Madaba and Petra, provides some major lessons on how complex the issues can be. If preservation is taken seriously, for example, it can be very expensive. Some excavations need little in the way of conservation—simple back-filling will suffice. If, however, there have been major finds that are to be left exposed so that the general public can enjoy them, other measures must be taken. In Jordan, for example, it is particularly rich in mosaics, but excavated mosaics must be protected from the elements, must be sheltered. Beyond the issue of the cost, sheltering a site is not as easy as it would seem at first glance.

With funding from the United States Agency for International Development (USAID), ACOR has built a total of five shelters, four at Madaba and one at Petra. Four other shelters have been designed: for the Petra Church baptismery; the Church of St. Stephen at Um el-Rasas; Lot's Cave; and the Church of the Martyrs at Madaba.

The two large shelters at Madaba, designed and built by Ammar Khammash for the Church of the Virgin/Hippodamus Hall and the Church of the Apostles, are built of stone, in the main stone found at the site. Both are large buildings and required large foundations. They are very beautiful buildings and they provide security and environmental control.

A smaller shelter in two parts was designed for the two wings of the Burnt Palace at Madaba by Leen Fakheury and built by Kamal Tayem. It is steel construction with precast concrete roofs. Because the spans involved were not great, the foundations needed were minimal. Finally at Madaba, the partially preserved mosaics of Church of the Prophet Elias needed a small shelter. Pierre Bikai designed and built a simple steel and wood structure with a tile roof. These last two shelters are

The Petra Church shelter from the air. Rob Shuster, archaeologist.
open-sided and therefore offer less security and less protection against wind-blown dust. The trade-off between the heavy foundations needed for a fully secure building with environmental control can easily be seen by comparing the small shelters to the larger stone structures at Madaba.

At the beginning of the design process for ACOR’s shelter over the Petra church, architect Rob Shuter asked us what it was we wanted from that shelter and he presented a number of possible criteria (some of which are incorporated into the chart). Early on in the design phase, some of the trade-offs were already clear: as previously noted, maximum security results in large foundation size. In another example, construction on site carries with it the danger of damage both to the site being protected and to the surrounding cultural remains during the construction process; on the other hand, prefabricated structures can be expensive. Finally, the jobs created by using local building techniques, as had been done for the stone buildings at Madaba, had to be weighed against the issue of whether those stone buildings presented themselves to the lay person as being antiquities themselves.

For the Petra shelter there were constraints beyond those at Madaba. The first of these was that the visual impact had to be minimized. This had not been necessary in the urban context of Madaba, where the architects actually had to be inventive to prevent the antiquities from being overwhelmed by surrounding high-rise buildings. The second constraint was that Petra Church required a shelter that would span

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Madaba Church of the Apostles</th>
<th>Madaba Church of the Virgin</th>
<th>Madaba Burnt Palace</th>
<th>Madaba Church of the Prophet Elias</th>
<th>Petra Church</th>
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<tbody>
<tr>
<td>1. Protect from the elements</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<td>2. Minimal intervention at the site</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<td>3. Clearly new</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<td>4. Reversible without harm to the site</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<td>5. Inexpensive</td>
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<td>x</td>
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<td>6. Simple to install</td>
<td>x</td>
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<td>x</td>
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<tr>
<td>7. Natural light</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<tr>
<td>8. Natural ventilation</td>
<td>x</td>
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<td>x</td>
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<td>9. Flexible and expandable</td>
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<td>10. Provide security</td>
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<td>11. Environmental control</td>
<td>x</td>
<td></td>
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<td>x</td>
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<td>Size in square meters</td>
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<td>500</td>
<td>225</td>
<td>200</td>
<td>600</td>
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<tr>
<td>Cost including design/supervision</td>
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<td>$175,000</td>
<td>$85,000</td>
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<td>Cost per square meter</td>
<td>$250</td>
<td>$350</td>
<td>$377</td>
<td>$125</td>
<td>$408</td>
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</table>

*Costs are approximate and do not include conservation of the mosaics, signage, walkways, etc.
*Does not include the cost of recycled materials used in the project.
*This shelter was prefabricated in the U.S. and there were shipping costs; nonetheless, the cost is still in line with the cost of the shelters built in Jordan where labor costs are appreciably lower.
Shelter for the Burnt Palace: The western part is to the left and the eastern to the right. Leen Fakhoury, architect.

Shelter over the Church of the Prophet Elias. Pierre M. Bikai, architect.

The aluminium frame of the Petra Church shelter.

The Petra Church shelter after completion.

The whole width of the structure. This meant that it would be either a building with massive foundations built on site, or it would utilize an extremely modern (and expensive) technology, the space frame. That was, indeed, the technology finally chosen—precisely because of the sensitivity of the site. In addition to the shelters actually constructed, architect Leen Fakhoury did a preliminary design for a 520 m² shelter for Madaba’s Church of the Martyrs, consisting again of a steel frame. That shelter has yet to be built, but would cost around $40,000 or $260 per m². ACOR also sponsored a design for a shelter at Lot’s Cave measuring approximately 100 m² at an estimated cost of $34,000 or $340 per m². A shelter for the Petra Baptistry, measuring 102 m², as designed by Rob Shuter, would cost $34,000 or $333 per m². The project at Um al-Rasas did not reach the costing stage. However, the cost of the shelters that have been built and the estimated cost of the three that haven’t ranges between $125 and $408 for an average of $307 per m². Five different architects have been involved with the eight projects and all were under pressure to devise a low cost solution to the problem of sheltering. As the chart shows, none met that criterion, with the exception of the Prophet Elias shelter, which was unusual in that no great spans were involved and recycled materials were used.

There is presently no low-cost solution, so responsible excavation of mosaics and the like should not be undertaken without provision for such expensive sheltering. Provision must also be made for conservation, on-going maintenance, and security.

Cost, however, is not the only issue. The design issues encountered in each of the projects showed that, whatever the cost, there is still no perfect design for a shelter. Each of the shelters built by ACOR exhibits one or more compromises, as can be seen in the chart. Together, however, the shelters mark a major step forward in the effort to make what has been uncovered accessible to all, to give back to Jordan—our hosts—and to treat the cultural heritage of Jordan in a responsible manner.
Field Projects

Eastern Hasa Late Pleistocene Project

The eastern Hase contained a Pleistocene lake which was present as late as about 20,000 B.C. Local conditions favored long-term visits by hunter-gatherers. Subsequently, during the Last Glacial Maximum (LGM), about 18/17,000 B.C., it is likely that Lake Hase shrank or disappeared. During the LGM, hunter-gatherers probably were highly mobile, although the eastern Hase would have remained attractive because of the many springs, pools, and marshes. After the LGM, climatic conditions ameliorated, and the marsh/pond system became more extensive. This again favored longer stays at basecamps. These favorable conditions persisted until at least 11,000 B.C., after which the marsh system in the Hase disappeared.

With the purpose of understanding ancient settlement systems associated with that ecology during the interval from about 40,000/11,000 B.C., the Eastern Hase Late Pleistocene Project (EHLPP), funded by the National Science Foundation, conducted its first field season from 1 June to 12 July, 1997. Major objectives included: (1) relocation and assessment of Wadi Hase Survey (WHS) and Wadi Hase North Bank Survey (WHNS) sites; (2) testing at Tor Sadaf (WHNBS-8), Tor Sager (WHNBS 242), the Multaka al-Wadian site complex (WHNBS 192-198), and Tabtaqa (WHS 195); (3) excavations and testing at Ain al-Buhira (WHNBS 148); and (4) geochronological investigations of Tor Sadaf, Tabtaqa, and the Hase/Almar confluence, as well as new investigations at Ain al-Buhira and at the juncture of the Hase and Khazra.

Our relocation and assessment of twelve WHS and WHNBS sites has confirmed the presence of Upper Paleolithic and Epipaleolithic sites in areas away from the lake/marsh system of the eastern Hase basin. This highlights the importance of the lake/marsh ecological context during this interval.

Two new sites, EHLPP 2 and WHS 618X, as well as testing at Tor Sadaf and at the Multaka al-Wadian site complex, document a substantial Early Ahmarian (Early Upper Paleolithic) presence in the eastern Hase. In conjunction with Late Ahmarian assemblages from Ain al-Buhira and Yutul al-Hase (WHS 784), this affords great potential to study responses within the Upper Paleolithic to fluctuations in the lake/marsh ecology, and to document continuity and change within the Ahmarian.

Testing at Tor Sager revealed an Early Epipaleolithic occupation that emphasized activities other than production of microlithic tools. This adds considerably to our understanding of site activity differentiation during this period. Additionally, the lithic assemblage from the site, which includes a small number of unusual types ("Cedron" and "Sager points"), as well as relatively narrow-backed microliths including La Moulihah points, may represent an interval that falls between the non-geometric and geometric Early Epipaleolithic occupations at Tor al-Tareef (WHS 1063).

Testing at Tabtaqa yielded Late Epipaleolithic assemblages (Early Natufian) that augment preliminary work at the site by B. Byrd. Perhaps the most significant observations are related to the geomorphology of this locale, where a probable oxbow lake/marsh was present during the Early Natufian. This occupation is buried beneath 1-2 m of marl deposits, indicating that the 30-35 m terrace in the lower portions of the Hase drainage existed at least as late as ca. 11,000 B.C.

Excavations at Ain al-Buhira confirmed the existence of a well-developed Late Ahmarian in the eastern Levant that has a distinct bladelet technology focused on the production of "Ochotcha points." The recovery of large numbers of faunal remains, including whole teeth and ostrich egg shells, adds to our understanding of subsistence patterns in a lake/marsh ecological setting.
Spatially discrete artifact distributions have provided one of the first opportunities to examine in situ Ahmadian activities.

During the excavations at Tor Sidjaf, Tor Sager, Taloua, and Ain al-Buhira, including WHS 618X, flotation, phytolith, and pollen samples were collected for analyses. Faunal remains and geoarchaeological sediments also will be studied. This extensive sampling strategy was undertaken to aid in the reconstruction of the paleoenvironment, paleoecology, and geomorphology of the Wadi al-Hasa region, and in certain aspects of subsistence/sedentism.

Nancy R. Cotton, Iowa State University
Deborah J. Oszanski, Bishop Museum, Honolulu

Khirbat al-Mudayna

The second season of excavations at Khirbat al-Mudayna on the Wadi al-Thamad continued under the supervision of Michèle Daviau of Wilfrid Laurier University (Waterloo, Canada). Excavations at Kh. al-Mudayna again concentrated on three fields: Field C on the northern top of the tell was opened to explore the Iron Age II remains further, and in Fields L and N, excavations of the Nabataean and Roman remains at the bottom of the tell continued. The regional survey continued for the second season.

The Iron Age Gate. In Field C, excavations confirmed the existence of a six-chambered gate on the northern side of the tell; it dates to the Iron II period (ca. 800-600 B.C.). The gate's total length is approximately 15.3 m and it was 15 m wide. This structure was connected to a casemate wall which seems to surround the whole tell. Excavations suggest that the gate was built on bedrock from the beginning as a six-chambered gate. An interesting feature of this six-chambered gate is the fourth wall of each chamber on the side of the main road. It is clear from this season's work that all three west chambers were sealed by a wall on the east side. This feature seems to be similar to the construction of the Iron Age gate at Hazor (Stratum X). No remains from the excavation of this gate suggest an occupation earlier than Iron II, but further analysis is needed.

The Nabataean Reservoir. After further excavations in Field L situated on the northern slope near the bottom of the tell, it has been determined that Building 700 had at least two phases. In the first phase, this structure which measured 10 x 16 m, was built of walls made of boulder and chink; up to five courses of these are preserved. The presence of water channels and of plaster found on the floor and walls, suggests that it was a Nabataean/Early Roman reservoir. It resembles the reservoir at Mamship. Attributable to the second phase are a line of ten piers visible on top of the plaster surface, about 0.5 m apart. These were built in the header-and-stretcher style of construction, and seem to be part of a large arch support system for a ceiling.

The Nabataean Temple. Excavations in Field N revealed additional architectural features, and further strengthened the hypothesis that Building 800 was a Nabataean Temple. A single boulder with drafted margins may represent the symbol of the Nabataean god Dushara. In Room 801, a flight of 10 steps lead to a platform that towers over the remains of this building. Additional rooms were built along the west side of the temple. These rooms had floors lined with plaster and arches to support the ceilings. A Roman coin found in the debris may help to date a later occupation phase to the late 3rd century A.D., the time of Valerianus according to Z.T. Fiema.

Site 13. During last year's regional survey, a complete female figurine and fragments of anthropomorphic vessels were found at a site south of el-Romlu, called WT-13. A salvage excavation was conducted during this season and produced several other figurines and more fragments of anthropomorphic vessels. Most of the figurines are ceramic representations of women holding either their breasts or a disc. Other finds included murex and cowrie shells, miniature jugs, a limestone figurine head, and a blue faience pharaonic amulet. The faience amulet together with the hairstyle and dress of some of the figurines suggest a stronger Egyptian influence here than in neighboring Sidjaf. The finds and the position of the site suggest that site 13 was an Iron Age II cultic place. The site

Rooms 803/804, the Nabataean Temple Complex. Photo by Wendy Porter.

Firgurine from Site 13. Photo by Wendy Porter.
had been looted but most of the objects found this season were found under a layer of cobbles stones in what appears to be a pit fill.

The Region Survey. The regional survey continued under the supervision of J. Andrew Doerrman from Austin Presbyterian Seminary (Texas). The survey was undertaken to understand the distribution of sites and settlement patterns along the Wadi ath-Thamad and Wadi Shibik. A total of 33 sites have been located, 15 of them this season. Most of the sites belong to one of the two periods attested at Madayb: Iron Age II and Naba- tan. The Iron Age settlements are usually watch turrets or agricultural installations. The abundance of strategically located Iron Age II towers suggest that this area was at the border between Moab and Ammon. The Naba-tan sites are mainly farming settlements and are located across the wadis overlooking the agricultural land. At some of the sites numerous buildings and other features were detected. For example, no less than 33 cisterns were identified at el-Rumel. Only one site (RS-33) with earlier material was located. It is on a terrace on the south side of Wadi ath-Thamad and yielded Chalcolithic-Early Bronze Age levels.

Cristian G. Rata, U. of Toronto

Karak Resourcites Project

In 1997 the Karak Resources Project (KRP) completed a second season of research at central Jordan's Karak plateau. During their 1995 pilot season, KRP's staff launched a multidisciplinary project with an intensive surface survey of 19 sites chosen from the earlier Miller-Pinkerton survey of this region. In June and July of 1997, the KRP conducted research through three interrelated approaches: Regional archaeological survey; regional scientific studies; and excavation at Madayb.

The Karak Project's purpose is to document areas in which occupants of this 875 km² section of tableland have utilized available natural resources, including the location and access to local and long-distance hard goods. Through its continued study of how Karak's inhabitants have used natural resources (e.g., building stone, clay deposits, water resources, soils, plant communities, site positions, natural routes of travel), KRP should provide significant information on the region's historical and cultural development. Such research is especially important because rapid demographic and economic changes threaten the rich environmental and archaeological heritage of central Jordan.

In 1997, the KRP survey team revisited the sites previously documented by the Miller-Pinkerton survey sites visited this season are in the extreme southern and southeastern parts of the Karak district, the territory around Madayb. This follow-up work allows the more recent project to monitor damage done to these ancient settlements and to gather new information while it is still available. Thirteen new sites were also located and studied in the 1997 season.

The 1997 KRP team included six specialists who completed research in the environs of Madayb. They examined the Karak plateau's geology and soils and the changing Bedouin and village cultures. All off-site investigations concentrate on resource exploitation and, in the case of ethnographic studies, are intended to illuminate patterns of continuity and change in the region.

KRP chose to excavate the site of al-Madayb because it is well preserved but threatened by development. This fortified hilltop is located in the semi-arid southeastern corner of the Karak government, on the west side of Fuj al-Uwayrak, a wide valley that runs between the Desert Highway to the east and the King's Highway to the west. As it stands today, the walled enclosure, which measures 83.5 m x 88.75 m E-W, was built largely in Iron Age II but modified for use in later periods. Al-Madayb must have served as an administrative center for the tiny Moabitite kingdom; its strategic situation could have served both military and commercial interests. For KRP's purposes, the site's location on the "desert fringe" of the plateau makes it a perfect case study in resource utilization.

In this first of at least three excavation seasons, KRP opened a total of six 6 m x 6 m squares in two archaeological fields, A and B. The three squares in Field A ran from inside the site's northern, Iron Age wall into a later "scropis," and the three squares in Field B ran from just outside the eastern, Iron Age gate into the site's elevated interior. A variety of building remains, artifacts, and contexts were recovered in the excavation. Field A yielded materials which date primarily from the Late Byzantine through Late Islamic periods. Excavation in both fields yielded a considerable amount of stone tumble that almost certainly resulted from seismic activity.

Remains from Field B date mostly to Iron Age II and are dominated by a monumental city gate, which origi-
nally included at least four large, elaborately carved "proto-Aeolic" capitals and as many lintels. While addi-
tional excavation in the next RRP season will be needed
to obtain a full plan of the entire structure, it is likely that
this was a four-chamber gate which measured ca. 15 m
on each side. Excavators removed debris from the gate's
chambers and passageway, including remnants of
chained beams and reed impressions from the collapsed
roof. At this preliminary stage, it appears that the closest
parallel to the new gate at 'Ain Darawieh is the Iron Age city
gate of Beersheba III, dated to the 6th century B.C.
Gerald L. Mattingly, Jordan Bible College (Knoxville, TN)

Petra: Great Temple

In cooperation with the Department of Antiquities of the
Hashemite Kingdom of Jordan, excavations were
carried out at the Petra Great Temple from June 14 to
August 11, 1997. Work was begun in the Propylaion
which defined an upper west terrace and crosswalls.
The east-west retaining wall of the Lower Temenos was
completely exposed as was the east stairway leading
itself where one-half of an apsidal structure was recov-
ered tentatively identified as having served as a temple
theater or bouda'etum (council hall). One half of the
temple's West Corridor was found to be frescoed with
red, yellow, and blue plaster. The earth chinking the East
Exterior Anta and the East Interior Anta was removed so
that the full sweep of the Temple Pronaos can now be
appreciated. Eight courses of the massive heart-shaped
column at the eastern rear were removed for re-erection
and this area was excavated to ground level 7 m below
the modern surface, exposing an elegant base to our
heart-shaped rear column as well as a later Nabataean
east-west stairwell, leading from the central Aedytum to
the East Interior Corridor.

A study of the glass was undertaken, and our artifact
data base now holds some 115,000 items. The 1997
catalog contains an additional 34 coins, 68 lamps and 46
other items including Nabataean wares, elephant parts,
a partial Greek inscription, two bronze finials, and an
extraordinary sculpture of a lion's head. Architectural
elements, including marvelous painted stucco fragments,
continued to be prolific, but of particular note is a

Aerial view of the Great Temple, August 1997. Photo by
Artemis A. W. Jankowski.

from the Lower Temenos to the Temple Forecourt in the
Upper Temenos. A large area of the hexagonal pave-
ment was excavated and, to the west, a canalization
system extending under the pavement produced a cache
of Nabataean wares. Elephant heads and trunks contin-
ued to turn up, but there is still a mystery as to which
part of the Lower Temenos they adorned.

In the Upper Temenos, an elegant series of arches
covering a cistern was located just behind the East
Esedra. Much activity was devoted to the Great Temple

Martha Sharp Jankowski, Brown University

Petra Great Temple

Ground plan of the Great Temple

1997 Site Plan and Greek Catalogue
Petra: Roman Street Project

ACOR's Roman Street Project, funded by the United States Agency for International Development (USAID) and supported by the Department of Antiquities of Jordan, began in late spring 1997. The purpose of the project is to enhance the touristic attraction of Petra and to explore the city's urban history by exposing a part of the civic center. Five rooms along the southern side of the eastern end of the colonnaded street were excavated, three to the west of the grand stairway and two to the east of it. Judging from their location in the city center, all five rooms were commercial establishments, such as shops or taverns.

The main feature is the stairway leading to the upper market, which is on a large artificial plateau held in place by retaining walls. The steps are only partially preserved. The remains of three small landings were found. These facilitated the access to the second-storied rooms west of the stairway and to spaces far east of it.

The three rooms (XXVII-XXV) on the western side of the stairway are roughly of the same size (ca. 4.4 x 8.0 m) and are similar in appearance. Room XXVII features some unique details. Two niches in the facade flank the door and the room consists of two spaces separated by a wall. The upper floor was supported by the three arches in the back room and one in the front. The arch springers are well preserved in the back room, and the entire design of arches and springers is very uniform. Both external and internal doors in Room XXVII had been partially blocked at some point and secondary walls constructed on what had been the sidewalk. Two crosses incised on the front wall, and one on the partitioning wall may date to the Byzantine period.

Rooms XXVII and XXVI are each spanned by five arches. A puzzling feature occupies the southern half of Shop XXVII. It is a nearly square tank or basin with slightly curved internal sides and rounded corners. Stones and ashlars were deposited inside in tight but unpatterned layers. A roughly flat stone surface laid on top of them totally sealed the interior. Evidently the stone surface was meant to have a rounded form to facilitate some industrial operation. It has been suggested that it was a pottery kiln, a wine or oil press, or a threshing floor, but none of these suggestions is satisfactory.

The doors in Rooms XXVII-XXVI were also partially blocked. A raised area surrounded by the secondary walls in the front of Room XXVI represents one of the so-called "Byzantine shops" in Petra. The interiors of both rooms were filled up with stones, soil, roof tiles and paving slabs up to the level of the collapsed arches. The five arches in Room XXVII fell in orderly rows, allowing for the recovery of most of their voussoirs.

The twin shops XXIX-XXX are located directly east of the stairway. The main internal features there are benches or low counters set against the walls. In total, 138 coins were found in Room XXIX and 48 in Room XXX. South of these shops is Area East characterized by a series of parallel E-W walls, which form two long and narrow spaces or galleries on the increasingly higher ground. The galleries do not seem to feature any partition walls.
Perhaps the architectural design of Area East was intended to provide an aesthetically acceptable eastern frame for the monumental stairway. The two gradually superimposed spaces were perhaps open or covered galleries or porticoes opened to the north side. The general impression of the entire area is that of a huge facade, like an elaborate theatrical backdrop.

The preliminary interpretation of the site in terms of spatial and temporal changes is tentative and will likely be modified through future studies. Some remains at the site may belong to an earlier phase of development, perhaps to the first half of the 1st century A.D., or later. In the second phase, the stairway was constructed, probably with a monumental arch in front of it. An inscription dating to A.D. 114, probably belonging to that arch, had been found previously in the area. It appears that the original shops XXVII-XXVI were expanded through the construction of a new facade wall farther north. Rooms XXX-XXXI, if they existed before, were also substantially remodelled. The birdwork favors the opinion that the stairway is contemporary in construction with the sidewalk, the stylobate and the colonnade; the remodelled shops, and the extant pavement of the Colonnated Street. The pottery deposits are uniformly not later than the beginning of the 2nd century A.D. A coin of Rabbel II found in the bedding of the street's pavement, which also sealed the foundation trench of the stylobate conforms to that date. This development could relate to the last decades of the Nabataean independence, but the Trajanic, or generally post-Augustan period is preferred.

The commercial function of the rooms is supported by the predominance of storage jars, amphorae and unused cooking pots in the ceramic repertoire of Rooms XXVII-XXVI. The abundance of coins in Rooms XXIX-XXX may relate to operations conducted there. The majority are dated to the 4th century A.D., but 5th-century types are also present. Many coins were minted before A.D. 363, which may or may not be accidental. However, until the ceramic material is fully understood in terms of stratigraphic sequence and relationships, the impact of the 363 earthquake on this area cannot be fully ascertained or defined. Presumably, the construction of the "Byzantine shops" on the sidewalk and often upon the street itself, as well as the blocking of the doorways of the original shops, are related to earthquake damage and to increased threats of flooding and landslides.

The later Byzantine period is well attested in ceramic finds, but the coins included only a single issue of Justinian I. The gradual abandonment of the shops apparently progressed in a linear pattern, from east to west. Occupation in the eastern area of the street continued in some form during the 7th century. Incidentally, a fragment of a Crusader period cooking pot was found in Area East.

The Roman Street Project has greatly enhanced the architectural panorama of the city center and created a background to the Colonnaded Street. More importantly, the recovered information will permit a better understanding of the urban development of Petra. The gradual abandonment of the shops apparently progressed in a linear pattern, from east to west. Occupation in the eastern area of the street continued in some form during the 7th century. Incidentally, a fragment of a Crusader period cooking pot was found in Area East.

Wadi Ramm Recovery Project

The second season of the Wadi Ramm Recovery Project ran from June 27th to July 19th, 1997. Project directors were Dominie Dudley and M. Barbara Reeves of the University of Victoria.

The Eastern Complex, a palatial structure containing a bathhouse and public and private units, is situated alongside Ramm's Nabataean Temple on a small hill at the foot of Jebel Ramm. The elevation of the Eastern Complex in relation to Ramm's ancient settlement and the complex's pairing with a temple suggest this was an important structure when built (probably in the 1st c. A.D.-A.D.). Exploration of the structure began in 1996 with documentation of the exposed remains. The goals of this year's season were to examine some of the peripheral areas of the Villa and to probe two of the bathing rooms.

The core of the Villa consists of two rectangular
structures, separated by a corridor, and two paved rooms or courtyards. The grand nature of the architecture and finds recovered last season indicated that the central parts of the Villa originally served a public or official function. It was theorized that the NW section of the Villa contained the private quarters, the focus of this season’s work. A probe in the north end of the central corridor revealed a well-built staircase of three steps leading through a doorway into the NW courtyard. The threshold is carved from a single block and retains sockets for double doors—identical to the grand doorways in the central courtyard. This similarity between the two areas, both used for dining, gives weight to the theory that the NW section housed the private quarters.

Vicky Kates searched along the southern perimiter for the complex’s main entrance. It had been hypothesized that the entry would be found in alignment with the axial doorways in the central rectangular unit. This proved not to be the case, and a complicated architectural plan was revealed.

Excavation of the multi-room bannathouse concentrated on the frigidarium (heated bathing room) and the tepidarium or sweat room. At the center of the frigidarium was an immersion pool. One can imagine a Nabataean bather stretching out in this pool, relaxing, and temporarily forgetting about the scarcity of water in the desert outside. The interior of the pool was 1.24 m long x 2.59 m wide x 0.94 m deep and was rimmed by Nabataean dressed stones faced with hydraulic plaster. This portion of the room was paved by flagstones and contained a bench running along the outside of the pool. There was presumably also access to the basin from the southern (not fully excavated) half of the room.

To the west of the frigidarium and between it and the caldarium (excavated last year) is a room that probably functioned as a sweat room or tepidarium (cooler room). Excavation failed to uncover a hypocaust beneath the floor; however, a great deal of soil-carried wall plaster was found in the fill. This soil (present at 2 successive layers of wall plaster) appears to have accumulated while the plaster was still on the walls. This suggests that this room was heated by a brazier rather than a hypocaust.

The results of this season’s work show that the Eastern Complex was constructed in units, separating public and private spaces. The private apartments in the Villa were built with elaborate architecture and decorative features like its more public areas, indicating that personal luxury was as important as public display. The entrance to the Eastern Complex appears to have been complicated and carefully controlled. This suggests that the complex served primarily as a residence or palace and not as a civic building, although certain areas of the structure were designed for public use. Whether the bathhouse was primarily intended for public or private use is not yet clear. The bath is located next to the public areas of the complex and may have served either a religious function for the people visiting the temple or as a commercial enterprise catering to caravan travellers. Alternatively, the doors to the bathing block could have been closed to retain this area for private use.

Denise Dudley

Roman Agaba Project

From May 16 to June 30, 1967, excavations took place in Agaba as part of the Roman Agaba Project. The project is directed by S. Thomas Parker of North Carolina State University. This season, the field director was Mary-Louise Mussell of Carleton University (Ottawa, Canada). This season’s excavation focused on a large mudbrick structure identified in 1994. The structure is at least 14 m wide and over 20 m in length. The mudbrick walls rest on bases composed of 12 courses of stone. The walls were covered with white plaster and decorated with white plaster moldings. The long axis of the building is oriented east to west. The eastern section of the building is divided symmetrically into three rooms. A large central room, approximately 6 m wide, is flanked by narrow rooms 2 m wide. Entrance to the building can be gained through two arched doorways at the western end of the north wall. The mudbrick arches are still standing, having been blocked by mudbrick walls in antiquity. This season the excavation team was able to uncover a section of the floor of the
building. The initial floor was of mudbrick which was later replaced in one room by polygonal composite pavers, purple in color, and in the central room of the structure by a multi-colored cobblestone floor. These two layers of floor represent the first phase of occupation of the structure, when it was still a two-storey structure with vaulted rooms. The upper level was reached by a staircase at the western end of the building.

During the 1996 season almost 100 coins were found in the room with the pavers. It appears the coins were originally in a palm box that had been attached to the east wall of the room beside a small doorway. The doorway and the room beyond became a focus of the 1997 season. The doorway appeared to lead into a small room with a vaulted ceiling still intact. When excavation began it quickly became clear that beneath the southern portion of the room was a hollow. Unfortunately it was too dangerous to continue digging in the room. The vault appeared to be intact, but over the centuries the mudbrick had settled on the fill within the room. Collapse was an all too real possibility.

The original occupation of the building with its paved floors and plastered walls is dated to the 4th century A.D. This phase was probably destroyed, or severely damaged, in the earthquake of A.D. 363. After the earthquake much of the mudbrick vaulting collapsed, leaving a 0.5 m thick layer of mudbrick tumble over the floor. The walls, however, remained standing, as sometime in the 5th century the building was reoccupied.

During the 5th century, the building may have been the site of an artisan's shop. Pieces of worked shell and bone were common discoveries. Of special note is the head of a man carved on bone. Many of these bone and shell appear to have been cut as inlay pieces, so that other fragments found in 1996 may have been part of a decorative screen or similar ornate piece of furniture.

The most exciting find of the season was also from the 5th century occupation. Cut into the floor was a small hollow and in the hollow were 30 bronze coins. The latest remains identified this season are of an immense tablinum or oven dating to the early Islamic period. The tablinum was built against the wall which blocked the smaller of the two standing arches. The oven is large enough to currently hold the two students who excavated it. The initial use of this building is still a mystery, but an intriguing possibility exists. The central hall flanked by aisles suggests an early church. We know Agapi was an early Christian center, as it was represented at the Council of Nicea in A.D. 325 by a bishop. The style of the building is not unlike 5th century mudbrick churches from southern Egypt. Coin and ceramic evidence places the construction of this building prior to A.D. 350. The interior walls of the building suggests a hall church rather than a basilica which would have had pilaars or columns. Hall churches are usually dated prior to A.D. 330 which would make church one of the oldest known. Only further excavation can confirm this.

Mary-Louise Mussell, Carleton University

Update on the Scrolls

The University of Michigan team in 1997, consisting of Ludwig Kiernan, Robert W. Daniel, Donka Markov, Robert Caldwell, and Traianos Gagos, continued its work on the papyri by establishing a final text for roll no. 10 (Papyrus Petrie Kultur and Subh Shlomum), by dealing, with the historical and cultural implications of the information contained in that document, and by producing transcripts for almost all of the other priority rolls.

In 1997, in addition to the main pieces of the papyri that produce a more or less continuous text, there are 450 fragments, mostly the size of postage stamps, that provide snippets of information from the beginning of the document, which is otherwise completely lost. Several of the fragments come from the surviving part of the document. L. Koenns succeeded in placing a large number of these fragments onto the right side of the main text. This resulted not only in new information but also in confirmation of many restorations as well as the rejection of a few. In several cases, the placement of fragments solved problems on which the team had spent much time. It also turned out that 95% of the team's supplements were confirmed by the newly placed fragments. This is an unusually high rate of success (30-50% is regarded as very good) that is mostly due to the heuristic character of the document.

As reported before, inv. 10 is a division of property among three men named Bassos, Epiphanios, and Sabinos. The property consists of houses in the metropolis of Petra and in the nearby village of Shir, as well as land in the surrounding countryside. Study of the other documents in the archive suggests that inv. 10 is the oldest document in the archive, predating the earliest securely dated document of A.D. 328. Unfortunately, this cannot be proven since the dating formula that was at the beginning of the roll has been destroyed altogether.

The only link that connects inv. 10 with the rest of the archive is the name of one brother, Bassos, who does not come from the family of the principal person of the archive. Rather, Bassos is the grandfather of Theodorus's wife Stephanous. This might explain why inv. 10 was found among the papers of Theodoros, Bassos' son, Patrophilos (father-in-law of Theodorus), appears as a party in pre- or post-nuptial agreements with Theodoros (e.g., inv. 63-65 and inv. 68) and possibly in other documents that Stephanous brought into the family.

Inv. 10 is an interesting document both on its own and within the larger context of the archive, because it provides unique information on property ownership and inheritance and because it sheds light on the nature of Petra's economy and its hinterland.

Above all inv. 10 is a monument in the history of the Arabic language. This is due to its wealth of Semitic (mostly Arabic) names for places, houses (e.g., line 85-86: Gr. Daratit el-Bah = Ar. Darat al-Bah, "House of the Worshippers"), and parts of houses (e.g., line 86: Gr. 11
excavated as a group. The overwhelming majority of the rolls in this group deal with property matters such as the transfer of property rights, through cession, sale, or transfer of tax responsibilities. Three of the documents deal with the down payment of property, and the other property that Stephanus brought into the family.

Two of these texts will be briefly described here:

(1) Inv. 60 consists of 14 complete lines and four substantial fragments from the foot of that roll. The document deals with the registration of a vineyard called Makouda that is situated in a deserted hamlet called Battii Tel al-Kerb. It records the transfer to Theodoros son of Obodianos, of the responsibility for paying taxes on that property to the local authorities. For reasons that are obscure, Theodoros and his father paid the taxes in the past to a municipal official, Flavius Leontios and his father, Valens. The text can be securely dated to Jan./Feb. A.D. 540. The taxes for land that previously had been registered in the land-register of Augustopolis are now being collected by the tax-office in the metropolis of Petra. The vineyard fell under the fiscal authority of the city it is called "free" land, meaning free from the fiscal authority of the imperial administration; in other words, land that was under the control of the city. The rate of taxation is high, 47.5%, a rate corroborated by other documents in the archive that seem to record even higher rates.

(2) Inv. 67 (Papcyrus Petrae Selc Foundation 11) was reconstructed like a jigsaw puzzle, first by arranging the photographs and then arranging the original fragments, from more than 120 fragments of varying sizes. Seventeen lines of text were recovered. Only three or four of them are not complete and the signature, probably that of the local official, is missing. The document is addressed by Flavius: Dusarios son of Valens, who had been prefect of Keaton Amnath (modern al-Hammam, a settlement SE of Petra and near the modern city of Ma’an), to Alphios son of Valens, the keeper of the public records, probably in Petra. Dusarios had held a post in Amnatha, as the document informs us, but was a citizen of Petra. In this document, he requests the keeper of the public records to transfer tax responsibility for a piece of land (part of which was a vineyard) to Theodoros son of Obodianos. The property was located near Keaton Zakadakhon (modern Solada, approximately 20 km SE of Petra) in an uninhabited ramlet. As in many of the other documents from Petra, the plot of land bears an Arabic name.

It is too early to draw general historical conclusions, but it is certain that in the 6th century Petra’s agricultural economy was still functioning and that the city maintained economic and administrative ties with several other communities in the area, including Augustopolis, Ammatha, and Zakadakh. Furthermore, the documents inform us that at least the local administration (būb in Petra and Augustopolis) was still fully functional in the middle of the 6th century.

Trinity College, University of Michigan
Director's Report: January-June 1997

Pierre M. Bikai

ACOR Projects

ACOR/USAID and the Ministry of Tourism and Antiquities, Madaba: Archaeological Park and Mosaics Shelters, Church of the Prophet Elias, Pierre M. Bikai, architect; Burrest Palace, Presentation Phase, Lev Fakhoury, architect

Petra: Petra Church Shelter and Conservation Project, Zbigniew T. Fiema, archeologist; Robert Shuttler, architect; and Starmet, contractor; mosaics conservation, Enzo Di Carlo and Claudia Tedeschi; Roman Street and Project, Chrysanthos Kanellopoulos, architect; Zbigniew T. Fiema, archeologist

Petra Papyri Publication Project

University of Helsinki: Jaakko Frössén, Jorma Kainio, Mauri Kainio, Antti Arjava, Maria Lehtinen, Manna Vestrinen, Mari Mikkola, Tiina Rankinen, Marja Vierson, U. of Michigan: Ludwig Koenen, Tristan Gagos, Robert W. Daniel, Donka Marcus, and Robert Caldwell

ACOR-Assisted Field Projects

Aqaba/Ayla, Carleton U., Mary Louise Mussell, Iraq Wetlands Prehistory and Paleoenvironmental Project, Richard Watson, Rusty Low, and Douglas Schnurrenberger, San Juan College, New Mexico. Bir Madkur Excavation and Survey, Megan Perry, U. of New Mexico, and Andrew Smith, U. of Maryland

Dhiban Plateau Regional Project, Andrews U., Chang Ho C. Li, Eastern Hala Late Pleistocene Project, Nancy R. Colman, Iowa State U., and Deborah J. Olczewska, Bishop Museum, Hawaii.

Kerkhe Castle Excavations, St. John Fisher College, Jack Lee

Khirbet Iskander, Drew U., Suzanne Richard and Jesse Long

Urban Archaeology and Preclassical Madaba, U. of Chicago, Tim Harrison

Petra, Great Temple, Brown U., Martha Joakowsky

Petra, ridge Church, ACOR, Patricia Bikai, Bioarchaeology of Sa'ud: A Small Byzantine Village in the Mafraq District, Jerry Rose, U. of Arkansas, and Mahmood Al-Najjar, Yarmouk U. Tall Hisban Cultural History Project and Survey, Andrews U., Stem LaDiana and Gary Christopherson

Tell Abu en-Na'aj, Arizona State U., Steve Falconer

Tell Safat, Seton Hall U., Don Wimmer

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

Wadi Fidan Archaeological Project, Tom Levy, U. of California, San Diego, and Russell Adams, U. of Sheffield

Wadi Ramm Recovery Project, U. of Victoria, Dennine Dudley, Vicki Karas, and Barbara Reeves

Wadi ar-Thamad and Khirbat al-Mudayna, Wilfrid Laurier U., Michèle Daviau

Fellows in Residence

National Middle East Research and Training Act (NMERTA) NMERTA PEARL-DOCTORAL FELLOWS

Mansoor Mooskeld, East Michigan U., Understanding Jordanian Exceptionalism

Robin McGrew-Zoubi, Sam Houston State U., Middle Eastern Women in Science: A Study of Science Education in Gender Separate Schools in Jordan

Denise Schmandt-Besserat, U. of Texas at Austin, Neolithic Symbols at 'Arîn Chazzel: The Socioeconomic Significance

Amiya Mohanty, Eastern Kentucky U., Modernization and the Changing Social Supports, Needs, and Life Satisfaction of the Elderly in Jordan: An Exploratory Study

Ahmad Sadri, Lake Forest College, The Comparative Archaeology of Petra, Jordan.
Donors to ACOR

From January through June, 1997, the following friends of ACOR donated to the endowment:


General donations were made by Margaret Alissres, Henry Christianssen, Kyle-Kebo Foundation, Tom Limn, David McCrory, Petra Foum Hotel, Thomas Paradise, Bill Shuman, Mansal Torska, Nicholas Veldez and Donald Winner. Donations in kind were received from Rosamry Beier, Patricia Bickel, Gal and Jim Cleveland, Nancy and Dan Gamber, Beul McCall, Gaetano Palumbos, ICCROM, Phyllis Powers, and Marilyn and Tom Schaub.

The Jennifer C. Groat Endowment received a contribution from S. Thomas Parker.

The Harrell Family Trust donated from the Barbara Zuchrow Cohen Trust, Edgar Harrell, Erik Harrell, Matthew Harrell, and Phillip Harrell.

ASOR Challenge

The gift selected above from ASOR was made possible by a donation from ASOR Board Chairman, P. E. MacAllister. He and his wife, V. Rebecca MacAllister, have been generous to ACOR in the past—frequently were among the first to adopt scrolls. Thanks to his generosity, ACOR and the centers in Jerusalem and Nicosia each received $50,000 as an outright gift. Another $50,000 is now available to each center on a matching basis: every $2 we raise for any of our activities, ASOR will match with $1.

The Kenneth W. Russell Trust received donations from Kyle-Kebo Foundation and Biblical Archaeology Review.

Donations to the library endowment were received from Aina and Roger Borras and Pierre Bikai. A donation to library operations was received from Meryle Gaston. The Embassy of Canada has given a grant for library furniture.

United States Information Agency Fellows:
Rochelle Davis, U. of Michigan, Recreation Jerusalem:
Oral Histories of life in British Mandate Jerusalem
Francis-Oliver Wilcox, Georgetown U., Human Rights
and the Politics of Liberalization in Jordan since 1989
Kimberly Katz, New York U., A Comparative View of
the Developments of Academic Institutions in Amman
and Jerusalem in the 1990s.
Thomas Berger, U. of New Mexico, Diacronic Change in
the Natural of the Levant
Jenifer C. Grant Fellow:
Brian Brown, Brown U., Petra Southern Temple Project
Christian Kata, U. of Toronto, Wadiath Thamad Project
For information on ACOR’s fellowships contact: ACOR,
617 Beacon St., 5th floor, Boston, MA 02215-2010, Tel.: 617-353-6571, Fax: 617-353-6575, e-mail: acor@bu.edu.

News and Notes
Jan. 8. In the periodical room, James Sims and Patrick
Rogan lead a working session on the design of the new
national museum.
Jan. 13. Virginia Egan arrives with a delegation of con-
gressional wives including the spouses of Representa-
tives Ron Packard (R-CA), Joe Knollenberg (R-MI), Terry
Evetts (R-AL), and Michael Collins (R-CA).
Jan. 14. ACOR hosts the quarterly “directors’ dinner.”
The directors of the British, French and German insti-
tutes discuss better coordination among their libraries.
Jan. 18. While Senators Ted Stevens (R-AL), Thad Cochran
(R-MS), and Conrad Burns (R-MA) meet with H.M. King
Hussein, their spouses tour ACOR.
Jan. 19. Steve Fiskeworth comes by to discuss shipping his
study materials to Arizona State. After he leaves, Kathy
comments in disbelief, “He’s shipping 20,000 kilos of old
rocks and old dirt!!!”
Jan. 25. The ship with the shelter for the Petra Church on
it has declined at Aquaba.
Jan. 26. H.R.H. Prince Talal bin Mohammad and his
wife, H.R.H. Princess Ghida, visit ACOR.
Feb. 1. I go off on a rainy Friday morning to give a tour of
Madaba and Mount Nebo to FBI Director Louis Freeh.
Feb. 22. Richard Dockery from Starrett arrives to
assemble the shelter for the Petra Church.
Feb. 23. Almost six weeks after the publication
project began, the manuscript for The Great
Temple of Amman: The Excavations is ready to
print. It is due to Anith Koutsoukou’s persis-
tence that it is finished.
Feb. 25. Richard Dockery leaves for Petra at the
crack of dawn. A bit later, while it is
snowing, Patricia and Virginia Egan leave to
begin their season at the Edge Church.
On arrival at Petra, we find that the container
with the shelter in it has not arrived from
Aquaba. There is a lot of to-ing and fro-ing but,
late in the afternoon, it arrives and we begin
unloading. Patricia discovers at 4:30 PM that a certain
Dr. Bikai is scheduled to give a lecture at the Petra Forum
at 6 PM to a large tour group (it was on the ACOR
calendar for April 25). Never mind—while one Dr. Bikai
unloads tons of aluminum from a 40-foot container, the
other Dr. Bikai carries on with the lecture—it was quite a
day.
Feb. 26. Meanwhile at ACOR a very nice letter from H.M. Queen Noor arrives thanking everyone for the
preliminary report on Papyrus Petra H.M. King Hussein
and H.M. Queen Noor. She describes the document as “a
marvelous piece of our heritage.”
March 20. Don Keller becomes U.S. assistant director.
April 21. The new Minister of Tourism and Antiquities,
H.E. Akel Bikai, comes by for a visit.
April 23. There is rejoicing as librarian Hamy Ayyoubi’s
brother-in-law is released from the Japanese Embassy
in Petra. Hune’s sister was released the first evening.
May 14. Late in the evening the Aquaba/Ayla team comes in. The season begins.
May 18. After Dan Cantor does all the paperwork, Bob
and I sign the certification that ACOR has raised
$305,087.43 of the $400,000 needed for the NEH Chal-
lenge. This certification entitles ACOR to $101,027.14 in
NEH matching funds. Thank you all.
May 22. Prime Minister Salam Mahajali and Mrs.
Mahajli, the Minister of Tourism and Antiquities, Akel
Bikai, and the Director of Antiquities, Dr. Ghazi Bisho,
visit the Petra Church.
June 2. In the evening there is a reception to bid farwell to
Dan and Nancy Gambrer who are moving to Belgium.
June 10. A wonderful day with the following events: 8
AM: Executive Committee meeting, 10 AM: Board of
Trustees meeting, 6:30 PM: Signing of the $900,000 en-
dowment grant from USAID to ACOR (photo below);
income from the endowment will be expended at Petra.
July 9 PM: A party.
June 25. Patricia and I depart for Istanbul for a meeting of
the directors of the member schools of the Council of
American Overseas Research Centers (ACOR).

Patricia and Pierre Bikai, Chairman of the ACOR Board Artemis A.W.
Joukowsky; Grant Officer Celeste Fulgham; U.S. Ambassador Welsey Egan;
USAID/ Ammon Director Lewis Luckey; and Project Officer Alonso Fulgham

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Trustees Meet in Amman

On June 10, 1997, the ACOR Board of Trustees met at ACOR. The meeting was preceded by a trip to Syria by many of the trustees and their families. At the meeting itself, the focus was on the $900,000 endowment granted by the United States Agency for International Development (USAID). The income from the endowment will initially be used for continuing work at the World Heritage site of Petra, but after five years can be used in other ACOR program areas.

President Artemis Joukowsky congratulated everyone on how well the endowment campaign was going. Three new trustees were elected: Dr. Øystein Løhntun of Andrews University, who is associated with the Madaba Plains Project; Dr. John P. Oleson of the U. of Victoria in British Columbia, director of the excavation at Hu-meir; and Dr. Gianni Palumbo who was ACOR’s Cultural Resources Management Archaeologist and is now with the Getty Conservation Institute in California.

ACOR Trustees

Class of 1998: Mr. Artemis A.W. Joukowsky (President); H.H. Prince Bel‘ad bin Zeid (First Vice President); Dr. Lawrence J. Contini (Second Vice President); Dr. J. Carl Brown; Mr. Henry Christensen III; Mr. Nicholas Clapp; Dr. Michel Marto; and Dr. Bert de Vries

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Ex-Officio: Dr. Pierre M. Bikai, ACOR Director and Dr. Joe Seger, ACOR President.

ACOR and its Newsletter

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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 by Chrysanthos Kanellopoulos. The architecture of the temple that was excavated, and partially restored by ACOR, 880 pages, $175.

The Jordan Antiquities Database and Information System: A Survey of the Data, edited by Gaetano Palumbo. Basic information on nearly 9,000 archaeological sites from all periods, plus 117 maps. The 432-page hard-bound volume was xerographically reproduced, $40.


All prices include shipping.


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