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## IN MEMORIAM

- NABIL AL-QADI
- MOHAMMAD HATAMLEH
- MAHMOUD EL-NAJJAR
- NASRI ATALLA
- FATHER MICHIELE PICCIRILLO
- PHIILIP HAMMOND
- MANFRED LINDNER
- JOHNNY DEMIEULEMEESTER


## NOTES FOR CONTRIBUTORS

The Annual of the Department of Antiquities of Jordan is devoted primarily to studies of the cultural heritage of Jordan and the neighbouring regions, including the reports and results of archaeological fieldwork. The deadline for submission of contributions is 31 May for publication in the volume of the same year.

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1997 Ba'ja: A LPPNB Regional Center Hidden in the Mountains North of Petra, Southern Jordan.
Results from the 1997 Investigations. Pp. 221-262 in H.G.K. Gebel, Z. kafafi and G.O. Rollefson (eds.), The Prehistory of Jordan II. Perspectives from 1997. Berlin: ex oriente.
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## IN MEMORIAM FATHER MICHELE PICCIRILLO - A TRIBUTE

Father Michele Piccirillo sadly passed away on the 26th of October, after spending many years of his life as a priest, a scholar and a friend to Jordan. Born in Casanova di Carinloa, Italy, yet Father Michele spent much of his life at Mount Nebo in Mādabā, where he was known as Abuna Michele.

A Father of the Franciscan Custody of the Holy Land, he had a true passion for archaeology, excavating numerous Christian religious remains in Jordan and Palestine. As director of the Archaeological Mission of the Studium Biblicum Franciscanum in Jordan, he collaborated with counterpart institutions, particularly the Ministry of Tourism and Antiquities.

He was not only instrumental in uncovering significant Christian remains, like the ones at Umm ar-Raṣās, but also advocated the necessity of their preservation for generations to come. He interpreted mosaic images like few others would, which made him an expert and a reference on Jordanian mosaics.

His impact in Jordan in general and in Madaba in particular, can be greatly felt, especially by those who studied and worked with him. He was one of the founders of the Madaba Mosaic School, and later assisted and promoted its upgrading to become the Madaba Institute for Mosaic Art and Restoration, which he served on its
board of trustees.
His contributions were not only confined to Jordan, but extended to the region. As a professor in the Faculty of Biblical Science and Archeology in the Studium Biblicum Franciscanum of Jerusalem, he transferred his knowledge and experience to numerous students.

With great sincerity, he promoted the archaeological heritage of Jordan. As a true scholar, he was fascinating in his accounts of art, archaeology and history. One of his most prominent publications is "The Mosaics of Jordan", published in 1993, which presents a rich variety of mosaic remains of the Byzantine and early Islamic periods in the country.

Father Michele was also an example of humbleness, generosity, and a true compassionate for all that he represented. True to his ideals, he advocated tolerance and coexistence as a means for achieving peace in the region.

Father Michele was laid to rest on the first of November, at Mount Nebo, a place he loved and cherished.

He will be greatly missed by all of us at the Ministry of Tourism and Antiquities of Jordan.

May God bless his soul.
Maha Khatib
The Minister of Tourism and Antiquities

# IN MEMORIAM NASRI FOUAD ATALLA (1934-2007) 

Barbara A. Porter



Nasri Atalla had a long career promoting the interests of Jordan and held important positions in the Ministry of Tourism and Antiquities. In 1976 he became the Director of Development and Planning for the Ministry and from 19851995 he served as the Secretary General. During those years, he ensured that many essential projects were initiated. He was also a proponent of exhibiting Jordan's archaeological treasurers abroad as exemplified by several very successful museum exhibits documented by excellent catalogues, namely in France (1986-87), Germany (1987-89) and England (1991).

Within Jordan, he presided over the restoration of many significant sites. Some of the projects were realized through assistance from the United States Agency for International Development (USAID) and the American Center of Oriental Research in 'Amman (ACOR). These projects include the rest houses at Pella and Umm Qays; the restoration of the Great Temple on the 'Am-
man Citadel; Islamic ‘Aqaba (Ayla); the Madaba Archaeological Park; and the Petra Church Project begun in 1992. His foresight in enlisting the necessary financial and technical support should be noted as well as his devotion to the natural beauty of Jordan. He made great efforts to protect such sites as Wādī Ramm, Mt. Nebo, and Mukāwir. Nasri Atalla felt strongly about careful development of tourism in Jordan and the fact that the private sector had to be encouraged to play roles in preservation and promotion.

His personal background prepared him well for his career. He was born in Haifa. His family moved to Lebanon in 1948 and later to Jordan. He went to the United States for his undergraduate studies and received his BA from Georgetown University in the Foreign Service School (1961). In his college graduation year, he joined the Jordanian Diplomatic Corps and served from 1961 to 1968 in the Jordanian Embassy in Washington as the Press Attaché.

When he returned to 'Amman, Atalla served as the Assistant Chief of Royal Protocol at the Royal Palace from 1968 to 1970. This led to his becoming the Personal Secretary to HM King Hussein from 1970 to 1976. During that time he also managed to pursue graduate work at Harvard and the Massachusetts Institute of Technology. He again studied at Harvard at the Business School in 1976.

He received many awards in his lifetime and was honored to receive from HM King Hussein the Medals of Independence: Third Degree (1965); Second Degree (1989) and First Degree (1994) as well as ones from foreign governments (Austria, France, Italy, Spain, and Morocco) that recognized his endeavors to support and promote culture. Nasri Atalla - often called Tony - had a wide circle of devoted friends, who miss his
sophisticated humor and generous hospitality. He is also survived by his sister Maroussia, his wife Barbara, and his children - Fouad, An-
drea, and Lara - as well as four grandchildren. Barbara A. Porter
Director, ACOR, Amman

## IN MEMORIAM MANFRED LINDNER (1918-2006)



A sincere friend of Jordan and a tireless explorer of Greater Petra area, Dr. Dr. Manfred Lindner left this world on October 30, 2006, at the age of 84 years. The delay to honour his memory was due to the time necessary to gather exact information on his rich C.V., on his huge bibliography and finally to obtain some photographs on his main activities in Jordan. It was finally thanks to Elizabeth Schreyer, his active assistant and his faithful companion is his exhausting expeditions that $A D A J$ was able to include his life full of events, and a selection of his bibliography (infra).

Manfred Lindner was born on July 22nd, 1918 in Nürnberg. He studied medicine and psychology and obtained a doctorate in both fields, hence his double title of Dr. In his home Nürnberg, Bavaria, Germany, he settled and worked as a neurologist. Very soon, he developed an interest in the Prehistory and Archaeology of his own country. He joined the Society "Nature and History" in German "Naturhistorischen Gesell-
schaft, Nürnberg". This organization, as it was defined in its regulations "is traditionally open not only to the history of Nature, but also to the history of human culture, with a sound background in settlement archaeology. In this objective, the journal of the Society bears the title: "Nature und Mensch": Nature and Man.

Dr. Dr. Lindner was appointed chairman of this Society in 1967, and traveled to many countries in the Middle East, in Africa, including Egypt, in Asia and in the Americas. But his main concern through the years remained for Petra and the Nabataeans.

His first visit to the Rock-City was in 1963, as a tourist. As it was expressed by his near friends, he was 'thunderstruck' by the natural beauty of this desert caravan-city, and organized almost annual expeditions with his friends to explore the antiquities of Petra and its most remote environs. He was granted in 1973 a license by the Department of Antiquities of Jordan to start excavations in Petra. This same year he met with Fawzi Zayadine who had completed his doctorate at Sorbonne, Paris with a dissertation on the "Rock Architecture of Petra of Oriental Origin". They traveled from 'Amman by the Kings' Highway and stopped at the little village of Sela‘, south of at-Țafilah. Dr. Lindner was met with hostile reception because of unauthorized photos. But the problem was settled very soon and he was finally welcomed by the local people.

At the suggestion of F. Zayadine, the first excavations to be financed by the Society Nature and Man were started on April 1973, on the eastern slope of Jabal al-Khubtha, opposite the small theatre of Petra, on the way to the Urn Tomb, and in the Tomb 813 in the same area.

The reasons for this choice was that the rock
of al－Khubtha was carved with the most famous facades，such as the Palace and Urn Tombs，the Sextius Florentinus tomb but especially with Tomb 813，which was identified as the tomb of ＇Uneishu，minister of Shaqilat II，who assumed the regency of the Nabataean Kingdom，during the minority of her son Rabel II in 70－76AD．

The excavations proved to confirm that tomb 813 belonged to a dignitary of Petra，since a Na－ bataean inscription was found with the name Shaqilat and Nabatu（Zayadine，in Lindner，1986： 299－237）．In the same area，a shaft tomb was excavated by Muhammed Mrshed and yielded pottery objects and coins from the first century BC－AD，under a house（eod．loc．251－53）．The ex－ cellent results of this first campaign enticed Dr． Lindner and his team to continue their research－ es in remote and somehow inaccessible area of Greater Petra（Wādī Ṣabrā，2H30 walk south of Petra）．This important caravan halt which was famous for the small theatre at the foot of Jabal al－Jathūm was visited in 1828 by the French ex－ plorers Laborde and Linant who published the first ground sketch plan of the site（Lindner 1986： 137－169 and 142，fig． 4 and 152，fig．7）．

In this same expedition，Jabal al－Jathūm was explored and a genuine water system was discov－ ered，photographed and planned by Dr．Lindner and his companions，at the expense of dangerous climbing（1986：146－158）．The sounding and the good photographs of architectural blocks stirred new interests in so－far neglected site．In fact，the work in this isolated station was not without real dangers：During the campaign of 1984，for in－ stance，a furious windstorm threatened the camp and brought with it scorpions in the tents．The present writer was bitten by a scorpion in the dark midnight．Without hesitation，Dr．Lindner harried with a torch and immediately sucked the poison．This prompt decision saved trouble to a member of the team in a completely isolated area．

The concern of Dr．Lindner in the archae－ ology of greater Petra led his to more exciting discoveries at as－Sādah and $\mathrm{Ba}^{\text {‘j }}$ a：in those two remote areas，the representative of the Depart－ ment of Antiquities was Suleiman Al－Farajat， the present day director of the Petra National Park．A team including Dr．＇Adnan Al－Hadidi， a former Director of Department of Antiqui－ ties，Inyazi Al－Shab＇an and Fawzi Zayadine
was escorted by Major Ma‘rouf Al－Bakhit，the personal attaché to HRH Prince Al－Hassan who became later the Prime Minister of Jordan．The expedition reached as－Sādah after 4 hours of difficult walk．Although we were equipped with ropes and helped with a experienced mountain－ eer from Austria，the climbing of as－Sādah was most painful．Nevertheless the summit of the hill was reached and an extensive zone was uncov－ ered，with ruins going back to the Prehistoric， Edomite and Nabataean periods．Dr．Lindner ar－ rived later on as－Sādah，with Dakhil－Allah Qa－ balan，a well－known Bedoul guide，with a camel and three donkeys to carry the tents and equip－ ments（Lindner et al．1988：75－90）．

The extensive ruins of as－Sādah－Umm al－ ＇Ulā proved to be of the EBI－II periods（3200－ 2750BC）；one complete EBI jar was discovered by Elisabeth Schreyer．The team discovered also Iron II Edomite Pottery（7th－6th BC），similar to that of Umm al－Biyāra，south of Petra together with important collections of Nabataean sherds of the 1st Century BC－AD．As－Sādah appeared as a microcosm of the Greater Petra settled ar－ eas．It is indeed regrettable that this outstanding site was not the field of more technical research by specialized archaeologists．The site of $\mathrm{Ba}^{‘}{ }^{\mathrm{j}} \mathrm{a}$ ， north of Petra was more lucky in this respect．

It can be reached by Siq Umm al－Hiran， north of Siq al－Bārid and Bayḍa．This eagle nest included three antiquities sites，I－III．It was con－ fessed by Dr．Lindner that without the help of the Bedouins，ascent and descent were more diffi－ cult（1987：389）．In reality，it was thanks to Aus－ trian mountaineers that it was possible to reach the summit of this inaccessible rock．Suleiman Farajat participated to this dangerous expedition （Lindner and Farajat 1987：175－185）．

The climb started from a ruined house， $\mathrm{Ba}{ }^{`} \mathrm{ja}$ I to reach by a tortuous and perilous path $\mathrm{Ba}{ }^{〔} \mathrm{ja}$ III，at the summit of the rock．In between， $\mathrm{Ba}^{〔} \mathrm{ja}$ II was an outstanding PPNA site，surveyed by Gebel，H．G．（1986：121－126）．Several basalt grinding stones were collected（1986：figs．17－ 18）．But the most surprising discovery was the presence of an Edomite village of the Iron II pe－ riod；it was first believed that $\mathrm{Ba}^{\text {＇}} \mathrm{ja}$ was only a refuge rock in case of danger．But when several cisterns were discovered，with a ruined village and a natural garden with well preserved natu－ ral wild flora，it became certain that $\mathrm{Ba}^{〔} \mathrm{ja}$ was
an unexpected Edomite residential zone, which would remain unknown without the adventurous expedition of Dr. Lindner.

It is not easy to express a general review of Dr. Lindner achievements: yet, we have to recognize that he was not a specialist of Semitic languages. But he was able to gather around him good specialists in every field and to give to everyone the opportunity to write in his own field. Gebel, H.G. for instance, presented a synthesis of the possible future research in the Prehistoric periods in the Greater Petra area with excellent conclusions on the Natufian in the 8th mill. BC to the Neolithic PPNB in the 6th mill. BC (Lindner 1986: 273-308)

The Islamic periods were not neglected: he published articles on the Islamic villages around Petra, such as Bayḍa where he identified the site of Hurmuz of the Crusader periods, later confirmed by the discoveries of Patricia Bikai.

Fawzi Zayadine<br>Suleiman Al-Farajat

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## PHILIP C. HAMMOND - IN MEMORIAM "THE LION OF PETRA"

Philip C. Hammond, professor of archaeology and pioneer excavator of the Nabatean capital city of Petra, devoted some fifty years of his life to archaeological research, excavation, and restoration in the Hashemite Kingdom of Jordan. His death on February 24, 2008 marked a significant loss for the community of archaeologists, researchers, and intellectuals who love Jordan, and who commit their time and talents to press ahead in the knowledge and appreciation of that remarkable part of the Near East. Philip is survived by his wife of 15 years, Lin Hammond, to whom he was married on December 5, 1992, and who was his companion in exploration and excavation at Petra.

Born in Brooklyn, New York, on May 5, 1924, Philip Hammond was raised and educated in the New York area. As a young man he served in the U.S. Army in the European theater during World War II, participating in the allied invasion at Normandy at age 20, and earning the Bronze Star. After the war, Philip began his university studies at New Jersey's well known and idyllic "college in the woods", graduating in 1948 with a B.A. from Brothers College and in 1951 with a B.D. from Drew Theological Seminary - both schools are now part of Drew University in Madison, New Jersey. He immediately began advanced work at the Graduate School at Yale University in New Haven, Connecticut, and earned his M.A. in Semitics in 1953. Philip spent 1954 and 1955 studying at the American School of Oriental Research in Jerusalem (now known as the W. F. Albright Institute of Archaeological Research). During that time he also excavated with Kathleen Kenyon at Jericho (Tall asSultan), supervising work in the famous north trench, and assembling a colorful collection of anecdotes about the famous Dame Kenyon.

Upon returning to the United States, Philip completed his doctoral work with a dissertation entitled A Study of Nabatean Ceramics, earning his Ph.D. in archaeology from Yale in 1957.

Philip's university teaching career began at LycomingCollegein Williamsport,Pennsylvania, as assistant professor of religion from 1957 to 1960. Throughout his career he taught courses in archaeology, anthropology, history, and biblical and religious studies, in addition to the many scholarly articles, archaeological reports, and other professional publications he produced. From Lycoming he moved on to the Princeton Theological Seminary in Princeton, New Jersey, as assistant professor of Old Testament from 1960 to 1966 . He then accepted a position at Brandies University in Waltham, Massachusetts, where he was associate professor of Mediterranean archaeology from 1966 to 1969. He finally found his home in Salt Lake City at the University of Utah, where he taught for twenty five years, from 1969 to 1994, as professor of anthropology (earning status as a full professor in 1974). After retirement from Utah in 1994, Philip and his wife Lin moved to Fountain Hills, Arizona, where he remained active in academics as adjunct professor of archaeology at Arizona State University in nearby Tempe. He remained an emeritus professor of anthropology at Utah, assisting his remaining graduate students in their degree pursuits. Philip graduated numerous M.A. and $\mathrm{Ph} . \mathrm{D}$. students, some of whom followed his footsteps as archaeologists working at significant sites in Jordan and neighboring countries.

Philip's career directing archaeological expeditions in Jordan began in 1959 at Petra, when he joined with co-director Peter J. Parr of the British School of Archaeology in Jerusalem in the first ever excavation of ancient private

Nabatean homes in Petra. Building upon that experience, Philip organized the American Expedition to Petra (AEP), and became its director. In 1961-62 Philip and the AEP took on a very ambitious project-the excavation of ancient Petra's theater. Carved into the solid hillside of the outer Siq during the first century AD , the ancient Nabatean Theater featured 45 rows of seating and had a capacity to accommodate over five thousand people. Every visitor to Petra today passes by that magnificent theater, but its excavation by the AEP was just the beginning of Hammond's legacy to the people and culture of Jordan. After 1962, however, Petra would be put on hold for an over decade while Philip worked elsewhere in the kingdom.

Philip's interest in excavating an ancient biblical site was a natural product of his position as assistant professor of Old Testament at Princeton Theological Seminary. Like many archaeologists of his era, who taught both archaeology and biblical studies at institutes of religion, the effort to better understand the intersection of archaeological research and the study of the biblical texts motivated Philip to undertake an expedition in the West Bank area of Palestine, which was part of the Kingdom of Jordan at that time. Only one major biblical site in Jordanian territory remained unexplored, the site of ancient Hebron. Philip organized and directed the American Expedition to Hebron (AEH) which surveyed and excavated the site of biblical Hebron (Tell er-Rumeide) from 1963 to 1966. Hebron was a difficult site in terms of logistics, being located at the end of the road that led south from Jerusalem along the cis-Jordanian mountain ridge, just at the edge of the 1949 armistice line with Israel. Travel, supplies, staff, and relations with the local population were just a few of the challenges. But Hammond worked out those issues during his 1963 survey season, and was able to conduct three successful summer seasons of excavation in 1964, 1965, and 1966. The planned 1967 season was pre-empted by the June war with Israel that year, which saw the West Bank area come under Israeli control. During Hammond's three dig seasons he opened seven areas at Tell er-Rumeide, and exposed numerous significant details of ancient Hebron's history and material culture. Utilizing skills he had developed while excavating with Kenyon
at Jericho, Hammond devised an intricate system for discerning and recording Hebron's complicated stratigraphy, revealing occupation levels from Early Bronze Age I and III, Middle Bronze Age II, Late Bronze Age I and II, Iron Age I and II, and the Hellenistic, Roman, and Byzantine periods.

Although he had hoped to return to Hebron in the post-1967 period, when Philip realized that the West Bank would not be returning to Jordanian control any time soon, he returned to his focus on Petra. He revived the American Expedition to Petra in 1973 with a project that would occupy the rest of his life - the excavation and restoration of the Temple of the Winged Lions. Other projects at Petra were undertaken as well at the same time. From 1974 to 1977 the AEP excavated a series of Nabatean private houses on the northeast slope of Wadi Musa. And winter seasons of excavation in 1981 and 1982 at Tall ash-Shuqayfiya in Egypt were also part of Philip's legacy. But summer after summer, for twenty five excavation seasons over a span of thirty years, Philip returned to Petra with his AEP staff of experts and student volunteers to uncover and restore ever more of the Temple of the Winged Lions, making it one of the significant archaeological attractions for the increasing thousands of annual visitors to Petra, as well as perhaps the most intricately and scientifically excavated site at the Nabatean capital from the mid 1970s until the mid 1990s. In addition to the restoration of the temple itself, the AEP unearthed numerous artifacts, some of which were important enough to become quite famous, such as the sandstone "Eye Idol," a large, rectangular, inscribed deity figurine with prominent eyes, eyebrows, nose, and lips. The "Winged Lions" name given to the temple by Philip was based on the remarkable feline decorated capitals he recovered in the edifice. The temple itself is thought to have been dedicated to the goddess Allat, but it is often referred to as the temple of al-'Uzza. The complex consisted of the temple's main worship hall, residential areas, and workshops, such as the marble workshop, the oil workshop, the metal workshop, the painter's workshop, and even a souvenir workshop. The temple was apparently erected in AD 28, during the reign of the Nabatean king Aretas IV, and the whole complex was destroyed by the earthquake
of AD 363. Publications on AEP finds at Petra were prepared at regular intervals, appearing in a wide variety of journals and periodicals, and are, as a result of the expansion of the internet, widely available. Most notable of these include Philip's 1996 scientific summary report, The Temple of the Winged Lions, and his reports in the Annual of the Department of Antiquities of Jordan (ADAJ), specifically ADAJ 32 (1988), ADAJ 38 (1994), and ADAJ 42 (1998), all on the temple, as well as $A D A J$ 8-9 (1964) on the theater.

In a way, the "Winged Lions" image defined Philip Hammond himself, who could be aptly described as the "Lion of Petra". Philip himself became somewhat of iconic image over the years. In some ways a remnant of "old school" archaeology, he developed new and modern techniques for excavation that affected the way that not only he himself excavated, but also his colleagues who came to Petra to uncover other major features. His AEP dig headquarters at Nazzal's Camp became a hub of intellectual and social activity each season over the decades that Philipexcavated at the temple.Andhis expedition staff were readily recognizable in their military style khaki shirts with embroidered AEP insignia. Hammond outfitted his staff at AEP, and earlier at AEH, in uniform garb reminiscent of the old Jordan Legion, and he himself often accessorized his own uniform with a flowing red and white checkered Jordanian Kufiyyah. His flamboyant, colorful style and swashbuckling attitude were trademarks of his approach to archaeology, which he regarded not only as scientific research, but also as the adventure of a lifetime. For him, archaeology was not just a profession, it was a passion. Philip was also the quintessential lover of Jordan and things Jordanian. He was hosted on several occasions by His Majesty the Late King Hussein, and enjoyed a personal friendship
with the Jordanian royal family. At the time of his passing, efforts were underway to grant him a Jordanian passport, a tribute to his lifetime of service and love for the country.

On a personal note, and as one of Philip's many students and Ph.D. graduates who have gone on to a career in archaeology and teaching, I am honored by the invitation to prepare this modest memoriam and necrology, which in no way can really honor Philip C. Hammond in the manner he deserves. I am just one of many with whom Philip worked and joked, just one of many students with whom he has graciously shared his talents, his research, his material, and even his excavation projects, allowing us to develop, expand, publish, and grow into our own as archaeologists. In my own case, Philip opened his lab, his office, his files, and even his own treasury of memories to allow me total and complete access to all of his material from the AEH excavations at Hebron, and he seemed always more than happy to do so. I know from personal experience that he has done the same for others of my colleagues who have worked with him at Petra or who have otherwise worked with his AEP materials. He was genuine and generous to the end. I express both gratitude and satisfaction at having known him, having learned from him, and having been treated so very generously by him, as I know do my colleagues who were likewise his students and fellow archaeologists. This is dedicated to you, Philip, and to your lovely and generous wife Lin, from all of us. Farewell and rest well, Lion of Petra.

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# THE "TEMPLE OF THE SERPENTS" <br> A SANCTUARY IN THE EARLY BRONZE AGE 1 IN THE VILLAGE OF JABAL AL-MUTTAWWAQ (JORDAN) 

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## Introduction

In an earlier publication (Fernández-Tresguerres 2005) some aspects of the domestic architecture of Jabal al-Muṭawwaq were discussed, especially regarding its uniformity. The fact that the structures which are described in the following do not conform to this expectation would seem to indicate that it was not used as a family dwelling. The complex is made up of three dwellings ( 75,76 and 77 ) and a large patio that has a series of rooms built within it. Given that pottery was found inside them which had
been decorated with serpents, it has been called the "Temple of the Serpents". This site was excavated in the campaigns of 2003 to 2006 (Fig. 1)

## The Main Building: Dwelling 76

Before excavation began only the top line of the bricks of the walls of the dwelling could be seen, it has the same features as all of the rooms that have been observed in the village: an oval longhouse, facing northeast-southeast, 12.67 m long and 3.30 m wide (reaching 3.85 at some


1. General plan of the "Temple of the Serpents".
points). It goes against logic to build a room on a steep incline, and it would seem that this was done deliberately to preserve the two meters difference in surface level between the two ends of the upper house.

## Construction

The building was constructed on the limestone itself. The walls were built out of large natural stones without using any type of mortar. The surviving walls show that it was built with blocks placed in irregular rows. In the rest of the building the walls have collapsed, falling both inside and outside of the structure, and only the base of the walls is still visible. The surviving elements and the size of the blocks appear to suggest that the wall would have been approximately two meters in height (Fig. 2).

The head of the building's apse, which faces east, is surprising as both the curved wall that closes it and the floor were cut out of the same limestone rock at some 0.54 m in depth. This created an irregular platform and it forms a crudely vertical wall which defines the apse end of the house. In addition, blocks of stone were placed on it that define the perimeter of the building (Fig. 3).

With the exception of the aforementioned head, the builders did not attempt to do anything about the steep incline of the rock. Instead it was kept, as the irregular incline made it easier to move upwards along the house from the lower platform to the upper one. However, with regards to the high vertical steps of the patio, it would seem that they were levelled out inside the house to leave a crude inclined plane.

2. General view of the east of dwelling 76.

3. Dwelling 76, cavity and altar.

The fact that dwelling 76 has two doors is also unusual; there is one on each of its long sides, and they do not face each other. One of them opens onto a patio and the other onto a space that is related to dwelling 77. Neither of them were built according to the plans that are defined and documented in some of the dwellings of alMutawwaq, as for example, in $\mathrm{n}^{\mathrm{o}} 20$. In dwelling 76 the doors are simply an interruption in the wall, using a series of slabs, which are more or less flat, to form the threshold. The size of the doors is different from the information obtained in other buildings in al-Muṭawwaq (normally around 0.75 m in width): one of them is 1.90 m in width and the other is 1.25 m in length. The eastern door is marked inside the dwelling by three blocks which are perpendicular to the wall. Various flint utensils were found together beside them (scrapers, sickles and a chopper), a bone awl and the remains of a goat or a sheep.

## Structures Built on the Iinside of the Dwelling

In the highest part, a strange structure was built on the artificially created platform and next to the wall cut out of the rock. It was formed by three large flat stones which rested on smaller ones (another one slid towards the inside of the well which is mentioned later). From its position and form it could be a small "altar". It is 1.40 m in length, 0.55 in width and 0.50 in height. Between this structure and the wall there is a hole cut out of the same limestone ( 1.75 m long by 0.55 m wide and 0.50 m deep) next to a shallow cavity in the rock. It was full of clayey sediments and it also contained some sherds, half
a mace-head and flint hammerstone, which had clear signs on one end that it had been used for hitting; they are possibly the same tools which were used to cut the rock and dig the well (Fig. 3).

Another small cavity, this time a natural one, which was perfectly circular (some 0.24 m in diameter and 0.20 m in depth), is found on the edge of this higher platform. It is possible that it was used to hold up a post as support for the roof that might have been there. There are no signs of fire in any part of the surface of the dwelling.

It is important to note the presence of a standing stone next to the wall of the head, lined up with others that faced a large cairn and a small enclosure positioned to the north (Fig. 4)

The positioning of the doors makes it seem that the head, which is perhaps the most important part of the building, is out of place. The visitor would have had to turn at a right angle to head towards the area where the platform

4. Standing stone in the head of dwelling 76.
and the possible altar were found. According to Kempinski (1992: 53-59), this is unusual in temples from this period, where visitors normally found themselves facing the sacred statue from the moment they entered the room through the only door found in the temples (in alMutawwaq there is no evidence of the existence of an image) ${ }^{1}$ In dwelling 76 the positioning of the doors in respect to the axis of the structure corresponds more, according to Kempinski's affirmations, with the end of the Early Bronze Age and it is due to an influence from Mesopotamia. This does not appear to be the case of the "Temple of the Serpents" with regards to chronology or influence.

## The Patio

It is found to the west of the house and occupies a space which is roughly rectangular and is bordered by medium-sized stone blocks. It runs 16.80 m from south to north and 16.15 m east to west. It has a strong incline from east to west, from its door at the highest point to the wall for dwelling $\mathrm{n}^{\circ} 75$ at the lowest point; the difference in level is some 3.30 m (Fig. 5). Towards the middle of the patio the step that suddenly breaks up the floor of the large room, which was mentioned earlier, continues. Therefore, the patio is formed by a succession of steps, of vertical walls, which are in part natural, but also regularized in parts through cutting. They reach 0.60 m in height and were used as a means of transit. At some points these steps served as an enclosing wall for the structures built in the patio.

The main entrance to the patio is found on the long side to the northeast. Comparing it to that found in al-Muṭawwaq, it could be said that it is a monumental door. Two large standing stones serve as doorposts and they are aligned with the standing stone outside the head of the house. Both of the blocks that frame the door are nearly 1.50 m in height, and the width of the entrance is slightly greater.

One of the doorframes has fallen onto the threshold which is formed by a step built out of a series of stone blocks which are smaller in

1. No fragments of either human or animal figures have been found among the remains found in al-Muțawwaq (except those of a serpent). However, it is not uncommon to find these types of figures from the Neolithic of 'Ayn Ghazāl to the Chalcolithic of al-Ghassūl and Abū Heāmid, and they were

[^0]
5. Door to the patio and way down towards the rooms.
size. Under this threshold another hole had been excavated, next to another natural cavity in the rock, where the flint hammers used for the excavation were found. This hole measures 1.63 m in length (counting the natural cavity of the rock, 2.30 m ) by 0.93 m at its widest part and 0.60 m in depth.

An interesting fact: adjoining the walls west of the patio and that of room 4 , on the outside of the complex, a small semi-circular structure appeared where human bones had been accumulated. It is possible that they were there due to the sacred nature or the site.

## Dwelling 75

Its floor is more or less rectangular; this irregularity with regards to the typical model of al-Mutawwaq is due to its northeast wall, which it shares with the patio. It is in part formed by a step in the rock on which blocks of stone were placed; it has a height of 1.59 m . The main part of the opposite wall has disappeared.

The house is divided into two separate rooms by a wall made of a row of medium sized stones. The northwest room ( 2.41 m by 3.52 m ) is full of ash which came from a fireplace positioned in
its northern corner.
To the southeast of this room there is another room ( 3.55 m by 3.87 m ) that has a large flagstone as its main feature, measuring 1.1 m by 0.68 m and 0.12 m in thickness. Judging by the tools found nearby, it was used as a table for some type of work; it was resting on small blocks of stone (Fig. 6).

## Rooms Built in the Patio

The earth that covered the rock hid the high steps making the four rooms invisible that were built between the upper step, which cut the patio from southeast to northeast, and the lower one, which served as a wall for dwelling 75. These rooms, which were connected to each other and faced northwest-southeast, are small in size and it is possible that they make up the interior of another smaller sanctuary.

Access is gained through the patio by descending from the main door. It is easy to move on this stairway, although at the lower end the soft incline of the ramp is interrupted suddenly by a step which is 0.60 m high. Some slabs of long prismatic stone make it lower in height, and

6. "Table" in dwelling 75.
convert it into a stairway at the end of which a small landing is found which serves as an access hall to the rooms. These were built with medium sized blocks and they also use the walls of the other structures.

## Room 5

It is the largest of the settlement ( 4.75 m by 3.15 m ). Access is gained from the hall by a door ( 0.97 m wide) facing northeast. The threshold is formed by a small step about 0.20 m in height (Fig. 7). This door had been closed with stones, one of which - a fragment of basalt with a hole in the centre - possibly formed part of the doorjamb. What was possibly the lintel was supported by the same blocks as the wall.

The walls of this room are complex given that two of them, made out of large irregular blocks of stone, are shared with dwelling 75 and with the patio. The rest of the walls were built with smaller stones which were also irregular and were supported by the aforementioned walls. The floor is the same flat regular rock, divided in two by a natural step in the rock.

## Room 4

Positioned southeast of the landing of the stairway which the door opens onto, it is more or less circular in plan. The entrance is formed by a prismatic block that serves as a jamb and, opposite this, the natural step of the rock. The height of the step has been increased by a block of rock being placed on it. The lintel had fallen on a block of flat rock that was used as a threshold.

The room measures 2.64 m by 2.76 m . The

7. Foreground - door to room 5. Background room 2 and the bench.
north wall (shared with the patio) is formed by the step of the rock, which is made higher with blocks of stone. The rest of the wall is curved and it was made with small blocks and the west side is joined to the wall of Room 5.

## Room 2

Here we find a southeast facing door, made of a large prismatic block placed on a base rock which defines the east side of the door, and the west side is defined by the blocks of stone used in the wall. This door gives access to a room which is more or less circular in plan $(2.92 \mathrm{~m}$ by 1.96 m ). The eastern wall, which is made of small blocks of stone, measures 0.89 m in height and 0.40 m in width. The west wall adjoins room 5 , forming a double wall ( 0.55 m in height) built out of medium to large sized blocks.

On its north-eastern side two steps made of rock were used to serve as a bench, one of them as a seat $(1.83 \mathrm{~m}$ in length by 0.55 m in width and 0.48 m in height) and the other as the back. This is completed with blocks of stone that form a corner with the wall that closes the room to the east $(0.61 \mathrm{~m}$ in height). This wall defines the bench by dividing it from the stairway. The base rock, which is completely flat, serves as a floor. A crack full of earth opens to the southeast to northeast (Fig. 8).

On the north side of this room a new door opens which provides access to a more complex space.

## Room 3

Access is gained by a door which has been

8. Room 2. Bench.
built perfectly in line with the model that is characteristic of the settlement: Two jambs and a threshold (three irregular blocks of stone placed directly on the rock floor). One of the jambs (which was partly resting on a light layer of earth, and sitting on another stone that was in direct contact with the rock) is 0.95 m high by 0.51 m wide and 0.24 m thick. The other jamb, placed directly on the rock, is 0.82 m high by 0.43 m wide by 0.38 m thick. The width of the door is approximately 0.93 m . Between the two pillars there is a fallen prismatic block which may have been the lintel, as its dimensions suit the width of the door (Fig. 9).

The ground plan ( 2.56 m wide by 3.47 m long) is oval, and is defined by walls made of medi-um-sized irregular blocks; one of them stands independently of the wall of room 5 and it was built separately from it.

The distribution of the space is more complex than that of the rooms described before as they are divided into two parts with different heights, and with an axis marked by a natural step of 0.58 m in height which is a continuation of the bench in room 2. In the lower section, the ground was covered by beaten earth around 0.25 m thick, which covered the upper part of the stone blocks used to make the threshold.

In the upper part, on the bench, a cist was built, more or less trapezoidal in form $(90.97 \mathrm{~m}$ wide by 0.95 m high), with ten prismatic flagstones which fitted together perfectly and were resting on smaller stones (Fig. 10). Its floor was covered with beaten earth, although the flagstones were placed directly on the base rock. At the bottom of the cist, on the same rock, a flat triangular rock had been placed. There is

9. Entrance to room 3.

10. Room 3. Cist.
an alignment of blocks that goes from the north wall of the structure to the cist.

From the north wall, which is partially rock, a standing stone, which is more or less triangular, ( 0.62 m high by 0.64 m wide and 0.24 m thick) dominates the space over the cist.

## Room 1

This is not really a room, but an access hall to the patio formed by a set of walls next to the north-eastern door (a simple interruption of the wall 1.55 m wide). A stairway of four steps, some of them cut out of the rock and complemented by slabs of stone (in the two instances where it measures more than 0.55 m high), leads up to the upper part of the patio, above the small sanctuary on room 3 .

This small hall ( 4.10 m long by 2.48 m wide) is bordered by the north walls of the patio (of which only a row survives, with a maximum height of 0.90 m ), those of room $3(1.17 \mathrm{~m}$ high) and 5 and that of dwelling 75. The walls have small inconsistencies in construction due to the different sizes of the blocks of stone used, which are bigger in the larger walls (shared with room

3 , with the patio and dwelling 75) and smaller for the wall shared with room 5 .

The floor of the room is the same base rock and it is fairly irregular and cracked. It is covered with a layer of brownish red clayey earth of between 0.15 m and 0.25 m in thickness; it only contained a few sherds that came from the hillside. Some of the cracks in the rocks were filled with earth and angular limestone pebbles in order to solve the problem.

## Dwelling 77

It is perhaps the most notable structure on the settlement of the sanctuary. Although on the outside, it is only 1.92 m from the southeast door of dwelling 75. It measures 8.50 m in length by 3.30 in width at the head, while in the centre it is 3.50 m wide, and at the other end 3.20 m wide.

The first surprising thing is its plan (Fig. 11). All of the dwellings of al-Mutawwaq that have been discovered to date belong to the characteristic "longhouse" with the double apse typical of the early Bronze Age. However, dwelling 77 was built according to a scheme close to the plan of an apse, which is unusual for the tradition of curvilinear houses of the period. The head forms an irregular arch, while the opposite side is straight. Another outstanding feature of this house, unusual in al-Muṭawwaq, is that the inte-

11. General view of dwelling 77. Foreground rectangular. room with stairs. Background: you can see the platforms.
rior is clearly divided into two rooms.
As usual the stratigraphy is very simple. After the settlement was abandoned and the walls fell down the dwellings were filled with the earth accumulated by erosion. Over this mixture of stone and earth another vegetable layer is formed which, in general, is very thin. Dwelling 77 is no exception and its stratigraphy repeats this pattern: a thin layer $(8 \mathrm{~cm}$ to 10 cm in thickness) of dark grey soil with a large number of bulbs. Underneath there is a layer of brownishred clay, of an irregular thickness, with a large number of stone blocks of different sizes, especially on the eastern side of the dwelling, where the rubble from the fallen wall accumulated.

A paved area is found under this layer (partially preserved and damaged by a wall that fell on it), it was found in part of the dwelling covered by a thin layer of brownish-red earth. Under this a horizontal rock floor can be seen, broken in blocks of prismatic stone, similar to those that were used to make the doors. The eastern wall is formed by a vertical rupture in the incline, upon which a wall of medium-sized blocks was built. The opposite wall, facing the valley of the Zarqā’ River, was built with aligned mediumsized blocks (bigger and more irregular than those that close off the ends of the dwelling). Only a row of stones has survived.

There are two clearly defined spaces. The first, a room with a long, narrow rectangular floor plan ( 1.50 m wide by 3 m long), occupies the whole area opposite the head of the house. The southeast edge is defined by the remains of a wall, 0.34 m in height, made of prismatic blocks, which were not smoothed down, aligned and placed directly on the rock. It is interrupted at its eastern end and there is an opening of 0.50 m marked by a cone-shaped stone of 0.45 m in height that indicates the access point to the room. Opposite this wall there is another that separates the main room from the building. It is 0.40 m in height and two continuous rows of uncut stone have survived which run from one wall to the other.

The floor of this room is formed by the same base rock which is usually even in this area, but there parts where it is uneven. There is a lower platform ( 1.78 m long and 1.40 m wide) which the stairs down to; these were partially cut out of the rock to make them even. The door opens
on the top step.
Many fragments of pottery were found inside this room which could indicate that it was used as a storeroom.

The second room is larger ( 6.75 m long by 3.50 m wide), and it is the largest and most notable space in the building. The paved floor that rests on a light layer of coloured earth covering the natural rock floor has already been described. The closing wall to the northeast is curved, which indicates an apse type house (Fig. 12).

Its head was determined by a rocky ledge measuring 0.60 m in height, positioned to the northeast of the central room, and included in the building of the dwelling. The ledge is divided by a deep crack, which may have been due to natural causes - such as an earthquake. The southern face seems to have been cut. The hollow between the two fragments of the rock was covered by three long, flat flagstones, which form a platform that dominates the room; its height is partly disguised by the construction on the west side of a second platform that was built on at a lower level ( 0.34 m in height). It is built on a small wall made of two rows of small stones, placed on a loose layer of earth; the inside was filled with aligned medium-sized blocks of stone that serve to support a set of seven flagstone that have been wedged down well, and that form the floor of the second platform. This raised piece represents an element that stands out so much that it again suggests that it was not meant to be used as a family dwelling.

The remains found inside the open hollow in the rock are not easy to interpret: A fragment of a storage jar with a horizontal handle which

12. Dwelling 77. Wall of head and platforms.
curves downwards and decorated with fingerprint impressions, a small bowl with a small lug on the edge, and two regular pebbles, one of limestone and the other of a hard green stone. On the lower platform only the structures described earlier were found.

An access door to the central room was not found, but it is possible, however, that the entrance was made by the stairs that serve as a wall, and by a place that was very close to the southeastern door of dwelling 75 and the platforms. The inconvenience of having to jump 0.60 m in order to get to the room was avoided by placing a step of 0.20 m on top of the natural lower step, made by a slab of flat, long stone $(0.80 \mathrm{~m})$ on top of another of 0.70 m in length and wedged with stones, and so making a rudimentary stairway.

## Pottery

Pottery fragments are abundant in all of the rooms of the sanctuary. Their typological structure and the original decoration are different from the normal forms found in the dwellings of al-Muțawwaq, which, together with the architectural anomalies, raise the suspicion that the meaning and functions of this settlement are different.

Despite the fact that they appear scattered around the different areas of the dwellings, their distribution is possibly determined by their original position (many of the jar fragments were found next to the walls in dwelling 76, and in the area nearest to the "altar"); but without doubt many fragments were shifted later on. The pottery is mediocre to bad in terms of quality: unrefined clay, the temper is thick limestone, made by hand and it has been poorly fired.

The most common type is the large storage jars, with horizontal handles curved downwards, and with frequent basketwork designs on the base. The holemouth jars which were used for food, and are common in al-Mutawwaq dwellings, are scarce in the sanctuary rooms, although they were more frequently found in dwelling 77. In dwelling 76 only five or six fragments were found. However, their decoration is more elaborate and the quality of the clay and the firing is better than that which is usually found in this type of vessel. The abundance of bowls with burnt rims would suggest that they were the characteristic lamps used in this period.

The decorative motifs usually found in vessels in the rooms of the settlement (finger impressions or alignment of cut points) are present, but it is surprising to find two new images in the sanctuary: the tree and the serpent. The quality, originality and the complexity of this decoration are better and very notable in terms of symbolism. ${ }^{2}$

There are at least four different models of the tree. They are painted in red on the vessel, the trunk comes up from a horizontal band of fingerprint impressions and the branches sprout from a central axis. In another case, three lines stem from small horizontal bifid handles and incised points are grouped around. The motif appears to be complex as the entire body of the vessel is surrounded by groups of points forming bands and circles obtained with the same technique. A new variation on this motif appears to be developed in vertical wavy lines incised around a double axis that stems from a small slightly raised handle; two oblique lines arise from two curved strokes that come out of a large spike. Also in dwelling 76, the motif becomes more complex when the two images are combined on the surface of the same vessel: two trees that interweave with two serpents, the trees are large and cover the area between the two handles, coming from large incised zigzag lines that stem from both sides of a deep vertical incision that represents the trunk. In this instance the trees grow from small protuberances positioned on the rope which is horizontal and has fingerprint impressions. The serpents snake towards the neck from the horizontal handles, rising up towards the inside of the vessel, and with their mouths open as if they were about to bite; this one is undoubtedly the most complex and mean-
ingful as it combines both motifs, alternated, on the same jar (Fig. 13).

In this instance, and in that of the rest of the serpents, the technique is more regular; although there are some differences in the representations. There are always wavy bands, moulded and stuck to the walls of the jar, although the characteristic markings on the skin are done differently: incised lines and incised markings, and there is only one case where these markings do not appear. This motif appears in dwelling 76, in room 2 and in dwelling 77. In the latter the serpent's body is inserted in the horizontal design around the base of the neck of the vessel, and another, which is similar, uses the upper part of the body. However there is a difference in the decoration between this motif that uses incised lines with the vertical wavy body of the snake between both, which has incised markings.

Another interesting case in terms of decoration is a jar with a short neck, wide oval body and flat base, with small flattened vertical handles, which was found in room $\mathrm{n}^{\circ} 5$ of the patio: the entire body is marked by 73 very simple oval seal impressions (a central vertical line cut by other horizontal ones) (Fig. 14). Its design is similar to the impressions found in a dwelling in the same settlement of al-Mutawwaq, and repeated in seals found in places in Jordan such as Tall Umm Hammād and Katarat as-Samrā and the Black Desert (Jāwā), and the model reaches regions as far as the Euphrates and the south of Anatolia (Tarso) (Betts 1991).

Finally, a complete jar with a long globular body and a high neck and a vertical handle found in room 1, is decorated on its bottom half with a reticulated motif done in red paint: a sequence of fine vertical lines interweaved with

13. Dwelling 76. Jar with serpent and tree decoration.
2. In Fact, to date, only a small fragment of potter decorated with a serpent has been found in one of the dwellings.

14. Room 5 jar with seals impressions.
other horizontal zigzagged ones, that are developed around another set of simple vertical lines; this motif seems to connect to the representations of trees which were seen earlier in the jar with serpents. The motif is not unusual, in either the Chalcolithic or the Early Bronze Age 1, (for example Jāwā).

## Flint Industry

Although it is not particularly abundant nor is it in the remainder of the rooms in the settlement - pieces which had been worked to perfection were found in Dwellings 76 and 75 and in room 1 , and these are undoubtedly of interest.

Near one of the doors in Dwelling 76, a set of flint tools was found with a bone awl and some goat or sheep remains. The finding was made up of four scrapers worked in tubular flint (three of them were fanned), two sheets of flint with the characteristic lustre which defines them as sickle blades (one of them serrated) and a chopper with indications that it had been used.

The set in dwelling 75, found in the north room along with an alignment of blocks that marked out the division between the two rooms, is made up of four large fan scrapers, all of them well worked in tubular flint (Fig. 15). In the adjoining room, next to the large horizontal stone that forms a type of table, a set was found made up of two endscrapers of the same characteristics, but smaller.

In room 1, along with the jar with the painted decoration, a fan scraper made of tubular flint, similar to those found in Dwelling 75 was discovered. All of these types of scrapers, that are

15. Set of scrapers in dwelling 75.
similar to the Chalcolithic fanned pieces, are uncommon among lithic material found among domestic items in al-Mutawwaq, which in general were shorter and were not as well made.

In the cist in room 3 a sickle blade was found along with a fragment of a round scraper.

Finally, as has already been mentioned, in the holes dug out beside the "altar" of Dwelling 76 and in the opening under the door of the patio, flint hammers, which looked like they had been used, appeared with some flint cores, half of a mace-head and some fragments from basalt grinding tools.

## Bone Utensils

Only one utensil was found in dwelling 76: an awl made out of a long goat's or sheep's bone. This type of utensil is very rare in the settlement of al-Muṭawwaq.

## Animal and Olive Remains

Animal remains in the dwellings of alMuṭawwaq are never abundant, and this settlement is no exception. Sheep's or goat's bones were found, jaw fragments and some molars.

Burnt olive stones were found in nearly all of the structures of the settlement.

## Chronology

The dating of the olive stones found in dwelling 76 gives two sets of C14 dating, which give coherent results. One of the samples gave the date of 5290-5040 BP (Beta-194526); the other 5270-5170 BP (Beta-194527). However, taking into account that it is difficult to mark the endpoint of the Chalcolithic age, on the one hand, and the dates of Abū Hāāid and al-Ghassūl, the discrepancy does not appear to be very big between the final moments of the Ghassulian culture and the occupation of al-Muṭawwaq. Further, if it is confirmed that a settlement found on the side of the mountain at 450 m altitude is older, the occupation of the Bronze Age in this place could have occurred before the moment that the settlement was created.

## Conclusions

On finishing the excavations on this settlement, and taking into account the considerations that have been outlined, it appears that the hypothesis that the space was set aside for a religious end is a reasonable one.

This idea is further supported by the presence of representations like the tree and the snake, which are contrasting symbols of life and fertility or death and resurrection, of the powers of the earth or the air. These icons with their dark meaning - which will be explained more explicitly in later texts - are far from being new in the time that life in al-Mutawwaq was evolving.

Neither of them were abundant in the Early Bronze Age Ia, and they do not exist in the eastern area of Jordan where the mountain of Jāwā is found. Vegetable motifs are very common in the decoration found on pottery or in scenes throughout history prior to the Early Bronze Age across the Near East, and to some extent present in earlier times. The serpent, which is represented in diverse forms, from a simple wavy line to an accentuated naturalism, opened the way for the symbolic universe in the Near East when it first appeared - along with other
symbols - on two slabs engraved in the Preceramic Neolithic Age of Jafr al-Aḥmar: in one it is associated with a design of a vulture and a four-legged animal, and in the other, various serpents associated with other signs (one of which could represent some type of vegetation) (Stordeur 2000). ${ }^{3}$ At the same time we find it again, carved in limestone, and adorning a human head found in the southeast of Anatolia, in Nevalla Cori.

In the Chalcolithic of al-Ghassul, a representation that is very similar to those of alMuṭawwaq decorates some pottery. ${ }^{4}$ But it is from the middle to late Bronze Age onward that trees and serpents become more frequent in pottery. On occasion they are mixed together and are found on what could possibly be worship and funeral objects, both Palestinian and Mesopotamian. With relative frequency they appear in later periods in tombs or religious places, on occasion associated with other animals and beings that are possibly divine in a wide variety of narrative. An example of this is found in late Canaan altar of Taanach from the tenth century BC.

It is evident, as J. Cauvin has indicated on many occasions, that a new mentality, full of new signs and symbols, opens the way in the societies that emerge from the Neolithic age. The appearance of sanctuaries from the VII millennia is a clear expression of the profound transformation that took place in the society, without necessarily implying the existence of a stratified urban society. The sanctuary is, or could be, simply a tie that strengthens social cohesion and allowed, on different levels - from subsistence to the configuration of the group - the continuance of a society in a time and space. In alMutawwaq the presence of religious spaces is not unusual. There are other enclosures that appear to mark sacred places near the "Temple of the Serpents".

It is more problematic to find parallels with this temple. If we ignore the rooms built in the patio, which may have come later, the plan of the "Temple of the Serpents" could have a distant connection with the plan for the sanctuary

[^1]serpent representation can be seen in Levy, 1993. On the murals of al-Ghassūl some serpents can be seen among a cluster of strange figures.
of En Guedi, although the model would have to be adapted to new architectural tendencies and forms. ${ }^{5}$ In the sanctuary near the Dead Sea a large room with a rectangular ground plan opens onto a patio that has another room with the same type of plan adjoined to it, and a clearly marked entrance. In al-Muṭawwaq only dwelling 76 had an oval plan, with another one which was nearly rectangular (dwelling 75) and nearby there is another with an apse ground plan. There is also a door which is nearly monumental, but - and it is nothing strange - the hydraulic installations found in En Guedi are not present. As was indicated earlier, the internal order of En Geudi with the altar opposite the door and controlled from the patio - is not present. Neither are the cultural structures of the interior.

These similarities and differences can be explained both in terms of the cultural continuity as well as cultural interruption that occur between the Chalcolithic and the Early Bronze Age. alMutawwaq does not offer any indication that this type of structure, which could be home to a statue of a divinity, had existed before.

On a hypothetical level we could say - cautiously - that the "Temple of the Serpents" was first formed by dwellings 76, 77 and 75 and by the patio. Perhaps the small buildings on the patio were added at a later point due to the destruction of the main buildings (an earthquake cannot be ruled out). The reasons that can be given for this are not enough to confirm this se-
quence of events. The difference in the size of the blocks used in the structures which are believed to be older (dwellings 76, 77 and 75, the walls and door of the patio) and the most recent (the interior structures of the patio itself). The way that some of the walls of these structures are supported by those of the earlier ones (this can be seen in the northeast wall of room 5 leaning against dwelling 75), would seem to indicate that they came later. However, it is impossible to say with absolute certainty while no differences are found between the fragments of pottery and the way that they are decorated. If it this were to be found, then it would be possible to consider that a sanctuary was substituted by another smaller one.

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# THE EASTERN JAFR JOINT ARCHAEOLOGICAL PROJECT: THE 2001 AND 2006 SURVEYS IN WĀDĪ AS-SAHAB AL-ABYAḌ SOUTHEASTERN JORDAN 

Hamzeh M. Mahasneh and Hans Georg K. Gebel

## Research Frameworks and Survey Goals

In Holocene times, the southern badia desert adaptations could support or destabilize the economic and cultural developments of the favored regions to the west, without which some of their achievements or regressions cannot be understood. Often misunderstood as marginal, unproductive or irrelevant for the major socioeconomic and political trajectories in the favored regions, these "deficit regions" allowed specialized economies the use of their biotic and abiotic resources that stabilized, promoted, or even interfered with developments in the Jordanian Highlands. Providing ores and other minerals, grasslands, long-distance route networks, etc., these vast arid lands could gain importance rapidly whenever needs and techniques occurred for their exploitation in the favored areas. Whenever hitherto "deficit" areas received impulses of growth, either by improvements of climate or hydrological situation ("green desert economies", cf. Gebel and Mahasneh n.d.) or demands which they could satisfy (trade routes, flint, ores, salt, etc.), they may show obvious peaks of occupational activities for certain periods, while some other periods can hardly be traced archaeologically. Certainly we have to expect periods in which the arid and the semiarid regions had little contact, and their societies co-existed without having much interaction.

A mixed hunting/ pastoral economy may have exploited the Greater Jabal at-Tubayk Area from the early 7th millennium calBC: certainly Wādì Jilāt to the north witnessed such an economy at that time (Horwitz et al. 1999); Jabal at-Tubayk may even have served as the summer base for seasonal pastoralists during wetter parts of the millennium. The arid lands' 6th and 5th millennium BC is somewhat difficult: characterized
by the aceramic "Arabian foliate/ slug horizon" stretching from the Omani Peninsula (Gebel 1982; Bergne and Copeland 1976) across the Arabian Peninsula as far west as Kilwa and Wādī 'Araba (e.g. Abū Barqa near Gharandal), these two millennia may represent a rather uniform pastoralism with a highly variable contribution of hunting. For the Mid-Holocene, we expected to be confronted with an occupational complexity in the survey, while we were and are not expecting oasis cultures of the 3rd and 2nd millennium BC in our area.

However, arid lands and their adaptation potentials should never be understood as the mere management of deficits or as a conservative factor in historic development, but rather as slumbering potentials for new interaction spheres. With these basic research ideas in mind, in 2001 we chose the desert territories east of alJafr, south of the Wādī Ḥudruj/ Wādī as-Sahab al-Abyad watershed, and north of the northern extensions of Jabal Tubayk in Saudi Arabia, as a future area of investigation (Fig. 1). With the support of the Department of Antiquities, two short field seasons were carried out in 2001 and 2006 as a joint project between Mu'tah University and ex oriente at Free University of Berlin. The area of the greater Wādi as-Sahab al-Abyad drainage system (also found on maps as Wadi ash-Shahab al-Abyad) was approached in 2001 with several goals: 1) to test the archaeological potential and the logistics of a project devoted to understanding the southern badia desert adaptations in the Holocene periods, 2) to trace the northern extensions of the Kilwa cultures of Jabal at-Tubayq (Rhotert 1938), and 3) to understand the socioeconomic oscillations wet periods caused in the area. Of course, aside from these goals all human and paleontological evidence


1. Location of the Eastern Jafr Joint Archaeological Project survey area. (dot marks Qulbān Banī Murra).
were subjects of record. In 2006, goals concentrated on the understanding of the magnificent Late Chalcolithic/ Early Bronze Age sepulchral site of Qulbān Banī Murra (Gebel and Mahasneh, n.d.).

Compared to the research we have for the Negev (Avner 2002), little had been done in the southern Jordanian badia. Although Rhotert had presented exciting evidence as early as 1938, subsequent researchers showed little interest in the southern badia Neolithic and later desert cultures. The same is true for the outstandingly rich late Chalcolithic/EB occupations, known since early works were carried out at Qulbān Banī Murra (Kirkbride and Harding 1944) and Risqah (Kirkbride 1960, 1969). It was only just as we started our project, that Wasse and Rollef-
son (2005) became engaged in similar questions north of us (Wādi Hudruj); however, L. Quintero and P. Wilke (2002) as well as S. Fujii (e.g., 2004) with their al-Jafr Basin projects had already probed into several aspects of the questions before.

After two seasons ${ }^{1}$, we are able to present the first results and our first thoughts on the research needs of a project in an area like ours. Apart from having the necessary skills for addressing chipped lithic industries in Holocene aceramic contexts, projects only make sense if the team is composed of various disciplines cooperating already in the field: epigraphy (e.g. Fig. 7), geology, geomorphology, pedology, hydrology, and paleontology. The area is also a candidate to search for remains of early man. The special

1. The surveys were made possible by the permit and assistance provided by the Department of Antiquities, 'Amman. It was carried out -including preparations and closing works- from 30th of Sep. to 11th of Oct. in 2001 and from 1-9 Sep., 2006. Co-directors of this joint project are Prof. Dr. Hamzeh M. al-Mahasneh, representing Mu'tah University, Karak, and Dr. Hans Georg K. Gebel, representing ex oriente at Free University of Berlin. While the principal funding of the 2001 survey came from al-Hussein bin Talal University, the 2006 season was financed jointly. The research area can be reached by GPS navigation, or with an experienced lo-
cal al-Howeitat Bedouin from al-Jafr. The Wādī as-Sahab al-Abyad is about $120-130 \mathrm{~km}$ ESE of the al-Jafr; a ride to the area (c. 3 hours) is demanding in terms of vehicles. Careful planning of equipment and water supplies is necessary, and for security reasons a minimum of two $4 x 4$ trucks have to be used, especially in view of tire damage caused by crossing extensive flint surfaces). There is a high risk of scorpion incidents. Work can be carried out only in the early mornings and late afternoons, due to extreme heat. While in 2001 some Bedouin had a tent in the survey area, nobody was in the area in 2006.
character of the landscape requires a lot of experience in deflated land archaeology, or in ḥammād prehistory: many remains are almost invisible heat-fractured stone structures embedded in the surface, often missed by those who follow what is everywhere and easy to identify: thousands of standing/ lying stones ...

## Survey Strategies

For the initial survey in 2001 (Fig. 2, Table 1), a systematic survey following a certain pattern was neglected in favor of getting meaningful insights on the occupational history during a short period. Sites were located by car (visiting promising physiographic settings such as prominent land marks, shelter/cave formations, the lower wadi slopes), which is not difficult for sites with surface structures. After locating them, they were intensively surveyed by means of walking at fixed intervals. It is of particu-
lar interest to mention the area's characteristic feature, that chipped lithic artifacts cover all of the survey area; borders of a site are often difficult to determine; single finds or find spots can be located everywhere. The 2006 site survey at Qulbān Banī Murra focused on making a topographical site map (Gebel and Mahasneh, n.d.), locating on it all surface features, and the selected drawing and photographing of its major monuments.

## Present Physiography, Climate and LandUse

The greater Wādī as-Sahab al-Abyaḍ drainage system covers in Jordan more than 150-200 square km . Its central and lower parts are about $40-50 \mathrm{~km}$ long, and drain into one of the basins (at 770 m a.s.l.) between the northernmost outcrops of Jabal at-Tubayk. Its orientation of drainage is roughly NW- SE, as is also the case

2. Wādī as-Sahab al-Abyaḍ: Part of survey area of 2001 with site locations.

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Table 1. List of major sites located in the 2001 survey, with preliminary information (only Wādī as-Sahab al-Abyaḍ).

| Site Name | Coordinates | Height <br> a.s.l. | Short Description of Site \& Setting | Surface Finds |  <br> linterpretation <br> (preliminary) |
| :--- | :--- | :--- | :--- | :--- | :--- |


| W. as-Sahab alAbyad 38 | 37 R 0336780 UTM 3321665 | 884 m | "Ibex Rock", in prominent position at the edge of a wadi "bay". Rock art: 1) pecked (wild) goat or gazelle with smaller animal (dog?) on a vertical rock surface (sandstone), flanked by two deeply engraved pairs of signs <br> 2) 4-legged creature with "hook" and circular sign, and stylized ibex with drilled leg ends on a fallen rock | blade industry, flake industry, burins, ret. blades and flakes, notched blades, few foliates | PPNB/PN |
| :---: | :---: | :---: | :---: | :---: | :---: |
| W. as-Sahab alAbyad 40 | $\begin{aligned} & \hline \text { N29 }{ }^{\circ} 59.472^{\prime} \\ & \text { E } 37^{\circ} 18.350^{\prime} \end{aligned}$ | 844 m | Circular sandstone structure at the foot of a sandstone formation. The formation eroded and exposed a stair-like structure in the rock. | some flakes and cores, undiag. industry |  |
| W. as-Sahab alAbyad 43 | 37 R 0341164 UTM 3318813 | 882 m | Circular sandstone structures at the foot of a cone-shaped sandstone hill. | large blade and flake industry with many fan scrapers and ret. flakes | Late Chalco / EB |
| W. as-Sahab alAbyad 44 | 37 R 0341164 UTM 3318813 |  | Rock engravings (picking) on top of the cone-shaped sandstone hill (SA43). | none | ? |
| W. as-Sahab alAbyad 45 | $\begin{aligned} & 37 \text { R } 0344980 \\ & \text { UTM } 3319241 \end{aligned}$ | 870 m | Circular limestone structures at the foot of a hill, isolated or in groups. The hill consists of limestone and sandstone. | large flake industry with fan scrapers and steeply ret. flakes | Late Chalco / EB |
| W. as-Sahab alAbyad 46 |  | 868 m | Circular structures of very dark sandstones below and between two spurs of a hill. | undiag. industry, one lump of basalt | indet. |
| W. as-Sahab alAbyad 48 |  | 882 m | Cone-shaped hill with circular structures on the slope. | large flake industry with fan scrapers and large thin flakes with cutting edges (ret.) | Late Chalco / EB |
| W. as-Sahab alAbyad 49 |  | 852 m | Circular limestone structures at the foot of a sandstone hill. | large flake industry with fan scrapers and ret. blades IIIIV | Late Chalco / EB |
| W. as-Sahab alAbyad 50 |  | 877 m | Circular sandstone structure, partly covered by sand. | none | ? |
| W. as-Sahab alAbyad 51 |  | 884 m | Cone-shaped sandstone hill. At the foot are circular sandstone structures. Flaked material and fan scrapers were found. On top of the hill rock pecked engravings | large flake industry with fan scrapers and ret. blades IIIIV | Late Chalco / EB |
| W. as-Sahab alAbyad XX |  |  | Petrified forest ('Forest I) |  | Paleontological monument |
| W. as-Sahab alAbyad XX |  |  | Fossil bones and shells exposed in a deposit, today forming the ceiling of a small shelter |  | Paleontological monument |
| abbreviations: ret. retouched, Sa. Wadi as-Sahab al-Abyad - explanations: blades $1<25 \mathrm{~mm}, \\| 1<50 \mathrm{~mm}$, III $<80 \mathrm{~mm}, \mathrm{IV} \times 80 \mathrm{~mm}$ |  |  |  |  |  |

for Wādì as-Sahab al-Asmar running parallel in the SW. The waterless and treeless landscape is characterized by a shallow undulating relief, in which one can listen during the day to the heatpops of its flint pavements.

The area today is hyperarid (Emberger Classification: very arid - mild; Koppen: E B 4'db4') and receives $25-50 \mathrm{~mm}$ rainfall in very wet years. The mean day temperatures are $14^{\circ} \mathrm{C}$ in January $\left(32^{\circ} \mathrm{C}\right.$ in July), the mean night temperatures are $4^{\circ} \mathrm{C}$ in January ( $24^{\circ} \mathrm{C}$ in July) (NAJ I). The landscape's slopes and summit surfaces are characterized by a large amount of flint debris and heat-fractured intact stone pavements (hammād) bearing desert varnish, by extensive gravel floors in the wadis, confined basins, hillside sand accumulations, and dune areas. There exists almost no vegetation in the area except in the wadi courses.

It appears that the landscape today is not used by herders or any other sort of subsistence
economy (although a pair of lost sheep-shearing scissors were found, and camel herds may pass through the area); however, at night the area can become the ground for smugglers to/from SaudiArabia. The nearest police stations are Enab Station some 40km to the WSW and Bshash Station some 50 km to the NE.

## General Observations on the Geology, Paleontology, and Geomorphology

The general geological stratigraphy of the wadi ridges bordering Qulbān Banī Murra area and further south is characterized by top layers of quartzite sandstone bearing desert varnish, in which quartzite layers of thicknesses up to 30 cm may occur. Whitish inclusions in this material are chalky particles less than $5-8 \mathrm{~mm}$. It is in here, where the fossil vertebrate (Wādì as-Sahab al-Abyaḍ 11) was found. Below this hard cover of the area, beds of limestone separated by tabular and nodular flint occur. Locally, consolidated
sand is to be found beneath these limestone and flint layers (erosional products of aeolian deposits from the sandstone bedrock underneath?). Below this stratigraphy the sandstone formation starts. The origin of the fossil wood (silicified tree chunks of real forests) found below the ridges bordering the wadi at Wādī as-Sahab alAbyad remains to be understood.

## Located Sites and Their Chronology

The more important sites located during 2001 are listed in Table 1; in this report, we can only describe some in a bit more detail. Our Survey area otherwise has countless locations with ancient, sub-recent (see Fig. 19) and modern rock art tribal marks, as well as innumerable pens with fan scrapers (see Fig. 20), or of just fan scraper scatters (see Fig. 21) of the late chalcolithic/Early Bronze Age with flint artifacts from other periods.

## Description and Interpretation of Selected Sites and Surface Finds

Qulbān Banī Murra (Figs. 3-6, 8-10)
The ruins of Qulbān Banī Murra (also called Biyar Beni Murra, cf. JADIS 1994), respectively their core area, stretch over some 2 square km along the hilly flanks and the bed of central Wādì as-Sahab al-Abyad. Its megalithic structures (cf. Gebel and Mahasneh, n.d.) made from the locally available tabular quartzitic sandstone are visible from afar and create impressive scenery in this barren and deflated environment. The site limits are unclear, since the summits and slopes to the N are covered by more burial grounds of the

4. Qulbān Banī Murra, Area A: Row of circular structures on the right or southwestern wadi flanks / hilltops, from S. (photo: Eastern Jafr J.A.P.).

5. Qulbān Banī Murra, Area C: Looted chamber grave on the hilltops south of Qulbān Banī Murra Area A. (photo: Eastern Jafr J.A.P.).
Qulbān Banī Murra types (not surveyed yet).
The topographical units and areas of investigation with their predominant structures include Areas A-C on the southwestern wadi slopes,

3. Qulbān Banī Murra, Area E: Burial structures on the left or northeastern wadi flanks / hilltops, from SW. (photo: Eastern Jafr J.A.P.).

6. Qulbān Banī Murra 1B: Chipped lithic artifacts (surface finds). (photo: Eastern Jafr J.A.P.).

7. Upper Wādī as-Sahab al-Abyad: Thamudic inscription on portable rock. (photo: Eastern Jafr J.A.P.).
separated by a runnel ( $\mathrm{A} / \mathrm{B}$ ) and a small wadi (B/C):

- Area A: a chain of circular megalithic structures, composed of room clusters (ca. 8 clusters with ca. 29 rooms) and ca. 8 isolated room structures; isolated megalithic circular room structures; megalithic cairn graves;
- Area B: mainly isolated megalithic cairn graves; ashlar field between Areas A and B;
- Area C: chain of isolated megalithic chamber


8. Qulbān Banī Murra Area E: Chamber grave and two embedded horseshoe-shaped structures (Structures E5a-c). (drawing: Y. Abu Zagrit, Eastern Jafr J.A.P.).

9. Qulbān Banī Murra, Area C: Chamber graves and associated structures (Structure C1). (drawing: Y. Abu Zagrit, Eastern Jafr J.A.P.).

10. Qulbān Ban̄̄ Murra, Area A: Circular Structure A27. (drawing: Y. Abu Zagrit, Eastern Jafr J.A.P.).
graves and remains of a camp area.
Area D in the wadi floor is characterized by large isolated multi-roomed structures with central depressions (the so-called well structures) and isolated megalithic chamber graves.

Area E on the northwestern wadi slopes has many isolated megalithic chamber and cairn graves, ashlar fields and quarries, and Bedouintype graveyards.

Area F (not yet surveyed) to the south of Area E seems to represent the same nature and burial types as Area E.

The areas' general characteristics differ considerably from each other, in terms of structure types, organization of space, image inventories, and surface finds, among others. The question whether we deal with a single occupation with different groups represented by different ceremonial manifestations, or if we deal with several reoccupations during the Late Chalcolithic - Early Bronze Age periods represented by different styles and finds, is unresolved yet. A preliminary summary description of the Late Chalcolithic - Early Bronze Age remains is presented in the following (for more details cf. Gebel and Mahasneh, n.d.):

Area A is dominated by a long row of single and clustered circular rooms, dispersed cairn graves and circular rooms, and a large space east of Structures A15-31 is structured by ashlar settings.

Area B is characterized by large isolated cairn graves with ashlars marking interior and exterior spaces, showing many signs of additive burials with added peripheral pavements or pavement terraces; rows of subsequent cairns resulted in huge stone accumulations, but single cairns also occurred. Very often an isolated group of two or three ashlars was erected in the southeastern part of these structures, as well as obvious fields of stone debris. Ashlar fields are found between Areas A and B. Except for a figurative decoration on the standing ashlars of Structure B39, no other stone pecking was found in Area B.

Area C witnesses a chain of isolated megalithic single and double chamber graves (most looted in recent times) and the remains of a larger camp area; no figurative or other stonepecked decorations were found in Area C. More burials exist on the hilltops east and southeast of Area C. It appears that many of the chamber
graves had annex structures. The human remains exposed by the illicit digging appear to be in a rather good state of preservation.

Area $D$ is typified by the remains of some nine multiroomed structures on small mounds along the western margins of the present-day "active" wadi bottom, and chamber graves on the hammād surfaces of the wadi floor. The small mounds rest ca. 0.5 m above the surrounding hammād and wadi gravel flats; the present runnels also cut through these hammād surfaces. The ground plan of the multiroomed structures is outlined by single row, single course walls or "wall-ettes", with clusters of curvilinear, polygonal, oblong, and sub-oval rooms sharing walls. Each building has between 12 and 24 rooms and a central or almost central depression reached by two or more oblong corridor or passage-like rooms with lengths between 1.5 and 5 m ; each structure has one to three rooms with interior stone piles. The surfaces of the circular or oval depressions (diameters $2-8 \mathrm{~m}$ ) are ca. 0.5 to 1.0 m deep and filled with sand; reportedly representing well shafts, we call these buildings "well structures". Located along the major wadi course, these shafts are expected to have tapped the aquifers. Little figurative and petroglyph material is found in Area D, and mostly they represent tribal tags.

Area E shows a high degree of structural variability in its isolated megalithic chamber and cairn burials. In addition, ashlar fields related to "runnel quarries", and Bedouin graveyards associated with various campsite remains from different periods were found in the northwestern parts of Area E's slope. Two horseshoe-shaped structures (each ca. $2 \times 2 \mathrm{~m}$ ) of unknown date, outlined by a double-row of small stone slabs (ca. 20 cm ) set upright into the surface, are characteristic and unique features of the site.

The deflated surfaces of the site are littered with fan scrapers and undiagnostic flake industries with some blade elements.

As a preliminary interpretation we offer the following site understanding. The huge site of Qulbān Banī Murra (about 2 square km), which has no equivalent yet in Jordan, seems to represent the burial place of hitherto unknown late Chalcolithic/EB cultures of Jordan. Risqah near 'Aqaba and Rajajil near Sakaka in Saudi Arabia may represent a similar culture. The herdsman
of these basically aceramic cultures gathered in sites like Qulbān Banī Murra to bury their dead and practice ancestral traditions. The 2006 reconnaissance recorded over 200 structures. The megalithic character of the site comes from these ashlar walls and standing stone groups connected with the cairn. Some of the circular structures and ashlars of the cairns carry decorations like ibexes and unknown signs. The "well structures" of Qulbān Bani Murra in the bed of Wādī as-Sahab al-Abyaḍ may date back as early as the Late Chalcolithic/EB burial grounds, since they are littered with the diagnostic fan scrapers as well. They must have been used in a climatic optimum of the Mid- Holocene times when most desert areas of the Arabian Peninsula were covered by seasonal lakes and vast pastures, also bringing life to dry and remote areas like Qulbān Banī Murra.

## Wādī as-Sahab al-Abyad 10

This site is a collapsed rock shelter (Fig. 11) once opening towards Wādī as-Sahab al-Abyaḍ of dimensions we were unable to reconstruct. On the banks of the wadi and upwards towards the previous rockshelter, and between its fallen debris, PPN blades occur in quite good numbers, struck from bidirectional non-naviform and single platform cores; burins are attested also. Large wind-worn and heavily patinated scrapers and flakes seem to represent Paleolithic use(s) of the shelter. Large vertebrates (Fig. 12) are exposed by fractured bedrock close to the site.

11. Wādī as-Sahab al-Abyad 10: Site of the PPN(A?) rock shelter. (photo: Eastern Jafr J.A.P.).

12. Wādī as-Sahab al-Abyad 10: Fossil vertebrate in the bedrock. (photo: Eastern Jafr J.A.P.).

## Wādī as-Sahab al-Abyad 14

SA14 is a unique site for the area, in terms of its Late Chalcolithic/ EB structural variability. Aside from the common animal circular enclosures in the sandy foot zones of the wadi side (e.g. Fig. 12, terraces in a drainage leading to

13. Wādī as-Sahab al-Abyad 14: Late Chalcolithic-Early Bronze Age camp site on the wadi terrace. (photo: Eastern Jafr J.A.P.).

14. Wādī as-Sahab al-Abyad 14: Late Chalcolithic-Early Bronze Age terraces of the burial ground. (photo: Eastern Jafr J.A.P.).

15. Wādī as-Sahab al-Abyad 14: Late Chalcolithic-Early Bronze Age circular structure in the burial ground area on the hilltop. (photo: Eastern Jafr J.A.P.).

Wādī as-Sahab al-Abyaḍ bear a graveyard with very different types of grave structures, among which a circular one is one the hilltop (Figs. 1215). On the summit of the wadi side to the N the remains of two tower-like graves are present.

## Wādī as-Sahab al-Abyad 38 ("Ibex Rock")

A rather prominent but smaller hill (Fig. 16, left) bears large sandstone rocks/ blocks with several ibexes on two vertical or slightly inclining rock surfaces in the upper part of the small conical mountain. This point provides an excellent view over the Wādī as-Sahab al-Abyaḍ.

The northwestern part of the conical moun-
tain is in shadow during forenoons and has a small flattish area that is bordered by more fallen rocks creating a room-like situation. One of these rocks, on a surface towards the "room", bears multiple depictions of ibexes (Fig. 17). The other depiction is on a vertical rock facing W (Fig. 18) and is oriented towards the wadi. Both images are on the highest part of the conical mountain.

All representations of the ibexes and nearby motifs are pecked. The repertoire of motifs exclusively involve the ibex except for the two scenes facing the southeast, showing a human and a human with an animal led by a rope. The

16. Wādī as-Sahab al-Abyad 38: View of the site from SW (photo: Eastern Jafr J.A.P.).

17. Wādì as-Sahab al-Abyad 38: Rock art on the southeastern rock face (drawing: H.G.K. Gebel, Eastern Jafr J.A.P.).
field of representations on the rock facing the northeast only has two ibexes deeply pecked in to the rock, while a third is executed less deeply, and a fourth only is outlined by a more fresh pecking. Other pecked areas show that the compositions might not have been finished or that

18. Wādī as-Sahab al-Abyad 38: Rock art on the western rock face (drawing: H.G.K. Gebel, Eastern Jafr J.A.P.).

19. Upper Wādī as-Sahab al-Abyad: Sub-recent narrative scenes on flat bedrock. (photo: Eastern Jafr J.A.P.).
more motifs were to be added. The rock is a porous and hard sandstone with quartzitic inclusions and veins; it bears desert varnish.

At the foot of the rock a large amount of PPN

20. Wādī as-Sahab al-Abyad 48: Chipped lithic artifacts (surface finds). (photo: Eastern Jafr J.A.P.).
21. Wādī as-Sahab al-Abyad 32: Chipped lithic artifacts (surface finds). (photo: Eastern Jafr J.A.P.).
flaked material was found including foliates, burins and cores (Fig. 22).

## Brief Summary

This report is preliminary in the sense that we have not yet found many parallels for our findings. The area of survey turned out to be
extraordinarily promising with an extremely high research potential for many disciplines. Unexpected and unknown were the very rich aceramic Late Chalcolithic/Early Bronze Age occupations with their large variety of circular and rectilinear structures, serving pastoral, domestic, sepulchral and unknown ritual purposes.

22. Wādī as-Sahab al-Abyad 38: Chipped lithic artifacts (surface finds). (photo: Eastern Jafr J.A.P.).

Much rarer, but clearly present, is the PPN in the area, while the Paleolithic and Epipaleolithic periods are almost absent, or not in the locations where we have so far concentrated our research, or they are buried in local stratigraphies. The collapsed PPN rock-shelter of Wādī as-Sahab al- Abyad 10 so far is among the very first PPN evidence in far southeastern Jordan. We expected that a PPNB/PN Kilwa-type of occupation would have occurred more densely in the area; future research has to investigate why it appears so limited in Wādī as-Sahab al-Abyaḍ. The marvelous findings of fossil forests and bones in the bedrock open a new field of research to paleontologists who have to join the future investigations of the area. At the moment, the findings are under study and deserve a very basic discussion, since our project has entered and encountered completely new evidence from many periods. It is planned to publish full reports in the near future: one will focus on the Neolithic occupational history of the area, one on the palaeoenvironmental aspects of the Early-Mid Holocene, and one devoted to the densely distributed Late Chalcolithic/EB camp sites and burial fields.

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# THE HELLENISTIC LEVELS UNDER THE TEMENOS OF THE QAṢR AL-BINT AT PETRA 

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Investigations into the most ancient levels of the city of Petra have for the past several years been the focus of research of some of the teams working on the site. Classical texts, that have often been presented and discussed, bear witness to Nabataean history going back at least to the 4th century BC (see recent work by Nehmé and Villeneuve 1999: 22-28; Dentzer and Augé 1999; Sartre 2001: 52-55; Hackl et al. 2003; Graf 1990; Wenning 2007). Also archaeology, has for a long time yielded up clusters of ceramics and coins which indicate human occupation dating back to the 4th and 3rd centuries BC; these are mainly Phoenician coins from the end of the 4th century and from the 3rd century BC, and Mediterranean stamped amphorae, the oldest of which dates to about 240BC (Parr 2007: 282, with a complete bibliography). In soundings carried out in the area of the Qaser al-Bint, levels associated with buildings yielded material from this ancient Hellenistic period for the first time (Parr 1968). Consequently it is in this area, along the left bank of the Wādì Mūsā, along the colonnade and at the entrance to the temenos that the most recent search for Hellenistic levels has been carried out. However ancient levels have also been found elsewhere, in particular on the az-Zanṭūr hill (Stucky 1995 and 1996) and on the terrace facing the Urn Tomb (Zeitler 1990). Two recent articles bring together all the archaeological documentation available on the subject and discuss the chronology (Graf et al. 2005; Parr 2007).

The excavations undertaken since 1999 by the French archaeological team in the Qaṣr alBint area have brought new information to light. Their work is chiefly concerned with the monumental religious complex, built during the first two centuries AD, the apsidal monument dating
from the imperial era and the large dwellings along the south east and western sides of the temenos, from the Nabataean and Roman periods. However, during the excavation several of the soundings reached down to deposits predating this group of monuments. Soundings A and B, between the apsidal monument and the central altar, were first excavated by Andreas Kropp in two consecutive seasons. They were then taken over and extended by the authors during the 2007 season. To the west of the apsidal monument, levels predating the installation of the temenos were reached in several places, among others soundings C and D as shown on the map (Fig. 1). These trenches revealed a phase of installations lying directly on the aeolian sand and the pebble layer which are considered to be the substrate (river bed), and an architectural phase recognised along a 3 m stretch of the bank of the Wādī Mūsā. These levels correspond to Phases 1 and 2 of the chronological-stratigraphic periods of the excavation area (Augé et al. Forthcoming), and are dated, by the material associated with them, to between the 3rd century and 1st century BC .

The layer of reddish aeolian sand presents a double slope towards the bank of the wadi, both from south to north by north east and from west to east, most probably because of greater deposits at the foot of the al-Habis cliff. Large pebbles which correspond to a phase of violent flows, surface from this sandy layer and form the natural terrace which was subsequently progressively covered by the sand being deposited by the erosion of the sandstone cliff. These pebbles in turn, rest on bedrock which touches the sounding made by P. Parr in the south west corner of the central altar (Parr 1968: 13). The installations which we will describe were there-


1. General plan of the Hellenistic levels examined in the soundings.
fore in the corner of a gently sloping terrace, overlooked by a high cliff and only a few metres above the enclosed bed of the Wādì Mūsā just before it disappears into the cleft which runs around the rock of al-Habis (Fig. 2).

## Phase I

Lying on the surface of the aeolian sand deposits, ceramic fragments and imported sediments are indicators of occupation, as are traces of surfaces evidenced by thin layers of compacted earth mixed with ash from hearths. This is Phase I of the occupation of the area.

At the bottom of a sounding in the corner of walls 9065/9069 (Fig. 1), a terrace wall was found, built from a single row of medium sized stones crudely positioned in four courses supporting a higher level to the south of red sand substrate, parallel to the wadi. (Figs. 3-4).

In another sounding, along the eastern face of the apsidal monument, layered occupation levels established on the red aeolian sand of the substrate were covered over by a backfill of loose brown earth up to a depth of 40 cm that
contained abundant animal remains (Fig. 5), which could be interpreted as the levelling of a terrace. Alternating layers of aeolian sand and of earth and ash subsequently accumulated over this backfill which were very disturbed due to the mobility of the sand's surface.

In a sounding on the western edge of the excavation area, below a Nabataean dwelling, an arrangement of pebbles was revealed in a ditch with a post hole in the sand on either side. These installations were in an area enclosed, 2.4 m to the north, by a small wall built of stones bonded with clay which was found in a very narrow sounding preserved between the foundation trenches of later buildings (Fig. 6).

These remains represent the oldest phase of occupation in this area. They bear witness to the installation of terraces which we are not able to attribute with certainty to agricultural activity - these areas may just as well have been the site of simple domestic installations which require levelled ground.

The stratigraphic position of the installations in soundings F and G to the west (Fig. 2) has not


[^2]
3. Stratigraphic section showing terrace wall 9085, Phase I.
yet been clearly established, and for this reason they have not been included in the general plan. They are situated directly on the red aeolian sand but were not sealed by constructions from

Phase II. Later channels disturbed the stratigraphic relationships and the upper layers are related to the building from the beginning of the 1st century AD. Furthermore these installations (the small wall to the north, the arrangement of pebbles and the post holes) may just as easily belong to Phase I as to exterior installations associated with nearby Phase II buildings.

## Phase II

During the excavation, the architectural remains of Phase II, discernable along a stretch of more than 30 m , stands out clearly from later buildings because of its oblique alignment relative to the buildings of the later monumental phase, associated with the sanctuary of the Qaṣr al-Bint and the temenos, which are strictly aligned on the wadi. The buildings of Phase II seem to run more or less northwest / southeast along the contour lines at the foot of al-Habīs. It is possible that the course of the wadi followed these lines at the time. If there were more buildings on the slopes of the hill it is probable that they were aligned along the same axes parallel to the slope.

The foundations were in deep trenches, and were made of blocks of undressed stone, with or without facing, and many large stones from the bed of the river. With few exceptions the stones

4. Terrace wall 9085, Phase I.

5. East-west stratigraphic section in room 105.
in the foundations were held together by a yellow clay mortar, residual traces of which are also found on the red aeolian sand near the trenches. Remains of the walls exist only up to one or two courses at most, and only in a few places. The development of the cult area, in the second half of the 1st century BC assumes the complete demolition of pre-existing constructions. Foundation trenches and various other pits also considerably disrupted this older architectural layer. The narrowness of the soundings and the small quantity of material recovered from them do not permit a functional interpretation of the areas. A general plan of all the Phase II installations cannot be drawn up of course, but the available data allow for some hypotheses and comments on the style of settlement and the relative chronology of the constructions.

Lacking any evidence to the contrary, we consider that these constructions were domestic
spaces; in other words dwellings. In spite of the lack of stratigraphic continuity (separate soundings and later disturbances) and the obvious on-going processes of installation, three architectural phases have been distinguished which both identify the evolution of the buildings and facilitate their description.

In the rubble in the foundation trench of wall 9065 many fragments were found of a thick white coating material, of good quality and bearing the imprint of the facing stones which it covered. It testifies the destruction of a building previous to the construction of room 104/101 (Fig. 1). This construction could have been room 107, which is the corner of an older building to the southeast. Walls 9084 and 9091 which form the northwest corner of 107 were flattened before the building of wall 9082 . A small ditch was built in the rubble whose oldest bedded layers seal the foundation trench of 9082 . The deposits from it

6. Stratigraphic section showing a Phase I wall built on virgin sand in an isolated sounding to the west.
are both on the top of the flattened wall 9091 and up against the face of wall 9082. Wall 9082 closes off the east side of area 100, probably an exterior space which was originally opened to the east. Two pavements were laid one after the other in this area, to the west along wall 9065, indicating rebuilding work. Only the upper pavement is preserved along wall 9082, which must therefore have been built during or after the remodelling work. We have therefore two phases of construction in area 100, which have also been noted in area 101, which are bounded on the west by two successive thresholds and the secondary construction of wall 9069 . This succession of the two phases is also found in area 105 where two occupation levels can be discerned, the earlier one marked by a thick floor of yellow clay, covered by a light backfill which separates it from two successive surfaces made of clay mixed with ash (Fig. 5). To the northeast, in room 102, the succession of the two construction phases is marked by the partition wall 4274 which was built over an older pavement.

To sum up:
Phase IIa: first solid buildings hypothetically including room 107 to the southeast;

Phase IIb: destruction of these buildings (including room 107?) and installation of areas 100/101, 105 and 102 to the west;
Phase IIc: construction of walls 9082, 9069, 4272 (we are grouping together works which might have been executed over a period of time), installation of the upper level.

In the excavation area, Phase IIa can only be represented by room 107 to the east, bounded by the two perpendicular walls 9084 and 9091. These walls are only preserved as foundations in the trenches dug into the red aeolian sand of the substrate. They consist of undressed stone blocks laid in courses and of pebbles sunk into a yellow clay mortar. No occupation levels have been found. The main part of this dwelling was to the south, towards the higher part of the river terrace and it is likely that it was made level by backfilling in the corner which we have explored: the very gravely deposits spread over the sand substrate between walls 9084 and 9091 could be the remains of such a backfill (Fig. 7). The tops of the walls were directly covered by the surfaces contemporary with the adjacent building.

The alignment and orientation of wall 9091 are the same as those of the wall excavated by P. Parr in a sounding opened in the southwest corner of the high altar in 1965 (Parr 1968: 19). If we believe that this is the same construction it must have been at least 8 m long, which allows us to put back at least one partition giving us two aligned rooms.

Phase IIb corresponds with the installation and initial occupation of areas 100/101, 103, 104, 105 and 102/106. There is no stratigraphic relationship between this group of rooms and construction 107 before its demolition, the sand substrate in the area which separates them having been eroded by the flow of water in the ditch built between walls 9091 and 9082. It is therefore impossible to establish whether occupation of room 107 was partly contemporaneous with that of rooms 100/103 before the building of wall 9082. However, since the walls of room 107 had been levelled during the occupation of the set of rooms 100/103 we believe that the occupation of 100/103 in part postdates that of room 107.

The oldest walls are 9051, 9052, 9035, 9046 and 9065, and further to the east 4272 and 4283 (4284?). The contact between walls 9051 and

7. Stratigraphic section in room 107 in the east.

9065 was destroyed by a later large pit which contained fine ceramics that date it to the last quarter of the 1 st century AD . The constructions to the west $(102 / 106)$ could not be associated with certainty with the traces excavated in the trench that was dug below the temenos because the foundations of the wall of the temenos itself and of the later apsidal monument have severed any stratigraphic link between these two areas. Nevertheless it is probable that they belong to the same grouping: walls 4274 and 9035 face much the same way and are built on the same axis, whilst walls 4272 and 9046, at each end, bound an area only 7.5 m long which can only be occupied by two rows of stones without leaving much room for an external separating space.

To the east, room 103 is associated with the exterior open space 100 . This area sloped towards the entrance to room 103, the interior floor level of which is only slightly lower than the natural sand outside. Stones crudely placed along the southern face of wall 9051 made it possible to descend to the pavement which marked the threshold of the opening to room 103 (Fig. 1). The flow of rainwater threatened this room with flooding and a collector was situated just opposite the threshold which collected the runoff water (9022) and channelled it away along a small underground conduit covered with stone slabs, probably to the riverbed to the northeast (Fig. 8). Room 103 never had a built floor, only a row of paving slabs along wall 9052 at ground
level (Figs. 8-9). This ground offers no signs of a particular type of occupation, nor of domestic activities: it may have been a store-room, but the lack of material does not tend to support this interpretation.

The presence of two successive pavements on the western side of area 101 could indicate that this installation already existed in Phase IIb when it was a courtyard opening to the west. The stratigraphic relationship with the levels associated with wall 9082 has unfortunately been broken by the digging of various later foundations. If this were the case then it would only have existed along wall 9065 , preceding the change of level leading down to the entrance to room 103.

To the west, room 102/108 was most probably a single space and connected to 106 by a threshold. A layer of large $(80 \mathrm{~cm})$, very even paving stones, covered the ground and supported the base of the white coating of the walls (Fig. 10). The levels of room 106, which have disappeared in the foundations of the walls of the apsidal monument and of the temenos, have been poorly preserved in the angle between walls 4272 and 4283: here regular floors of well compacted yellow clay are visible in the section. From this it seems to us that this dwelling on the western side was built with much more care than the spaces on the eastern side described above.

Phase IIc corresponds to the modifications made to the constructions of Phase IIb. Rather than a planned phase of general architectural

8. Room 103 to the east and the opening of the small channel 9022.
restructuring, it is a series of alterations which took place over a period of time. Nevertheless a second phase of occupation is identifiable across all of the levels which were explored.

To the east, the exterior space 100 was closed off by wall 9082 (Figs. 1 and 9). We have seen that the run-off flowing through this space led to the installation, in Phase IIb, of an underground conduit at the entrance to room 103 to evacuate the water. By closing off this exterior space with walls, the inhabitants of this dwelling diverted the run-off into a kind of open channel which they made along the outside of wall 9082. Supported by levelled wall 9091 and parallel to

9082, this channel eventually became silted up with layered deposits filled with ceramic fragments. Beyond the channel the flow was directed towards a small re-used stone basin with a spout, and from there it went directly into the red sand substrate (Fig. 11). The channel silted up over time but must have remained in use until the end of the Phase II occupation.

A new pavement was installed in room 101, about twenty centimetres above the previous occupation floor along wall 9065 (Fig. 12). Some paving slabs have been preserved on the same level also along the new wall 9082 in room 100 but it is not possible to determine whether this

9. View towards the south, over walls 9052 and 9082 bounding spaces 103 and 100 (on the right). Top left is room 107.

10. The pavement of room 102.
flooring covered the whole of room 100/101. An access corridor was created to the west by building wall 9069 perpendicular to 9065 against which it abuts (Fig. 1). Access to the west was over a threshold attested by the door socket carved through two blocks of stone (Fig. 13). The narrowness of the excavation trench makes it difficult to understand this area, in particular the reason for the remodelling and the relationship between room 105 to the west and the group of rooms centred around the exterior

11. Basin with spout installed in line with the runoff channel built between walls 9082 and 9091.

12. The two levels of paving to the west of area 101.
space $100 / 101$. The construction of this corridor may have provided a link to hitherto separate spaces.

Room 105, on the western side, is bounded by walls 9035 and 9045 . It already existed in Phase IIb as is shown by the two phases of floor construction clearly visible in the section. Both of these floors were carefully made with clay brought in to form smooth surfaces. However there is no sign of paving. Wall 9035, which runs southeast to northwest, appears to turn in very slightly to the east.

Further west, room 102 was divided, thus

13. Threshold of a door in between walls 9035 and 9069.
creating room 108, by the building of wall 4272 the foundations for which were dug through a beautiful pre-existing pavement. This wall is built into the angle of the threshold opening into room 106. Access to it was walled up, which implies another way into room 106.

The extent of the excavation does not allow a detailed study of the domestic space and the domestic architecture. Yet the nomadic history of the Nabataeans, as told in ancient texts, requires that these installations be viewed in a particular light. The evolution of the oldest domestic spaces on this site could give us information about this supposed lifestyle. Ethno-archaeology has been able to define the characteristics of the dwellings of groups in the process of settling. These characteristics have, in some cases been recognised in archaeology (see for example Aurenche 1984; Mouton 1999). In the current case one should note that in the small number of constructions which have been examined, only one angle between walls is bonded, allowing one to suppose that they were built at the same time. Elsewhere:

- wall 9082 was built abutting the angle of walls 9051 and 9052 , thus closing off room 100.
- wall 9069 was built abutting wall 9065 to form the corridor 101.
- wall 4272 was built to divide room 102.
- the angles between 9035 and 9046 and between 9065 and 9051 were sealed by later disturbances so that it was not possible to examine them.
In the majority of cases the tendency is towards increasingly complex structures, with
more partitions and more enclosures. This does not indicate a settlement planned out according to architectural rules and establish social practice. The impression is more of a building which was extended and remodelled according to developing needs rather than according to a plan. The practice of frequent and multiple remodelling of dwellings is more common where buildings are made of lighter materials or of unbaked earth. The tendency to enclose spaces progressively is one of the characteristics of the settlements of groups which are in the process of sedenterisation and who are dividing specialised areas from traditionally all-purpose spaces.

The question which arises, even though the area explored was small, is that of the dimensions and the structure of the dwellings. Given the multiplicity of rebuilding work and the irregular orientation of the walls one can put aside the notion of a large dwelling designed by an architect along ordered and regular lines, leaving two hypotheses: either there were small scattered dwelling units within an urban area, or there was a single large house which grew progressively by extension and division.

The first hypothesis points to an urban pattern made of small family units whose domestic space was a group of one to four rooms associated with an exterior space either open or enclosed. Supporting this view are the very different orientations of the walls which could be explained by their belonging to different units. This would consist of a first group formed of rooms 102 and 106 to the west, to which must be added at least an extra space between walls 4283 and 4284. A second group in the centre would be made up of at least two rooms, 103 and 104, bounding the exterior space 100/101, to which room 105 can be related, unless it belongs to the western group. To the east room 107, associated with the wall excavated by P. Parr in the sounding made at the foot of the larger altar, would be part of a third group, which has been the least explored. This scheme could represent an older phase of isolated units built around an open space in which domestic activities were carried out, and which was later enclosed in order to integrate it into the house (by the construction of wall 9082 which encloses room 100). But in the known examples of this kind of development of dwellings the houses are generally very dispersed,
like in the camps of nomads, both for privacy and because of the need for space to stockpile provisions and to keep livestock. This is not the case here, especially if room 105 is considered as part of the western grouping, making two practically contiguous houses; it is also the case for the eastern grouping between rooms 103 and 107. Consequently if we are interpreting these remains as being those of the evolving dwellings of a group of nomads in the process of settling, the urban density indicates an advanced stage of the process. Urbanisation is characterised by the progressive occupation of the free spaces between older dwellings. This would fit with the chronology indicated by the stratigraphy: the central group seems to have been built later than the eastern group which was then rapidly abandoned and flattened.

The second hypothesis, of the progressive growth of a single large house, assumes that all the remains of the architectural phase which was excavated belong to a single dwelling, with the exception of room 107 and the wall which extends it to the east, which would be the edge of a second dwelling which lies beneath the eastern part of the later temenos. Supporting this idea is the fact that the orientation of the constructions is roughly the same overall. But in particular, there is a discernable difference in the treatment of spaces which distinguishes the group 105/106/102 to the west, where good clay floors and careful paving were laid, from the group 100/104/103 to the east where the floors are beaten earth and only have a few paving slabs along the walls of the exterior space. This differentiation between the spaces is highlighted in the centre by the threshold which marks the end of corridor 101 , separating two complementary parts, a domestic area to the west, for daily life and reception, and a rustic area to the east with storerooms and various specialised spaces grouped around an open courtyard.

The area of the excavation is too small to provide sufficient elements of the architectural organisation to allow an informed choice of one or other of these hypotheses.

Setting aside room 107 to the east, which was destroyed during the occupation of the adjacent dwelling, it appears that the all the architectural elements of Phase II were demolished simultaneously and voluntarily. Higher levels of occu-
pation of the various spaces are not buried beneath irregular layers with successive exposed surfaces which would indicate a progressive destruction of the walls. The rooms are filled by dense layers of earth mixed with stones and chippings from the dressing of sandstone blocks which point to the re-use of the building materials of the walls. In some places regular blocking made of medium sized stones and earth indicate a deliberate levelling of the ground in preparation for new building work. The bedding fill for the laying of paving stones associated with the installation of the religious complex of Phase III rests directly on these deposits.

## The Pottery

The totality of the registered ceramics is not sufficient to allow a typological study related to the detailed sequence of occupation. Two phases can be identified however, and the division between them corresponds to the transition between Phase I and Phase IIa, when the construction of the built dwellings took place. This transition is marked principally by the change from a group of vary varied ceramic wares to one formed by a more homogenous and standardised material. It corresponds also to the introduction of fine red-glazed wares which takes over from the Greek Black-glazed wares that disappear at the beginning of Phase II.

The ceramics recovered from the Phase I levels come from the surface of the red aeolian sand substrate, and from the fill spread over two areas where it was mixed in with a fair amount of animal remains (terrace wall 9085 and beneath room 105). The collection recovered contains everything that was preserved directly on the substrate and thus does not exclude the presence of ceramics that predate the Hellenistic period. Furthermore it should be noted that this material is mixed with material from Phase II which accumulated in the sediments cut by the flow of water between rooms 100 and 107 to the east of sounding A.

In spite of that this assemblage of ceramics (Fig. 14) which is so far not well represented, is clearly distinguished from later collections in Petra by the low number of red sandy Nabataean wares and the strong presence of ceramics made from chalky ware and with slip. The collections are fairly varied in composition particularly in


15. Cooking pot from phase I (locus C4030).
the wares and the frequency of external productions.

The sandy wares are coarse or only somewhat levigated (using abundant unsorted mineral temper) and of a mainly beige to brown colour with a grey interior. Generally the local pottery from Phases I and II is made from beige paste whereas in later phases the paste is a bright orangey red. The oldest pottery is the greyest, especially inside, and the surface is the roughest. This means that one may have a pottery sherd which is grey in the interior and brown on the outer surface (and sometimes also the inner surface) and a grey or whitish wash on the outside. The presence of white grit is frequent and may be considerable on the surface. This is probably limestone grit and is characteristic

16. Grey ware from phase I (locus C4246).

17. Iron arrowhead from phase I (locus C4220).
of the ceramics of this older phase. A surface wash in shades of white, red or grey and of poor quality is already quite widespread in Phase I. The wash is very thin and allows large areas of the clay to show through giving the pottery a rather washed-out appearance. Three subcategories have been distinguished within the local production, having in common the use of sand as a tempering agent and a grey coloured ware with a brownish surface. The most common is a grey ware with a buff to brown surface. This same ware is sometimes found with a white to greenish wash, and least common is a grey ware with a pinkish beige surface abundantly speck-

18. Black glazed ware lamp.
led with white grit.
Fragments of medium sized jars and pots represent the majority of the locally produced pottery, but due to the small size of the fragments it is not possible to determine their shape with any precision. A single atypical fragment resembles the Cream Ware pottery with thick walls, no visible temper and a yellow to greenish tinge. This fragment could be the precursor of the Cream Ware produced throughout the Nabataean period.

Attention should be drawn to the very small number of open shapes. Storage jars (Fig. 14: 1-2) and cooking pots of coarse wares make up the majority of the closed-shape pottery. These are all thick-walled vessels (Fig. 14: 3-4) and are similar to a form that is very common in Palestine and Phoenicia during the Persian period. There are parallels with finds at Qadoum in Samaria amongst material from the 5th and 4th centuries BC (Stern et al. 1984: figs. 7, 1 and 3) and Tell Kazel in Syria (Badre et al. 1990: fig. 23e). Another type (Fig. 14: 1) has a short neck with a simple everted rim to which is attached a large handle, oval in section. The diameter of the opening appears to indicate the shape of a mid-sized, fairly squat jar.

A storage jar (Fig. 14: 4) of pale beige clay, reasonably well levigated and with a sand and plant temper, presenting a slightly soapy-looking surface, is one of the only open shapes identified: two fish dishes were also found, made of sandy orange ware with a rough surface and no slip (Fig. 14: 5).

The only evidence for large capacity storage jars is a few pottery sherds containing a large amount of mineral temper and showing traces of a red slip. The absence, in this context, of vessels for transportation, such as the Phoenician Basket Jars or Torpedo Jars, very common in the Levant at that period, is remarkable.

The absence of local fine wares is significant insofar as this is a diagnostic element of the later Nabataean phases. In general, and in the deeper levels in particular, groups of ceramics contain a larger quantity of fine slip wares, sometimes polished, than do the later levels of the early Christian period. This feature can be explained by the Iron Age traditions which group together numerous collections of this type, though less clearly here than in other sites of north eastern and north western Arabia.

The imported pottery seems to indicate interregional exchanges rather than long distance trading links. With regard to this it should be noted that imported Greek pottery has very little influence on local production at this time, contrary to what is seen right from the start of the next phase. Pottery made of alluvial limestone ware is well represented, often with a mica temper and a reddish brown slip with a nice polished surface which brings to mind the contemporaneous ceramics from the Egyptian Delta (Ballet 2002: 90). It should be remembered that the Zenon papyri attest to Nabataean participation in trade between Egypt and Palestine in the 3rd century BC.

Imported luxury pottery, of which there is very little compared to locally produced items, is of the Hellenistic type originating in Greece or the western Mediterranean (Rhodes). These pieces (drinking vessels, lamps, fish-plates, kantharoi) are Black-glazed are. There are several bowls with everted rims and fragments from a closed vessel with gadrooned decoration which could be a cantharos or an amphora of West Slope type (Fig. 19).

Level C4244, to the west, yielded a Blackglazed ware lamp of the Broneer IX type (Fig. 18) which may have come from mainland Greece or from a workshop on Rhodes which produced imitations of Attic ware. Three comparable items were found in old soundings made by P. Parr in Petra (Amr 1987: Pl 20-21, p. 273) and G. and A. Horsfield (Horsfield and Horsfield

19. Kantharos or West slope amphora in Black glazed ware.

1941: 108, p. 134, Pl. XV). This type is often dated from the second half of the 4th century BC and more commonly from the 3rd century BC (Kassab et al. 1995: p. 89, $\mathrm{n}^{\circ} 163,177-78$, 182-184).

A few fragments of amphorae were recovered, mostly of the Rhodian type ( 8 sherds altogether, against 42 from the following phase). These are all body sherds and no rims or handles were found. The presence of numerous amphorae from Kos and from Rhodes on some of the Hellenistic sites in Arabia can be linked with the unusual deposits of Samian and Koan wine amphorae found in Sinai in the coastal strip north of Romana between the western edge of Lake Bardawil and Pelusium. These deposits bring to mind the comments of Herodotus (III, 6-7) on the Egyptian custom of systematically saving the imported amphorae, once emptied of their wine, for use as water storage in the desert (Oren 1997: 80-81).

Finally six sherds of grey pottery were found, very similar to a type that was widespread in the Oman region during the Late Pre-Islamic period: three sherds were on the red aeolian sand substrate in two separate soundings, and three in the fine deposits over the red aeolian sand substrate in soundings to the west (and some also in fill contexts from the beginning of Phase II).

These sherds are of clinky grey ware, of medium thickness, containing exploded white grits and a medium mineral temper; deep finger impressions made whilst throwing mark the inside wall (Fig. 16). They are fragments of jars or pots of medium to small size. If the identification of
these is confirmed as being from the region of Oman, either by a well represented morphological type or by petrographic analysis, then this would support the belief that there was contact between the two communities, which also exhibit strong similarities in their funerary practices (Mouton 2006). It would also pinpoint a chronological break for the oldest levels of Phase I since this type of pottery does not appear in the Oman peninsula before the 2 nd century BC , and more probably towards the middle of the century.

The possible relationship with the Oman peninsula is not limited to these sherds of grey pottery. Various elements lead to more extended comparisons: a fragment of fine pottery, soapy textured and painted a dark wine colour, which is also found in the oldest levels of Mleiha, and an iron arrowhead (Fig. 17) with a morphology closely related to that of the late Pre-Islamic finds in that region (Mouton 1990). But in Petra the lack of elements that are truly characteristic of the finds in the Oman area must be underlined. However the parallels support prior observations made by S. Schmid on the relationship between some of the open forms with painted decoration found in Petra and the industries of eastern Arabia and the Iron Age traditions of the Oman area (Schmid 2004). But they must be confirm by achaeometric analysis.

The pottery finds from the Phase II levels (Figs. 20-21) are more numerous and are clearly distinguished from those of previous phases by their homogeneity and the strong influence of the Mediterranean Hellenistic pottery. A koine of ceramic types dominates the pottery of the eastern Mediterranean from the Hellenistic period onwards. The Petra region is an integral part of this phenomenon from this phase onwards.

The local potters learned new techniques and tricks of the trade which would last throughout the Nabataean period and become defining characteristics of the production. The pastes became finer, both in thickness and in quality, even though the source material appears to remain the same as in the previous phase. We have already remarked on the even texture, the orange colouring, the slight roughness to the touch and the almost ubiquitous lighter surface wash.

The diversity of shapes also distinguishes this assemblage from that of the previous phase.

For the most part they derive their inspiration from the Hellenistic world, as much for table ware as for the kitchen ware, indicating the rapid take-up of the new models. Among the open shapes the most common local version is a cup with an incurving rim (Fig. 20: 1-3); one should also note the production of dishes with a central depression of the fish-plate type (Fig. 20: 8) and of skyphos with pinched handles and a partial dull brown slip (Fig. 20: 11). The latter form, of which there are many examples at Caesarea, Ashod (Lapp, 1961: type 151-4) and Tell Kazel in Syria (Badre et al. 1990: fig. 9k) is generally dated to the middle of the 2 nd century BC . The unrefined shapes of the coarse ware cooking vessels of Phase I were followed, in Phase II, by vessels of better defined shapes (Fig. 20: 12-13) clearly inspired by Hellenistic productions (lopades and caccabes, Ballet 2002: fig. 6 ). The introduction of cooking vessels could reflect profound cultural changes and new culinary practices related to the use of olive oil. The examples of closed forms which have been catalogued are from mid-sized storage jars of orange ware with a white, grey or red wash. Their highly fragmented condition does not allow for a detailed typology.

Along side the ordinary pottery, a semi-fine local pottery becomes common, an orange buff ware without any visible temper, in both closed and open forms. Two decorated groups are discernible. The first consists of bowls without a foot (Fig. 20: 4-6) and cups with a low ring base (Fig. 20: 7) which have a linear or radial decoration of the kind defined as type 1 of the painted ceramics by S. Schmid, and which appears in the 2nd century BC (Schmid 2000). The second group contains locally made imitations of the early forms of Eastern Terra Sigillata, and particularly of the Samaria 1 form, and has a good quality polished red slip (Fig. 21: 1). The high quality of this production indicates permanent workshops and highly skilled craftsmen (Schmid 2001: 430).

In a more general way it is possible to distinguish common ceramics of good quality by defining a category of 'refined common' pottery which consists of shapes too thick to be fine pottery, with a surface that is not at all sandy, in which some irregularities are found, particularly striations from grits during turning, but which

20. Pottery from phase II levels at the Qaṣr al-Bint and from al-Habīs survey.

21. Pottery from phase II levels at the Qaṣr al-Bint, including imported amphora.
overall are smooth and regular. These ceramics are often covered in irregular patches of red and black slip which reflect both an attempt to copy the Hellenistic wares and perhaps the continuation of the traditional techniques inherited from the Iron Age. This non-sandy but common texture is not found in the assemblages from the beginning of the 1 st century AD .

The proportion of imports remains high but is centred around two types of product: amphorae for their contents (Fig. 21: 5-7) and the high quality products for their prestige value. This is the case for the Black-glazed ceramics which, during Phase II, are progressively replaced by the first of the red-glazed ceramics of the Eastern Terra Sigillata type. One should note a single sherd found in one of the levels of abandonment of this phase: a fragment from the rim of a green-glazed dish with a central depression (Fig. 20: 10) characteristic of the Mesopotamian productions from the Parthian period of the 1st century BC (Hannestad 1984: fig. 8).

Only two lamp fragments were catalogued from the Phase II levels. They are very small and come from the type of Delphiniform lamp that had an S shaped knob which was very fashionable in the 2nd and 1st centuries BC in the eastern part of the Mediterranean basin (Frangié 2004).

## Dating, Coins and Conclusions

From the point of view of chronology the diagnostic elements in the ceramics are weak. The collection of finds from the Phase I levels is poor. None of the forms refer to the Syrio-Palestinan collections from the end of the Iron Age (Torpedo jar, Basket handled jar, Mortarium, Cooking pot); the imported material covers a period from the 4th to the 3rd century BC , the fine pottery tends to be more from the end of the 3rd century BC. The collections from Phase II show a definite break with the previous phase. Once again it is the products imported from the Hellenistic world which are significant, indicating a date between the 3 rd and 2 nd centuries BC.

The coin finds provide some complementary chronological information. Almost all the coins found come from the trench opened through the temenos, between the wall of the apsidal monument and the high altar. All these coins were identified by C. Augé. Two groups become clear, one from the 3rd century BC and the other
from the end of the 2 nd to the beginning of the 1 st century BC.

The four coins from the 3rd century BC are:

- 1 coin most probably from Ptolemy I, from the beginning of the 3rd century BC , found in the small channel built under room 103 to carry away the runoff from exterior space 100 . This channel was in use either throughout Phase II or only during Phases IIb and IIc.
- 1 coin from Ptolemy II or III, from the middle of the 3rd century BC, in a late pit dated to the last quarter of the 1st century AD by the ceramics it contained; the coin probably came from the sediments through which the pit was cut since it passes through all the architectural levels down to the substrate.
- 1 coin from Arados from the middle of the 3rd century BC on the level of fine earth resting on the red aeolian sand of the substrate by the spouted basin, on the outside of room 103 to the east. Given the erosion by the runoff in channel 9088 at this point the coin may come from Phase I as easily as from Phase IIa or IIb.
- 1 silver coin, a prototype of the Nabataean coinage, dated from the 3rd century BC found against the face of wall 4284 which, by its construction and orientation, is identified as belonging to the architecture of Phase II.
The six coins from the end of the 2nd and the beginning of the 1 st century BC are:
- 1 coin from Aretas II, in the upper floor of room 105, therefore from Phase IIc.
- 2 Nabataean coins from the anonymous series, which were found in the pavement of room 101 and the surrounding walls, so probably from Phase IIc or from later fill linked to the destruction of the buildings.
- 1 coin not clearly identified but which can only be from Seleucid mints or from the anonymous Nabataean series (both being of the same date) found in the sediments against the foundation walls of the first remodelling of the temenos, so either from the levels of Phase IIb or IIc, or in the fill of the foundation trench of this construction.
- 1 coin from the anonymous Nabataean series found in the small channel built under room 103, which was in use either throughout Phase II or only during Phases IIb and IIc.
- 1 coin of the same type, found in the large pit from the end of the 1 st century AD (see
above), but which most likely comes from one of the levels cut by the pit.
A cautious interpretation of these coins indicates that the architectural phase which we are studying probably began in the 3rd century BC or maybe, in the second half of that century if one is being very conservative. The most recent series appears to belong to the later phases, except the coins found in dubious contexts, which indicates that these levels were occupied right up until the first half of the 1st century BC. These conclusions are not disproved by the distribution of the pottery.

The following chronology is therefore posited.

Phase I corresponds to the installations preceding the architectural phase. There are deposits from occupation and isolated terraces which cannot be chronologically sequenced. The ceramics are clearly of Nabataean tradition but one should not ignore the possible mixing with material from earlier phases in the sandy sediments (prehistoric lithics and Edomite pottery?).

Phase II and the construction of the first built houses on the terrace of the Wādī Mūsā must begin during the 3rd century, and extend through the 2 nd century and the first half of the 1 st century BC.

Finally the buildings which form the 'oblique architectural level' seem to have been deliberately levelled around the middle of the 1 st century BC to permit the installation of the religious complex.

The traditional nomadic history of the first Nabataeans can be connected to the vestiges of Phase I. It is true that the variety of coarse wares, in marked contrast to the collections from the later phases, could indicate a degree of mobility of the population. However without the written evidence there would be nothing in the small amount of archaeological material available to indicate a nomadic lifestyle. On the other hand there is no doubt that from Phase II onwards, that is to say from the second half of the 3rd century BC, the Nabataeans, or at least part of their community, had settled and were gradually adopting a lifestyle in which Hellenistic influence is seen in the material culture.

Bound by the cliff to the west, the areas which we explored stretch eastwards along the banks of the Wādī Mūsā, as revealed by the soundings
taken along the colonnade. The most significant recent discoveries were made by D. Graf's team since 2004 , about 300 m east of the soundings discussed here. The five lower strata identified, primarily in sounding III, have been dated to the last centuries BC by the excavators (Graf et al. 2005: 422-426). The oldest, stratum I, rests directly on the natural gravel and is characterised by an irregular low wall to which no built flooring corresponds. This quite clearly corresponds with the Phase I which we have described. The next two levels have revealed similar sections of wall, and are separated by a level with no trace of buildings from the last 'pre-monumental level', stratum V. Stratum V is crossed by a wall made of larger and better arranged stones, and which can most probably be associated with our Phase II.

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# THE GREAT ARAB REVOLT PROJECT 2006 AND 2007 FIELD SEASONS 

Neil Faulkner, Nicholas J. Saunders and John Winterburn

## Introduction

The Great Arab Revolt Project (GARP) is planned as a ten-year project to investigate the history and archaeology of the Great Arab Revolt and the origins of the Hashemite Kingdom of Jordan, and through this investigation to develop new heritage tourism attractions, particularly in southern Jordan.

The archaeology of the First World War (and modern conflict generally) is a growing sub-discipline concerned with the investigation, conservation, and public presentation of sites and artefacts of this period. Archaeology can deepen understanding of recent conflicts by helping to locate and characterise sites, and by reconstructing the circumstances and 'materiality' of war. It can also connect with, and contribute substantially to, wide public interest in the First World War. Huge numbers - school parties, relatives of soldiers, and battlefield tourists - regularly visit sites on the Western Front. This interest is likely to increase as we approach the centenary of the war (2014-2018). Other theatres of the First World War have been little explored but offer great potential for research and public engagement with heritage. The remains in Jordan are especially important for six reasons:

1. They represent the struggle from which emerged the Hashemite Kingdom of Jordan, the modern Jordanian Army, modern Arab nationalism, and many of the states of the modern Middle East; they also have particular importance for the history of the royal family in Jordan.
2. They represent the collapse of the Ottoman Empire and therefore the background to the emergence of the modern Turkish nationstate and national identity.
3. They offer a range of military landscapes,
sites, and artefact assemblages, and a range of memories, associations, and modern significances, which contrast with the more familiar archaeology, commemoration, and tourism of the Western Front.
4. They are associated with the exploits and legend of Lawrence of Arabia, an iconic historical and cultural figure in the English-speaking world.
5. They represent one of the latest phases in a long sequence of human activities imprinted on the landscape in the archaeology of southern Jordan.
6. They are subject to rapid destruction and vandalism, due partly to development pressures, partly to folk myths about 'Ottoman gold', such that recording, public information, and preservation are urgent.

## The Organisation and Methodology of the Project (Fig. 1)

GARP is supported by the University of Bristol, the al-Hussein bin Talal University, the Jordanian Department of Antiquities, the Jordan Museum, the Council for British Research in the Levant, and HRH Prince Hasan. Generous support has also been given by Mr Tayseer Dhmour, Deputy-Governor of Ma‘ān, Engineer Hussein Kraishan, Director-General of the Aqaba Railway, the Chief of Police in Ma‘ān, and the Head of the Intelligence Department in Ma'ān.

The academic leaders of the project are Neil Faulkner and Nick Saunders. They are supported by two field directors, David Thorpe and David Hibbitt, and by four Jordanian colleagues, Hani Falahat, the representative of the Department of Antiquities of Jordan, Zeyad al-Salameen and Mansour Shqiarat of the al-Hussein bin Talal University, and Jihad Kafafi of the Jordan Mu-


1. General location map.
seum. Other current members of the team are: Fizz Altinoluk (planner), Ali Baldry (photographer), Susan Daniels (administrator), Cat Edwards (site supervisor), Jules Evan-Hart (metaldetectorist and finds specialist), Angie Hibbitt (geophysicist), Roger Ward (metal-detectorist and IT specialist), and John Winterburn (landscape archaeologist).

The project's main activity is a two-week fieldwork season in November involving a team of about 10 archaeologists and 15-20 volunteers, and the research, analysis, interpretation, and publication associated with this fieldwork. Two seasons have been completed (2006 and 2007),
and this summary report covers both. Work takes place at four distinct but overlapping levels:
Level 1: Archive research and general field reconnaissance in vehicles to locate and map military sites within the southern Jordan study area (broadly the area from the Wādī al-Hasā southwards to the Saudi border).
Level 2: Archive research, field reconnaissance on foot, and GPS-based surveying to identify and plot military sites and features within specific militarised landscapes identified at Level 1 (mainly, to date, in the area around Ma ān Station, and in the Wādī Rutm /Baṭn al-Ghūl / ‘Aqabat-Ḥijāz area.

Level 3: Metal-detector survey, geophysical survey, and measured ground survey to map and characterise a) groups of features forming coherent sites, and b) spreads of diagnostic artefacts, within the specific militarised landscapes surveyed at Level 2.
Level 4: Surface clearance, excavation, stand-ing-building survey, and detailed recording to characterise and phase typical and or significant features within the areas surveyed at Level 3.

## Ma‘ān: a First World War Trench Fortress (Figs. 2, 3 and 4)

In 1916-1918, Ma‘ān was one of the most important Turkish military bases in what is now southern Jordan. It was a major communications node with good water supplies. It lay on the ancient pilgrim route along the western edge of the desert that linked the cities of Syria with the holy cities of the Hijāz. It was also a traditional stopping-place for traders moving between the deserts to the east and such places as Petra, Gaza, and 'Aqaba. When the Hijāz Railway reached Ma'ān in 1904, the town comprised about 500 flat-roofed mud houses 1.5 km west of the station, with another 200 or so about a kilometer to the north; the total population was around 3,000 . A large station complex was established, and Ma'ān came to be regarded as the 'Gateway to Arabia'.

Control of Ma‘ān therefore gave the Ottoman Army a strong base for the accommodation of soldiers, matériel, and supplies that could be moved rapidly in any of several directions: by train north or south to support station garrisons under threat; by road westwards into the relatively rich, heavily populated, grain-producing uplands beyond the desert fringe; and again by road south-south-west along the route to the Red Sea coast and the port of 'Aqaba.

Because of its strategic importance, Ma‘ān was heavily garrisoned between the summer of 1917 and the autumn of 1918 by between 4,000 and 6,000 Ottoman troops, and in April 1918 it was the target of a direct (and unsuccessful) assault by Hashemite forces. The town and railway station were therefore heavily defended by trench-works. Many of these were recorded at the time on British air-reconnaissance sketches and photographs. We are currently researching various archives to flesh out the details of these
valuable resources. Many of the trenches survive as visible earthworks. A selection appear on a set of air photographs taken by Bob Bewley and David Kennedy in 2000, archive copies of which are held at the offices of the Council for British Research in the Levant in 'Ammān. These trenches and many others can also be seen on Google Earth (again, research is in progress). During the 2006 and 2007 field seasons, field reconnaissance and GPS survey by John Winterburn allowed us to map five groups of Ma‘ān trench-works on the high ground west of the Hijāz Railway, these are:

1. The Jabal Abū att-Tuyūr group immediately west of the station: It includes: two linear fir-ing-trenches 725 m and 500 m in extent; communication trenches serving these; at least two ring-trenches forming hilltop redoubts; four closely spaced and aligned artillery emplacements with two associated observation/ sighting positions; and a hilltop command-and-control bunker. Trench excavation revealed two main phases of activity, the first represented by shallow linear firing-trenches, the second by deeper, better constructed ring-trenches. It seems likely that a change in defensive tactics from linear firing lines to separate fire-bases with interlocking fields of fire is implied. The distribution of expended munitions recovered by metal-detector survey has been plotted along the main firingtrenches. Evidence has also been found between Jabal Abū aṭ-Ṭuyūr and Ma‘ān Station for a possible Ottoman Army camp, with low earthworks representing sizeable rectangular buildings of standard size (approximately 30 x 10 m ) and in regular alignment, as well as the probable site of a group of bell-tents.
2. The 'Northern Ridge' group approximately 1 km to the north: It comprises one main linear trench of 500 m and up to four redoubts.
3. The 'Southern Ridge' group approximately 1 km to the south-west: It comprises a linear trench of 400 m , with a second trench laid out, surviving as a distinct earthwork, but never cut (Further out again, 2km to the south-east, is another 220 m extent of linear firing-trench).
4. The 'Western Hillock' group lies approximately 0.5 km to the west: It comprises a hilltop redoubt and a communication trench.

5. Plan of trenches on the Jabal Abū at-Tuyūr west of Ma'ān Station.

6. Air photo of the Jabal Abū at-Tuyūr trench system taken by Bob Bewley and David Kennedy in 2000.
7. The Jabal Samnah group lies approximately 6.5 km to the west: It comprises a series of trench systems and associated tentage extending northwards along the Samnah Ridge. A large redoubt lies 300 m north of the point
where a main road cuts through the ridge.
Wādī Rutm / Baṭn al-Ghūl / 'Aqabat-Ḥijāz: a Heavily Defended Desert Railway (Figs. 5-8)

Our second 'Level 2' study area is centered on three former Hijāz Railway stations approximately $50-60 \mathrm{~km}$ south-south-east of Ma‘ān adjacent to the desert highway: these are, from north to south, 'Aqabat-Hijāz (at 50 km ), Baṭn al-Ghūl (at 55 km ), and Wādì Rutm (at 60 km ). Work so far has concentrated on the southernmost, Wādì Rutm Station. The following sites within the study area have been explored:

1. The ruined buildings of 'Aqabat-Hijāz Station: Rapid survey, surface clearance, and standing-building recording has provided a basic plan and description of a small fort formed of Late Ottoman station buildings and associated improvised breastworks and blockhouses. This site is under extreme threat from industrial development and private 'gold-digging'.
2. The ruined 16 th century fort and cisterns at Fașsū 'ah: These lie in a wadi approximately 1.7 km west of 'Aqabat-Hijiāz Station. They were reused in the Late Ottoman period to supply water to the railway via a mule track, and trenches and breastworks on the surrounding heights have been recorded.
3. The site of Baṭn al-Ghūl Station: This has been identified and plotted; no standing buildings survive.

4. General view of trenches on the Jabal Abū at-Tuyūr looking approximately west from the Northern Redoubt.

5. Plan of Wād̄̄ Rutm militarised landscape.
6. The site of an Ottoman Army camp at Baṭn alGhūl: This has been identified and plotted. It is represented by stone tent-rings and such diagnostic finds as Ottoman Army uniform buttons.
7. A large ruined fort on the escarpment above Baṭn al-Ghūl Station: This has been identified and plotted. It comprises an outer perimeter wall with sentry posts, and an inner complex of defended courtyard building with associated breastworks, trenches, and blockhouse. Various trackways link the fort with other positions, and there is a large ex-
tramural oven. Fașṣū‘ah Ridge (as we are calling this site) is believed to be the former Ottoman command-and-control centre for the entire area.
8. The Hijāa Railway embankment. This comprises a modified extent that is still in use as an industrial railway, and an extent that is now redundant running from the Baṭn alGhūl escarpment down Wādī Baṭn al-Ghūl and the Wādi Rutm. The remains include cuttings through rock and a gravel embankment. Careful examination was made at Wādī Rutm Station, which includes a substantial

9. An Ottoman station building with improvised defenses.

10. An Ottoman Army 'tent-ring'.

11. Ottoman Army uniform buttons from the Wādī Rutm camp.
siding and passing place. All rails and sleepers have been removed, though a rail section, several sleepers, and numerous fish-plates, bolts, and other railway engineering artefacts have been found on the site. The line of the embankment close to Wādi Rutm Station has been GPS plotted, a section through it
has been cleared and recorded, and railway engineering artefacts have been comprehensively catalogued.
12. The ruined buildings of Wādī Rutm Station. Three Ottoman station buildings, which we have numbered 1, 2 and 3 from north-west to south-east, survive. All are ruinous and roofless, though 1 is otherwise fairly wellpreserved, 2 is largely demolished with only one wall and a corner surviving, and 3 has substantial wall survival. These three buildings stand on what appears to be a siding and passing place on relatively low-lying ground. The buildings, especially Building 1, have been partially cleared and fairly comprehensively recorded, and all show evidence for improvised fortification.
13. The old pilgrim road: a stone-paved caravan and pilgrim road that ran roughly parallel with the railway embankment through the Wādī Rutm. It branches into two as it approaches the caravan site (see below) from the north-west. This road was in use until the modern desert highway was built, and several short stretches have remains of an asphalt layer on top of the stone-paved base. The line of the road close to Wādì Rutm Station has been GPS plotted.
14. An ancient caravan site: a probable place of assembly, camping, and trading on the paved road roughly abreast of the railway station. The site is represented entirely by finds of coins and other small metal objects of medieval and later date. The site has been metal-detected and its location and approximate limits defined. A total of 101 coins were recovered in 2006, and analysis has shown these to span the entire period from the first century AD to the present, with a predominance of Mamluk and Ottoman coins.
15. A defended Ottoman Army camp on a commanding hill approximately 1 km north-west of Wādī Rutm Station. The hill dominates the railway to the north-east and the road through the wadi to the south-west. The main archaeological characteristics of the site are: firing dugouts with stone parapets at either end of the hill; approximately 20 stone tent-rings across the plateau; numerous finds of domestic military artefacts such as tins
and buttons; and an oven pit, a latrine, and a probable parade ground and sundial. The site has been fully surveyed, excavated, and recorded.
16. A small defended observation post on a hillock 200 m north-west of Wādī Rutm Station. Most of the hillock has been quarried away, probably for gravel for railway embankments during an abortive modern (1960s?) reconstruction project. The feature, which may have been an observation post and/or a firing position (for a machine-gun?), appears to have been deliberately respected during quarrying. The location of the site has been plotted.
17. A ruined fort at Wādī Rutm. A hilltop defensive complex comprising a small fort, a defended occupation area, outworks formed of trenches and breastworks, and mule tracks down to the wadi, has been identified and GPS-surveyed on the high ridge on the northeast side of Wādī Rutm, approximately 1 km from the station. Metal-detector survey has revealed significant quantities of expended munitions.

## Conclusions

The first two seasons of the Great Arab Revolt Project have confirmed the huge potential of modern conflict archaeology in southern Jordan. We have revealed an extensively militarised landscape designed to defend wide areas against a threat which appears to have been, on the one hand, dispersed and low-intensity, but on the other, chronic and pervasive. The archaeological imprint, reflecting a very different kind of war, contrasts sharply with that of the Western Front. Early results have fully vindicated the decision to establish the Great Arab Revolt Project, and give every reason for assuming that the project will fulfill all its aims and realise our highest expectations in the years ahead, culminating in the creation of new heritage tourism attractions for southern Jordan, and possibly a complete 'Lawrence of Arabia trail'.

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# THE 2007 SEASON OF THE WĀDĪ ASH-SHUQAYFĀT SURVEY IN THE GREATER WĀDĪ AL-MŪJIB AREA 

Friedbert Ninow

## Introduction

The Central Moabite plateau and the Dhībān plateau are separated by a deep gorge, the Wādì al-Mūjib, which forms an impressive canyon. Wādī al-Mūjib cuts deep into the plateau-landscape, which ranges between 750 to 900 m above sea-level. At various points the slopes drop up to 700 m into the depth. Wādì al-Mūjib empties into the Dead Sea at ca. 400 m below sea-level. During the time of the Moabite King Mesha this wadi was called "Arnon".

Wādì al-Mūjib has various tributary systems. A major one is the northern one coming from the Dhibān plateau, which unites with the main arm ca. 2.5 km east of the Dead Sea. Its lower section is called Wādi Hidān; its central section with its main site Khirbat Iskandar is called Wādī al-Wāla, and its upper segment Wādī athThamad with Khirbat al-Mudayna as one of the major sites in this vicinity. Just east to the point where a modern dam holds back the winter rains, Wādī al-Mūjib bifurcates into an eastern and southern major tributary. The eastern arm, Wādī as-Su'aydah and Wādī as-Sāliyah, climbs up the eastern plateau, collecting various smaller tributaries in the area of Qaṣr Bashir, Qaṣr al‘ $\bar{A} l$, and Qassr ath-Thurayya. The southern arm is called Wādì an-Nukhaylah, further to the south it is called Wādī ad-Dabba and Wādì al-Lajjūn (see Fig. 1). Wādī ash-Shuqayfāt is part of the southern tributaries that empties into Wādì anNukhaylah ca. 5 km south-east of the modern dam. Near the plateau Wādī ash-Shuqayfāt bifurcates into Wādī Abū al-Kibāsh (southward) and Wādī al-Bālū‘ (westward; see Fig. 2).

The first season of the reconnaissance survey of this area was carried out in August 2001. During this campaign, various sites, especially at the mouth of Wādì ash-Shuqayfāt were reg-
istered (where Wādī ash-Shuqayfāt empties into Wādì an-Nukhaylah, the southern arm of Wādì al-Mūjib; see Ninow 2002a, 2002b). Among the most important of these sites is a large Early Bronze site ( $31^{\circ} 24^{\prime} 50.37^{\prime \prime} \mathrm{N}$; $35^{\circ} 49^{\prime} 51.50^{\prime \prime} \mathrm{E}$ ), which has been partially destroyed by modern intrusion. Opposite, across Wādì ashShuqayfāt on a slope towards the north, is an Early Iron Age site, Khirbat al-Mu'mmariyya ( $31^{\circ} 24^{\prime} 46.00 " \mathrm{~N} ; 35^{\circ} 49^{\prime} 17.03{ }^{\prime \prime} \mathrm{E}$ ). Khirbat alMu'mmariyya stretches from the summit of Jabal al-Mu'mmariyya downward along the eastern slopes in form of a huge triangle. The massive city walls formed by a casemate wall with a width of almost 5 m are already visible from the distance. One can get a good overview of the site from the northern tip of the Khashm as-Sanina plateau southeast of Khirbat al-Mu'mmariyya (see Fig. 3). The northern and southern city walls have a length of about 300m.

In the years 2002 to 2005 a couple of small sondages were conducted by a team from Theologische Hochschule Friedensau (Germany) at Khirbat al-Mu'mmariyya (see Ninow 2004, 2005, 2006). The results show, that Khirbat alMu'mmariyya was occupied exclusively during the Early Iron Age. From this period a number of site are known at the northern edge of the Central Moabite plateau: Mudayna al-‘Āliyah al-Mūjib ( $\left.31^{\circ} 25^{\prime} 45.86^{\prime \prime} \mathrm{N} ; \quad 35^{\circ} 44^{\prime} 1.77^{\prime}{ }^{\prime} \mathrm{E}\right)$, al-Balū‘a ( $31^{\circ} 21^{\prime} 35.97{ }^{\prime} \mathrm{N} ; \quad 35^{\circ} 466^{\prime} 56.31^{\prime \prime} \mathrm{E}$ ), Mudayna al-Mu'arrajah ( $31^{\circ} 19^{\prime} 21.55^{\prime \prime} \mathrm{N}$; $35^{\circ} 51^{\prime} 47.33^{\prime \prime} \mathrm{E}$ ) and Mudayna al-‘Āliyah ( $31^{\circ} 16^{\prime} 55.58^{\prime N}$; $35^{\circ} 52^{\prime} 17.27^{\prime}$ E; see Fig. 4). Khirbat al-Mu'mmariyya shares a number of similarities with these other sites: occupation during the early part of the Iron Age, extensive and massive fortification systems, and similar


1. Greater Wādī al-Mūjib with its tributaries.
pottery and architecture. All sites are situated in close proximity to the edge of the plateau. Khirbat al-Mu'mmariyya is the only site that did not command its surroundings from the top/edge of the plateau, but rather controlled the wadi bed itself (i.e., Wādī ash-Shuqayfāt and part of Wādī al-Mūjib). During the 2001 season various other sites could be located: among these are Khirbat Abū as-Samin $\left(31^{\circ} 24^{\prime} 17.00\right.$ " N ; $35^{\circ} 49^{\prime} 28.00^{\prime \prime} \mathrm{E}$ ), a site that had been occupied mainly during the Iron Age and the NabateanRoman period; Qaṣr ar-Raḥa ( $31^{\circ} 24^{\prime} 8.72$ " N ; $35^{\circ} 49^{\prime} 19.71^{\prime \prime} \mathrm{E}$ ), an impressive fortification that also yielded pottery from the Iron Age into the Nabatean-Roman period.

During the 2007 season of the Wādī ashShuqayfāt Survey the area under investigation stretched from the plateau edge where the mod-
ern road coming from al-Karak plunges into the depth of Wādī al-Mūjib, covering the slopes toward the east down into the bed of Wādì anNukhaylah, and southward alongside the rim of the plateau edge and its slopes following Wādī ash-Shuqayfāt towards the south (see Fig. 5). Due to the very difficult terrain we could not cover every square inch of the area; we investigated those areas that we could reach by foot without mountain gear.

During the 2007 survey season around 150 more sites were discovered and registered, bringing the total site count of both surveys up to almost 200. The survey shows that the wadi was more densely and more frequently occupied than previously thought. The newly registered sites include occupation from the lithic periods, Early Bronze, Iron Age, Roman-Nabataean, and

2. Wādī ash-Shuqayfāt.

Islamic periods. The following list represents a selection that shows the variety of sites that have been registered. The position of each site has been registered by Global Positioning System (GPS).

## Catalogue of Sites

Site \#53 - Rujum

- Position: N 31 25’ 46.6; E 35 49’ 00.7
- Elevation: 317m
- Due to the recently constructed dam a new road leading southeastward into Wādī anNukhaylah had to be built on a higher elevation. This road passes by a heap of black basalt stones mixed with light brown limestone slabs. Since the pottery discovered can be dated exclusively to the Roman period, it appears as
if the Roman had built a large watch tower at this point to have quick access to the Wādi alMūjib bridge that crossed the stream just north of the Rujum.
- Pottery: Roman.

Site \#54 - Fort

- Position: N 31 25' 46.6; E 35 49’ 15.3
- Elevation: 292m
- Just further to the SE of the Rujum across a small wadi there is Roman fort built mainly from basalt stones that seems to be the main fortification in the lower part of Wādī anNukhaylah. Its seize is ca. $25 \times 17 \mathrm{~m}$. The architecture of the southern part of the fort is not as clear as the remaining sections. It appears as if there was a tower in the southern part of the



4. Iron I sites at the northern edge of the Central Moabite plateau.

5. Survey Area 2001 and 2007.
fort (see Fig. 5).

- Pottery: Roman.


## Site \#55 - Ascent

- Position: N 31 25’ 59.8; E 35 48’ 18.7
- Elevation: 583m
- Just beneath the first major bend of the modern road that turns again to the west, a small track leads down into the wadi in small serpentines. Roman pottery can be found in the vicinity of the track.
- Pottery: Roman.

Site \#57-Petroglyphs

- Position: N 31 26’ 01.3; E 35 48’ 18.9
- Elevation: 566m
- A huge slab covered with petroglyphs; mainly ibexes; possible letters; modern Arabic inscrip-
tions added
- No Pottery.


## Site \#58 - Cairns

- Position: N 31 26’ 00.2; E 35 48' 25.2
- Elevation: 507m
- Two cairns; a larger one and a smaller one; the larger one has a main circle with larger stones; further outside circles with smaller stones.
- No Pottery.


## Site \#66 - Khirbat

- Position: N 31 25’ 54.2; E 35 48’ 34.7
- Elevation: 455m
- Various wall lines made of black basalt stones; the site is situated on a ridge overlooking the wadi; adjacent to the side (further up the slope) a modern Bedouin cemetery is located.
- Pottery: IR I and Roman.

Site \#68-Cairns

- Position: N 31 24’ 47.8; E 35 50’ 06.8
- Elevation: 288m
- Group of cairns on a narrow shoulder; much erosion; various Chalcolithic/Early Bronze Age lithics.
- No Pottery.

Site \#70 - Quarry

- Position: N 31 24’ 47.0; E 35 50’ 02.5
- Elevation: 315m
- This quarry either provides the building material for the cairns nearby or/and for a major Early Bronze site which is just around the corner; possibly in use during the Early Bronze period and/or during the Roman period.
- No Pottery.

Site \#73-Tower

- Position: N 31 24’ 51.0; E 35 50’ 12.0
- Elevation: 236m
- A guarding station; just above the wadi bed of Wādī an-An-Nukhaylah; $5.3 \times 4.7 \mathrm{~m}$; a small entrance is located at the southern side of the building; the site is used by modern Bedouins.
- Pottery: Roman; scattered Neolithic flints.

Site \#75 - Flint Site

- Position: N 31 24’ 51.8; E 35 49' 55.2
- Elevation: 262m
- Slope covered with Neolithic flints.
- No Pottery.

Site \#85 - Ascent

- Position: N 31 26’ 09.5; E 35 47’ 50.7
- Elevation: 790m
- Ascent that reaches the plateau north-east of Upper Maḥaṭat al-Hajj the main fort guarding the Via Nova Traiana reaching the Central Moabite plateau at this point.
- Pottery: Roman; however, it is not clear whether this ascent had been in use prior to the Roman period.

Site \#87-Site

- Position: N 31 25’ 58.5; E 35 48’ 04.0
- Elevation: 794m
- At this point the surface is covered with lots of Roman pottery; there are no clear wall lines;
from this point one has a very good overview of Wādī an-Nukhaylah; modern construction work has added possible damage to the site.
- Pottery: Roman.


## Site \#90-Khirbat

- Position: N 31 25’ 37.7; E 35 48’ 14.9
- Elevation: 775m
- This site is located on a lower plateau; various scattered wall lines.
- Pottery: IR, Roman and Early Islamic.


## Site \#95-Cairns

- Position: N 31 24’ 33.5; E 35 49́ 43.5
- Elevation: 362m
- Various cairns along a ridge.
- No Pottery.


## Site \#96-Track

- Position: N 31 24’ 23.6; E 35 49' 55.2
- Elevation: 472m
- A track that leads up to the tip of the Khashm as-Sanīna plateau; partially cut into the rock.
- No Pottery.

Site \# 098 - Tower

- Position: N 31 25’ 12.4; E 35 48’ 14.8
- Elevation: 820m
- Possible tower.
- Pottery: Roman.

Site \#100 - Wall Lines

- Position: N 31 25’ 07.1; E 35 48’ 23.3
- Elevation: 793m
- Wall lines on a lower plateau beneath the edge of the main plateau.
- Pottery: EB and Roman.

Site \#110-Petroglyphs

- Positions: N 31 24' 13.5; E 35 48' 29.1
- Elevation: 706m
- Ibexes and another animal with big horns.
- No Pottery.


## Site \#112-Cairns

- Position: N 31 24’ 20.3; E 35 48’ 54.2
- Elevation: 645m
- No Pottery.

Site \#119-Ascent

- Position: N 31 22’ 23.6; E 35 49́ 06.6
- Elevation: 784m
- Ascent leading from the upper Wādī ashShuqayfāt up onto the Khashm as-Sanina plateau.
- No Pottery.


## Site \#134 - Petroglyphs

- Position: N 31 22’ 04.2; E 35 48’ 01.3
- Elevation: 687m
- Hunting scene.
- No Pottery.


## Site \#138 - Small Fortress

- Position: N 31 22’ 12.0; E 35 47’ 53.2
- Elevation: 778m
- Just beneath the edge of the main plateau a small fortress is located; its size is $22 \times 11 \mathrm{~m}$; the outline of the fort is formed by walls of rubble; there are no structures inside of the fort; the location just beneath the plateau guards the fortress from the winds that blow across the plateau; just below the fortress a rounded area (cleared from the black basalt rubble) served possibly as a shelter for animals.
- Pottery: Roman.


## Site \#139-Tower

- Position: N 31 22’ 14.0; E 35 47’ 52.3
- Elevation: 791m
- Just above the small fortress, right at the edge of the plateau, a round watch tower is located; it appears as if this tower was guarding the fortress; the tower has a diameter of 4.5 m with a wall width of 1.0 to 1.2 m ; its location allowed a good view above the fortress into the wadi, but also a good view to the north across the plateau and toward a major route that crosses to the north.
- Pottery: Roman.


## Site \#148-Terraces

- Position: N 31 21' 52.8; E 35 48' 11.9
- Elevation: 610m
- Above the point where Wādī ash-Shuqayfāt bifurcates into Wādī Abū al-Kibāsh and Wādī al-Bālū‘, traces of wall lines can be seen; they are possible remains of ancient terraces or foundations of a road that led upwards from the wadi bed.
- No Pottery.

Site \#160 - Field of Tumuli

- Position: N 31 25’ 11.4; E 35 49’ 08.6
- Elevation: 379m

Site \# 169-Dam

- Position: N 31 25’ 48.8; E 35 49' 06.4
- Elevation: 272m
- Remains of several dams built into one of the small wadi cuts.
- No Pottery.

Site \# 180-Stone Circle

- Position: N 31 25' 56.9; E 35 48' 51.4
- Elevation: 356m
- The diameter of this stone circle is about 10 m .
- No Pottery.


## Site \# 185-Building

- Position: N 31 25’ 57.4; E 35 49’ 09.8
- Elevation: 285m
- Remains of a big building; $11 \times 18 \mathrm{~m}$; possible later addition/extension at the northern side of the building by 5 m .
- Pottery: Roman.

Site \# 189-Cairns

- Position: N 31 23' 39.2; E 35 49’ 24.9
- Elevation: 723m
- A number of cairns on a lower plateau near the tip of the Khashm as-Saninna plateau.
- No Pottery.


## Summary

Ancient travelers who wanted to cross Wādī al-Mūjib with its various sub-wadi systems from North to South (or vice versa) had to find their way on winding tracks traversing the steep slopes of the wadi, or follow one of the tributary wadis that led upwards until they finally reached the plateau. Wādī ash-Shuqayfāt seems to be a natural approach to the southern Central Moabite plateau since it cuts deep into the plateau and reaches the major site of Khirbat alBālū". The numerous sites and installations of Wādī ash-Shuqayfāt - many of them well fortified - indicate that this route through the wadi was frequently in use throughout the centuries. At various points the course of this route can be traced (see Fig. 6). From this main route that led through the wadi many smaller tracks branched off and ascended to the edge of the plateau. The

6. Ancient route through Wādī ash-Shuqayfāt.
western edge and slopes of Wādī ash-Shuqayfāt seemed to be more frequently and densely occupied than the eastern part (this is due to the geomorphic situation of the eastern slopes; and furthermore, the area west of Wādì ash-Shuqayfāt provides better economic possibilities).

The Nabataean and Roman presence in this wadi system is surprisingly well attested. In 64BC the Roman general Pompey had formed the province of Syria thus establishing Roman power and control in this region. However, at this time he had not been able to crush the Nabatean forces; they remained a power to reckon with. In the following decades the Nabatean kings became dependents of the Roman Empire; yet with considerable autonomy. By the time of the annexation of the Nabatean kingdom in 106AD, the area of its domain had become very extensive, covering also the Central Moabite Plateau. When the Roman army became the ruling power in this area, its territory was incorporated into the new province with the name Arabia. In order to maintain an effective administration in the area east of the River Jordan, the Romans
built new roads to connect the various areas of the new province. The most important one that run the length of the province was the Via Nova Traiana that had its one end at Bosra near the border with the province of Syria and its other end at Ayla ('Aqaba). It connected the area east of the Decapolis, Philadelphia ('Ammān), ancient Moab and Edom. The date of its construction according to various milestones has been established between 111 and 114AD.

While it seems that the Nabateans did not consider alternative routes climbing down into Wādī al-Mūjib while travelling northward (i.e., passing through Wādī ash-Shuqayfāt), the Romans did not use the geomorphic advantage of natural wadi descends but crossed directly Wādī al-Mūjib climbing up the steep slopes, often in narrow serpentines. Even today the point is visible where the Via Nova Traiana reaches the Central Moabite Plateau at almost the same point where the modern asphalt road climbs the plateau (at the site of the Upper Mahaṭat al-Hajj).

However, the survey shows that the Romans did not neglect the old access to the Central Moabite Plateau; Wādī ash-Shuqayfāt remained an alternative option for them. Various installations such as watchtowers, forts, tracks, and other architectural remains point to the presence of the Romans in this area and to the fact that they considered this an important area that they had to guard. It appears that various secondary roads extended eastward from the Via Nova Traiana connecting this major highway with the Wādī ash-Shuqayfāt approach and further with the Roman road that crosses Wādi an-Nukhaylah and climbs up to the small fort of Maḥaṭat al-Hajj (this road probably continues further toward the east, connecting with one of the major fort scattered throughout the eastern desert - possibly Qaṣr Bashir which is one of the best preserved Roman forts in Jordan). While it is known that there are major roads branching off the Via Nova Traiana towards the east, the Wādī ash-Shuqayfāt Survey Project has confirmed that there existed also such roads between the Via Nova Traiana extending towards Wādī ash-Shuqayfāt to the east.

Besides the prevalent Roman presence in the survey area, other remains from various periods were attested. While lithic material was scarce-
ly scattered throughout the slopes, the edge of the plateau (especially the plateau east of Wādi ash-Shuqayfāt) yielded numerous stone tools. Several sites with substantial Early Bronze occupation were added to the list of EB-sites in this area.

With the completion of Wādi ash-Shuqayfāt Survey Project 2007 a small but important part of the greater Wādì al-Mūjib area has been archaeologically surveyed. While one of the most prominent sites within the survey area, the Early Iron age fortification of Khirbat al-Mu'mmariyya ( $31^{\circ} 24^{\prime} 46.19^{\prime \prime} \mathrm{N} ; 35^{\circ} 49^{\prime} 16.44^{\prime \prime} \mathrm{O}$ ) has been studied during the past years, several other sites could be recommend for further study: Site \#52 ( $31^{\circ} 24^{\prime} 49.86^{\prime \prime} \mathrm{N}$; $35^{\circ} 49^{\prime} 52.31^{\prime \prime} \mathrm{O}$ ), a midsize EB site overlooking the mouth of Wādi ash-Shuqayfāt; Qaṣr ar-Raḥa ( $31^{\circ} 24^{\prime} 8.53^{\prime \prime} \mathrm{N}$; $35^{\circ} 49^{\prime} 19.42^{\prime \prime}$ ), a fort that has a long occupational history; or Khirbat Abū as-Samin ( $31^{\circ} 24^{\prime} 16.57^{\prime \prime} \mathrm{N} ; 35^{\circ} 49^{\prime} 28.38^{\prime \prime} \mathrm{O}$ ) with mainly Iron Age and Nabatean/Roman occupation.

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# GROUND-TRUTHING AT WĀDĪ RAMM: A FOLLOW-UP TO THE 2005 GPR SURVEY 

Megan A. Perry and Geoffrey L. Jones

The site of Wādī Ramm (ancient Iram) was a small Nabataean religious and trade center located in the Hisma region of southern Jordan. Previous excavations at Ramm have not extended beyond the temple and bath complexes in the site center, nor have they located any mortuary remains associated with these features (see Dudley and Reeves 1997; Horsfield and Savignac 1935; Kirkbride 1960; Savignac 1932, 1933; Tholbecq 1998). In 2005, we employed ground penetrating radar (GPR) at Wādī Ramm to map subsurface archaeological features in unexplored areas of the site, with a primary emphasis on locating ancient mortuary features (Perry and Jones 2005). Seven grids (Blocks A-F) totaling $8300 \mathrm{~m}^{2}$ were explored within the environs of the Nabataean temple and bath/villa complexes and "southern village" (Fig. 1). GPR data were collected along parallel traverses spaced at 1 m intervals across these blocks. This rather coarse traverse interval was adopted to maximize horizontal coverage while still providing reasonable resolution, a compromise made because of delays resulting from logistical problems. GPR data were used to produce time-slices, or planview maps, isolating specific depths. These time-slices thus provided indications of subsurface features differing substantially from the surrounding soil matrix.

All seven blocks surveyed had GPR anomalies that were thought to express ancient architecture. Although it was often weak or poorly defined, their linear/rectilinear patterning was very suggestive of cultural origins. Six out of seven blocks also contained more discrete anomalies that could indicate graves. Furthermore, two tomb-like features were noted on the surface in Area F. In 2007 we excavated seventeen separate soundings in Areas A, D, E, F, and

G in order to explore these surface features and subsurface anomalies. Here we present some of the results of ground truthing, focusing on the utility of using GPR in desert environments to locate a variety of subsurface features.

## Area A

Three $2 \mathrm{~m} \times 2 \mathrm{~m}$ trenches were placed in Area A, located on a slope ca. 15 m east of the villa/ bath complex, to explore two areas of linear patterning and two discrete reflectors possibly indicating tombs (Fig. 2). Trenches A.1, A.2, and A. 3 failed to reveal any significant archaeological features. A few artifacts were recovered from the topsoil stratum in Trenches A. 1 and A.2, but the subsoil layers in all trenches only contained naturally deposited pebbles and small cobbles down to 1.25 m below the surface. The ceramic sherds recovered in the topsoil, primarily Early or Late Roman in date, likely were transported downslope from the first century AD villa/bath complex and adjacent structures.

## Area D

Two $2 \times 2 \mathrm{~m}$ trenches in Area D, on a slope ca. 20 m north of the villa/bath complex, were established to clarify one subsurface linear anomaly and one wall feature noted on the surface (Fig. 3). No archaeological features, with the exception of the wall, were uncovered in this area. Trench D.1, similar to the soundings excavated in Area A, only contained Early/Late Roman artifacts in the topsoil layer that likely had washed down from the area of the villa/bath complex. A 0.25 m layer of naturally-deposited cobbles and pebbles were identified ca. 0.25 m below ground level.

Excavation in Trench D. 2 uncovered a 2.25 m long portion of a 0.75 m thick and 0.63 m high


1. Map of the areas surveyed showing posited and known archaeological features.

2. Time slices of Area A showing location of excavation trenches.

3. Time slices of Area D showing location of excavation trenches.
wall running approximately east to west ca. 60 m north of the bath/villa complex (Fig. 4). Excavation of loose, sandy topsoil and subsoil did not uncover any surface or other features associated with the wall. No artifacts were discovered be-
low the topsoil level, with the exception of one Early Roman/Nabataean bowl fragment. The wall may have served as a boundary marker or perimeter wall to the ancient sanctuary, but the date of the wall could not be established.

4. Wall of unknown date in Trench D.2.

## Area $E$

Three trenches were placed in Area E, on the slope to the south of the eastern complex and temple, to investigate two linear subsurface patterns and an area of high-amplitude response extending across the northern portion of the survey area, apparently caused by fill on top of a horizontal stratum below the modern top of the landform (Fig. 5). Excavation in $2 \mathrm{~m} \times 2 \mathrm{~m}$ Trench E. 2 was halted soon after it began due to its incorrect placement in Area E. Trench E.3, also a $2 \mathrm{~m} \times 2 \mathrm{~m}$ trench, contained naturally deposited cobbles and pebbles just below the topsoil. A small ash feature, possibly a hearth, was incorporated into the top layer of cobbles. Early and Late Roman ceramics were recovered from

5. Time slices of Area E showing location of excavation trenches.
the cobble layer underneath the hearth, implying that it resulted from later human occupation in the area. Excavation in the trench ceased at 1.25 m below ground level.

Trench E. 1 was a 2 mx 6 m trench situated to explore a linear anomaly at the northern end of Area E in addition to the high-amplitude response noted above. The loose, pebbly, sandy topsoil and more compact subsoil with fewer pebbles contained very few artifacts and no architecture features. The second stratum, Locus 2 , partially consisted of a thick layer of alluvial deposits concentrated on the northern end of the trench and tapering off to the south (Fig. 6). This wash/tumble layer of large pebbles and small cobbles may have resulted in the high-
amplitude response noted above. No other features were noticed in this trench to a depth of 1.65 m .

## The Cemetery in Area $F$

Seven trenches in Area F, on a small alluvial fan ca. 100 m to the southwest of the temple complex, served to explore two surface features, possibly tombs, in addition to a linear subsurface feature and a discrete anomaly at the southern end of the area (Fig. 7). Three trenches uncovered two primary, single burials, and four trenches uncovered a monumental tomb located just outside of the eastern edge of the GPR survey area. One trench did not reveal any evidence of archaeological features.

6. East section in Trench E.1 showing layer of cobbles and pebbles possibly picked up by the GPR.

7. Time slices of Area F showing location of excavation trenches.

## The Cist Tomb in Trench F. 1

The $2 \mathrm{~m} \times 3 \mathrm{~m}$ Trench F. 1 was situated to investigate a surface feature resembling the corner of a cist tomb noticed in 2005. Removal of the loose topsoil revealed a cist tomb constructed with partially worked sandstone slabs containing a poorly preserved adult individual (Fig. 8). The top of the western end of the 0.20 m high cist tomb was located ca. 0.20 m under the modern surface, while the southern end was exposed. The $10-60 \mathrm{~cm}$ GPR slice does not indicate any anomaly representing the cist tomb structure, however.

The cist tomb contained a single, very poorly preserved individual surrounded by medium compact sandy fill. The sandstone slab at the foot of the grave was decorated with 10 circular impressions arranged into two rows. A small blue glass bead (RO \#07.1) was recovered from within the fill above the body. The bones in this grave had been mostly replaced by small rootlets, with the exception of the dentition and a few parts of the lower limbs, prohibiting any assessment of sex or age beyond identifying this individual as an adult. Despite the poor preservation, a few observations could be made. This person was interred on his/her back, with legs and arms extended, and the skull slightly facing the north. Just to the right and above the head, a small glass bowl was discovered in situ, although taphonomic processes had broken it into numerous small fragments. The entire body apparently was covered with leather (RO \#07.14), upon which some textile impressions could be seen. Nine iron spear points (RO \#07.2-07.10)
were recovered to the right of the pelvic region and upper leg, which apparently had been hafted on to wooden spears that were not preserved in the burial environment (Fig. 9). Further investigation of the spears and glass will provide a date for the burial, although the body orientation and an Early Roman/Nabataean body sherd in the grave fill implies that the burial dates between the Early Roman/Nabataean and Late Byzantine/Early Islamic eras.

The Monumental Tomb in Trenches F.2, F.3, F.5, and F. 7

Four $3 \mathrm{~m} \times 3 \mathrm{~m}$ trenches, F.2, F.3, F.5, and F. 7 were laid out to explore another surface feature resembling a tomb that was noted during the 2005 season. This tomb was not included within the area explored by the GPR in 2005. It was apparent at the beginning of the field season that this structure had been significantly disturbed through human activity since it was last visited in 2005; local informants stated that the robbing

9. Spear point (RO\#07.10) recovered from cache in Trench F. 1 burial.

8. Burial in Trench F.1.
had occurred during the past two months (Fig. 10). Most of the disturbance involved displaced ashlar blocks from the upper sections of the structure, in addition to the lifting of sandstone pavers and excavation beneath the floor level.

Excavation revealed the plan of a large partial cruciform-shaped tomb structure measuring almost 5 m N -S by 5 m E-W (Fig. 11). The tomb consists of a square central room with rectangular 2 m X 2 m rooms off to the north, west, and south, all constructed from sandstone ashlar blocks sitting on a cobble foundation (Fig. 12). The northern room was divided with a ca. 0.18 m wide sandstone block that provided a double repository. The northern and southern rooms and the central area were paved with sandstone paving stones. Portions of these paving stones
in the western room and the eastern sector of the central room had been removed by looters. Remnants of plaster adhering to the divider of the northern room suggest that the interior of the tomb had originally been covered in plaster.

The paving stones in the central room originally covered a ca. 1.5 m E-W x 1.10 m N-S chamber. The interior face of the chamber was constructed with ashlar sandstone blocks with the exception of the northern side, while the outside portion consisted of unfinished cobbles. The chamber itself is divided into two E-W compartments (southern compartment $=0.52 \mathrm{~m}$ wide; northern compartment $=0.35 \mathrm{~m}$ wide) by a single row of ashlars two courses $(0.48 \mathrm{~m})$ tall. The eastern section of this divider was not in situ. The southern compartment and the east-

10. Before and after pictures of the monumental tomb in Trenches F.2, F.3, F. 5 and F. 7 showing recent disturbance.

11. Monumental tomb in Area $F$ (view to the $S$ ).

ADAJ 52 (2008)

12. Plan of monumental tomb
in Area $F$.
ern end of the northern compartment contained disturbed soil that included cobbles in addition to ceramics and disturbed human and faunal skeletal remains. The western end of the northern compartment on the other hand contained homogeneous sandy fill with no artifacts. The subfloor chamber thus was robbed, likely first in antiquity, and the tomb robbers discovered that only the northern compartment was devoid of artifacts and skeletal remains once they removed part of the ashlar divider. That the ashlar blocks of the divider were only finished on their southern side, i.e., facing the southern chamber, providing further evidence that only the southern compartment was used for burial. The minimum number of individuals (MNI) recovered from this tomb is three [one subadult and two adults (a 20-30 year-old, and an old adult)], although the original number might have been higher before tomb erosion and robbing.

The pattern of ashlar finishing and the style of the tomb suggests that it originally was partially or mostly underground. The walls of the tomb only contained finished ashlar blocks on
their internal surface, but the outer side of the wall was only constructed of rubble fill. The alluvial fan presumably has eroded since the tomb was constructed, but we can see that the foundation walls surrounding the subfloor chamber and supporting the central room are slightly deeper on the eastern end $(1.03 \mathrm{~m})$ than the western end $(0.65 \mathrm{~m})$ to accommodate the ancient slope. The entrance to the tomb likely was through its highly degraded eastern end that once may have contained a doorway built into the slope.

Little evidence remains to establish the date of this tomb. Local informants report that similar tombs were discovered in the 1960s near the modern Islamic cemetery and village road, possibly the mysterious tombs uncovered by the Department of Antiquities in the 1960s that originally initiated our search for the cemetery at Ramm. The disturbed soil within the tomb contained Early and Late Roman ceramics, including the remains of utilitarian jugs and cooking pots, and a lamp fragment currently under investigation. The ceramics from the cemetery strictly date to the Nabataean and Roman peri-
ods, suggesting that this tomb and the other excavated graves also date to this period.

## The Burial in Trenches F. 3 and F. 6

Another burial with similar preservation to the one in Trench F. 1 was discovered at the western end of Trench F. 3 and in Trench F.6. The burial was placed in a simple pit 1.0 m E-W x 0.60 m N-S covered with oblong, unshaped capstones ca .0 .28 m thick and 0.70 m long. The section between Trench F. 3 and Trench F. 6 showed that the pit had been dug into the compact subsoil, which had been overlain with the extant sandy topsoil. Only ca. 0.20 m of topsoil existed above the pit cut, suggesting, like the other tombs, that the ancient surface had been much higher and has eroded since the Nabataean/Roman period.

The grave contained the remains of a single individual interred on his/her left side in a tightly flexed position with the head to the west and facing north (Fig. 13). The preservation of this adult individual resembled the burial in Trench F.1, with most of the bone replaced with small

13. Burial in Trenches F. 3 and F.6.
rootlets. Poor preservation hindered any detailed demographic assessment beyond an adult of unknown sex. Some textile impressions, possibly from a burial shroud, were observed on some of the skeletal remains. Some of the bones appeared to be carbonized by exposure to low-intensity heat source, and small patches of ash were noted around the skeletal remains. A small bowl constructed of pieces of wood held together with bronze fasteners was discovered in the pit fill ca. 15 cm above the head (Fig. 14). No other artifacts, including secondary ceramic sherds, were discovered in the burial fill.

## Trench F. 4

Trench F.4, measuring 2 mx 2 m , was placed at the southern edge of the area to explore a discrete reflection noted in the GPR results. A 1 mx 1 m probe was placed in the southwest corner of the trench to try and uncover features that may have resulted in the observed GPR reflection. Excavation of this probe uncovered successive layers of naturally deposited strata to a depth of 1.25 m below the surface. A number of large cobbles were uncovered at that level in the probe that may explain the GPR results in this area.

## The Nabataean Village in Area G

Eight trenches in Area G, the area of the "southern village," were laid out to investigate several linear anomalies picked up by the GPR

14. Fragments of wooden bowl with copper fasteners in situ above the burial in Trenches F. 3 and F.6.
in addition to surface architectural features (Fig. 15).

## The Wall in Trenches G. 1 and G. 8

A $2 \mathrm{~m} \times 2 \mathrm{~m}$ trench, Trench G.1, was placed to explore a linear anomaly noted in the GPR results. Excavation revealed a 1.30 m thick wall constructed of unworked cobbles running northeast to southwest. Another $2 \mathrm{~m} \times 2 \mathrm{~m}$ trench, Trench G.8, was placed to the west of G. 1 to uncover the continuation of the wall in G.1, and to see if it cornered to the southeast, as suggested by the GPR data. In this trench the wall continues to the southwest instead of cornering to the southeast (Fig. 16). The wall was preserved at a height of 1.25 m in both trenches. No clear floor or surface associated with the wall was dis-
covered, however the wall was surrounded by a layer of ashy, silty soil that contained a large number of artifacts, likely occupational debris. Datable ceramics from this stratum date strictly to the first century AD according to preliminary analyses.

## The Room in Trench G. 6

The 2 mx 2 m trench G. 6 was placed within an area bounded to the west and north by two bonded walls visible on the surface. These two walls, running approximately $\mathrm{N}-\mathrm{S}$ and $\mathrm{E}-\mathrm{W}$, were constructed from unworked cobbles and boulders. The room contained a beaten earth floor, upon which was constructed a small curved 0.35 m wide feature separating the NW corner from the rest of the room (Fig. 17). A 0.55 m wide grind-

15. Time slices of Area G showing location of excavation trenches.

16. Wall in Trenches G. 1 and G.8.

17. Plan of the room in Trench G.6.
ing stone was built into the southern part of the feature, which suggests that this room was used for food preparation and perhaps storage. Numerous ceramics were discovered along the northwestern wall and within the corner enclosure, all dating to the first and early part of the second century AD. The ceramic corpus from this small trench contained 24 unguentarium fragments, mostly from different vessels, perhaps suggesting that the room was used for production of oil or other liquids in addition to domestic activities.

## The Room in Trench G. 7

Trench G.7, a $2 \mathrm{~m} \times 2 \mathrm{~m}$ trench, was placed within the southeastern corner of another room in the "southern village". This corner of the room was bounded by two visible walls running

E-W and N-S and constructed using unworked cobbles and boulders, similar to the other walls in this area (Fig. 18). As with Trench G.6, this room had a floor of beaten earth. Ceramics associated with the single phase of occupation date to the late first and early second centuries AD. No evidence for the function of this room was noted.

Occupational Layers in Trenches G. 2 and G. 3
Excavation of the $2 \mathrm{~m} \times 2 \mathrm{~m}$ Trenches G. 2 and G. 3 uncovered only one layer possibly associated with human occupation along with naturally deposited soil layers containing no artifacts. Most evidence for human occupation in the area comes from a ca. 0.20 m thick, extremely ashy and silty layer. This stratum contained many animal bones and almost purely first century AD

18. Plan of the room in Trench G.7.
ceramics, and is probably with the architecture uncovered in the rest of the area. A small hearth constructed of small cobbles was discovered on top of this layer in Trench G.3, which may have produced the shallow circular anomaly at N3/ E19. Neither of these trenches, however, contained architecture or anything that could have resulted in a linear anomaly in each trench.

## Previous Excavation Soundings in Trenches G. 4

 and G. 5The area of Trenches G. 4 and G. 5 was selected for excavation due to a large rectangular/Lshaped anomaly noticed in the GPR results. The GPR apparently detected backfill from unpublished soundings excavated by Tholbecq due to the soil and compaction differences between these backfilled trenches and the natural strata.

## Discussion

GPR was utilized to identify the Nabataean cemetery and other subsurface archaeological features at Wādì Ramm. In a few cases, the GPR clearly identified subsurface features, such
as the capstones covering the grave in Trenches F. 3 and F.6, and the stone wall running diagonally across Trenches G. 1 and G.8. The GPR additionally picked up architectural features partially visible on the surface in Trench D.2, and in Trenches G.6, and G.7, and the backfilled excavation trenches in Trenches G. 4 and G.5. However, the GPR failed to pick up the cist tomb structure in Trench F.1. The physical properties of the sandstone slabs used to construct the cist did not differ significantly from the surrounding sandy strata, and therefore were undetectable by GPR. The walls in Trenches D.2, G.1, G.6, G.7, and G. 8 were constructed primarily of uncut granite stones held together with clay mortar, which the GPR differentiated from the surrounding sand. Builders of many of the walls in the Wādi Ramm area preferred granite over sandstone (see also Rollefson and Matlock 2007: 212); therefore, GPR would effectively identify these structures in this context. On the other hand, it would not pick up features constructed of sandstone, such as many of the paving stones utilized at the site, or cist tombs
similar to that in Trench F.1.
Additionally, in many cases the GPR provided false positive results. Excavation of Trench F. 4 to explore oblong, grave-like subsurface anomalies and of Trenches D.1, G.2, and G. 3 to confirm linear reflections did not turn up any evidence of occupation or anthropogenic features. Trenches in Areas A and E produced similar results. The evidence from Block D demonstrates the difference between very unambiguous patterning explored by Trench D.2, which uncovered a wall, and weak patterning near Trench D.1. The GPR could be picking up changes in natural stratigraphy in the latter example. The natural strata in D. 1 included a ca. 0.35 m thick deposit of pebbles and cobbles surrounded by sterile sandy layers. These strata did not appear to be associated with human activity or occupation, and were almost completely devoid of artifacts, unusual at a Nabataean site. The other trenches with false positive results had similar deposits.

Despite the above issues with ground-truthing of the GPR results, the 2007 excavation season shed light on the extent of occupation of the ancient site of Iram. Soundings in Areas A, D, and E discovered that structures related to the main religious, social, and political center of the site do not extend far beyond the top of the alluvial fan. The well-constructed, but undated, wall in Trench D. 2 may be contemporary with the temple and bath complexes on top of the rise.

The date and function of the "southern-village," located ca. 150 m south from the temple and bath, was also confirmed through excavations within Area G. The ceramic and stratigraphic evidence from the two partially excavated rooms and the outlying areas suggest that the village had a single period of occupation during the first and possibly into the second century AD. This occupation is contemporary with the last building phase of the temple, originally constructed in the first century BC (Tholbecq 1998: 245-246), and may slightly post-date construction of the villa and bath in the Eastern Complex (Dudley and Reeves 1997: 99). The relationship between the domestic structures and the temple and bath/ villa complexes remains unclear, and the flexible chronology provided by the ceramic dates cannot clarify the sequence of construction.

The abandonment of the domestic structures at Ramm, probably in the second century AD, appears to have occurred concomitant with desertion of the temple. Continued study of the ceramics, faunal remains, and archaeobotanical evidence will illuminate the trade networks and diet of this community. Many parallels exist between it and Khirbat adh-Dhariḥ, a Nabataean religious and economic center north of Petra (see Al-Muheisen and Villeneuve 2005). The Dharịh sanctuary appears to have bee constructed before the domestic structures, similar to the purported sequence at Ramm. It is possible, as these sites grew more religiously and economically important, that more people were needed to perform subsidiary duties for the temple, in addition to engaging in market transactions and possible domestic-based production. This drew a permanent population to these religious and economic centers.

The 2007 excavations additionally discovered what appears to be a first century $A D$ cemetery contemporary with occupation at the site. The two primary, intact burials were positioned slightly differently, but both were facing north, which, incidentally, is the direction of the temple. Mourners placed importance on including objects within the graves, including a set of weapons and a glass bowl in one, and a wooden bowl in the other. The monumental tomb at Ramm unfortunately was extremely deteriorated and ransacked, making it difficult to discover anything regarding the individuals in the tomb, local mortuary practices, or the tomb superstructure.

## Summary

The 2007 season of the Wādi Ramm Cemetery Project discovered evidence of a pre-Islamic, likely Nabataean or Roman, cemetery on the alluvial fan between the temple area and the "southern village". It is anticipated that this area contains additional, as yet undiscovered tombs. Numerous local informants furthermore remarked that communal tombs similar to the one in Area F had been uncovered during construction of the main modern village road and new cemetery. Therefore multiple cemeteries, including the one in Area F, may have been utilized during Nabataean and Roman occupation of the site. The date of the southern village ex-
plored by Tholbecq also was confirmed through further excavation this season. Test trenches excavated around the temple and related complexes furthermore discovered that this sector of the site does not extend much beyond the excavated areas, a finding important for further development of the region. This investigation demonstrated that linear/rectilinear patterning in geophysical results - often considered to be diagnostic of cultural features - should be interpreted cautiously, for linear natural deposits can mimic architectural features. It is possible that survey at higher resolution (closer sample intervals) may have made it possible to better distinguish between natural and cultural features. Finally, the GPR results may be elucidated by any future excavation within the survey areas; comparison of excavation results and geophysical data can inform geophysical interpretation and help to extrapolate excavation results.

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# PRELIMINARY REPORT ON THE FIRST SEASON OF CENTRAL PETRA EXCAVATIONS 

Adnan Shiyyab

## Introduction

The Department of Archaeology at al-Hussein Bin Talal University started its initial fieldwork in the centre of Petra under the supervision of Dr. Adnan Shiyyab. The site chosen for excavation is located on the northern bank of Wādī Mūsā immediately to the west of the nympheum; it is further situated on the lower slope of the hill that accommodates the Petra church and faces the market and colonnaded street area (Fig. 1). An unexcavated site was chosen to address two project goals: to train the students of archaeology and to uncover new archaeological materials.

The excavator, according to field observations, believes the site will be important, reflecting to some extent the development of the Nabataean culture, particularly the flourishing stage of the city and state during the first century

BC and the first century AD extending through the Roman and Byzantine periods. Some walls and fallen stones are evident on the surface and well-built, rectilinear walls have been partly exposed due to the erosive effects of floods from the nearby valley. Moreover, pottery shards of the Nabataean, Roman and Byzantine periods are distributed extensively throughout the site.

The work started on 28/6/2007 and continued until 10/8/2007. Throughout this period, a surface survey was carried out, photographs were taken, surface features were documented and a contour map was made. Two areas within the site were chosen for digging and five grids ( $5 \times 5 \mathrm{~m}$ each) were planned in order to examine the nature of the site and understand the relation between the architectural features that can be seen on the surface and those which are still underground. Additional goals of the excavation


1. The excavation site (looking southward).
were to understand the stratigraphy of the site as well as to uncover any archaeological remains.

The preliminary results of our excavations follow:

## Area A

Square 001
A wall built of large, dressed stones was found at the eastern side of the square. Excavation reached a depth of 2 m along this wall. The wall (running north-south) intersects, at a right angle, with another wall (running east-west) uncovered at the southern side of the square. It appears that the two walls were constructed in two different structural periods since the lower courses of each wall have different types of stones and the construction methods in these courses differs from those in the upper courses. Between the southern and eastern walls and in a northwest direction, a small oval-shaped structure was uncovered. Its walls are constructed of mud and small, undressed stones. Considerable portions of the walls and the floor are covered with plaster, indicating, it could have been used in a later period to collect rainwater (Fig. 2).

## Square 002

In this square a wall running north-south and parallel to the wall in square 001 was uncovered. The wall is built of dressed stones held in place by mortar and small stones. The lower courses of this wall were constructed earlier than the upper courses which appear to belong to a later period.

The walls in squares 001 and 002 appear to be parallel and linked and could have been

2. The southern and eastern walls border the oval-shaped structure in Sq. 001.
constructed during the same period and might represent a larger structure or a structural unit which could not be identified in this season.

Ceramics, complete ceramic objects, and a few coins were found in square 002 .

## Square 003

This square was situated a little to the north of squares 001 and 002 in an area where some architectural elements were visible on the surface. These elements might also be linked to the architectural features in the above mentioned squares.

In this square the digging process led to the discovery of a wall running west-east. Nine courses of this wall were uncovered and the bedrock was still not reached. The two upper courses are different from the lower courses in terms of their nature and the dressing method used; however, they all seem to have been built during one period. The western part of the wall was constructed of dressed stones vertically laid whereas in the eastern part there is a projection which looks like an apse (Fig. 3). In front of this possible apse and on the level of the sixth course, the team discovered a square platform (partly excavated) which will be excavated during the next season. The exposed stones of the assumed platform are marked by some decorations. Its lower course has a square hole closed from inside while the upper surface is covered with mortar. The presence of the platform in front of the suggested apse may indicate a functional link between the two features.

## Square 004

Square 004 was located at a site with notice-


[^4]able architectural features on the surface east of Squares 001 and 002 and southeast of Square 003 . In this section, a wide, rocky surface about 9 m square was discovered. This surface ends on a wall (running east-west) in the north side of the square. The wall consists of six courses built of dressed limestone ashlars. The bedrock could not be reached along this wall due to the presence of a significant number of mud bricks. This wall also intersects another wall in the west side of the square. The latter wall was constructed of dressed stones in its southern end and was covered with mud bricks in its northern end in order to hold and protect the ceramic pipes. The pipes were vertically and horizontally laid and can be easily seen. At the level of the third course of this wall, small arches join it to the wall in the western baulk. Future work will focus on this area to understand the function of the arches and their relation to the wall in the baulk (Fig. 4).

Three arches in the northern part are built of perfectly constructed dressed stones. The arches were laid not on the wall but on a stone beam projecting from the wall. It was difficult to trace the end of the vaulted area during this season because it continues northward outside the square and the excavator lacked sufficient time to dig another square along that side (Fig. 4). The depth of the vaulted area is about 2.5 m and its length (within the square) is about 3.5 m , its floor is paved with undressed and unshaped stones. The roof of the three arches mentioned above is made of well dressed slabs extending outside the square.

4. Vaults and ceramic pipes in Sq. 004.

The fourth arch appears not to be related to the other three arches as it is wider and has different stones and is laid on the wall perhaps indicating that it belongs to another architectural phase.

On the southern side of the square, a wall was uncovered which is linked to the wall in the western side. This wall is built of undressed and unshaped sandstones like the stones of the walls in the western and northern sides. The stones in the upper part of this wall seem to have been affected by high temperatures strongly suggesting that it is probably a fireplace used to heat what preliminarily seems to be a bath. The lower part of this wall is coated with rectangular mud bricks. The latter are linked with three rows of square mud bricks posts. Each row of these posts consists of a number of square mud brick courses. These rows stand immediately on the floor extending eastward and southward. One aspect of next season's work should be to clarify the function of this structure which was possibly a public bath in the centre of Petra. The relation between the mud brick posts and the arches resembles the plan of the bath found in al-Humayma ${ }^{1}$.

## Area B

## Square 001

Area B is clearly demarcated from area A due to the presence of a large number of stones remaining from the destruction of what appears to have been a free-standing structure between the two areas. Because it was quite difficult to dig in the area of destruction as it would have required significant manpower and special machines and equipment, a suitable square was located near the demolition area. Digging to a depth of approximately 1 m did not result in archaeological strata, but only soil and pebbles. However, the work did lead to the discovery of a wall approximately 1 m thick running north-south. The external face (eastward) of this wall is built of mud bricks while the internal face is built of stones. The latter have some holes and shallow channels that run horizontally along the wall. A marble floor running parallel to the wall was found in the western part of the square. The marble tiles are white and grey; some tiles are complete
with a length of 30 cm . Despite the fact that the marble tiles received a great deal of destruction due to the pressure from the ground, most of the tiles are still in place. The marble floor extends in different directions and continues outside the square. Further work and investigation in the next season should help to understand the site which appears to be one of the more significant sites in Petra. Rows of stones were also uncovered in this square which are horizontally linked to the wall, but neither the stones nor their masonry resemble the stonework of the wall and this might suggest that this feature is from a later phase (Fig. 5). Digging continued between the eastern baulk and the external face of the wall to a depth of about 1.5 m but the bedrock could not be reached in this season while the floor between the internal face of the wall and the western baulk is paved with marble tiles, and the latter might extend outside the baulk.

The archaeological features in this square are difficult to identify; they appear to belong to different architectural phases. The mud brick wall is one phase, the wall which has holes and channels is another phase and the rows of stones that run horizontally towards the main wall in the square may belong to a third phase.

5. Three structural phases (marble floor, a wall and irregular walls) in Sq. 001, Area B.

## Conclusion

The major purpose of the fieldwork was to answer critical questions concerning the specific site which is located in the centre of Petra near the colonnaded street. The site contains archaeological remains worthy of investigation; nevertheless, the site has not previously been studied although excavations in Petra started as early as the 1930s.

It is quite difficult to answer questions regarding the site's function and nature based on preliminary results obtained during the first season. However, the available evidence allows for some hypothesizing: part of the site may have been a public bath as indicated by the existence of the vaults and mudbrick posts in what appears to be the heating room.

There is also evidence from square 003, indicating the presence of a possible apse in one wall. Additionally, a platform was found in front of the assumed apse. The proposed apse may somehow be functionally related to what was subsequently discovered in square 004. A bath is most likely the main feature in the latter square and the use of the apse is probably related to the use of the bath.

All of the above conclusions are preliminary and remain subject to further modification and clarification based on the findings of future seasons' excavations and the analyses of ceramics, marble, coins and soil samples. It is also worth noting that the architectural features discovered throughout the digging areas clearly point to two or three construction phases as in area B, square 001 . Such findings underscore the potential significance of the site and support the long-term utilization of the site for further archeological research.

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# A MOSQUE, SHOPS AND BATH IN CENTRAL JARASH: THE 2007 SEASON OF THE ISLAMIC JARASH PROJECT 

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## Introduction (AW)

The Summer 2007 season of the Danish-Jordanian Islamic Jarash Project had as its primary objective the continued excavation and recording of the mosque, the underlying bathhouse, a line of shops flanking it on the east, and adjacent buildings of still uncertain function to the west (Fig. 1). In 2007, the full extent of the mosque was finally exposed, except for the retention of an access point on the west side. Accordingly, the full length of the qibla (prayer) hall is now uncovered. Notable is the architectural evidence for a central axial transept (nave) in front of the original main mihrāb, as evidenced by the higher disposition of the column foundations and the greater space between the column bases. Similarities with the Great Mosque of Damascus are very apparent. Also resolved is the later insertion of two further niches in the qibla wall and the partial blocking of the original main mihrā$b$. This rather unusual change seems to have resulted from the subdivision of the qibla hall into two uneven parts: a larger area to the east and a smaller area to the west. A wall was built perpendicular to the qibla wall to effect this division. The two added mihrāb are positioned at equal distance between the original outer walls to the east and west and the dividing wall, indicating that the division of the qibla hall and the insertion of the new mihhā $\bar{b}$ were related and perhaps simultaneous events. Also possibly dating to this time was the blocking wall construction of the archways between the qibla hall and the courtyard before it. However, the reasons for these changes are not clear.

To the west of the mosque, further investigations were undertaken into the buildings located there and a street that separates the mosque from them. A hard packed yellow clay surface was iden-
tified for the street at its north end. At the south end a substantial foundation trench for the west mosque wall was uncovered, indicating that the buildings to the mosque's west predate it. New areas were opened up over these western structures, with important results. A new alley, heading westwards away from the mosque, separates two major building, one of which had arched rooms and evidence for pottery making. Much further work is required here to illuminate the nature and function of the buildings in this area.

Undoubtedly, however, our most exciting find during a season of major discoveries came from the line of shops that lay east of the mosque, butting against it, and which faced out on the old Roman-period cardo. Excavation in 2006 had revealed the back rooms of these shops, each subdivided by low bins (Blanke et al. 2007). Five whole vessels of the eighth century AD were found late in the 2006 season, but even more exhilarating was the discovery this season of two marble tablets, reused, with Arabic writing in a charcoal pen, on which further below. Initial reading of the clearer of the two tablets suggests merchants' records, listing names of customers and amounts owing. These historically important documents reveal not only the sophistication of commerce in the eighth century, but also the common use of Arabic - written in a neat, careful and confident hand - by this time in the market place. Just to reinforce the prominent role of Arabic in the town, a small ostracon was found in the northwest corner of the mosque. The text is faint but should be readable in due course.

In the sections of this report that follow, the different authors offer preliminary accounts of the field areas for which they held special responsibility: the mosque, the buildings to the


1. General plan of the excavations in central Jarash, to end of 2007 season (Barnes mod. Walmsley).
west, the shops, and the bathhouse. A progress report on the ceramics is also offered.

The Mosque Qibla Hall, West Half: Continued Investigation of Architecture and Occupation Record (IS and AM)

Excavations in 2007 continued in the west
end of the qibla hall of the mosque, revealing the complete architectural plan of the hall area and shedding more light on the occupation record of the building. The main objective was to examine the architectural plan of the west end of the mosque hall as a coherent whole by excavating to floor-level a number of baulk walls which had
been restricting an overview of the full width of the hall. This involved excavation recording in excavation units $\mathrm{MO} / 4, \mathrm{MO} / 5, \mathrm{MO} / 11, \mathrm{MO} / 13$, MO/14 and MO/15 (Fig. 2).

The upper layers of the baulks consisted mostly of topsoil and mixed deposits, then a level with some remains of roof collapse in the form of tile fragments. Baulk excavations completed the exposure of two fallen column drums in the centre of the hall, between units $\mathrm{MO} / 4$ and MO/15, which belonged to the double colonnade that supported the roof of the hall. One of the columns features a lipped end and was found lying at subfloor level where a column base is expected, according to the floor plan. The other fallen column was found resting on top of broken roof tiles lying over stone paving slabs of the mosque hall floor. Rather than preserving a picture of a possible collapse of the building, the situation described is that left after salvaging activities had taken place in the mosque hall. Altogether, there remain only six lengths of fallen column shafts and a fragment of column standing in situ on a column base in the mosque qibla hall, the rest of the columns having been taken during salvaging, as have most other architectural elements. Notably, all the columns excavated so far in the mosque are smooth round cylinders of limestone. This indicates a consistent program in the columns of the mosque's colonnades, although it is not surprising since architectural elements were re-
used from older buildings and these are the most common type of column in Jarash.

With the newly revealed patch of paved floor mentioned above there is a total of eight small groups of floor paving stones preserved in the hall, while the rest of the paved floor was removed in antiquity for re-use elsewhere. The newly exposed pavers are similar to the other isolated patches of mosque hall paving, made up of flagstones of different quality. This is further evidence of matching together re-used dressed stones in laying the hall floor. A single building stone was found standing on top of the newly exposed paving slabs, aligned with the paving. This initially suggested it was part of a larger architectural feature or wall, but no further stones were found and the single stone shows no signs of mortar and may have simply collapsed in this position.

Excavation also brought to light another pier base in the mosque hall entrances and exposed the extent of a wall belonging to the bath house. The old wall was incorporated in the pier base as a foundation on which to build the entrance piers to the mosque hall, showing the extensive planning that went in to constructing the mosque. This type of planned reuse requiring careful preservation of previous structures to specified levels for the construction plan of the mosque has been observed repeatedly in excavations of the building's foundations (Fig. 3).

Excavation of the west baulk in square MO/15

2. A panorama of the full width of the mosque hall, after completing excavations to floor level (1 September 2007). The remains of the late antique bath house integrated in part of the mosque hall entrance foundations can also be seen in the foreground.

3. A fallen column shaft resting on stone paving of the floor in the mosque hall, with roof tile fragments crushed between the column and paving.
found substantial layers of stone tumble above floor level of the mosque hall, mostly inside the hall but also some in the courtyard area just outside the hall entrances. In the courtyard no stone or stamped clay floor surface and no evidence of a portico was found in front of the entrances to the hall. The tumble excavated in $\mathrm{MO} / 14$ and $\mathrm{MO} / 15$ forms one contiguous area of collapsed stones in the northwest part of the mosque hall, located west of a dividing wall reported in 2007 (Barnes et al. 2006). Ignacio Arce has identified the incised markings previously reported on a number of the tumble stones as grooves used to hold bonding material, probably inserted as a liquid metal (lead) or mortar, to help fix building stones, often voussoirs, together in place. In the mosque no evidence has been found that this bonding function was reused.

Finds recovered in 2007 mostly comprise ceramics, including roof tile fragments, and some bone material and glass beads. The dividing wall was excavated further, revealing on its west side a thick layer of compact, light yellow, clayey material, constituting a floor or subfloor packing (Fig. 4). Narrow foundation trenches of darker soil run along both sides of the doublerow wall and confirm that it is a later addition built by cutting a trench through the floor bedding inside the hall. Moreover, the substantial foundation coursing of the wall, which visibly continues below floor level, suggests the wall was not simply a retaining strip for a raised area of paving but more likely a dividing wall inside the hall.

West of the dividing wall, the distinctive yel-

4. The west side of the dividing wall in the mosque hall, showing a darker brown foundation trench cut through the lighter coloured floor packing.
lowish clay packing material continues to the west wall at the end of the hall and has a southern limit that is in line with the south end of the wall and the north colonnade in the prayer hall, perhaps laid as a bed for a raised floor area, or laid simply as a later unpaved, stamped clay floor. There is evidence of more than one layer of this clay material, which covered the two lower steps of the stairs to the entrance in the northwest corner of the hall in square MO/14. Perhaps this represents more than one bedding layer or floor surface. Its southern limit might be associated with later disturbance or other activity, possibly a cutting or a pit, from which Middle Islamic wares were recovered at floor level in 2007, including sherds of Hand-Made Geometric Painted Ware in the north baulk of $\mathrm{MO} / 13$. Middle Islamic pottery has only been recovered from the west end of the hall demarcated by the dividing wall, but does not seem to be related to construction of the wall (Fig. 5). The division of space by the wall, with the stepped west entrance and the west mihrāb, appears to be due to an occupation phase corresponding to the use of the raised area of hard yellowish packing. The dividing wall does not meet the qibla wall, so the division does not appear to have separated the west miḥrāb in an enclosed area. However, placement of the west mihrāb is equidistant (within 10 cm ) to the line of the dividing wall and the west wall of the mosque, so it is tempting to associate the walled division and west mihrā$b$, in plan at least. Alan Walmsley suggests the placement of the west mihrāb and the similarly sized easternmost mihha $\bar{b}$, which is precisely

5. View of the construction technique for the western wall foundations of the mosque.
equidistant to the line of the dividing wall and the east mosque wall, is a related matter. In this interpretation, the original, large central mihrāb was blocked up and replaced by the two others, positioned symmetrically within their respective divisions in the qibla hall. This fits well the modified hall plan if it was partitioned as indicated. On the other hand, the short dividing wall does not appear to create a well-demarcated modification of space along the qibla wall itself, and the two small mihrāb differ significantly in form and building technique, which is perhaps surprising if they were both planned as part of altering the use of the qibla hall. Future excavation of the qibla wall outside (south of) the mosque will hopefully help to shed more light on this building history.

In the laneway on the west side of the mosque (see: Blanke et al. 2007), where a stamped-earth street surface had already been traced, work in 2007 continued investigating the relationship between the mosque, the street, and the adjacent GO structures. A section previously excavated through the walking surface had not shown any layering, indicating a uniform fill material, but the excavation had been limited to upper deposit levels. In 2007 a difference in soil colours was traced in the street, with a clay terra rossa soil visible along the mosque wall indicating filling of a foundation trench. Excavation of the trench, which included terra rossa and pebbles, shows the street deposits at this level had already been laid down and were then cut through to construct the western wall of the mosque. This is significant in terms of urban planning and renewal at the scale of city zones because it may indicate
that the laneway alignment, which differs considerably to the orientation of late antique period building orientations in this quarter, predates the foundation of the mosque. The mosque foundation wall here is constructed to a high standard, consisting of several courses below mosque floor level: two courses of dressed stones well jointed with mortar, the lower course widening slightly for stability, below which is a levelling course of fist-sized irregular stones sitting on large undressed foundation stones (Fig. 6).

Excavation of the GO outer enclosure wall in the street produced evidence of a 2.5 metre wide entrance in the form of two door jams separated by four flat stones. Interestingly, the threshold is elevated about a metre above the level of the west entrance to the mosque hall, but the entrance was blocked at some point and no evidence for stairs to this higher level were found. Until the foundation construction of the GO enclosure wall is better understood and excavations continue along the laneway, it is difficult to determine whether the GO and mosque entrances near to each other were also used at the same time.

## The GO Complexes (KD)

The GO area consists of a substantial plateau, presumably created by an accumulation of material culture, located immediately west of the mosque. The area is arbitrarily defined by the mosque on the east, the decumanus to the north, a surmised street leading south from the south decumanus on the west (represented by a widening in the colonnade opposite the so-called 'Umayyad House'), and the macellum area to the south.

6. View of the "wash room" and associated courtyard and portico in GO/2.

This part of the site was surveyed in 2004, and excavation units have so far been placed in the easternmost end (i.e. closest to the mosque). Research strategies in the GO area have mainly focused on illuminating the relationship between the mosque and any contemporary buildings located to the west. Traditionally, mosques are not only religious focal points of Islamic urban settlements, but also judicial and administrative hubs, as well as areas of significant social and commercial activity. In order for a town to be bestowed with a congregational mosque such as the one in Jarash, an executive caliphal order had to be issued first (Pedersen 1991). Any large buildings in the immediate vicinity could thus have been conceived and commissioned by a centralised Muslim authority as well, and may reflect a more general policy of urban refurbishment in Islamic Jarash. If that is the case, excavating the structures may yield decisive information on the way in which the Muslim authorities governed and interacted with local populations in the provincial centres of Bilād ash-Shām.

The 2007 campaign saw a significant enlargement of the GO excavation area (For background information on the areas of GO/1 and GO/2 that were excavated prior to the 2007 season see Barnes et al. 2006: 307-10; Blanke et al. 2007). Two entirely new 10 by 10 metre excavation units, $\mathrm{GO} / 4$ and GO/5, were laid out in line with, but 10 meters (i.e. one excavation unit) north of GO/1 and GO/2 (Fig. 1). In addition to these new squares, the halved excavation unit termed GO/ 2 was extended to a full excavation unit. The work yielded various new insights regarding the GO area immediately, and has prompted us to rethink many of our initial ideas. The following presents the results of the 2007 season and suggests an initial interpretation.

## GO/2

$\mathrm{GO} / 2$ is situated over a sizable building complex immediately west of the mosque's prayer hall. The actual excavation unit is placed directly west of the mosque's north-western corner ( $\mathrm{MO} / 14$ ). The two buildings are separated only by a laneway that runs the full length of the mosque's west wall. The excavation unit was originally defined in 2005, and excavation was continued in 2006. However, in order to achieve as comprehensive a stratigraphic profile as pos-
sible, it was only the southern half of the 10 by 10 metre square that was subjected to actual excavation. The overall goal of the 2007 season was, therefore, to excavate the northern half of the unit to a level consistent with the southern half. Some excavation was, nonetheless, also continued in the southern part of the unit, and before presenting the new area, a few notes should be made on this work.

Focus was on the small building unit that is presumed to have a water related function, and on which we have reported in previous publications. For the sake of communication, this structure will here be referred to as the "wash room", though no such specific function has been irrefutably confirmed yet. Internally, a sondage was placed in the area of makeshift marble paving, effectively halving it. The aim of this sondage was to resolve the exact function of the building and why such a diminutive building, placed within the confines of a larger enclosure, was constructed with such robusticity. What were the intentions of its builders? Externally, work was continued in a pre-established sondage butting the 'wash room' at a perpendicular angle on its northeastern side. Here, the aim was to re-investigate the possible presence of a foundation trench and, as a minimum, retrieve material that could help date the building's insertion within the overall complex. Regrettably, both sondages yielded disappointingly little, and we are no closer to unequivocally resolving the meaning and function of the 'wash room'.

In the northern half of $\mathrm{GO} / 2$, the desired level was reached by the end of the season. Excavation indicated that most of this area had been used as an open courtyard for an extended period of time, as little more than a number of hard-stamped earthen floor layers were identified. The paucity of architecture in this half of the excavation unit further corroborated the notion that a courtyard was located here. The only architectural elements identified in the courtyard area were two in situ column bases; one of which remains almost completely hidden in the north baulk (Fig. 6). The column bases are aligned with the northernmost corner of the 'wash room' and run parallel to the substantial wall against which that room is built. Both wall and columns extend from the entrance of the 'wash room' in a northwest direction, and are

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likely to constitute the remains of a colonnaded portico that originally surrounded the courtyard. However, excavation northwest of GO/2 is required to confirm this.

Access to the courtyard was seemingly granted from the laneway between GO and the mosque. Excavation of an area of tumble along the interior of the GO complex revealed a doorway that had once opened into the alley, but which at some stage had been blocked. The doorway was quite wide and set into the wall at a rather high level compared to the internal and external surface levels. Whether auxiliary features such as steps once existed could not be ascertained.

Upon reaching the courtyard surface associated with the 'wash room' entrance and columned portico, excavation was halted for the season. In the process of cleaning this surface for final photography, a big non-diagnostic sherd of a thick coarse ware, coated with a turquoise alkaline-based glaze, was discovered on the courtyard floor. Although only a single piece was found, the surrounding context indicates an early to mid eighth century date. This is rather early for glazed wares in Bilād ash-Shām, and, since the style and production methods are reminiscent of late Sasanid wares, it is quite likely to constitute an import from Iraq. Considering that the nature and function of this complex still cannot be unequivocally associated with Muslim elite in Jarash, it is certainly promising to note that similar sherds have been found in other Early Islamic elite contexts.

A good example is from the Umayyad complexes at Umm al-Walīd (Bujard and Jogin 1995: 142, 147, fig. 5.29, 30). At first glance, these appear to be various standardised types of qusūr, however, all three have unusual subdivisions of their central, and traditionally open courtyards (Bujard et al. 2001). The eastern qastr is particularly interesting for within each subdivision of courtyard, a single row of columns once bore the colonnade of a sheltering portico. Whether something similar happened in Jarash is still not clear and will be investigated in coming seasons.

## GO/4

$\mathrm{GO} / 4$ is the first of the two new excavation units. It was laid out north of GO/2, but at a dis-
tance of one unit (i.e. 10 meters) in order to maintain full access to the other excavation areas (i.e. bathhouse, mosque and shops). Both GO/4 and $\mathrm{GO} / 5$ are on the plateau west of the mosque's north-western quadrant, and the buildings they inhabit remain physically separated from the mosque by the interceding laneway. The presence of structures here, belonging to roughly the same period as the mosque, was recognized during a survey of the GO area in 2004, although no excavation had taken place in the north-eastern corner of the GO area prior to 2007.

The eastern perimeter wall of a large structure flanking the mosque's west side was identified, cleared and recorded as part of the work conducted in MO/16 over the last few seasons. However, once the GO/4 unit had been defined and excavation begun, it quickly became clear that we were, in fact, dealing with multiple buildings. In GO/4 alone, at least two substantial building units were identified, and although these clearly seem related (e.g. by alignment and association with the mosque) to the architecture in $\mathrm{GO} / 1$ and $\mathrm{GO} / 2$, they may well be independent structures. This would mean that perhaps as many as three large complexes flanked the west side of the mosque; a scenario which is mirrored in the so-called Umayyad palaces in Jerusalem, though there on a larger scale (Ben-Dov 1985: 292-321).

Prior to excavation, the presence of a considerable amount of stone tumble was visible in the ground. Once excavation commenced, it became clear that in spite of some clearance work in 2004, the topsoil still consisted of ubiquitous modern disturbances interspersed with a high density of ancient tumble. Work therefore proceeded slowly, and the debris layers were the only strata to be fully excavated this season. Nevertheless, removing the modern fills and upper tumble layers revealed a range of architectural features, which in alignment, building techniques and initial artefact yield seem to correspond chronologically to the early phases of the mosque (Fig. 7).

Based on the architecture, GO/4 is interpreted as containing elements of two major structures, as well as an east-west running alley that intersects at a perpendicular angle with the laneway running parallel to the mosque. The remains of the northern building are the most substantial in

7. Preliminary surface plan of the architectural features of GO/4.
this excavation unit. These constitute a square room that appears once to have had a vaulted ceiling borne by a sizeable arch. Only the foundation springers of this arch were found in situ, placed centrally in room and spanning its full width, but these were complimented by a few voussoirs retrieved from the tumble. A line of stones ran between the springers, but excavation this season did not penetrate deeply enough to ascertain whether these are, in fact, part of the collapsed arch, or a later makeshift wall and bin subdividing the room. Of the second building unit only the northernmost wall was discovered, and because the area designated to become $\mathrm{GO} / 3$ remains unexcavated, we are so far unable to confirm or deny this building's direct relationship with the courtyard structure in GO/2.

Between the two buildings was an open band, 2.70 meters wide and spanning the full east-west length of the excavation unit (Fig. 8). In the few areas where the tumble and modern infilling
was removed, it seemed that the band consists mostly of hard stamped earthen strata, which at present display no signs of having contained any type of architectural compartmentalisation. The empty band joins with the pre-established north-south laneway at a 90 degree angle, and it has therefore initially been interpreted as a similar passage or laneway. Further excavation is required to uncover the full extent of this feature, but it is worth noting that as infrastructural organisation goes, the orthogonality of its planning corresponds to general urban trends in the Early Islamic period (Foote 2000).

It would be premature to consider chronological aspects of the excavated remains in $\mathrm{GO} / 4$. First of all, they have not been fully exposed and we did not identify any clear occupational surfaces with an associated ceramic profile. Furthermore, there were some indications of later reuse of this area, and distinguishing between the phases requires a localised stratigraphic pro-

8. Oblique aerial view of excavation units GO/4 and GO/5 (both to left) including the two building unit and interceding street or laneway. To right: MO/16 (1 September 2007).
filing in order to be reliable. A limited amount of artefacts were discovered in the excavation of this unit, the most interesting being two Umayyad oil lamps within what seems to be a poorly constructed stone bin. However, as only clearly disturbed layers were removed, further excavation is necessary in order to determine whether they come from a primary archaeological context or from somewhere else in Jarash and then simply were dumped here at a much later stage.

## GO/5

The GO/5 unit is located immediately west of the southwest corner of the mosque ( $\mathrm{MO} / 16$ ), in direct northern extension of GO/4 (Fig. 8). It is the northernmost excavation unit in the GO area and borders the south decumanus. The eastern edge of the excavation unit is demarcated by a substantial perimeter wall belonging to what we now know is the northernmost of the GO complexes. The accommodation of the excavation unit to fit within the architectural features (i.e. the perimeter wall) means that even though it is in accordance with the overall grid, this unit was slightly reduced in size to accommodate it to the available space. The area was surveyed and preliminarily cleared in 2004, but no actual excavation has been conducted here prior to this season.

As excavation commenced, it was evident that in spite of the 2004 clearance work (which included a significant modern deposit of fine red

Suwaylih sand), there was still a high degree of contamination in the upper strata. Nevertheless, following the removal of a spit of roughly 30 cm , the first individually identifiable loci appeared. Most dominant was a large feature, which we termed a platform for lack of a better characteristic. Although the feature was completely excavated, it remains unclear exactly what it was intended or used for. The installation consisted of approximately 45 large limestone ashlars of varying dimensions placed against each other in a rectangular shape; as if constructed to constitute a small paved area. Both the eastern and southern edges of the platform were defined by stone blocks that were raised between 10 and 30 cm from the general level of the platform, suggesting that at least these edges were undisturbed. The western and northern edges of the feature did not have similar demarcations, but nor were there any indications that it had been cut back here.

The platform had been set in a whitish clay packing that contained an extremely high density of ceramic sherds, which, based on preliminary in-field readings, appeared to be mostly late sixth to early ninth century material. The clay packing surrounding the platform had a similar high density of ceramic material. At first, this led us to deem the area a late antique ceramic dump, but upon closer inspection of the material, it became clear, that despite the density and
chronological limitations of the material, the deposit was practically void of wasters or other purposefully discarded vessels. The level below the platform revealed a more substantial yellowish clay packing, still full of ceramics.

In the southeastern corner of the unit, a dark discolouration of the soil prompted the definition of an independent locus. The presence of what at first seemed to be a large ceramic sherd was soon redefined as some sort of oven. Further fragments were retrieved, but none in situ and they appeared to have been dumped here as part of the fill. Excavation below the ash deposit was temporarily halted when the density of ceramics diminished drastically and the soil colour changed from yellow to a very dark brown. The appearance of an actual surface (upon which the ceramics seem to have been dumped) was confirmed by the discovery of an in situ t $\bar{a} b \bar{u} n$ cut into this surface. More than half of it was missing, and the standing $t \bar{a} b \bar{u} n$ wall was extremely porous. The wall was roughly 3 cm thick and packed on the outside with coarse clay. The same clay was used for its foundation. The contents of the țābūn yielded only a few ceramic sherds and some faunal remains.

Once the fill was removed, a series of ashlars appeared upon which the $t \bar{a} \bar{b} \bar{u} n$ had been partially built. The blocks formed a semi-circular shape, and still had the visible remains of what once was the brick superstructure (mostly visible as profiles, but also including a few standing bricks of the lowest course). Further excavation showed the feature to be the foundation of a substantial ceramic kiln; the brick superstructure being the remains of the kiln wall (Fig. 9). Although smaller than most of its presumed counterparts, this installation is similar to many of the Byzantine and Early Islamic kilns identified throughout the site, for example in front of the Artemis Temple and in the North Theatre (Pierobon 1986; Schaefer and Falkner 1986; Uscatescu and Martin-Bueno 1997). The kiln had a base diameter of just less than two meters ( 198 cm ) and the coursing consisted of a double row of dressed limestone blocks. Approximately half of this feature remains hidden in the southern baulk, and because of time constraints the kiln and its contents were not fully excavated this season. Both features were, therefore, backfilled in anticipation of further investigation in 2008.

9. Vertical shot of kiln foundation and the in situ remains of the țābūn.

## Concluding remarks

The work conducted in the GO area in 2007 has given cause to a considerable reevaluation of this area and its relationship to the mosque. We now know that at least two and possibly three substantial buildings were located to the east of the mosque on the other side of a laneway, and there is some evidence to suggest an elite presence in these structures. This conclusion widens the central role of the mosque in a much larger urban refurbishment plan focusing on the area around the south tetrakoinion during the eighth century AD.

## The Shops at the Eastern Enclosure Wall (LR)

The aim of the 2007 season was to finish the excavation of the row of shops situated between the eastern enclosure wall of the mosque, against which they are butting, and the cardo (excavation units MO/9 and MO/10; see Fig. 1). The area investigated was the northern part of the shop complex, closest to the east entrance of the mosque, where a semi-circular staircase was found in 2005. A detailed description of the staircase and eastern entrance can be found in the report on the 2005-2006 seasons (Blanke et al. 2007).

All the shops in the area had, in previous seasons, been assigned letters to differentiate one from the other. These allocated letters ranged from A to $H$. The shops have now been assigned a numeric sequence from 1 to 5 starting from the southern shop. Accordingly, the focus of work in 2007 was on shops 4 and 5 (previously F, $G$ and $H$ ). This change in numbering resulted
from a difficulty in differentiating separation walls between the shops from walls used for the internal division of space within the single shop unit.

The shops in the southern part of the complex (shops 1-3) had been deemed fully excavated in previous seasons and the level where excavation was stopped had been interpreted as the primary occupation-level. A similar level was reached in shop 4 and 5 by the end of 2006, but the finding of five Umayyad-period ceramic vessels in one of the storage bins in Shop 5 made it clear that the primary Umayyad occupation-level was still to be reached in the rest of the shop (Fig. 10, initial report in Blanke et al. 2007).

## The Hearth in Shop 5

In the course of this work it was established that a fireplace, first found in 2006 in a bin in the south-western corner of Shop 5 and interpreted as a dug-in fire installation, actually belonged to a lower, and thus earlier, occupation level. When layers previous thought to be the floor level were removed, we encountered deposits of ash located outside of the hearth. These deposits were traceable all the way down to the base of the hearth where, still on the outside, they continued horizontally on a hard packed floor level of reddish soil. The hearth itself was made of a mixture of mud and terra rossa clay, strengthened by applying large sherds of ceramics, tiles and pavers to the outside (Figs. 11, 12). The rim of the hearth was rounded off by applying sherds from the rim of a broken storage jar, this being excavated in 2006.

10. In situ view of the group of ceramic vessels found in 2006 in Shop 5.

## The Inscribed Marble Tablets

To the north of the hearth bin, and sharing a separation wall, another bin of just about the same size and layout had been defined in 2006, but left unexcavated. This bin was excavated in the same manner as the rest of the loci in the shop, horizontally in spits of 2 to 3 cm at a time, sieving (sifting) all of the soil removed. Except for signs of rodent activity, no finds of particular interest were found in this bin to begin with. In due course, however, in the southwest corner of the bin, the top of a marble tablet was exposed that seemed to be standing almost upright, tilting slightly to the west. Careful excavation resulted in the exposure of a light grey marble tablet sitting 16 centimetres above the base of the bin, and on which clear black writing in Arabic could be seen over much of the surface (Figs. 11, 13). From a preliminary in-field translation the inscription consisted of a list of names and amounts owing to the shopkeeper (see the report of F. Bessard, below).

A second inscribed marble slab was found later in the season in the adjacent Shop 4 (Figs. $\mathbf{1 4 , 1 5}$ ). Unlike the first tablet, this slab was lying horizontally on the floor level. As can be seen in Fig. 15, the writing on the second slab was considerably more indistinct than that on the first, and the fine layer of dirt and mud covering it made it very hard for us to be sure if the slab actually had any writing on it at all. Only a few letters were visible in the upper left corner.

## The Storage Bins

The remaining bins in Shop 5 were excavated in the hope that these would shed further light on other commodities originally sold there (Fig. 11). In that sense our efforts turned out to be fruitless. As the excavation of the four remaining storage bins progressed, no other significant finds were found. Instead, their excavation recovered small pieces of ceramics, glass, bone and the odd piece of corroded metal, mostly nails. One rather large chunk of melted lead was found in one of the bins, but we were unable to determine whether it was placed there as part of the sub surface packing, kept in the bin for later use, or was the leftover from another kind of activity. Similarly, two other bins in Shop 4 showed the same lack of any finds which could be related to the commercial activity of the shop.

11. An overview of Shop 5. 'A' shows the find spot of the marble tablet with an Arabic text, while ' $B$ ' indicates where the ceramic vessels were found in 2006. The bin containing a hearth can be seen in the upper left hand corner of the image.

12. Hearth in the southwest corner bin of Shop 5, looking southwest.

The Fragmented Mosaic Floor
At the bottom of two bins situated in the southeast of Shop 5 the first of several pieces of fragmented mosaic floor were uncovered. It was thought that a similar piece of mosaic might be revealed in the bin located immediately to the north of these two, in that they were only separated by the central walkway, but any mosaic that might have been there was destroyed by the construction of Shop 5 and wall 2 . The only surviving mosaic found in the northern part of Shop 5 was the scarce remains running underneath Wall 2. Better results were obtained further to the south where it was possible to trace the mo-

13. View of the excavated tablet resting in an upright position before lifting.
saic first revealed in Shop 5, underneath Wall 3 and into Shop 4 where we found the largest and best preserved parts (see Fig. 14 for location).

The motif and design of the mosaic is a relative simple one, consisting of a repeating pattern of squares with an alternating decoration of either a smaller square with a central point, or a cross (Fig. 16). The tesserae used are of a rather rough quality, cut from off-white and red stone. Similar pieces of mosaic were found in a sondage made in 2004 (Barnes et al. 2006: 296-97).

Unquestionably, the mosaic predates the shop complex as separation walls, bins, and floor levels are all superimposed on the mosaic. Its function is not clear, but may relate to a large area of mosaic found in front of the macellum by Dr Asem Barghouti between 1975 and 1978 (Barghouti 1982: 224-25). As the present state of the IJP mosaic is fragile it was reburied and covered with sandbags at the end of the season.

## Construction Sequence of the Shop-Complex

Although the construction sequence of the shops in relation to the mosaic was a relatively straightforward matter, the sequence for the whole complex still presents a few questions.

It was shown last season that the ramp, leading up to the staircase and the eastern entrance of the mosque, was constructed prior to Wall 2 (the northern wall of Shop 5 in the line of shops), as the foundation trench of that wall was dug into the ramp, and that the semi-circular staircase was built subsequently as the lower course of the stairs is superimposed on the foundation trench of Wall 2. The time span for this sequence is not clear as of yet. It should be noted though that the stairs are founded directly on top of the foundation trench with no additional build-up of archaeological layers between them. This could, of course, easily be due to the removal of an earlier staircase and the subsequent clearing and levelling of a foundation area for the new one and is, therefore, a circumstantial indication at best.

What would be interesting to establish is the construction sequence of the shop-complex as a whole. Is the current layout the result of more than one sequence of building activity, or does the intrusion of the foundation trench of Wall 2 into the ramp represent the starting point of the entire row of shops?

Shop 5 in its current state is the best preserved in regards to layout and surviving bins. The remaining shops exhibit (in their present state of excavation) a more advanced state of decay especially in regards to their internal features and layout. Yet due to the fact that the whole complex has been built using reused material from older buildings, we are unable to see the decay of the masonry as any certain indicator of construction sequence. Or in other words; the relative age of the building-stones does not necessarily relate to the sequence in which they were brought to, and used in, their current location.

## Plans for the Next Season

A re-evaluation of all the separation walls in the complex in regard to building technique, masonry, packing and foundation level will be carried out in the coming season. A detailed assessment of differences, if any, will help shed new light on the question of construction se-

14. An overview of Shop 4. 'C' indicates the find spot of the second, but indistinct, marble tablet with an Arabic text.

15. Discovery of a second, but less clear, inscribed marble tablet in Shop 4.
quence. Completing the excavation of the three southern shops will, hopefully, also contribute to answering this question, as well as giving
more clues to the nature of activity within them. While the pottery in Shop 5 should be seen as representative of the commodities sold there, little information yet exists as to the goods sold, or services provided, in the rest of the complex, but further work may shed new light on this matter.

## Arabic Shopkeepers' Accounts from Early Islamic Shops of Jarash ${ }^{1}$ (FB)

As reported above, two marble tablets with Arabic inscriptions on one face were discovered at the floor level of shops adjoining the Early Islamic congregational mosque of Jarash (Walmsley and Damgaard 2005: 362-378). A similar marble tablet with an Arabic inscription, now held in Jordan Archaeological Museum, was found by the Yale excavations in 1931 in

16. Drawing of the fragmentary mosaic surface exposed below Shop 4.
nearby shops located in the northeast part of the Tetrakionion area, but was not published at the time (Kraeling 1938: 109-14; Simpson forthcoming).

All three ostraca consist of irregularly shaped marble pieces reused from older buildings, probably wall cladding. The practice of reusing marble slabs for writing on was common in the Early Islamic period and is known, for example, from 'Asqalan (Sharon 1997: 147-48) and Qaṣr al-Ḥayr al-Gharbī (Schlumberger 1986). On the Jarash tablets the obverse (polished) side was used to write on, while the reverse was left blank. The inscriptions appear to be written using a charcoal-based medium or ink and were executed in a cursive script closely related to the naskhi form of Arabic. Both in appearance and formulation the texts are informal and are written as formulaic lists. The writer did not use diacritical marks systematically, which makes the inscriptions difficult to read. None of the inscriptions is dated explicitly in the text, but palaeographic indications (Abbott 1941: 65-104),
in addition to archaeological context, suggest they date to the first or second century of the Hijrah.

Each inscribed tablet consists of a list of individual debt transactions. On the best preserved tablet (Figs. 17, 18), the text begins with the standard phrase bism Allah al-rahman al-rahim. This is followed by the transactions, each recorded according to a set formula giving the type of transaction, name of person and monetary sum. To introduce each debt record, inscriptions use the preposition min or the fixed phrase qibala, which means in this context 'payable from' (Ibn Mansur, Lisan al-Arab, ed. Dar Sader, Beyrouth 1990, T. 12 p. 14), or the verb sharata, conjugated in the past tense in the third person plural, which means 'to agree to pay' (Dozy, Dictionnaire, T. 1, ed. Maisonneuve, 1967: 145). The shopkeeper then notes the names or the kunya of his customers, which are encountered frequently in literary sources of the early Islamic period, and then the small debts outstanding, all expressed in dirham values. Most likely the

17. Tablet 1, discovered in August 2007, eleven lines in naskhī script (IJPFCN5782). Length 18 cm ; width 17.5 cm .

18. $\underset{\text { (Bessard). }}{\text { Drawing }}$ of Tablet 1 (Bessard).
debts were paid in silver coin, dirham or dirham fractions, although Alan Walmsley proposes that copper fulūs could have been used to meet the value of dirham fractions, probably at a set rate of 24 fulūs to a dirham (Walmsley forthcoming). One may also propose that clients cut the silver coins to get fragments, as similar examples in Umayyad Spain suggest. Once the customers had paid their debts the shopkeeper probably then rubbed out their names and transactions. This practice is suggested by marks showing several older layers of writing on the tablet, which can be seen clearly with the aid of a microscope. The inscriptions were unsigned, which means that they were private documents, not to be considered as contracts.

A transcription and translation of the best preserved tablet from Shop 5 follows (Fig. 19). The reading of the inscriptions were made from photographs taken by Ian Simpson following inspection and recording of the physical properties of the tablets and the writing on them with conser-

19. Transcription of Tablet 1 (Bessard).
vator Margit Petersen. The transcription system employed is based on the Leiden convention.

## Transcription

The transcription system used here is based on the Leiden convention.
<> Angle brackets enclose letters and words that are not present in the inscription but which should be.
(?) Round brackets with question mark inside is used for words which are unclear because they are hardly visible.
... Three dots indicate the text continues but the tablet surface is chipped or erased.

## Translation

1. In the name of God, the merciful, the compassionate
2. (payable) from Ḥammād and from (?) darāhim
3. from Heamad dirhamayn, from Abū aṣ-Ṣaqar one dirham
4. from Jarraḥ${ }^{2}$ one dirham, from Mustawrid one dirham
5. from Zaid three quarters of a dirham, from Hārith
6. dirhamayn, from ash-Shāh one dirham and from (?)
7. one dirham, from 'Alā and Ibn Jamya' one dirham, from Abū al-‘Ị̣̄
8. one dirham, from (?) one dirham, alYamānī...
9. from Randa dirhamayn (?) one dirham
10. Ḥamdūn one dirham plus another dirham, from Sulaymān...
11. Umm 'Abbād three darāhim, from (?) one dirham

## A Note on the Continuing Exploration of the Central Baths (LB)

Following on from previous reports on the Central Baths at Jarash (Barnes et al. 2006; Blanke and Damgaard 2005; Blanke et al. 2007; Damgaard and Blanke 2004), this section gives an account of the continuing exploration of the
bathhouse conducted in 2007. The preceding excavations of the bathing facility included a full uncovering of the hypocaust, piscine in the frigidarium, tepidarium, selected parts of the service area, hereunder the praefurnia as well as a secondary entrance to the hypocaust; constructed for the purpose of maintenance. A deep sounding conducted in 2006 below the piscine led to results that suggested a construction of the bathhouse within the late third or early fourth century, and a thorough examination of the finds in strata that relates to the demise of the building has provided a tentative date for the disuse of the baths in the early eighth century (Blanke et al. 2007). Also, a strip trench stretching westwards from unit MO/1 into unit MO/17 was begun in order to establish the westernmost extent of the building (see Fig. 1).

## Unit MO/17

The objectives in MO/17 during the 2007 season were based on questions that arose out of the work undertaken in the previous year. Firstly, the excavation of a three-metre wide trench in unit $\mathrm{MO} / 17$ had resulted in several unanswered questions. These questions involved the previous uncovering of the remains of a mosaic floor that was constructed against a substantial wall running north-northwest to south-southeast. It was, however, not possible to either establish the purpose of the wall or to define the position of the mosaic within the functional layout of the bathhouse. Nonetheless, based on the considerable width of the wall it was interpreted as the outer wall in the western part of the bathhouse and the area that contained the mosaic was interpreted as the remains of an apodyterium based on its position within the bathhouse plan, as well as the remains of a small basin, which would have been a common feature in apodyteria and was designed for washing hands and face before entering the baths. During the 2007 season, an attempt was made to solve these issues by extending the excavation to include the entire unit. The excavation uncovered a continuation of the
2. To translate the names of the customers I used the Kitāb al-Ansāb of Ibn Sallām (154-224/776-846), ed. Dar alFikr, Damascus, 1989. But, some of the names are still subject of controversy. (Lign 4) the name Jarrah lacks the definite article, according to Ibn Sallām, Ibidem, p. 319-321. (Lign 4), the name Mustawrid is also missing thedefinite article, Ibn Sallām, Ibidem, p. 236. (Lign
5), the name Hārith is rare, but attested by Ibn Sallām, Ibidem, p. 257. The names Ḥārith and al-H̄āritha are however more common. (Lign 6), the translation of the name ash-Shāh is uncertain and needs more detailed research. (Lign 7), finally, the names 'Alā, Ibn Jamya' and Abū al-'ITs are rare, but are attested by Ibn Sallām, Ibidem, p. 199, 350.
wall throughout the entire length of the unit as well as a continuation of the mosaic floor north of the major east west running sewer (Figs. $\mathbf{2 0}, \mathbf{2 1}$ ). The remains of the mosaic floor were 75 cm wide and were found preserved along the entire northern section of the wall. However, a larger area of cement that originally served as a foundation for the mosaic witnessed that the mosaic floor originally occupied a much larger area. The cement showed evidence of cut marks indicating that the majority of the mosaic floor was removed in a quick manner with a pickaxe
like tool. This process must be assumed to have taken place as part of the overall dismantling of the bathhouse, and the associated harvest for valuable and useful building materials, just before the construction of the mosque.

A second important discovery came with what is currently interpreted as a large basin that was accessed from the caldarium (Fig. 21) However, the basin was not heated by the hypocaust, but appears to either have been fed with hot water from the boilers, or have been filled with cold water. The basin consisted of a rectangular

20. Mosaic floor in Unit MO/l7 running parallel to westernmost outer wall in Central Baths, looking south.

21. Overview of basin in Unit MO/17 looking southwest.
shape that measure approximately 4 by 3 meters and a small niche in the northern end of the west wall; thereby, the basin is large enough to have served as a plunge pool. This is a highly unusual feature and more consideration is needed in relation to how this installation functioned within its context of the heated part of the bathhouse. A small section of the basin was excavated, which revealed that the sides and bottom of the feature were covered in a thick layer of plaster, which would have been sufficient to hold water. At a later, currently undated, phase in the history of the bathhouse, the basin went out of use and was filled up with soil, and a surface was constructed from three layers of fist sized stones coated with a layer of plaster. The surface could possibly have facilitated the continuous use of water in this area.

## Unit MO/18

A 4.5 meter wide trench was excavated through unit MO/18, which enabled an analysis of the relationship of the bathhouse, excavated in unit MO/1 and the Roman Period shops below the level of the mosque in unit MO/3 (Fig. 22). This trench was designed to deal with a longstanding issue regarding the entrance to the bathhouse and the relationship between the baths and the shops. However, establishing the relationship between the two appeared more complicated than firstly assumed, primarily as a result of the intense harvest for building materials that provided a situation where almost nothing has remained of the floor paving nor of the general superstructure. However, it was pos-

22. Overview of excavated area between bathing suite and shop in Unit MO/3 looking north.
sible to establish that the bathing section and the one shop that has been excavated in Unit MO/3 were only separated by a single row wall, which clearly suggests that the two were constructed as part of one building. Furthermore, it can be suggested that the entrance to the complex was situated between two shops on the decumanus. Further excavation is however required before this suggestion can be confirmed.

## Future Work on the Central Baths

Following the seasons of excavations of the bathhouse conducted hitherto, it has been possible to establish a general plan of the building, as well as excavating important rooms and features that has enabled a good understanding of the history and use of the bathing facility. In a building as substantial in size as the Central Baths there will always be remaining questions regarding the understanding and interpretation of the facility; however, in the case of this bathhouse, it is currently believed that such issues will not alter the general perspective and understanding of the building. Therefore, further work will include only minor examinations in order to clarify chronological issues and explicate matters that currently must be perceived as tentative. These further examinations include a sounding through the subsequent paving in the assumed basin described above, which will be carried out in order to fully establish the function of the room. Further excavation is also required in order to determine the exact nature of the entrance to the baths. Based on the archaeological data presented above it is most reasonably to suggest that the uncovered shop in unit $\mathrm{MO} / 3$ was part of the actual bath building, and that the entrance to the bathing facility was situated next to, or between two such shops. However, this suggestion needs to be fully ascertained by excavating directly west of the shop in unit $\mathrm{MO} / 3$ as well as west of unit MO/18. The latter will most likely provide the continuation of the western outer bathhouse wall as well as clarify the physical relationship between the shops, the bathing suite, and the apodyterium. Lastly, further excavation is required in order to fully establish the relationship between the Central Baths and the surrounding buildings as well as the general history of development in this particular part of the city.

## A. Walmsley et al.: A Mosque, Shops and Bath in Central Jarash

Continuity in Material Culture from the Sixth to Ninth Centuries AD: Pottery from the Bathhouse, Mosque and Market in Jarash (SMcP)

This report presents an overview of the principal ceramic classes identified in study seasons in 2006 and 2007 of ceramics from the excavations of the Islamic Jarash Project. It concentrates on pottery from selected archaeological contexts within the Byzantine bathhouse over which the Umayyad mosque was built in the eighth century (Blanke et al. 2007; Walmsley and Damgaard 2005). Reference is also made to ceramics from the adjacent commercial precinct, which provide evidence of eighth and ninth century occupation, and to material from pits cut into the prayer hall of the mosque, attesting to a Middle Islamic presence in this part of the site.

Archaeological deposits antedating the bathhouse were identified by L. Blanke in 2006 beneath the paving of the frigidarium pool, giving a terminus post quem for its initial construction of 218-222AD (Blanke et al. 2007). Pottery from this location is Late Roman in date, while a few earlier fragmentary sherds are from the Hellenistic period.

## A Sixth Century Use of the Baths

A small group of vessels excavated in an enclosed cistern represents an intermediate phase during which, it is likely, the bathhouse was still functioning in its entirety (Blanke, pers. com.). They are squat, fine-walled biansulate cooking pots in an oxidised well-levigated ware containing small amounts of white and grey mineral tempers (Fig. 23). At Jarash, as elsewhere, this type of jar is part of a long running ceramic tradition of terracotta or "brittle" wares first ap-

23. Two cooking jars from late sixth century bathhouse.
pearing in the second and third centuries and running into the ninth century. A development of a similar squat jar with an out folded rim has been charted from late sixth through to the beginning of the eighth centuries at Pella (Watson 1992: 236), while in the Jerusalem region a range of cooking jars with different rim shapes, but closely paralleling the Jarash group, dates from the fifth to sixth century through to the late seventh or early eighth century (Magness 1993: 219-20).

## Late Sixth Through Seventh Century Bathhouse

Later in the Byzantine period, the northern part of the bathhouse underwent significant transformation. The hypocaust system in this area went out of use and the water evacuation channels were subsequently filled in (Blanke et al. 2007). Coin dates include a mid-sixth century follis of Justinian I (527-38), but also a prereform Islamic fils dated $660-680 \mathrm{AD}$ in locus 183 (Walmsley 2007). The ceramics from these drain deposits are consistent with a late sixth through seventh century dating based on initial parallels, principally from Pella, 'Ammān and Jerusalem, with the presence of some rubbish survivals from the fourth and fifth centuries. The majority of the material is in a medium fine terracotta ware in a uniform oxidised fabric with very fine white and great grits.
Fine terracotta cups. A series of small shallow cups with a tulip shaped profile and an omphalos base was found in great numbers in the drain fill (Fig. 24.1-4), some examples with concentric bands of red painted decoration (Fig. 24.3). One similar form is published from the excavations at the North Tetrapylon of Jarash and dated from the late sixth through the seventh century (Watson 1986: fig. 6.3), while a similar group of cups from Pella is from the sixth to eighth centuries, with this form being amongst the later variants seen at the site (Watson 1992: 241 no. 93). A related form from Jerusalem has a wavy incised line similar to (Fig. 24.4) with a date range from the mid sixth to eighth century (Magness 1993: 193-94).
Small terracotta flasks. These have prominent ribbing and string cut bases, and are concentrated in the infill of the frigidarium (Locus 349), possibly indicating that a specific artisanal activity occurred in this area (Fig. 24.5-7). No clear

24. Selection of pottery from the mosque and bathhouse (1-15). Drawings by Anna Ottilia Hilton Soria.

## A. Walmsley et al.: A Mosque, Shops and Bath in Central Jarash

parallels have been found for this type from the seventh century, but an apparently similar flask from the 'Ammān Citadel has been dated to early in the Byzantine period (Northedge 1992: fig. 123.5).

Conical ledge-rimmed terracotta bowls. This series of white slipped and red painted conical ledge-rimmed bowls is in a fine terracotta fabric (Fig. 24.8-10). The sculpted bowl closely resembles a bowl dated to the last quarter of the sixth century at Pella (Watson 1992: fig. 11.89). Small cooking jars. A more evenly distributed fine terracotta form from the bathhouse is a squat biansulate cooking jar type with an everted and outfolded rim and omphalos base (Fig. 24.1112). It does not differ appreciably from the sixth century variant (Fig. 23). This pot develops into a more varied range of forms in the seventh century which have a longer neck and slightly everted rim (Fig. 24.13), and by the eighth century are frequently decorated with white painted decoration and are thrown in a grittier fabric, which is often fired dark grey. Similar pots are published from Jarash and have dates that correspond to the bathhouse material (Watson 1986: fig. 6.2).
Cooking pot lids. The two lids with distinctive knife cut rims and white and red painted decoration illustrated here (Fig. 24.14-15) would have belonged to the casserole forms found more frequently in eighth century levels in this part of Jarash (Fig. 25). A similar painted lid is published from the North Theatre kilns and dated to the early eighth century (Walmsley 1995: fig. 2.5). These were not present in the bathhouse loci, presumably because of their domestic and not industrial function, but both the lid and casserole forms have a long life in southern Bilād ash-Shām, beginning in the third century and lasting through to at least the ninth century (see, for example, Magness 1993: 211-13).
Arched rim basins. These basins in a fine terracotta fabric appear frequently in the bathhouse but are uncommon in eight and ninth century levels (Fig. 25.16). At Jerusalem a related basin appears from the late third to early fourth, through to sixth and seventh centuries, and as at Jarash combed decoration is more common on the later examples (Magness 1993: 13-15).
Reduction fired handmade basins. Handmade grey wares are present in lower quantities in
bathhouse deposits than in those associated with the mosque and shops (Fig. 25.17). These wares were produced in kilns excavated in several locations in Jarash, notably in the area in front of the Artemis Temple (Pierobon 1983-1984: 94) and in the North Theatre (Schaefer \& Falkner 1986).
"Nicked" ware. Several examples were recovered of this distinctive group consisting of small collared juglets (Fig. 25.18). The fabric is a fine, orange coloured terracotta with white grits; the surface is highly burnished and decorated with small oblong "nicks". This ware is known from north Jordan and dated at Pella and Jerusalem from the late sixth through to the early eighth century (Magness 1993: 239-40; Watson 1992: 241).

Amphorae. There is a small presence of imported amphorae in the bathhouse excavations. Several examples were found of an amphora type with a wide Eastern Mediterranean distribution that was probably produced in Cyprus or Cilicia and finds parallels at Pella and Baysan, suggesting a late sixth to early seventh century date (Watson 1992: 78-79, fig. 10:75). These have dipinti inscriptions in demotic Greek on the shoulder of the vessels in a watery red paint (Fig. 25.19). A single example of a Gaza amphora used for the export of wine from that city (Riley 1975: 27-31), was also excavated in the bathhouse. These are commonly dated between the fourth and seventh centuries (Fabian and Goren 2001; Majcherek 1995; Reynolds 2005).
Jarash bowls. Several fragments of the distinctive Jarash bowls were found in the bathhouse loci. These painted bowls appear first at Jarash in the sixth century, with production continuing through the seventh century (Watson 1986; 1989).

## Ceramics from the Eight Century Bathhouse

The southern area of the bathhouse, including the furnace and adjacent hall, functioned until the structure went out of use prior to the construction of the mosque, with the discovery of two post-reform Umayyad coins in sealed loci providing a terminus post quem for this event (Walmsley 2007). Less pottery and few diagnostic forms were found in this sector, but it is significant for the evidence of some change in the character of the assemblage, notably an

No. Square/Locus

| 16 | $\mathrm{MO} / 1.300$ | 1158 |
| :--- | :--- | :--- |
| 17 | $\mathrm{MO} / 1.183$ | 1400 |
| 18 | $\mathrm{MO} / 1.183$ | 1074 |
| 19 | $\mathrm{MO} / 1.300$ \& 302 | 1088 |
| 20 | $\mathrm{MO} / 1.315$ | 1052 |
| 21 | $\mathrm{GO} / 1.15$ | 1068 |
| 22 | $\mathrm{MO} / 5.11$ | 1108 |

Munsell
Core 2.5YR 5/8 Surface 7.5YR 7/2
Core/Surface 5YR 6/3
Core/Surface 5YR 6/6
Core 7.5YR 8/4 Ext Surf 10YR 8/3 Paint 7.5YR 4/4
Core 10YR 5/5 Surface 10YR 6/1
Core 2.5YR 6/8 Surface 2.5YR 5/2
Core 5YR 5/12 Surface 5YR 6/3
25. Selection of pottery from the mosque and bathhouse (16-22). Drawings by Anna Ottilia Hilton Soria.

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increased presence of a more thickly potted terracotta ware with white painted decoration (see Fig. 26 for examples of this ware). This group continues through to the eighth and probably ninth centuries, undergoing morphological and decorative changes in the process. Hand made reduction fired wares are also more prevalent, this large basin with a thickened rim (Fig. 25.20) being an example consistent with an early eighth century date.

## Ceramics from the Mosque

Changes are apparent in the make up of the ceramic assemblage from contexts in the early to mid eighth century Umayyad mosque in relation to that of the bathhouse. There is a marked increase in the quantity of grey hand made wares, mostly basins but some jars, often with incised wavy lines or impressed decoration, roof tiles found in large quantities in the excavation of the mosque collapse sharing the same technical characteristics and were presumably a part of the same production. Although oxidised and reduction fired terracotta wares continue to be present in large quantities, they become noticeably thicker walled, and more frequently feature white painted decoration in multiple strokes or wavy lines. Red painted white slipped wares that are well known from elsewhere at Jarash are uncommon, surprising given that production has been attested in the eighth century town (Gawlikowski 1986: 117, fn. 14), and fragments found in the North theatre excavations (Walmsley 1986: 335). Illustrated here is a cooking pot with an intact profile excavated in the area to the west of the mosque, corresponding to the lids from seventh century contexts discussed above (Fig. 25.21). Early eighth century parallels for this are published from 'Ammān (Harding 1950; Northedge 1992: fig. 133.3-4).

## Ceramics from the Shop Complex

The shop complex contemporary with the mosque (Area MO/9 and MO/10; see above) produced a limited amount of pottery, all of it consistent with the corpus from the mosque. Most notable were the group of four casseroles and a jug found in situ in Shop 5 (Blanke et al. 2007: fig. 13). Coarser than sixth and early seventh century cooking wares, and with white painted decoration in curving parallel lines (Fig. 26),

26. Casseroles and jug from Shop 5 (MO/9).
they have the gritty terracotta fabric common to the cooking pots made in kilns of the first half of the eighth century in the North Theatre and terrace of the Sanctuary of Artemis (Piazza 19831984; Pierobon 1983-1984; Walmsley 1986). A close parallel for the jug is published from early eighth century deposits adjacent to the Sanctuary of Artemis (Piazza 1983-1984: 123, fig. G.35). Surprisingly, the casserole lids had not been cut from, and then reattached, to bottom part of the vessels prior to firing, although in all other ways they appear functional, steam vents even being punctured beside the handles when the clay was leather hard. It is possible that the vessels were made to be sold whole and prised open at a later date by the customer themselves in accordance with religious ritual, an interpretation suggested in explanation of the discovery of several similar examples from the Byzantine period near Nessana in Southern Palestine and in the Iskandil Burnu shipwreck in Turkey (Wolff 1997). A handmade, reduction fired basin with combed incised decoration was found in a secondary usage in the shops, containing ashes and inverted, it was missing its lower part and had clearly been used as a fire pit (Fig. 25.22).

## Abbasid Occupation at Jarash

Later eighth and ninth century wares were excavated in the northern part of the shop complex where a poorly defined stone structure was excavated in 2006. The archaeological strata corresponding to these periods were heavily disturbed in the twentieth century, and as a result this pottery was found only in small quantities. Red terracotta wares in the Byzantine and Umayyad tradition are still in evidence, but they
are joined by a pale yellowish brown thicker walled variant, several fragments of thin walled fine cream wares, and the "Palace Ware" found at other sites in the region (Walmsley 1995). Reduction fired grey ware basins are likewise attested here, although these have a thicker browner and crumbly fabric and pinched inverted rim profile in comparison to seventh and early eighth century predecessors at Jarash. At 'Ammān and Jerusalem a similar form is dated to the Abbasid period (Northedge 1992; Magness 1993: 210-11). Several fragments of lead glazed splashed and incised pottery of ninth to tenth century date have been found in architectural tumble in areas of later disturbance in the mosque, but not in this area of the site.

## Middle Islamic Pottery

A range of ceramic material found in pit disturbance in the area in front of the qibla wall of the mosque indicates the presence of occupation from the Ayyubid and Mamluk periods in this central part of Jarash. These include sherds of Hand Made Geometric Painted Ware (Fig. 27) along with examples of burnished hand made cooking vessels, and monochrome and slip painted lead glazed earthenware (Fig. 28) typical of sites with twelfth to fifteenth century occupation in the region. Middle Islamic painted wheel turned wares, the medieval descendent of Early Islamic painted wares, were found in small quantities in the pit contexts (Fig. 29).

27. Hand Made Geometric Painted Ware sherd from eastern mihrā̄b.

28. Middle Islamic Slip Painted Ware.

29. Middle Islamic Painted Ware.

## Concluding Remarks

The Danish Islamic Jarash excavations provide new ceramic data which have the potential to both confirm and question existing archaeological interpretations of the site in an area of the Late Antique and Early Islamic city where a varied range of activities took place. This data supports the hypothesis that there is strong continuity in material culture from the Late Byzantine to Abbasid Jarash. Pottery traditions evolved gradually from the later sixth to the eighth centuries, and by the later eighth and ninth centuries we observe indications of the shift taking place in material culture reflecting altered socio-economic patterns across Bilād ash-Shām at this time. Our material adds to the evidence of continued occupation at Jarash in the Abbasid period, and enlarges the picture of Middle Islamic occupation at the site previously known only from fill excavated in a cistern in the Temple of Zeus complex (Tholbecq 1997).

The tenth and eleventh centuries and the Ottoman period are not at present identified in the ceramic repertoire from Jarash, but it is hoped that further work in refining typologies will also enable us to ascertain their presence or absence at the site.

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# DOCUMENTATION OF MOSAIC TANGIBLE HERITAGE IN JORDAN JARASH GOVERNORATE 

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## Introduction

In the year 2005 a project was launched to build up a data base inventory of Mosaics in Jarash governorate, study their geographical distribution, evolution through time, their conservation status which will help to plan future restoration work, distribute resources, protect the mosaics from hazards, and prepare better representation, help in future urban planning, as well as providing accurate comprehensive information for scholars.

## Historical Background

Jarash city lies about 45 km to the North of 'Amman the capital (Fig. 1). The ancient ruins of Jarash were first discovery in 1806 by the German traveler "Seetzen", this rapidly drew the attention of scholars and archeologists, who started in 1925 their intensive excavations that unraveled much of the history of human occupation from the Neolithic period till the Ottoman period. Amongst the beautiful ruins discovered, mosaics were the most decorative ornaments found in both religious buildings and civil architecture dating from the fifth century till the seventh century.

The resettlement of Circassian community in the 19th century in the eastern part of city, and the urban expansion of the modern city, unfortunately, lead to the demolition of some of the monument. The expansion of the infrastructure lead to the other part of the site becoming detached, intensive tourist interest lead to the reburial of some mosaic pavements, not to mention the change in environment and the effects of pollution. The intensive excavations drew the attention of looters, whose illegal actions lead to the destruction of some of the pavements.

## Mosaic Documentation in Jordan

The first attempts undertaken to record the most outstanding mosaics found in Jordan were lead by Father Michele Piccirillo from Studium Biblicum Franciscanum at Mount Nebo, who published in 1993, with the support of ACOR "Ammān, a book about "The mosaics of Jordan" (Fig. 2), based on archive documents, collected information and personal discoveries and visits which documented most of the mosaics found prior to 1990, yet since then much had changed, so there was an urgent need to update the information based on field observation.

## Project Objectives

In 2005 an initiative was put forward by the Department of Antiquities in order to safeguard this tangible heritage, to fulfill the following objectives:

1. Build a national database for mosaic heritage both in situ and detached;
2. Locate and document the mosaics both in situ and detached;
3. Assess the state of conservation of the mosaics, both in situ and detached to establish the future restoration works needed,
4. Establish the tourist potential possibility of the mosaic sites and their visit accessibility;
5. Provide full information for scholars, researchers and restorers.
Due to the acknowledgment of the large amount of mosaic pavements found in Jordan, it was important to choose a location for a pilot project testing and development prior to launching. Jarash was chosen as a prototype for the following reasons:
6. For its long span of settled civilizations.
7. Jerash has been renowned for mosaic art school/workshops since the Roman period.


## 1. Jarash Location.

3. The ongoing excavations are providing new information about the site.
4. The flourishing tourist management growth in the governorate, not to mention the department of Antiquities initiative to protect the site.
5. The absence of a full mosaic documentation record.

## Methodology

A process was developed for the project which included several steps:
Gathering Information: In order to establish all mosaics uncovered since 1925, all documentation regarding excavations conducted in the governorate was collected and analyzed from all available publications, in addition to the study-
ing of all available documents in the Jordanian Department of Antiquities archive.
Mapping the Locations: Sites with mosaics were mapped on a $(1: 10,000)$ scale map of Jerash governorate. The routes for reaching the sites were located.
Field Visits: Sites were visited, verifying their location on the map, their current status was photographed, and the requirements needed for their uncovering and documenting were estimated and recorded.
Budget Allocating: An assessment was made for the number of workmen, vehicles, materials and equipment needed and the time span to complete the necessary work. The materials were covered by personal payment, while the Department of Antiquities covered the vehicles and workmen.

2. First Documentation efforts for the mosaics of Jordan.

## The Project Implementation

Jarash governorate covers approximately: $515 \mathrm{Km}^{2}$, according to the assessment done based on field observation. The governorate was divided into three zones

- Sites located within the ancient city walls / Ancient city (Fig. 3);
- Sites located within the ancient city walls / Modern city (Fig. 4);
- Sites located outside city walls (in the vicinity of Jarash) (Fig. 5);
Based on accessibility, all museums, stores and warehouses belonging to the archaeological departments at Jordanian Universities, archaeological centers and belonging to the Department of Antiquities were visited to locate detached mosaics from Jarash governorate.

All mosaic pavements were uncovered (Fig. 6), documented by: photograph, description of their state of conservation and then measured. The detached pieces from Jarash were traced, compared to original photographs or plans, and documented according to current state (Table 1).

## Building Up the Data-Base

## 1. The Site Card

Due to the tremendous amount of mosaics identified, the remoteness of their location and the fact that some are located on private property, it was important to develop a site card in order to fill in as much information as possible immediately at the site and in the simplest possible way.

Several versions were made for the site card; they were tested on the ground both for detached mosaics and in situ before the adaptation of the final version to be used on a larger scale (Fig. 7).

The card (Fig. 8) was designed to sustain field information documentation and bibliography, both gathered at the field and from available sources by understanding the following.

Table 1: Showing the distribution of mosaic pavements in Jarash.

| Sites With Mosaics | Within City Walls Inside the Ancient City | 17 |
| :---: | :--- | :--- |
|  | Within City Walls Outside the Ancient City | 3 |
| Detached Mosaics | In the Vicinity of Jarash <br> From: <br> Prophets, Apostles and Martyrs <br> Elia, Maria and Sorge <br> John the Baptist <br> Bishop George | 7 |
| Mosaics <br> outside of Jordan | "Villa of Muses and Poets" partially in Berlin's <br> Pergamon Museum and partially at the Yale <br> University Art Gallery | 2 |


3. Sites within the City Walls (Google Earth).

4. Sites located within the ancient city walls / Modern city (Google Earth).

5. Sites located outside city walls; (After Google Earth).

6. The Process of Clearing and re-opening the buried Mosaic locations.

## Office Information

Location/ Previous and Current: Cadastral maps were used for reference to mosaic pavement location, due to the fact that: some locations relapse with each other, marking them with Similar coordinates and establishing the ownership of the land. For detached mosaics their original location was identified and current location was

7. Gathering information on the site in order to prepare the site card.
mentioned by name, for example the Jordan Museum of Popular Traditions - museum number was added for further detail.

Historical and Archaeological Background: Extracted from available information about discovery date, period, architectural context, bibliography and references. In addition, pre-

8. The Designed Site Card used in the field. (Overse, Reverse)

9. The Automated Site Card.
vious information about restoration or conservation works if they occurred and were available.

## Field Observation

Photograph: Several photographs were taken, basically a general photograph for the site in addition to detailed ones for detailed information of the state of conservation and for specific details. Description: Each mosaic depiction was described laconically, concentrating on distinguishing features present in each particular pavement.
Inventory Number: Detached mosaics stored at storehouses or displayed at the museum or in an exhibition hall which had an inventory number, registration were recorded on the card, and on the original plan their contour was marked in order to detect all pieces belonging to the same pavement and available, to distinguish them from the lost, deteriorated and degradated pieces.
Dimensions: Each mosaic was measured; two dimensions were taken for the pavements, while three dimensions (including thickness) were taken for detached pieces, in centimeters.
State of Conservation: Assessments of the current mosaic state and documenting the location of the main damage; previous restoration works and recommend future intervention.

For detached mosaics particular attention was given to the support the mosaics were laid upon.

The completed cards were catalogued according to location (Store, Museums, in situ ... etc) and were stored at Madaba Mosaic School.

## 2. Computerized Access Version

The site card developed was converted into a digitalized form using MS- Access program. This was important for protection of the gathered information, accessibility, the possibility of future modification and the ease of adding more sites in the future (Fig. 9).

All collected information was then catalogued into the computerized version of the card, for future analysis. The program was later installed on one of the Madaba Mosaic School computers.

## The Results

The work was completed within three years. The basic results were:

1. Full inventory of mosaic pavements, their location, accessibility and ownership;
2. Current condition of the state of conservation for both detached mosaics and in situ which will help the department of Antiquities plan future conservation project;
3. Analyze the development of mosaic workshops of Jarash in time, the materials used and the common artistic trends;
4. Mark potential sites that could become major tourist attractions to prolong the stay of tourists and visitors;
5. Provide up to date information for scholars and researchers;
6. Provide information for restorers about: the history of conservation, factors affecting mosaic deterioration and the results of previous restoration works which will help to plan future projects in the area;
7. Document the lost mosaic pieces, and collect and gather the detached mosaic fragments together;
8. Choose better representation of mosaics at exhibitions and museums to provide full information;
9. Provide information for public work and urban planners to better provide infrastructure
for potential tourist sites and to help better protect archaeological sites;
The future aim is to continue the project and be able to do it for all the mosaics of Jordan, publish the results in a new book about the mosaics, exchange this experience with the other countries in the region the outcome of which will be a better understanding of mosaic production history and art in the region.

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# THE NINTH SEASON OF EXCAVATIONS AT KHIRBAT SHUWAYKA 2005 

Marwan F. Abu-Khalaf

## Introduction

Khirbat Shuwayka is located 12 kilometers north of Jerusalem on the southern side of alBireh, a few hundred meters west of Tall anNasbeh.

The site was mentioned in the famous Survey of Western Palestine (1871-78), and in the work of the Franciscan monk Bagatti, who visited the site. The Khirba was known to local inhabitants as "Queen Helena's Palace", indicating notable monuments on the site. In 1935 the excavators of Tall an-Nasbeh dug a limited area of the site, discovering the mosaic floor which was covered over to protect its remains.

The Higher Institute of Archaeology at alQuds University carried out a survey of the site in 1996 before the start of the excavation work. The area of Khirbat Shuwayka, which is about $2,750 \mathrm{~m}^{2}$, was divided into squares using the grid system (Fig. 1). This allowed a systematic mapping of the architectural and material finds of the site.

The distinctive archaeological features which have emerged from the excavation are: a residential complex in the north-west; a church in the north-east; a winepress installation in the south-east; and a paved courtyard in the middle divided by walls in a later period for other uses.

The excavations uncovered evidence of Roman-period occupation, but the heyday of the site was the Byzantine period (fourth-seventh centuries AD) and the early Islamic period (Umayyad and Abbasid, eighth-11th centuries AD). Later the site was completely abandoned and used for agricultural purposes - destroying much of the archaeological record.

Work on the site during the ninth season, as in the previous seasons, had concentrated on the southern area with the aim of finding more evi-
dence that would better relate the extant architectural features.

The ninth season started on June 21 and ended on July 11, 2005. The team consisted Dr Marwan Abu Khalaf, director of the Institute; two supervisors, Dr Salah Houdalieh and Dr Ibrahim Abu Amar; a surveyor, Ibrahim Iqtait; and eight MA students from the Institute. The excavations concentrated on three main areas: the residential complex (Square I7); the courtyard (Square K12); and the winepress area (squares R17, R16, S18, S16, Q16).

## Square I7

The main aim behind excavating this square was to follow the walls which were uncovered during previous seasons in squares $\mathrm{H} 7, \mathrm{H} 8$, and H9. This led to a clearer understanding of the residential complex. During the process of excavation, we were able to distinguish 17 loci. These ranged from the upper part locus, representing the surface which covers the whole area of the square, to the paved floor which represents the bottom layer (Fig. 2).

Locus 6 is a wall located on the northwestern part of the square, which extends from east to west. It is built of large and small stones, and believed to date to the Byzantine period, as a Byzantine coin was found beside it.

Locus 8 is also a wall, located on the southern part of the square and formed of large welldressed stones.

Locus 9 is a wall located on the eastern part of the square, which extends from north to south and forms a vertical angle with the wall of locus 6 . Its stones are very similar in character to those of locus 8 , which indicates that both walls can be dated to the same period.

Other rectangular well dressed stones were


1. Survey map showing the various remains at the site.


2a. Plan of square I7 and its neighboring area.
also uncovered in locus 12 joining the wall of locus 6 with which it forms a niche, a shape dated to a later period, probably the Abbasid. Other
types of stones that were well cut and dressed were uncovered in locus 16 located at the western side of the square which also joined the wall


2d. Square 17, northern section.
of locus 6. It is believed that these stones form the lower part of an arch to which the related residential complex found in square H 7 , dated also to a later period probably the Abbasid period.

A large amount of smooth soil and fallen stones of various sizes were also found in this square, as well as many pottery sherds, glass


2e. Square 17, eastern section.
and coins (Fig. 3).
Based on the architectural features and other finds that were uncovered, it is possible to distinguish two phases: the first phase is Byzantine, represented by the walls of locus 6 and 9 , the Byzantine coin, and pottery sherds. The second phase is the early Islamic (Umayyad and Abbasid), represented by locus 12 and 16 and the large quantity of Umayyad and Abbasid pottery sherds.

## Square K12

The aim of excavating this square was to better understand the courtyard area, the remains of which had appeared in other squares in previous seasons. The main architectural feature, which appeared in locus 2 of the square, was a wall of large irregular stones located at the middle of the square. The wall runs from east to west, and its structure showed that it was probably built in a later period - most likely during the Umayyad


[^5]period. Locus 5 also contained a wall, located on the southern side and running in a north-south direction. The wall, made of undressed stones of varying sizes, is not well-built, and probably dates to the Umayyad or Abbasid periods (Fig. 4).

In this square many fallen stones from walls 2 and 5 were also found, as well as a large quantity of smooth dark brown dirt - which probably indicates the existence of a hearth or $t \bar{a} b \bar{u} n$. The soil in this square is mainly dark brown and smooth, and contains a large quantity of pebbles, tesserae, pottery sherds and charcoal.

The natural rock layer which we reached at the bottom indicates that the character of this square is not very different from the neighboring Square K11. The result of the work in this square shows again the three main periods of

4. Square K12, showing the stone pavement $L 5$.
occupation on the site: the Byzantine, which was close to the natural bedrock, and then the Umayyad and Abbasid.

After completing the work in this square, we found it necessary to extend the work from its southern side (Fig. 5a). This was due to several reasons, including the continuation of the wall of locus 5 under the southern side of the square. After removing the layers and reaching the required level of the wall, an important feature was revealed: wall locus 7 , this wall is one line of large well-dressed stones supported by small stones mixed with lime mortar. It runs in an east-west direction, and can be dated to the Byzantine period (Fig. 5b).

## The Winepress Area

Seven squares were excavated in the Winepress Area. The principal aim was to uncover the other parts of the press. The most important discovery came in square Q16, where a wall running north-south was uncovered in locus 2 . The wall, 80 cm in width, is formed from two courses of different-sized stones filled with pebbles and built directly on the bedrock. The western end of this wall, about 70 cm in height, forms the other part of the western wall of the winepress which was uncovered in 2003 (Fig. 6).

No architectural features were found in the other squares, which were excavated down to the natural bedrock, with internal grooves filled with dirt to different depths (Fig. 7a). The dirt covering them is brown, containing large, rough


5a. Plan of squares K12 and K13.


5b. Square K 12, northern section.

6. General view of the winepress area, showing the excavated squares.
grits mixed with pebbles, as well as Byzantine and early Islamic pottery. The lack of any architectural features in these squares shows that the area was used for agricultural purposes during and after these periods (Fig. 7b).

## The Finds

Apart from the architectural features, the finds from the three areas consist of pottery sherds, glass, bones and mosaic tesserae, all dating largely to the Byzantine and early Islamic period.

## Pottery

A large quantity of pottery sherds were found on the site during the excavations. These belong
to various types of vessels: large- and mediumsized jars, jugs and juglets, cooking pots, bowls and dishes, oil lamps and animal figurines.
Jars (Figs. 8a, 8b): Fragments of large and me-dium-sized jars were found. These were used mostly for liquids - either oil or wine. Their handles are vertically placed, extending from the rim to the shoulder, and are sometimes decorated with stamps. Their rims are either flat or averted, and they are patterned with dental decoration. The bases of the medium-sized jars are either ring or flat; those of the large jars are oval.
Cooking Pots (Fig. 9): The cooking pots are of various sizes. They are spherical in shape, and decorated with light ribbing. The clay is brownish-orange, and is covered with traces of firing. The rims are either flat or beveled, mostly grooved so that the lids fit closely. The handles are mostly horizontal, and placed slightly under the rim. The lids of these vessels are also decorated with slight ribbing and have knobs or ring handles at the centre. The larger vessels have narrower openings, with vertical handles extending from the rims to the shoulders.
Jugs and juglets (Fig. 10): These vessels are made of pale yellowish or orange clay. They have thin walls, long necks, and handles extending from the neck to the shoulders. A few of them are formed of double or triple joined handles. Their bases are short and cylindrical.


7a. Plan of the squares in the winepress area.


7b. The northern section of the winepress area.


8a. Jars.


8b. Jar handles with stamp decoration.

9. Cooking pots.

The juglets (ewers) have spouts on one side, protruding from the bottom of the neck.
Craters (Fig. 11): The craters are of large size, and made of brownish-orange clay. They have flat bases and arched or flat rims. The thick walls are straight or slightly rounded, and they are adorned with either painted patterns or bands of combed, zigzag, stamped or thumbed decoration.
Plates, bowls and cups (Figs. 12, 13): These are made of various colored clays, ranging

10. Jugs and juglets.

11. Craters.
from pale cream or light brown to orange and sometimes gray. Some of the vessels are wheel made, and others are handmade. The small vessels have thin walls, and flat or disc-like bases, whereas the large vessels have thicker walls with disc-like or rounded bases. These larger vessels are mostly decorated with combed patterns.
Other pottery fragments (Fig. 14): This season's excavations yielded many different pottery fragments. These include a fragment of a bull figurine made of yellowish clay; a fragment of an oil lamp decorated with vegetal motifs, such as palm trees, or grapes, which date most probably to the Umayyad period; and a fragment of a mediumsized pilgrim flask, made of brown clay.
Other objects (Fig. 15): Other objects uncovered during the season include iron nails, a copper ring, glass fragments, pieces of basalt, and coins.
Byzantine pottery (Fig. 16): What little Byzantine pottery was found during the season came in the form of sherds from jars, juglets and craters found either on pavements or on the beaten floor. These were made mostly of orange clay.

## Summary

The 2005 excavations uncovered various architectural features and material evidence which indicate three main phases of occupation at the site of Khirbat Shuwayka. The first phase is the surface, which was used for agricultural purpos-

12. Plates, bowls and cups.
es for a long period. The second phase represents the Early Islamic period, mainly Umayyad and Abbasid. Walls found in square K12 and I7 (and then the extension of I7) indicate reuse of the site during this period. The third phase is Byzantine, indicated by walls and several coins discovered in squares I7, D12 and Q16.

The results of this season's excavations match to some extent the results from previous seasons. Square I, for example, shows connections to squares H6, H7, and H8; square K12 shows connections to squares L12 and K10; and, in the winepress area, square Q16 helps us better understand squares S15 and R15.

13. Plates, bowls and cups.

## Acknowledgements

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[^6]ADAJ 52 (2008)

14. Other pottery fragments.
15. Various objects.
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16. Byzantine pottery.

# AN OVERVIEW OF THE ITALIAN EXCAVATIONS IN THE ‘AMMĀN CITADEL 1927-1938 ${ }^{1}$ 

Roberto Parapetti

## July 25th 1938

The members of the Italian Archaeological Mission in Trans-Jordan, whose seat is in Amman, met in Brindisi to board the seaplane to Athens.
July 26 ${ }^{\text {th }}$
They continue their journey to Haifa making a stop in Rhodes.
July 27th
From Haifa to Lydda by train and from Lydda to Jerusalem by car.
July $28^{\text {th }}$
They stop at Jerusalem because of the Palestinian insurrectional movements.
July 29th
Jerusalem-Amman by car. July 30th

Preparation for excavation work cannot be started because tools and "decauville" material are lacking: it is impossible to collect the above mentioned material from the storehouse of the Directorate of Antiquities of Amman because of the drivers' strike... ...
August $4^{\text {th }}$
Work starts near the eastern gate and the final arrangement of the "decauville" track is settled... November $22^{\text {nd }}$

Work is aimed at a radical cleaning of the Arab monument and at completing the clearing out one of the rooms. Furthermore, the arrangement of the basilica is started by cutting the path
that crosses it."
These evocative notes, of a time only in part passed, are the starting and the final records from the excavation diary drawn up by the field assistant during the last 1938 campaign of the Italian Mission of the 'Ammān Citadel. The outbreak of the Second World War and the engaging appointment of Renato Bartoccini, the director of the mission, in the Italian public administration, imposed a definite halt to the research in 'Ammān.

Unfortunately, since then those works had been almost forgotten in spite of the preliminary reports, published between 1930 and 1939.

It is true, in fact, that before 1973 (Zayadine 1973) no mention was made of those issues ${ }^{2}$.

In consideration of the radical change made on the archaeological landscape of the citadel through the uncovering of the Great Temple and more than half of the Umayyad Palace, which had been unchanged until the early 1990s, those works were but irrelevant:
"...In figures, there have been five digging campaigns, employing 350 workers for an amount of 20.000 working days. $30.000 \mathrm{cu} . \mathrm{m}$. of materials have been removed, bringing to light more than 7.000 sq. m. of monumental areas....." (Bartoccini 1939).

No matter how things have developed, the following remarks are intended to complete

[^7]Antiquities files, was available already before that date, but without bibliographic references (see Tell S., Notes on the Archaeology of 'Amman. ADAJ 14 (1969): 30). It must be also omission is also remarkable in the report of the trial trenches made for the construction of the museum, likely planned on the citadel between the monuments just brought to light by Bartoccini (Harding G.L., Excavations on the Citadel, Amman. ADAJ 1 (1951): 7).
those unfortunately incomplete works. In order to facilitate the reading, Bartoccini's quotations were translated from Italian.

The beginning of the Italian adventure in Transjordan is described in this way:
"... ...After the establishment of the Emirate, the Italian Association for the Missionaries decided to build there a hospital. Soon afterwards, also an Archaeological Mission was sent there, the care of which was entrusted to the Direction of the Italian Scientific Missions in the Levant presided by H.E. Paribeni. Having participated in the war in Palestine, he felt and still feels a nostalgic affection towards those countries. The mandatory power granted our request for an excavation permit...... In October 1927, comrade Giacomo Guidi.... carried out the first survey in Amman, and started the first excavations on the acropolis....... The following year, Giacomo Guidi succeeded me in the Direction of the Excavations in Tripolitania, as I was entrusted with that of the Mission in Trans-Jordan" (Bartoccini 1939).

More than the nostalgic feeling or the comfort from the presence of the missionaries, it was a political opportunity to suggest Roberto Paribeni, the 'Direttore Generale delle Antichità e BelleArti', should start archaeological research beyond the Jordan river. Notwithstanding the endemic economic difficulties, fascist Italy could not avoid being present in regions where European and American scholars had already gathered prestigious scientific positions ${ }^{3}$.

Besides the first 1927 mission, the field activity in Transjordan consisted of only four campaigns: June-September 1929, July-October 1930, Janu-ary-April 1933 and July-November 1938.

As far as Giacomo Guidi's 1927 mission re-
sults are concerned, I could only go through a short manuscript he sent to Renato Bartoccini including, together with the Excavation Permit, a letter dated June, 2nd 1929 wishing him good work, just a few days before the latter left to 'Ammān ${ }^{4}$.

On the 25th October 1927 the survey of the acropolis started and continued until the end of November.

From the above mentioned manuscript, it appears that Guidi could have at his disposal an average of 60 workers led by the assistant Musa Kamar. The Dominican Fathers for their hospitality and Dr. Fausto Tesio, director of the Italian Hospital, for his friendly support, were worthy of credit. The bases to establish a long term research were immediately evident to him. The first pick was dealt inside the area delimited by the remains of a structure appearing like a foursided portico of the Roman times, north of the well-known Arab building:
".... the excavation began from the north-east corner so to have the advantage to discharge the earth down to the desolated valley below.......... while digging, it was possible to find, inside the four sided portico, Byzantine and Arab structures. Some of them, judging from the remains of masonry built column bases must have had a quite fair aspect. ... In the superficial layer, there was plenty of interesting fragments of Arab pottery in geometric style: afterwards, I saw some of the integral pieces of these ceramics in the little museum of Nazareth... Had chosen a space free from the Byzantine-Arab structures, it was possible to dig a deep trench... ...many remains of characteristic pottery were found, dating back to the Hellenistic period, to the Iron Age and finally to the Bronze Age III. Therefore, the scientific systematic exploration of the four-sid-

[^8][^9]ed portico's subsoil are promises for interesting findings especially of biblic and Greek period. At this point, it seems there's no more doubt that the fortified citadel, under the walls of which general Uriah, Bathsheba's husband, fell, had to be located in the third terrace of the acropolis of Amman".

In his first campaign in the summer 1929, Bartoccini reconsiders his predecessor's hypothesis affirming that the Biblical Rabbath Ammon could not be located on the third terrace as this is only the result of a filling contained by the imposing Hellenistic-Roman walls, on which the four-sided portico had been built The most ancient city had rather to be located on the first terrace, that is in the long eastern wing of the acropolis (Bartoccini 1930: 15).

The field activity was mainly focused on bringing to light the Great Temple in the second terrace:
".... we dug for an average of 3 m . down to the Roman soil; I made a 2 m . more down sounding collecting material of various epochs.....the temple foundations are still deeper ....the temple podium preserves ..... a nice wide base moulding. Astride the joint of two blocks of the base there were the letters $\mathrm{A} / / \mathrm{ZE}$. ......The temple pronaos.....was a tetrastyle of the Corinthian order, the columns were composed of more elements...On one of each drum faces there is the Greek name $\Delta \omega \sigma \epsilon O \sigma$......and some sign which I believe to indicate their positioning...Observations of some interest were made on the monument structure itself. The workmanship of the cella have nothing to share with that one of the pronaos. The stone material itself shows sensible differences...... At any rate it is certain that the pronaos was added to a preexisting, perhaps not Roman, building, built under Marcus Aurelius rule.... I began then the unearthing of the cella ... walls of various structure and orientation associated with change of findings started to appear" (Bartoccini 1930: 15-16).

The hypothesis of the temple having a tet-
rastyle pronaos, certainly deriving from Butler reconstruction (Butler, H.C., Ancient architecture in Syria, Section A, Leiden, 1907), has been eventually revised during the restoration work carried out by the American Center of Oriental Research in 'Amman (Kanellopoulos 1994). The front must have had, in fact, six columns (see also Zayadine 1977-78: fig. 1).

In July 1930 (second campaign),
"... ...the mission was welcome with the usual warmth by Col. Cox, English resident, by the President of the Emirate's Council, by Mr. Head, regent of the Department of Antiquities... .... With me, there were architect Carlo Ceschi, who made a complete surveying of the Amman monuments, and an assistant ${ }^{5}$....Towards to the end of the campaign, H.H. the Emir Abdallah visited the mission's work... "The work began with the resumption of the excavation in the temple.... [where] it was soon brought to light a colossal marble elbow, part of a possibly female statue..."

No mention is made of the fragmentary left hand belonging to the same colossal statue, at present, together with the elbow, at the sides of the Museum's entrance, evidently a later finding.
"....to continue the excavation it became necessary to remove a pillar laying sideways in the cella and a number of ashlars which have been numbered and stocked in the vicinities.... The bed rock was soon reached showing a convex shape.... a cistern was uncovered (together with two others outside the temple) filled up by stones among which only a couple of black ware monocline handless lamps (cocked-hat lamp) were found. Just close to the temple front a big rock appeared and.... stone blocks against its south side have been interpreted to form rudimentary steps. Once cleared, a cavity on its top was recognized associated with other cavities at its base connected by a drainage groove. To its north east side a small cave, the roofing of which had collapsed was also found....... We were then

[^10]published by the director of the Spanish Archeological Mission in 'Amman (Almagro 1983).
at the presence of the Ammonite sacrifice sacred rock, the most ancient worship site of this bellicose people..." (Bartoccini 1932: 16-23).

The subject of the "Ammonite sacred rock" was resumed in a separate short article (Bartoccini 1935). The identification of the site with the 'high places' of Semitic tradition, though, was not shared by Zayadine who considered not fully convincing the supplied identification elements (Zayadine 1973). The rock, oriented eastwards apparently like a ship prow, seemed to confirm the discoverer the hypothesis that the citadel mentioned in the Bible had to be located on the lower terrace. So he decided to open a large north-south trench on the lower terrace and therefore the excavation permit had to be extended - spanning from one terrace side to the other. At the end of the campaign the first building structures appeared at about a depth of one metre. The collected material consisted, mostly of Roman potsherds.

The availability of a 'decauville' allowed the excavation to start again and more rapidly extending the work begun in 1927 in the four-sided portico. Together with the various architectural elements, an abundance of Arab pottery was found, of the type already observed by Guidi, was gathered:
"... ...In the layer which can be dated back a few centuries later than the construction of the well-known Arab building, we brought to light a big quantity of potsherds of a rather unrefined and porous mixture with external pale-yellow wash on which brown geometric decorations
are painted, generally distributed on horizontal zones... ... ...We are dealing with a new ceramic production. Only the Kaiser Friedrich Museum has two samples of uncertain origin but certainly not coming from an excavation, and three or four fragments found near one of the Arab castles of the desert area bordering Amman. Therefore, for the first time, their exact context can be declared... ... ...In this case, we should date the finding back to the 12th-13th century... ...I took a typologically complete collection of the above described ceramics to Italy and gave it to the "Museo Internazionale della ceramica" in Faenza" (Bartoccini 1932: 22-23, Fig. 1) ${ }^{6}$.

During the same campaign a 'water reservoir', which had been seen already by Conder (Conder, C.R., The survey of Palestine I, London, 1889), north of the northern bastion, was cleared.

Bartoccini, like the British traveller, associated it with a passage of Polybius [Histories] according to whom, during Philadelphia's siege, Antiochus the Great defeated the besieged Ptolemy Philopator by cutting off the water-supplies that must have been granted by a secret passage from inside the fortress to a water reservoir. The investigation on the cistern was resumed in the following campaign 1933:
"..the channel giving into the great cistern opens outside the present walls. It must therefore be supposed that these ones were erected when the first was not in use anymore. ...From a careful exam of the foothill one can suspect..... the existence of a more advanced city wall, con-


1. Faenza, Museo Internazionale delle Ceramiche, samples of medieval pottery from the 1930 excavation in the "four sided portico".
[^11]Second World War, and they are still available.
temporary to the one on the first terrace dating to the bronze age....In the next campaign I plan further investigation in that area. (Bartoccini 1934: 275-276).

If any, Bartoccini did not give record of further research. However, the suggestion of the existence of a more ancient city wall was much later confirmed. The water reservoir and the area surrounding it were, in fact, carefully investigated allowing for the reaffirmation of the extent of the historical reconstructions advanced by Conder and Bartoccini (Zayadine, Humbert and Najjar 1989; Zayadine 1990). In my opinion, judging from its layout, the water reservoir, as it appears now with its thick plaster lining, must had been originally made for a hypogeal tomb.

We must realize, however, that our archaeologist was not lucky, indeed. In 1949, in fact, just a few metres away from the above mentioned reservoir, four exceptional sculptures (R.D. Barnett, Four Sculptures from Amman. ADAJ I, 1951), which had to be associated with an Ammonite shrine dating back to the 8th century B.C., were found. They could have given Bartoccini a much wider scope of research.

Still in the 1930 campaign:
"......We isolated and discovered part of a coeval construction [with the Arab building], similar in style, which raised on the northern limit of the terrace. It promises to reveal new decorative material with a better link with the very well-known material of Mshatta. The gate in the western side of the walls, that I had identified in a series of soundings carried out to recognize the exact perimeter of the acropolis, had to be probably connected to this group" (Bartoccini 1932: 23).

January and April 1933 (third Campaign):
"...As regards the workers, we had a great choice, due to the crisis in the work sector that also Trans-Jordan was going through... ... ...In this campaign, but never before, the whole Islamic world was represented on the acropolis of Amman: Javanese, Zanzibaris, Somalis, Eritreans, Yemenite, Iraqis, Druses, Syrians, Circassians, Tripolitans, Tunisians, Egyptians, a small tower of Babel complicated by natives already immigrated from South America who
were keen to make their comrades believe they were "almost... Italians", as they spoke Spanish or Portuguese! Exquisite, as usual, the welcome of H.H. the Emir Abdallah and col. Cox,......and of the colleagues Horsfield and Head.... " (Bartoccini 1934: 275, Fig. 2).

The presence of such a variety of labours was due to a different reality. The events that occurred in Cyrenaica as result of political and military actions carried out by the Italian colonial government, and in particular the killing of the rebel Omar Muktar in 1931, anti-Italian actions were provoked throughout the whole Muslim world: the workers of 'Amman demanded an excessive pay increase and the owner of the land, where the excavation debris were usually thrown down, demanded a lease. The removal of the anti-Italian impasse, came through an unexpected chance: the British premier J.R. MacDonald paid Mussolini a visit and soon after this, the latter made a declaration for the non

2. 'Amman, official visit to the Italian Archaeological Mission at the Citadel in 1933 (centre, Emir Abdullah; left, R. Bartoccini).
partition of Syria. Bartoccini was able to take an advantage of those circumstances: after dismissing the entire labour gang, he recruited again the milder of them and paid the land owner a ten years lease (Petricioli 1988).

The work continued as usual in the four-sided portico (from then called "agora").
"... ...The large sounding along the walls... ...towards the Arab building, towards the west, have revealed many and frequent re-makings of the protecting walls built around the third terrace... ......two interesting basalt stelae each bearing the image of a divinity were uncovered. The first of them was found near the [west] city gate,...the second was found while dismantling a part of the wall which from the Arab building goes straight to the agora [north] entrance... One of the figures is shaped like a mummy bearing the uraeus on his head ...; the other one, proceeding on the side has a cat head (!) adorned with the uraeus, the naked breasts below the egida.... For style and intrinsic anomalies, the
gods of the two sculptures must be assigned to the Syrian-Palestinian pantheon, influenced by the Egyptian artistic style; I think they can be dated to the IV-III century B.C." (Bartoccini 1934: 278, Fig. 3).

Photographic images of the two stelae are reproduced in the report (Bartoccini 1934: 277) identifying the two gods Osiris and Bastit. An incredible oversight. Leaving out here discussion of the date of the pieces, we have to correct the interpretation of the second bas-relief which, by his "ram-head" is evidently an Amon. After the finding, the two important discoveries were dislocated at the sides of the entrance gate of the mission's house, where they remained until 2004 when they were moved to the Citadel Museum.
".....It is now clear that the all area (of the agora) was occupied by a complex of private constructions, chronologically posterior to the Arab conquest and topographically connected

3. Basalt stele of Osiris and Ammon, 2003.
to the great monument . ...The whole was embellished with a double colonnade of which the bases were found.... The main building was in fact in direct relation with a coeval building outside the agora at the limit of the fortification.... The main construction represented the entrance to the complex and for this use two seats were located at the entrance gate sides. A similar arrangement was realized at the old [north] entrance to the agora..... In a synthesis..... we acquired the following: $1^{\text {st }}$ The Roman agora, probably settled during the rule of an emperor of the Antonine dynasty .....2 $2^{\text {nd }}$ The agora was endowed with a second outer [northwards] colonnade....to create a portico...... $3^{r d}$ At least, the eastern side of the agora was arranged with shops paved with a plain white mosaic flooring...The façade of this side was certainly different from the others. A number of corbels for sculptures was found; one of them is a big winged phallus. $4^{\text {th }}$ Beyond the agora, between this last and the temple, already explored on the second terrace, there must have been buildings of an importance....... A tradition , according to Mukaddasi, assigns [the Arab buiding] to the function of a mosque built on Uria's tomb. ... That room is obligatory a by pass space and. .....all induces to believe that it was simply a pavilion, in which the lord, that resided beyond the plaza, in the building on the walls, received the applicants: i.e. a diwan. The decorative apparatus adorning the interior of the building must have been repeated outside in its top part as the lower one was only plastered ....... Fragments of columns and corbels... were possibly to create a blind arcade. Traces of coloured retouch are present, in which the red is prevailing. As for the date of this pavilion ....the majority assigns it to a lord of a Sasanian dynasty in consideration of Persian influence to be recognized in the geometric and floral patterns of the decorative apparatuses ....From the artistic point of view it as been associated with the Mshatta castle....but, also for this monument the most various hypothesis have been proposed. Strzygowski assigns it to the IV century, Brunnow to the V, Diehl to the VI, others to the VIII. .....I have no difficulty to assign it to the IV century (!), but for the Amman pavilion, I think we must descend to the second half of the VII century because, even tough there are evident reminiscences of Byzantine patterns
in some details of partition fillets, of panels and frames, it has an overall design which makes it stand out from the old classic world, taking it back to the typical products of the Arab architecture's origins... With this respect, the building is closer to Qasr-el-Qarani..... The main entrance of the Arab building from the agora side was found sealed and the interior was reshaped by partitions of a very late epoch....after the collapse of the central dome.... Already before our excavation, the local archaeological office had executed propping works which resulted though, insufficient. I managed to build them again and to seal the most unsafe breaches.." (Bartoccini 1934: 279-282, Figs. 4-8).

In consideration of Bartoccini's classic background it is remarkable how close he went to the date suggested for the "Arab building". The excavation made by the Spanish mission, starting from 1974, ascertained that the Arab building is the result of a remodelling of a late-antique/ Byzantine construction which took place around the middle of the VIII century (Almagro-Olavarri 1982). More accurate observation on the building technique allowed for the hypothesis that later building additions were in the Abbasid period (Northedge 1992).

The excavation of the big trench in the lower terrace, where Bartoccini was sure to find traces of the city destroyed by David, goes on:
"....my attention was attracted by the particularity of a stretch of the walls in which was evident a discontinuity indicating the blockage of a previous gate. From there, the decision to start the research....The discoveries can be for the moment subdivided in this way : $1^{\text {st }}$ A thick soil stratum with abundant Roman potsherds... $.2^{\text {nd }}$ Byzantine structures connected to some evidence of an agricultural exploitation of the area consisting in cisterns and irrigation channels. $3^{\text {rd }}$ below the bigger of the various water reservoirs discovered, subsequently demolished, the bedrock cropped out, apparently the top of the hill......The rock shows characteristic artificial cavities which are called " coupoles" by the Semitists. In one of them there was found a single potsherd of coarse ware, which I shall assign to the Bronze Age..... At the side of this rock crop it was gathered a double room cistern with

4. The great "Arab building", cross section, 1930.
eight pillars and a small polygonal column demonstrating the long use of the reservoir." (Bartoccini 1934: 284-285).

During the 1933 campaign, Bartoccini developed the necessity of consolidating, in Amman, a stable position for the Mission. With the support of Mariano de Angelis, consul in Jerusalem, the Italian Foreign Office decided to assign the amount of Lit. 80.000 for the construction of the Italian Mission House, at the same time sacrificing the funds for the 1935 digging campaign. In the meantime, Bartoccini was appointed as the official responsible for the Department of Antiquities and Arts in Puglia and while the building was in progress in Amman, he remained in Italy (Petricioli 19887, Figs. 9-10).

In July 1938, after five years of inactivity, Bartoccini resumed the work on the acropolis of Amman.

No preliminary report was produced about this last digging campaign, except a few observations contained in an article on the entire work of the mission:
"......With this year excavation in Amman, we have proved the Crusaders' presence within
the Roman agora, which was from them transformed in a fortified settlement. Outside those walls we identified and dug a small three nave Basilica, apparently a Crusader's time reshaping of a small Byzantine church....." (Bartoccini 1939):

Explicit proof of the Crusaders on the citadel is not supplied. On the other hand, it is likely that the land of 'Amman passed for a short period under Crusader's control, while we know of Ayyubid work on the citadel (Northedge 1992: 55). As for the church of the acropolis of Amman, a first report was issued only in 1973 thanks to Father Begatti's enduring work (Begatti 1973). The resumption of the study of the church and the extension of the investigation are due to F. Zayadine in 1977 (Zayadine 1977-78: 34-37), but no reshaping from the time of the Crusaders has been observed.

A precise description of the work of the 1938 campaign is available, consisting though of little more than quantitative data, in the assistant's diary mentioned above. We learn from it that the work continued, besides the new excavation of the church, in the area of the so called agora, in the small Arab monument north of it and in the

[^12]political reasons and with unknown procedures, during or soon after the Second World War, was transferred to the Italian Hospital. From 1991 to 2003 it was given in use to Centro Ricerche Archeologiche e Scavi di Torino to host the Italian-Jordanian Institute of Archaeology.

5. Decorative panels in the great "Arab building", 1930.

## first terrace.

In summarizing the daily records, it comes out that the excavation of the agora, between the colonnaded street and the Roman east wall, of which also a sketch plan drawn by arch. Schettini is preserved (Fig. 7), allowing the identification of 44 rooms and three courts; in two rooms the bearing vaults of a staircases are indicated. In another room, indication of a window one metre from the ground is recorded. Beside the large quantity of ceramic and glass, numerous fragments of the Roman wall top parts with corbels and pediments are mentioned in the diary (Fig. 8).

The excavation in the area north of the agora brought completely to light the remains of an external colonnade, which shows a corner pillar with engaged half-columns and 22 rooms of the so called small Arab building. In clearing out the area, various architectural elements with Arab decorations were found.

From September 12th to November 14th, the excavation of the big trench on the lower terrace continued, extending it with an additional area of $20 \times 18$ metres (Fig. 9). Two metres below the surface, big walls take shape; one metre below, a tomb with a stone covering is found but not opened; and, nearby, fragmentary spherical pots

6. Decorative element from the amall "Arab building", 1930.
are found. More walls in the layer below are found digging down to 5.1 m under the surface level without finding either the bed rock or the walls' bases.

At the same time, from September 19th to November 22nd, the opening of a new trench started near a modern path, with two columns emerging from the ground. 1.8 m below the surface, it was found the floor of a building which was subsequently identified as a basilica by a central nave and side aisles, with annexed rooms and a colonnaded narthex. The semicircular apse had steps covered with marble. The altar table was to be supported by four small columns, the base location of which was recognized on a rectangular platform. The nave probably had a mosaic flooring, while the aisles were paved by flagstones. On ground and on site, a total of 14 bases, 4 of which in the external portico, 11 columns, 14 capitals, a voussoir with a cross engraved on it, were found (Fig. 10).
"At the end of December [1938] we celebrated in Amman the first decade of our institution
in a conference attended by English, Arab and our political and civil authorities.... The result of the various digging campaigns have been timely referred through exhaustive reports, awaiting for the final publication, we hope not to be late. Some discoveries of particular importance have already been reported in numerous conferences... that have informed the public about the spiritual activity of fascist Italy...." (Bartoccini 1939).

That was the last act of the Italian enterprise in Transjordan.

Bartoccini, for reasons unknown to me, while covering, also after the war, important positions in the administration of Cultural Heritage in Italy (Superintendent in Apulia, Superintendent of the Etruscan museum in Roma), never revised his work in the 'Amman Citadel.

A real pity! Had Bartoccini speculated, at least, upon the extensive clearing of the 'Arab Palaces' that he brilliantly assigned to Umayyad times, the weight of the Italian Mission in TransJordan could have enjoyed much more relevant consideration than it actually has.

7. Plan of the structures brought to light between 1927 and 1938 in the north sector of the Citadel, 1938.

8. Graphic reconstruction of the south side of the four-sided portico.

9. Sketch of the trial trench in the east sector of the Citadel, 1938.

I would like to suppose that the lack of a comprehensive publication is due to a rise of the author's own scrupples, as much as a very possible lack of funds.

I would also like to suppose that had Ugo Monneret de Villard accepted the direction of the Mission in Transjordan as he was originally invited to do (Petricioli 1988), the research in the 'Amman Citadel, in consideration of his experience in Middle Eastern Art and Architecture, could have contributed a lot to the knowledge of the early Islamic architecture at least.

Starting from 1974, Bartoccini's work in the

10. Plan of the basilica in the Citadel, 1938.
upper terrace of the 'Amman Citadel was eventually inherited by the Spanish Archaeological Mission. The work, though, has been mainly dedicated to the restoration of the remains of the

11. 'Ammān, the house of Italian Archaeological Mission near the Italian Missionary Hospital in Jabal al-Ashrafiyyah, 1938.

12. 'Ammān, the Jordanian-Italian Institute of Archaeology, 1991-2003.

Umayyad cultural horizon. The Pre-Roman settlement on the acropolis remains still very poorly investigated. Nevertheless evidence of architecture of more ancient times continues to come to light. Besides the two basalt stele above mentioned (a third one has also recently appeared), fragments of capital of the vertical volutes type (proto-Aeolic/Palestinian) and a basalt cushion base have been seen by me reused in late walls.

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# UMAYYAD DYERS' WORKSHOPS OF THE HIPPODROME OF JARASH (PRELIMINARY REPORT 2007) 

Fanny Bessard, Olivier Callot, Akram al-‘Tum'

The Hippodrome of Jarash (Fig. 1), which dates back to the second half of the second century AD (Ostrasz 1989: 51-77), was excavated in the 1930's by E.B. Müller, G. Horsfield and C.H. Kraeling (Kraeling 1938: 50-51, 85-102), and also in the 1980-1990's by 'Abd al-Majid al-Mujalli, I. Kehrberg and A. Ostrasz. They mainly focused on the restoration of the site but also carried out excavations in the cavea, the carceres, the arena (Ostrasz 1989: 51-77) and the basements of the northern and eastern terraces which contained two mass graves (Kehrberg and Ostrasz 1994: 546-547) and some Byzantine potters' workshops (Kehrberg and Ostrasz 1997: 167-173). They also cursorily cleared the remains in the basements of the western terraces of the rubble caused by the earthquake of 131H/748AD (Russel 1985: 37-59), but did not study in depth the layers under the rubble. However, new cleaning in these western terraces carried out from third to nineteenth April 2007 led to the uncovering of a group of workshops. Chambers W6, W9, W11, W14, and W15 contained five identical workshops, which all featured basins and vats having the main characteristics of the Byzantine and Umayyad dyers' workshops found in nearby Gaza (Ovadiah 1969: 193-1989), Baysan (Bar-Nathan and Mazor 1993: 37-38), and the Macellum of Jarash (Martin-Bueno and Uscatescu 1997: 67-88). Moreover, the workshops in the hippodrome of Jarash contained Umayyad coins and ceramics, dating to the first half of the eighth century AD , that is before Jarash's destruction by the earthquake of $131 \mathrm{H} / 748 \mathrm{AD}$.

Let us take the example of chamber W9,
whose two trapezoidal layouts are $9,70 \mathrm{~m}$ in length east-west and $4,30 \mathrm{~m}$ in width to the east and $3,50 \mathrm{~m}$ to the west (Figs. 2 and 3). The remains of dyeing facilities form two distinct units. The western area is raised while the eastern one is level. The central aisle of the western work area, whose floor is wholly paved, is surrounded by two large circular vats and four rectangular basins, three of which have worktops. The basins (maximum length: $1,68 \mathrm{~m}$, maximum width: $0,95 \mathrm{~m}$, maximum deep: 0,50 ) are built equally of rubble-stones, used blocks and paving stones. All of them have a duct for evacuating waste water which then runs through a drainage pipe along the central aisle and then out under the door of the chamber. Moreover, earthenware slabs were applied to the inner walls and the bottom of the basins to prevent leakage. Opposite the basins are the circular vats (maximum diameter: $0,82 \mathrm{~m}$, maximum deep: $0,60 \mathrm{~m}$ ), embedded in a cluster of rubble-stones. Both have a small cup like depression in the center to facilitate removal of the last liquid. The fibres and fabrics treated in such dye shops were first cleaned in the vats and the basins of this western workspace. The paved floor, the waste water evacuation pipe and the precautions against loss of water suggest the extensive use of water, which was stored in an open cistern (length: $1,90 \mathrm{~m}$, width: $0,80 \mathrm{~m}$ ) outside the room. Thus, the circular vats must have been used as soap baths in which the fibres were dipped in order to clean them of sandstone, greasy deposits or dye resistant pectin's. The rectangular basins were presumably used to rinse the fibres.

The central aisle of the eastern area of the

[^13]

1. The Hippodrome of Jarah.
F. Bessard et al.: Umayyad Dyers' Workshops of the Hippodrome of Jarash

2. Drawing for the western terraces.

3. The western terraces.
chamber has a simple earthenware floor. It is surrounded by three deep rectangular basins and their worktops and a circular vat embedded in the ground (see Fig. 2). The basins (maximum length: $1,68 \mathrm{~m}$, maximum width: $0,95 \mathrm{~m}$, deep: $0,75 \mathrm{~m}$ ) have no drainage holes and are built with blocks or stone slabs. Their worktops are covered with heavy lime coating. The vat (diameter: $0,77 \mathrm{~m}$, deep: $0,60 \mathrm{~m}$ ) is set in a block of mortar and rubble-stones. Despite its poor state, remains of lime coating are still visible. The dyeing of the fibres was carried out in this eastern work area. Since there is no hearth we can assume that the dyes used must have been vat dyes, in particular indigo and red ochre, traces of which can be seen. As vat dyes are insoluble in water and need a reducing agent like alkaline and low temperatures to become soluble, the dyers presumably combined quick lime (traces of which were also found) and water in dyeing vats to produce heat and an alkaline-rich envi-

4. Umayyad Fulūs
ronment. The earthenware jars, built up and embedded in a cluster of rubble stones, must have been macerating vats. The craftsmen then dyed the fibres or the fabrics in the worktop basins.

Dating these dyeing workshops is possible thanks to ceramic and numismatic finds. First, three Umayyad bronze coins (Naghawi 1989: 219-222) struck after the reform of the caliph 'Abd al-Malik bin Marwan in 80H/696AD were recovered on the paved floor in chambers W11 and W14 of the hippodrome (Fig. 4). Second, three moulded, zoomorphic handle type lamps, of oblong form were recovered while excavating chambers W6 and W14 (Fig. 5). They can also be dated to the Umayyad era (Scholl 1986: 163-166; Parapetti 1986: 167-205; Gawlikowski and Musa 1986: 137-162) ${ }^{2}$. Moreover, several fragments of jugs and red and dark clay gargolettes, decorated with sinusoidal patterns in white paint, typical of the ceramic works of Umayyad Jerash ${ }^{3}$, are further strong evidence

[^14][^15]
5. Three moulded, zoomorphic handle type lamps.

6. Fragments of Jugs.
of the Umayyad origins of the workshops (Fig. 6). In addition, fragments of large jars and craters, decorated on the top of the body or the rim with typical incisions (wavy or wheat motifs) of middle-eastern ceramic of the beginning of the eighth century $\mathrm{AD}^{4}$, are additional criteria testifying to the Umayyad dating of the site (Fig. 7). Finally, the absence of refurbishing works in the dyers workshops suggest that their operat-
ing lifespan did not exceed fifty years. Thanks to this evidence, we can safely say that the dyeing workshops operated continuously from their foundation, perhaps in 'Abd al-Malik's Caliphate, up to the earthquake that destroyed the city of Jarash in 131H/748AD. Given the high similarity of the five dyeing workshops in the hippodrome of Jarash, it is also possible that they were the product of a coordinated effort by the

7. Fragments of large Jars and craters.
state or by local authorities, rather than being merely the result of individual plans.

One can draw the following conclusions. On the one hand, the analysis of the remains of the hippodrome's dyeing workshops has yielded new and worthy information about the artisanal techniques used in textile dyeing in the East. On the other hand, homogenous numismatic and ceramic evidence, dating back to the eighth century AD , testify to the thriving activity of the hippodrome up to the earthquake of $131 \mathrm{H} / 748 \mathrm{AD}$. It was prosperous during the Umayyad period thanks to the development of textile industries which probably were the result of coordinated efforts by the local authorities.

## Catalogue of Selected Ceramics and Umayyad Fulūs from the Dyers' Workshops

## Umayyad fulūs

No. 1 (Fig. 4) (Walker 1956)
Ob.: With two concentric circles (اله/ اله (الله/ وحـده
Rev.: Central (محمد/ رسـول/ الله)

## No. 2 (Fig. 4)

Ob.: With two concentric circles (//بسـ (لله لا اله/ الا الله
Rev.: Central, within a circle of dots (محمد/ رسـول/ الله/ حمص)

## No. 3 (Fig. 4)

Ob.: With two concentric circles (له اله/ الا (الله/وحـده
Rev.: Central, within a circle of dots (محمد/ رسول/ الله)

## Mould made lamps

## No. 1 (Fig. 5)

Mould made lamp, used; zoomorphic handle missing; on rim and nozzle radial lines, circles and half-volutes; on base oval ring, two pairs of half-volutes and two short lines.
No. 2 (Fig. 5)
Fragment of mould made lamp, used; zoomorphic handle; nozzle radial lines, circles, below zoomorphic handle Greek cross.
No. 3 (Fig. 5)
Fragment of mould made lamp; nozzle radial lines, half-volute and scallop patterns (cf. Scholl 1986; Parapetti 1986; Gawlikowski 1986; Kehrberg 1989).

## Pottery

No. 1 (Fig. 6)
Fragments of jugs and gargolettes; red and grey ware; white painted decoration, sinusoidal patterns.

## No. 2 (Fig. 7)

Fragment of basin; grey ware; combined incised decoration on the rim, wavy motif.

## No. 3 (Fig. 7)

ragment of crater; red ware; combined incised decoration on the top of the body, wheat motif (Kehrberg 1989; Sodini and Villeneuve 1992).

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# MADABA PLAINS PROJECT: EXCAVATIONS AT TALL AL-‘UMAYRĪ, 2006 

Larry G. Herr and Douglas R. Clark

## Introduction

An eleventh season of excavation by the Madaba Plains Project at Tall al-‘Umayrì occurred between June 28 and August 2, 2006. It was sponsored by La Sierra University in consortium with Andrews University School of Architecture (Michigan, USA), Canadian University College (Alberta, Canada), Mount Royal College (Alberta, Canada), Pacific Union College (California, USA), and Walla Walla University (Washington State, USA). Full reports have already been published for the first five seasons (first season [1984]: Geraty et al., eds. 1989; second season [1987]: Herr et al., eds. 1991; third season [1989]: Herr et al., eds. 1997; fourth season [1992]: Herr et al., eds. 2000; fifth season [1994]: Herr et al., eds. 2002). Preliminary reports have also been published (first season [1984]: Geraty 1985; Geraty et al. 1986, 1987; second season [1987]: Geraty et al. 1988, 1989, 1990; third season [1989]: Younker et al. 1990; Herr et al. 1991; LaBianca et al. 1995; fourth season [1992]: Younker et al. 1993; Herr et al. 1994; fifth season [1994]: Younker et al 1996; Herr et al. 1996; sixth season [1996]: Younker et al. 1997; Herr et al. 1997; seventh season [1998]: Herr et al. 1999, 2000; eighth season [2000]: Herr, Clark and Trenchard 2001, 2002; ninth season [2002]: Herr and Clark 2003, 2004; and tenth season [2004]: Herr and Clark 2005a, 2005b).

In the 2006 season, a team of 27 Jordanians and 62 foreigners ( 15 of whom were present only during the first or second half) participated in the fieldwork and camp activities of the interdisciplinary project at 'Umayrī, located about 10 km south of Amman's Seventh Circle on the Queen Alia Airport Highway at the turnoff for Amman National Park (Fig. 1).


1. Map of the central plateau of Jordan with the major sites of the Madaba Plains Project.

In the first season (1984) four fields of excavation were opened (Fields A, B, C, and D) (Fig. 2). During the second season (1987) three of the four were expanded (Fields A, B, and D), one was completed to bedrock (Field C), and two new fields were opened (Fields E and F). In the third season (1989) one field expanded (Field A), three fields reopened old squares and expanded slightly (Fields B, D, and F), another re-

2. Tall al-'Umayrī: Topographic map through the 2006 season with the location of the fields of excavation.
duced excavation from two squares to one (Field E ), and a new field was opened on the northern slope as a series of three soundings (Field G). In the fourth season (1992) three fields deepened previously opened squares (Fields A, D, and F), one deepened existing squares while expanding by one square (Field B), and two Fields were discontinued (Fields E and G). During the fifth season (1994) one field deepened (Field A), another expanded and deepened (Field B), and one was added (Field H). In the sixth season (1996) three fields expanded (Fields A, B, and H). The tomb excavations on the southeastern slopes of the tall, already begun under the hinterland survey in 1994, became part of the 'Umayri excavations as Field K. During the seventh season (1998) two fields deepened their squares (Fields A and B), two expanded (Fields H and K), and a
new field was opened on the southern lip of the site (Field L). In the eighth season (2000) we deepened three fields (Fields A, B, and H) and expanded and deepened in two fields (Fields K and L). During the ninth season (2002) Field A was not worked, while Field B expanded to the north and continued in two other squares; Field H limited itself to the large plastered and cobbled courtyard near the northern extent of the field (next to Field A); in Field L we exposed more of the Hellenistic structure by opening two new squares and reopening one other. During the tenth season (2004) Field A deepened squares begun during the 1980s; Field B deepened three earlier squares and expanded to the north to intersect the northern edge of the site; Field H deepened earlier squares in its northern part; and Field L deepened three previous
squares and opened one new square.
This season (Figs. 2-3) Field A concentrated on removing balks and small areas between walls to deepen the western part of the field to late Iron I levels; one square was opened at the southwest corner of the field to examine the possible existence of a gateway. In Field B excavation concentrated on uncovering the floors of the northern extent of the remarkably preserved LB building; no new squares were opened and most of the surfaces and a monumental doorway were discovered. Excavation in Field H concentrated on bringing the southern part of the openair sanctuary down to late Iron 1 levels; probes
were also sunk to test for earlier surfaces, but Iron 1 domestic remains were found instead. Field L, on the southern lip of the site, expanded to the east and north with three new squares (see Fig. 21), digging through a thick layer of topsoil to uncover the eastern limits of the Hellenistic building.

## FIELD A: THE WESTERN EDGE OF THE ADMINISTRATIVE COMPLEX

 Robert D. Bates (La Sierra University)Field A is located at the central western edge of the site (Figs. 2-3). Nine previous seasons in Field A (the field was unexcavated in 2002) had

|  |  |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |

3. Tall al-'Umayrī: Schematic grid of squares for Fields A, $B$, and $H$.
discovered a large administrative complex from the end of the Iron 2 period extending into the Persian period. Domestic dwellings, perhaps belonging to the officials who worked in the administrative complex, were built to the north and south of the complex. To the north and west, outside the area of this complex, were multiple phases of Iron 1 remains, including very significant structures from the earliest decades of that period. These were found primarily in Field B to the north, but also somewhat in the northwestern parts of Field A. This season there was a lot of work in balk removal and the excavation of very small areas between walls. We thus reopened parts of Squares 7J59, 7J69, 7J78, 7J79, $7 \mathrm{~K} 40,7 \mathrm{~K} 50$, and 7 K 60 , and began Square 7 J 49 . Many of the operations were very small. Some even straddled two sides of an intervening balk. Square Supervisors were often called upon to jump from one square to the next.

The goal of our work in Field A this season was to reach the early Iron 1 period in the area south of Field B and inside the perimeter wall and to examine Iron 1 remains that suggest the presence of a city gate in the southwest corner of the field just north of Field H in Squares 7J49 and 7 K 40 .

## Field Phase 13 (LB/Early Iron 1 Transition)

In the 1998 season we had discovered that the north-south perimeter wall curved into the city in Square 7J59 in an east-west orientation (Herr et al. 1999: 102). This season we traced the wall as it continued into the city in Squares 7 K 50 and 7 K 40 where it seems to have been robbed by the late Iron 2 administrative basement structures. As early as the 2002 season we had wondered if a large parallel east-west wall about four meters to the south could be the southern side of an entrance way into the city. We could discern no gate tower structures, but posited a simple entrance between two parallel walls. We further suggested that a large north-south wall at the western edge of Field H , whose founding level had not yet been reached, could be the continuation of the perimeter wall around the southern part of the site.

This season we opened a new square, 7J49, to ascertain if the possible southern wall of the entrance, or "gate," extended farther west and to see if there were any monumental features as-
sociated with the exterior of this structure. It became abundantly clear almost immediately that the new square was outside the town. During balk removal between Square 7J49 and 7K40 the monumental end of the southern wall of the "gate" was discovered, complete with one stone measuring $2.4 \times 1.2 \times 1 \mathrm{~m}$ (Fig. 4). In Square 7 K 40 , we discovered the tops of what may be small piers in the gate area, dividing it into very shallow chambers. But the exact form of the "gate" needs to be clarified during the next season (Fig. 5).

## Field Phase 12 (Iron 1)

The earliest phase above the LB/early Iron 1 transitional Phase 13 consisted of several wall fragments with earth and rubble deposits beneath the square structure of Phase 11 discovered in previous season. So far, we have not been able to make coherent sense of the fragments.

## Field Phase 11 (Iron 1)

Above the wall fragments of Phase 12 were the stone walls and surfaces of a cobbled room with a doorway leading north. These remains were found in the 2004 season (Herr and Clark 2005a: 248). This season, more of the remains were cleared, but they consisted mainly of wall fragments disturbed by the walls of Phase 10. The walls were oriented parallel to the east-west portion of the perimeter wall after it had turned into the city and become part of the gate. They must have belonged to a multi-roomed house tucked into the corner made by the bend of the perimeter wall. Unfortunately, parts of it were destroyed by later Iron 1 and Iron 2 structures.

It seems that the gate continued in use during

4. Tall al-'Umayri: Photo of the western terminus of the southern wall of the gateway complex.

5. Tall al-'Umayri: Plan of Field A during the transitional LB/Iron 1 period, Field Phase 13. Some of the walls in the gate area and to its north are late Iron 1 or Iron 2.
this period, but more excavation is needed to be positive.

## Field Phase 10 (Late Iron 1)

Walls from earlier phases continued. Especially clear was the perimeter wall and the gate may have been re-used. Otherwise, this phase is represented by fill layers. The site seems to have abated in importance during the last part of the Iron 1 period and was not very significant during the 10 th century or Iron 2 A (Field Phase 9). Nothing new from this phase was found this season.

## Field Phase 8B (Iron 2)

Although we began to find evidence in 2004 for this phase, this season we established for the first time clear stratigraphic evidence for the mid-
dle Iron 2 period. Previously, we had collected only potsherds. This time, in Square 7K40, over a meter of compact reddish earth was excavated which contained reconstructible pottery dating most likely to the ninth and eighth centuries (Figs. 6-11). None of the layers was a surface. Everything seems to have been a secondary fill deposit which, because of the reconstructible pottery, originated from one location. This pottery has, heretofore, been very rare at the site and no other in situ deposit has been found in all eleven seasons. It seems a number of the earlier walls were reused and that the earth layers filled a room constructed into the Iron 1 gate.

Whereas the square room with two pillars discovered in earlier seasons has been ascribed to Iron 1 in prior reports (Herr et al. 1999: 103), it seems that, after excavation of the walls, it

6. Tall al-'Umayrī: Pottery from Field A, Field Phase 8B, dating most likely to the middle parts of the Iron 2 period.
was actually built about this time. Each one of the walls contained several Iron 2 sherds. This is more than can be accounted for by contamination. Thus, the structure has been moved to this phase.

## Field Phase 7B (Late Iron 2/Persian)

This phase was a complicated mix of remodeled old walls, stone tumble, and fill layers excavated primarily in balks that were being dismantled and in tight corners between walls and balks. Most of the layers were deposited outside the administrative structure of this phase farther east in Field A. A possible bin and another small enclosed area may suggest a small informal domestic dwelling immediately
to the west of the administrative complex, but it was difficult in such small excavation areas to be confident that we were excavating a surface. One layer that included plaster and ran up to stones that seemed to outline a bin was probably a surface. However, the surface could not be traced over a large enough area to suggest a coherent room.

## Field Phases 3 and 2 (Classical and Islamic Ages)

These were topsoil and sub-topsoil layers in the balks that we excavated. They were made up of older debris that was reworked during agricultural activities on the mound during Roman to Ottoman times.

7. Tall al-'Umayrī: Pottery from Field A, Field Phase 8B, dating most likely to the middle parts of the Iron 2 period.

FIELD B: THE WESTERN DEFENSE SYSTEM AND NORTHWESTERN DOMESTIC AREA
Kent V. Bramlett (University of Toronto)
Field B is located at the northwestern corner of the site (Figs. 2-3) and has been excavated during all our field seasons. In earlier seasons it probed the western fortification system and uncovered the two well-preserved houses from the LB/Iron 1 transitional period. The primary objective for excavation in Field B this season involved the discovery of the northern limits of the Late Bronze Age palatial building, its surfaces, and entrance in the northeastern corner. With this in mind, we traced the surface in Squares $8 \mathrm{~K} 11,8 \mathrm{~K} 12,8 \mathrm{~K} 21$, and 8 K 22 . We also did touch-up work in Squares 8 K 01 and 8 K 02 .

Fieldwork in 2006 did not alter our understanding of Field B phasing deriving from the most recent past seasons. Our work this year involved primarily remains from the Late Bronze Age.

## Field Phase 15 (Middle Bronze 2C)

The probable top of the MB 2C rampart was located on the northern side of the site, but was not excavated.

## Field Phase 14 (Late Bronze 2)

By far the majority of the season's work in Field B was located within the Late Bronze Age monumental building, especially in Rooms 3 and 4 (Figs. 12-14). Two teams worked in both rooms. The plan of the building is now com-

8. Tall al-'Umayrī: Pottery from

Field A, Field Phase 8B, dating most likely to the middle parts of the Iron 2 period.
plete. Remaining work will focus on exposure of the floor(s) and a few loose ends in corners here and there.

The LBA destruction layer filling Room 3 was sealed against all the walls of the room as well as a stone bench along the eastern wall and a mudbrick altar in front of the cultic niche (Fig. 15). The thickness of the destruction debris ranged between .75 and 1.4 m and corresponded to the preserved height of the mud plaster preserved on the eastern and southern walls. It was also the height of the mud-brick wall between Rooms 3 and 5. The destruction layer consisted mostly of fallen mud brick from the upper wall levels mixed with numerous ashy and burned inclusions. The tumbled mud bricks interlaced vertically throughout
and provided certainty that the entire destruction layer derived from a single destruction event. The southern third of Room 3 showed the most evidence of burning and, on or just above the floor, contained several burned beams, especially near the altar and between the altar and the southern wall of Room 3. Samples of the beams were taken for species identification, 14C dating, and dendro-chronology analysis. The pottery in the destruction level derived primarily from the mud bricks and dated best to the LB 2A to early LB 2B periods (Figs. 16-18).

Directly beneath the destruction layer was the latest surface of Room 3. It was exposed across the entire room. A lower surface was found in probes along the eastern wall and in

9. Tall al-'Umayrī: Pottery from Field A, Field Phase 8B, dating most likely to the middle parts of the Iron 2 period.
a meter strip along the northern wall. The upper floor was made of compacted earth and nari with some plaster and bricky material. The surface sealed against the mud-brick and plaster altar, which was constructed of stacked mudbricks of the same dimension as those found in the destruction layer and measured $.56 \times .38-.39$ $\mathrm{x} .10-.12 \mathrm{~m}$. The two lowest bricks were coated with the same thin plaster with which the mud brick wall and the cultic niche were coated on its eastern and western faces. The upper part of the altar was coated with a thick white plaster similar to that used on the floor of the cultic niche and around the standing stones. The altar flared out along its northern and southern edges. The flares, though partially broken and incomplete,
appeared to be constructed mostly of plaster and increased the length dimension to .69 m . The preserved height of the altar ranged from .55 m to a maximum of .63 m above the surface. A small table of flat stones, possibly analogous to stone libation tables, was placed in front of the altar and was not plastered.

A series of stacked flat stones lay against the eastern wall of Room 3. They formed a probable bench 2.3 m long, $.48-.54 \mathrm{~m}$ wide, and $.18-.20 \mathrm{~m}$ above the floor. Several of the stones were plastered against the wall. Similar benches are commonly found in LBA temples and cultic rooms. The northern exterior wall of the building was further clarified. It was exposed to a height of five courses and was confirmed to measure 1.5-

10. Tall al- 'Umayri: Pottery from Field A, Field Phase 8B, dating most likely to the middle parts of the Iron 2 period.

## 1.6m wide.

Excavation in Room 4 also clarified several problems from previous seasons. As in Room 3 , the destruction layer is now clear. It sealed against the walls of the room and the newly discovered entry and stairs (Figs. 12-14). Removal of the destruction layer exposed the surface of the room, which has so far been uncovered only in the southern third of Room 4. An earlier surface was also exposed in a probe in the eastern side of the room (adjacent to the entry stairs). The eastern wall of the room was divided by an entryway 1.5 m wide. The entry consisted of stairs descending into Room 4 from a threshold midpoint in the entryway. The external features of the entry, whether additional stairs descend
from the doorway outside or whether the approach is level (except for one known step up to the threshold) is unknown but may be revealed in future excavation. The interior stairway contained several parts. A landing just inside the building offered the choice to turn right descending to the floor of Room 4 or to turn left ascending toward the south. Flat orthostatic stones lined the entry and portions of the stairway. The treads of the stairway, consisting each of two flat stones placed side-by-side, had been splayed apart in apparent earthquake damage. Also, a large hewn stone forming the door jamb in Wall 27 had been split in two and splayed wide apart. This earthquake damage may help to date the destruction of Building C , if the burning can

11. Tall al-'Umayrī: Pottery from Field A, Field Phase 8B, dating most likely to the middle parts of the Iron 2 period.
be attributed to the aftermath of an earthquake. Generally, earthquake damage evincing this much movement is not considered possible to deeply buried structures, which are inadvertently reinforced by the surrounding matrix. There appears to be no reason this same earthquake could not be accountable for the damage to the rampart, in which case, the Phase 12 repair to the rampart would not have been immediate but following a lapse of time.

There is at present some debate about the function of this building. Some of us believe that the building was primarily a cultic, or temple, structure with associated rooms. Others believe that it was a palatial building that included a major shrine room.

Field Phase 7 (Late Iron 2/Persian)
A significant problem was resolved conclusively this season, which was, it turns out, correctly interpreted following the 2004 season. In 2004, the Phase 7 reuse of Room 4 in Late Bronze Age Building was evident in a series of earth layers and one associated wall found above the LB destruction layer. Although these layers contained LB pottery, it is now proven that they were not a part of Phase 14, but, as suggested in the 2004 report, derived from redeposition as fill of excavated LBA debris from nearby at a time when the Phase 7 reuse of Room 4 was ceasing.

The eastern wall of the Phase 7 reuse of Room 4 was only partially preserved for a

12. Tall al- 'Umayrī: Field B, the LB building from the east; the entrance and stepped descent into the building are at the bottom; the cultic installation is at the top.

13. Tall al- 'Umayrī: Field B, the LB building from the east (drawing by Rhonda Root).
length of 2.9 m at its southern extent. In most places in the LB building the Late Bronze Age walls were located and heightened for the later Iron Age reuse; in some locations they were heightened but in rebuilding were slightly misaligned to the earlier wall lines below. The evidence for the re-dating of the northern wall
is very clear and centers around a layer with straw inclusions (phytoliths). The absence of more Iron 2/Persian ceramic readings would be due to the rarity of pottery sherds becoming mixed in with the straw placed in storage. Thus Room 4 was probably used as a haymow during Phase 7 until subsequent construction

14. Tall al-'Umayri: Field B, isometric sketch of the LB building from the east (drawing by Kent Bramlett).

15. Tall al-'Umayrī: Field $B$, the cultic niche of the LB building with a small plastered brick altar on the floor in front.
activity in the area filled it with excavated debris and the room was leveled and built over as Building D.

## FIELD H: THE OPEN-AIR COURTYARD SANCTUARY

David R. Berge (Portland, Oregon)
Field H is located at the southwestern corner of the flat top of the site (Figs. 2-3). Excavations here began in 1994 for the initial purpose of exploring the southern extension of the Ammonite
administrative complex in Field A, directly to the north, but instead found a large courtyard sanctuary paved by alternating layers of cobbles and plaster. Its religious function is based on the presence of figurines and model shrines found on the surfaces (Herr and Clark 2003: 290-291). This season we probed beneath the lowest cobble floor of the late Iron 1 open-air sanctuary in Squares 7K21, 7K22, and 7K31, while also clearing the southern part of the cobbled complex in Square 7 K 11 and 7 K 12 .

16. Tall al- 'Umayrī: Field B, Phase 14 LB pottery from the bricks in the destruction of the LB building.

17. Tall al-'Umayrī: Field B, Phase 14 LB pottery from the bricks in the destruction of the LB building.

18. Tall al-'Umayrī: Field B, Phase 14 LB pottery from the bricks in the destruction of the LB building.

## Field Phase 12 (Iron 1)

This phase had already been discovered in a small area outside the courtyard to the west in Square 7K20. At that time we interpreted it as Iron 1 domestic structures. This season, more domestic remains were uncovered, including a bin and oven on the beaten-earth floors of two room fragments (Fig. 19). A collared pithos, lacking both rim and base, was found placed up-side-down into the floor. Reused pithoi like this are often interpreted as ovens, but there were no signs of burning on the pithos itself; however, surrounding it on the floor was a thin layer of ash. Both rooms used a single very thick wall (ca. 2.5 m wide) as their northern wall. It may have been the continuation of one of the city gate walls discovered in Field A this season as it led into the town. We have given the general date of Iron 1 to the phase, because the pottery seems to be later than the typical transitional LB/Iron I pottery we have found in the two houses to the north in Fields A and B.

## Field Phase 11 (Iron 1)

Above the debris of Phase 12 were a few wall and possible surface fragments from which a large amount of destruction debris originated. Not enough has been found to suggest a possible plan or to characterize the nature and function of
the structures. However, the pottery continued to be no later than the Iron 1 period.

## Field Phase 10B (Late Iron 1)

This is the lowest level of the courtyard sanctuary with its cobble and plaster surfaces. Previous reports have described its extent and discoveries (Herr and Clark 2003: 290; Herr and Clark 2005: 254-255). This season we discovered that the lowest cobble surface, which we thought had sloped to the east, was actually the product of two surfaces, the later one "blended" with the earlier one, making it seem as if it were one surface. The lower surface dates to the late Iron 1 period, while the later one may be early Iron 2. Surrounding the surface our team discovered the boundary walls of the courtyard Fig. 20, at the top. They abutted the east-west passageway that led into the town from the gate farther to the west. The courtyard thus was very near the gate on the south of the entranceway.

The function of the area must be connected with outdoor activities. The area was much too large to be roofed. There was one central "column base" or "altar" sunk into the cobble floor, but we could not connect it with any other feature of the structure. Although we found no cultic objects on this lowest surface, other such finds were made in several of the subsequent

19. Tall al-‘Umayrī: Field H, Domestic architecture of Phase 12 below the lowest cobble floor of the courtyard sanctuary.

20. Tall al-'Umayrī: Field H at the end of the season; Phase 12 remains are at upper right; the lowest cobble surface has been removed in two squares in the center; and later cobble floors and walls are visible at the left.
floors during the Iron 2 period.

## Field Phase 10A (Early Iron 2)

This phase represented a repair to the cobble floor of Phase 10B, in which the later surface "blended" into the earlier one, making them difficult to separate until the upper one was actually removed. It is this repair that caused the slope of the Phase 10 cobble floor noted in previous reports. The pottery here was early Iron 2 , probably Iron 2A.

## Field Phase 9 (Early Iron 2)

After a short period of abandonment when a thin layer of earth accumulated over the Phase 10A surface, the walls of the courtyard were changed slightly and a new surface was laid.

## Field Phase 8 (Iron 2)

This phase was mostly excavated in the 2000 season when a model shrine was uncovered on the floor of the courtyard sanctuary. The courtyard was made smaller and a row of very large stones was placed on the northern side (but see earlier reports). This season a small part of the phase not excavated in 2000 was removed.

## Field Phase 7 (Late Iron 2)

Excavation of the southern reaches of the courtyard revealed later cobbled floors of the
courtyard along with subsequent buildup of surface debris (Fig. 20). Associated walls were reused from earlier Iron I and early Iron 2 phases. A small room in the southwestern corner seems to have been associated with the courtyard. However, no finds were made on the cobbled floor of the room or in a stone-lined pit that could suggest a function for the room.

## Field Phase 6 (Late Iron 2/Persian)

Like Phase 7, the architecture of previous phases was reused and reworked. The majority of remains dating to this phase have been already excavated in previous seasons. However, excavation in 7 K 12 revealed that one wall was constructed over the large cobble surface of Phase 7. This discovery necessitates reassigning to this phase the doorway and threshold which were previously assigned to Phase 8 in the 2004 report.

No new remains were found from Phases 5-1.

## FIELD L: THE SOUTHERN EDGE

David C. Hopkins (Wesley Theological Seminary) and Mary Petrina Boyd (University Temple United Methodist Church, Seattle)

Field L is located at the southern edge of the flat top of Tall al-'Umayri roughly in its middle (Fig. 2). Excavations in this field began in 1998 for the initial purpose of exploring the transition
of the top of the site to the southern slope where several surface architectural features were visible or had appeared in ground-penetrating radar images. This season we opened two new units in Squares 6L70 and 6L80 and expanded Square 6K98 to its full size (Fig. 21). The goal of excavations was to ascertain the eastern and northern limits of the Hellenistic farmstead and uncover the top of Iron 2 remains. However, all three operations ended before Hellenistic remains were completely excavated. In the eastern portions of the field, the Hellenistic sediment diminished in thickness and no in-situ finds were discovered.

## Field Phase 7 (Iron 1)

In one square ( 6 K 98 ) excavations proceeded through topsoil and stone rubble. No coherent remains were discovered from the Hellenistic and late Iron 2/Persian periods. Instead, after the removal of fill layers, the top of a massive wall constructed of very large boulders was discovered running north-south (Fig. 22). More of this wall had been discovered to the south in earlier seasons. It is part of a series of massive walls stratigraphically pre-dating the late Iron 2 period. Only one of the walls has so far been dated to the Iron 1 period, but we have not reached the foundation levels for any of the walls (Fig. 22, in the square to the right of the meter stick). The stone construction is similar to the large stone construction in the gate area of Field H .

21. Tall al-'Umayrī: Schematic grid of squares for Field $L$.

The presence of such massive stone walls in the center of the site is surprising, especially if the Iron 1 date is confirmed. Most Iron 1 structures except the perimeter wall near the gate tend to be made of small to medium boulders or large cobbles. Such walls indicate the probable presence of public architecture, also a rare item during the Iron 1 period. These walls must be a major long-range research question for future excavation at the site.

## Field Phase 6 (Late Iron 2/Persian)

The very tops of walls from this phase were uncovered, but none of the destruction/ abandonment debris was removed. The most that can be said is that the wall fragments beginning to emerge under the Hellenistic levels seem to be orientated similarly to walls discovered in earlier seasons.

## Field Phase 5 (Late Hellenistic)

Remains from the lower Hellenistic phase were not clearly discovered this season. A few fragmentary installations and debris layers may reflect activities in a courtyard on its eastern side, but not enough was found to present a coherent picture of the phase. Some of the wall fragments attributed to Phase 4 below probably continued in use from Phase 5.

## Field Phase 4 (Late Hellenistic)

Features from this phase were the clearest phase discovered this season. A long wall along the north side of the excavated area (Fig. 23) may be the northern wall of a courtyard for the Hellenistic farmstead. A parallel wall fragment in the southern area of our excavations may have been the southern wall of the courtyard. Fragments of a plaster surface were discovered that were very similar to the plaster surfaces found in other rooms of the structure to the west. Placed into the surface was a continuation of a stone-lined drain found in earlier seasons to the west. It was oriented in the same direction and constructed in the same manner and must be the northeastern continuation of the drain. Other fragmentary remains, such as pithos bases and reused jars turned upside down, were also discovered (Fig. 24). There were no signs of the eastern wall of the complex.

22. Tall al-'Umayrī: Field L; the tops of large walls made of very large boulders are visible under the later, Hellenistic architecture (they are also slightly darker in color); they may date to the Iron 1 period.
23. Tall al-'Umayrī: Field L; features between two parallel walls that may have been part of a courtyard associated with the Hellenistic farmstead found in earlier seasons in the top part of the photo.

24. Tall al- 'Umayrī: Field L; one of the pithos bases from the possible courtyard of the Hellenistic farmstead.

The relatively large space between the north and south walls of the room suggest that it was an open courtyard with typical domestic activity areas that included storage facilities and possible work areas, if the several boulders with holes in them were interpreted as weights as we are inclined to do.

## Field Phases 3-1 (Classical to Islamic)

Topsoil and sub-topsoil contained archaeological sediment with post-Hellenistic pottery and must be related to the debris which accumulated after the farmstead was abandoned and the area was turned into agricultural fields.

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# THE 2007 SEASON OF EXCAVATIONS AT KHIRBAT AS-SAMRĀ ANCIENT CEMETERY 

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## Introduction

The objectives of the 2007 excavation at Site-C were to determine the western boundaries of the ancient cemetery at Khirbat as-Samrā, increase qualitatively and quantitatively the human skeletal sample, and to obtain further archaeological evidence concerning the cemetery as a whole. Site-C is supposed to covers the western edge of the cemetery. The 1997 and 1998 excavations at this site resulted in determining the cemetery's southern boundary. It is the least molested part of the cemetery. About $40 \%$ of the 95 excavated tombs were intact, many with multiple burials (Nabulsi et al. 2007). This report outlines some observations and results of the seventh season of excavations in the cemetery.

## The Excavation at Site C

The excavations were carried from 28th July to 6th September 2007. Based on a previously set $5 \times 5 \mathrm{~m}$ grid of six rows (A to F from east to west) and nine columns ( 1 to 9 from North to south), 15 squares were opened starting by square B5 extending northwards and westwards. A total of 50 tombs were excavated, 11 of which were intact. Some tombs extended beyond row F, i.e. few meters beyond the expected cemetery margin and about 80 m from the ancient city.

The excavated tombs were variably and generally more thinner distributed than previously observed. Many evidently adult tombs, over 2 m in length, were significantly shallower than those found in 1997 and 1998 (Fig. 1A). The correlation coefficient between tomb length and depth fell from 0.776 to 0.654 after adding the 2007 data. The tombs 378, 388 and 389 are not only shallow but also have neither shoulders nor covering slap. Also there is no evidence for the use of a coffin of any type. Tomb-403, a slap-
grave, revealed 4 iron cleats of rectangular shape in situ, one in each corner of the tomb, as well as other displaced ones. Clumps of decomposed wood stuck on the "inner" surfaces of the cleats. This indicates the use of a wooden coffin in this particular tomb.

The lateral west part of the excavated part revealed a distinctive area of markedly broad tombs with broad shoulders and massive ( $>1 \mathrm{~m}$ long, $30-60 \mathrm{~cm}$ broad and ca. 20 cm thick) roughcut basalt slaps. These slaps are similar to boulders used in buildings at the ancient settlement. Remnants of the white plaster used to seal the slaps were found on some stones. At Umm alJimāl, Brashler (1995) excavated similarly structured Byzantine tomb, though Khirbat asSamrā tombs involved single burials. Tomb-381 is the largest excavated tomb in the cemetery ( $280 \times 132 \times 176 \mathrm{~cm}$ ). The huge stone slaps were ca. 50 cm below the surface leaving a 1 m deep burial cist. The almost decomposed human remains were laid stretched at one side; apparently to make room for following burial(s), something which did not happen.

A large pile of stones covering some $20 \mathrm{~m}^{2}$ distorted the excavated area. Four tombstones were found in the pile, all with engraved crosses. One of them, tombstone KS-1326 (Fig. 2), has an Aramaic or "araméenne melkite", according to Desreumaux (1998), inscription engraved below the cross. Local information suggested that this particular area used to be a sewage drainage pit of a local house demolished some 30 years ago. The pit was then filled with the stone debris. Further efforts to clear the stones were consequently abandoned. During the last seasons, it was possible to confirm observations on the tomb desecration that was carried around 1910s. In two incidents, the socket of the tombstone


1. Plot of Site-C tomb length against tomb depth (A) and tomb width (B). Circles represent tombs excavated in 2007, triangles tombs excavated in 1997 and 1998.

2. Tombstone KS-1326 with engraved cross and araméenne melkite inscription.
was found on the tomb's eastern end. When Savigniac (1925) visited the site he recognized the cemetery by the then field of tombstones. He also noticed disturbances in some tombs that were easy to locate from the surface. Tombstones were used to locate tomb. Those without a tombstone, for one reason or another, have had a better chance to escape being looted. Probably most of the tombstones in the area covering Site-C were displaced before the 20th century. Thus many tombs remained "unmolested" prior excavations. All tombstones disappeared from the surface decades ago.

## Objects and Other Finds

A moderate number of objects and tomb offerings were retrieved during this season. These include few gold and silver earrings and a moderate number of cheap jewellery of various materials. Most objects were fragmentary and incomplete.

Yet, some interesting objects were found.

Among them are two gemstones (Fig. 3A and B). The first, KS-1275, is a oval flat bezel of cornelian stone, $13.4 \times 8.5 \times 3.4 \mathrm{~mm}$ in size. The engraving on the flat side represents a standing female, probably Hygeia the Greek goddess of health and daughter of Asklepios, holding a snake with her left arm and with a bowl in her right hand (Croissant 1990). This stone, datable to 2 nd -4 th century AD , was found in Tomb-392 that contrary to all other tombs have a NorthSouth axis. The second, KS-1287, is also a cornelian, oval and $10.7 \times 8.8 \times 3.2 \mathrm{~mm}$ in size. It has a crude lion engraved on its flat side. It is probably of an earlier date than KS-1275.

KS-1289 is an olive green steatite stone, oval shaped and $25.8 \times 21 \times 10 \mathrm{~mm}$ in size (Fig. 3C). The convex side is decorated with geometric lines. The stamp is a cartouche including four
variable s-shaped elements between two vertical decorative bands. The stone looks like an imitation of old Egyptian scarabs, not unusual in Palestine and Jordan in Iron Age contexts (Keel and Eggler 2006), but no later reference was found. This case requires further investigation. The stone is perforated through the long axis like a large bead and was used as an amulet-pendant. It was found in the intact Tomb-358, involving a child burial. Tomb-358 also included the engraved tombstone KS-1325, reused as covering slaps. It is a light brown limestone, $36 \times 35 \times 18 \mathrm{~cm}$ in size.

## Tombstone KS-1325

Three lines of Greek letters are engraved on the stone KS-1325 (Fig. 4). Although the left corner is damaged, it is clear that no character

3. Gemstones from the 2007 excavation.


[^16]is missing. The alignment of the first letters in each line supports this observation.

The first line includes two letters AN only. The second line starts with an A. The second letter M is closely attached to the partly damaged O to the right. The clearly readable AN in the first line is too short for a personal name and meaningless as a short form. Hence, the first two lines are to be connected: AN/AMO = ANAMO. This form has no corresponding Greek or Latin name. For the meaning, it is easier to consider the Semitic root $n^{\prime} m$, which is documented in personal names the Arabic ( Nu 'aim), over to the biblical Hebrew (comp. Na'em, Na‘ama, No'mi) and the Palmyran Syrian (Wuthnow 1930). Desreumaux (1998: 488) offers a name in a Syrian inscription (Nw'ymw) on tombstones from Khirbat as-Samrā (S.0655 and S.0655) and provides an overview including other in Greek (NAOM) from different sites. Whether the writing AN/ $\mathrm{AMO}=\mathrm{ANAMO}$ is a derived from $\mathrm{n}^{\prime} \mathrm{m}$ with prosthetic Aleph ( $=^{*}$ An'am) or a writing error ( $=* \mathrm{Na}^{‘} \mathrm{amo}$ ) remains to be a subject of own discretion. This is also the case for the ending O . Since the letter A occurs twice in the text but not at the end, it is possible to interpret the Greek O meaning the Arabic $U$.

The third line starts with an E, followed by T and $\Lambda(=\mathrm{L})$. The text formulation of comparative tombstones (Canova 1954; Gatier 1998) reveal the name of the deceased and his or her age. Other statements on the father's name or common terms, such as $\theta \alpha \rho \sigma(\epsilon) \iota$, could be added. The letter $\Lambda$ in the third line probably refers to the number 30 . Thus, the line means: $\in \mathrm{T}(\omega \mathrm{N}) \Lambda$ or "(died at the age of) 30 years". The whole text
is "*An'amu (*Na'amu) of 30 years".
The letters form indicate a dating of stone KS-1325 before the fourth century AD Tomb358 , where it was reused as a covering slap, is of a later date.

## Inscription KS-1331 and KS-1332

Two fragments of an inscribed basalt stone were found as part of the covering slaps of the already molested Tomb-357. The inscription on these fragments, KS-1331 and KS-1332, together $55 \times 40 \times 15 \mathrm{~cm}$ (Fig. 5) are north Arabic Safaitic. The original stone was evidently cut across and oblong so that part of the text is lost with the missing part(s). The inscription is the 8th of its kind to be found in Khirbat as-Samrā. Other

5. The two fitting fragments, KS-1331 and KS-1332, of a basalt stone with North Arabic (Safaitic) inscription. The arrow (top right) marks the supposed text start. Based on the table of characters suggested by Knauf (1998), the text starts with the characters equivalent to the Arabic letters " $ل$ ", " $\varepsilon$ " or " $\tau$ ". Notice the chisel marks along the detachment line. Remains of a frame are seen along the lower side of KS-1332.
than being the first to be found in the cemetery, the three-lined text was engraved on a prepared cut-stone with a relative flat surface. Marks of a simple frame can be seen on the lower edge of KS-1332. The text appears to be dedicative. It is not known if the original stone was placed vertically or erected horizontally somewhere in the ancient settlement or the cemetery. Presently, the condition of the stone fragments is of relevance. It is clear that the chisel marks damaged the inscription. Furthermore, the two fragments were placed near each other in the tomb. It would not have made a difference to leave the inscribed stone intact, given the size of other slaps used in Tomb-357 and others nearby. It appears that the damage to this stone was intentional.

The aim of defining the western boundary of the ancient Khirbat as-Samrā cemetery was not achieved in this season of excavations. The total number of excavated tombs was raised to 403 and the human osteological sample was improved. Previous observations on the cemetery's organization became physically substantiated. The appearance of the safaitic text adds to the epigraphic richness of the site in Khirbat as-Samrā as a whole.

## Acknowledgement

It was the voluntary invitation of Mr. Saleh Azzam Al-Mashaqbeh to excavate in his property and to provide many supportive measurements, beside those of the DAJ, which enabled the smooth execution of excavations in this season. The excavating team also included Dr. P. Schönrock-Nabulsi, the restoration technician Mr. H.-G. Bunger (Stadt Archäologie Höxter), the students Simon Kannenberg and Sven Kloth (Hamburg University in Germany). We also appreciate the assistance and comments by Dr. Antje Krug (Berlin, Germany) on the gemstones.

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# PRELIMINARY REPORT OF THE THIRD SEASON OF EXCAVATIONS OF ROME "LA SAPIENZA" UNIVERSITY AT KHIRBAT AL-BATRĀWĪ (UPPER WĀDĪ AZ-ZARQĀ') 

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## Introduction (L. Nigro)

Rome "La Sapienza" University Expedition to Jordan ${ }^{1}$ continued its research activities in year 2007 (Nigro 2007c) carrying on a survey in the Upper Wādī az-Zarqā' basin and systematic restorations at the previously almost unexplored Early Bronze Age site of Khirbat al-Batrāwī². Excavations wages were supported by Rome "La Sapienza" University, the Italian Ministry of Foreign Affairs, and the Italian Ministry of University and Scientific Research ${ }^{3}$. The third season of survey and restorations took place in May-June 2007 and was made possible thanks to the strong help of the Department of Antiquities of Jordan ${ }^{4}$.

The 2007 season was mainly devoted to the study of the settlement variations in Upper Wādī az-Zarqā’ throughout the Early Bronze Age (Fig. 1), the period during which the fortified town of Khirbat al-Batrāwī flourished. This
site, due to its state of preservation, with almost negligible superimpositions later than the Early Bronze Age and no previous excavations, offers, in fact, an extraordinary opportunity for a detailed study of the rise, growth and collapse of early urbanism in this district of Jordan during the 3rd millennium $\mathrm{BC}^{5}$, as well as for the investigation of the inner spatial organization and hierarchy of its territory.

During the third season ${ }^{6}$, excavations and restorations were focused on Areas B North (§ 2.2), B South (§ 2.3) and F (§ 2.1), respectively located at the middle of the northern line of fortifications (Area B North and B South; fig. 2), and on the easternmost terrace of the site (Area F). A major goal of the third season was the systematic restoration of the EB II-III city-wall and of the city-gate opening in it (Fig. 3).

The survey of Upper Wādī az-Zarqā' was carried out in three different sectors: the area

[^17]Matthiae, the Dean of the Faculty of Humanistic Sciences, Prof. Roberto Antonelli, the Director of the Department of Historical, Archaeological and Anthropological Sciences of Antiquity, Prof. Gilda Bartoloni, who strongly sustained the Expedition.
5. Nigro 2006a: 229-230; Nigro ed. 2006: iii-vii.
6. In the previous seasons (Nigro 2006a; 2006b; 2007a; 2007b; Nigro ed. 2006; 2008), the main chronological, topographical and architectural pinpoints of the site were fixed (Nigro 2006a: 233-236; Nigro ed. 2006: 9-36, fig. 1.2; Nigro 2007a: 346-347, tab. 1), and five areas were opened respectively on the Acropolis (Area A; Nigro 2006a: 236-240; Nigro ed. 2006: 63-102, plan II; Nigro 2007a: 347-349), on the northern slope (Area B North and B South; Nigro 2006a: 240-246; Nigro ed. 2006: 153-196, plans III-IV; Nigro 2007a: 349-354), in the north-western and south-western corners (respectively Area C [Nigro ed. 2006: 25-27, figs. 1.27-1.31] and Area D [Nigro ed. 2006: 32-33, figs. 1.38-1.41; Nigro 2007a: 355-357]), on the southern side (Area E; Nigro 2007a: 357-358) and on the easternmost terrace of the khirbat (Area F; Nigro ed. 2006: 22, fig. 1.25; Nigro 2007a: 358-359).


1. Map of Early Bronze Age sites in the Wādī az-Zarqā' Valley.

2. General view of the site of Khirbat al-Batrāwī with the restored EB II-III city-wall and the EB II city-gate, from north (2007).
around the sources of the river, in the Amman surroundings; the area just south of Batrāwī, at the ford of the river; and the area north of Batrāwī, including Tall as-Sukhna North up to Tall al-Bīra.

Further to the north, EB I villages on the northern bank of the Middle Wādī az-Zarqā (Manṣūb, Khirbat Manṣūb, Riyāshī, Marājim, Tall al-‘Ayn) and probably grouped around the major religious centre of Jabal al-Muṭawwaq
(Hanbury-Tenison 1987: 132; Fernández-Tresguerrez Velasco 2004, 2005; Douglas 2006: 51-52) were visited: most of them appeared to be definitely abandoned at the beginning of the III millennium BC, without any EB II centre taking their place (Douglas 2006: 52-54), the population probability moving down to the Jordan Valley, where a series of settlements may have benefited from these arrivals ${ }^{7}$, or climbing the valley in the opposite direction, attracted by
7. Tall as-Sa‘idiyyah, Tall al-Qaws, Dayr 'Allā, Katārat as-Samrā, Tall Handāquq South, Tall Umm Ḥammād,

3. The restored EB II city-gate L.160, from north.
the urban formation which was taking place in the Upper Wādī az-Zarqā', namely at the site of Khirbat al-Batrāwī (Nigro in press, § 2).

To the west, the edges of Batrāwī dominion were reached, up to the site of at-Tall, which probably controlled the area of a bordering realm.

## Work at the Site (L. Nigro)

Works at the site of Khirbat al-Batrāwī were concentrated in Areas F, B North and B South, with the aim of continuing the exploration of the EB II-III Broad-Room Temple in Area F and of the EB II city-gate and EB II-III city-walls in Areas B North and B South.

## Area F - the EB II-III Broad-Room Temple

In Area F, the exploration of the broad-room temple continued on the western side of the sacred building and in its forecourt. The excavation of the western side of the cella showed that it was erected in Period Batrāwī II (Early Bronze II), by cutting and regularizing a berm in the bedrock, against which the side wall of the building leaned on. Within the cella, a pillar base was identified in the western half, possibly belonging to the earliest phase of use of the building, while the exact limits of the niche facing the entrance and provided with cup-marks were fixed and the whole device was brought to light.

In the forecourt, excavation focused on circular platform S.510. This cult installation, which was a typical one in Early Bronze II-III Levan-

4. Circular platform $S .510$ in the forecourt of Temple L.500, from west.
tine sacred areas $^{8}$, had a diameter of 2.5 m and a stone in the middle with a round hollow (Fig. 4), a shallow circular cup-mark, similar to those visible on the steps leading on the top of the round Altar 4017 at Megiddo (Finkelstein and Ussishkin 2000: 71, fig. 3.50).

## Area B North - the EB II City-Gate

In Area B North, the street running outside the main wall (W. 103) ${ }^{9}$ and leading to the EB II city-gate (L.160; Nigro 2007a: 352, figs. 10-11) was further exposed, showing its EB IIIA floor (L.144a) continuing in between city-wall W. 103 and outer wall W. 155 (Nigro 2007a: 349-350, fig. 8) towards the west beyond the blocked gate (Fig. 5) ${ }^{10}$, as well as the rubble filling (F.178) in between the outer wall (W.155) and the scarpwall W. 165 adjoined to the latter in Early Bronze IIIB in order to strengthen it (Nigro 2007a: 351, fig. 7) ${ }^{11}$.

Restoration works at the main city-gate (L.160) allowed us to clarify many details of this structure. On the outer side, both jambs of the gate were reinforced by big boulders set in the wall at its base and in the upper courses of the piers. The lowest course of irregular limestone blocks slightly protruded in order to strengthen the base of the two sides of the gate. A step marked the entrance to the passageway, with a stone abutting off in the corner, in order to protect the turning point (Fig. 6). The east-

[^18][^19]
5. Plastered floor L. 144 in between EB II-III main citywall W. 103 and EB IIIA outer wall W.155, from east.
ern jamb showed the setting for the monolithic capstone which surmounted the passage on the outer side, while inside it was roofed with wooden beams, the location of which was made visible by a burnt trace on the inner side of the gate. Since cracks were visible on both jambs corresponding to the monolithic capstone (Fig. 7), it seems plausible that this was crushed and collapsed when a strong earthquake brought to a sudden end the life of the EB II city, as also attested to in other parts of the site.

## Area B South - the EB III Layers Inside the CityWall

Inside the main city-wall, excavations were concentrated in squares $\mathrm{BqII} 8+\mathrm{BrII} 8$, in between city-wall W.105+W. 121 and wall W.409, showing that this structure continued eastwards, following the same slightly diverging orientation of the inner face of the city-wall. A stratigraphic section between wall W. 121 and wall W. 409 was cut, showing a long EB III sequence (Fig. 8).

## Restorations of the City-Wall

A further stretch of the main city-wall including the gate and part of the structure west of it was carefully restored with antique-like mortar, after a special treatment of the stones (Fig. 9), up to the maximum preserved height ( 2.3 m to

6. Particular of the big boulders abutting off from the main city-wall foot on the western side of EB II citygate L.160, from north.

7. Particular of the eastern jamb of EB II city-gate L. 160 with the cracks of the earthquake which brought to the end the EB II city.

9. The western stretch of the main city-wall W. 103 with city-gate L. 160 restored in 2007 season.
the west, and around $1.8-2.0 \mathrm{~m}$ in the area of the gate) ${ }^{12}$. Restorations also allowed us to better distinguish the successive constructive phases and related building techniques of the wall itself. The earliest city-wall was supported by a 2.0-2.5m high stone base, with a mud-brick tapering superstructure, around 6 m high, crowned by wooden ceilings and mud-brick parapet (there are no data for establishing the shape of this parapet). The wall was built in juxtaposed

8. Particular of EB IIIB walls
W. 109 (to the right) and W. 409 (to the left), inside the EB II-III main city-wall W.105+W.121, from northwest.
12. In the meantime a large amount of collapsed and erratic stones were removed from the site, in order to enhance the readability of the urban topography and
to facilitate the widening of excavations in the next seasons.
independent sections around 8 m long ${ }^{13}$, which were intermingled when the stone basement was repaired and rebuilt at the beginning of the Early Bronze III, after the ruinous collapse of the end of the EB II city. The main wall at that time was entirely rebuilt with stones, the big ones employed in the outer and inner faces, and an inner filling of irregular stones laid in superimposed layers. On the inner side of the wall a series of stone slabs fixed into the wall were steps supporting a wooden staircase (W.181; Nigro 2007a: 350, fig. 9).

Thanks to the restorations the Batrāwī citywall stands as one of the best preserved monuments of this kind in Southern Levant, and testifies to the achievements of the local community during the Early Bronze Age.

Survey of the Site Surroundings (L. Nigro)
A systematic survey of the hills and the quarters of the modern city surrounding Khirbat alBatrāwì was carried out with the specific aim of identifying the ancient paths connecting the Early Bronze Age town to the underlying river and to locate the ford in the river banks. This was located just north of a rocky spur which narrowed the river banks and hosted the site of Junayna (JADIS n. 2516.016; Nigro ed. 2006, fig. 1.4, maps 4-5), south of Batrāwī (Figs. 10-11). A new examination of pottery on the surface of the latter site demonstrated that it was occupied not only in the Iron Age II-III, as already known (JADIS: 2.172), but also in the Early Bronze I (Douglas 2006: 50-51, fig. 2.16). The discovery of a series of "cup-marks" (Fig. 12) and rock-cut mortars on the rocky spur dominating the river near this site corroborated this hypothesis, suggesting that the EB I settlement was abandoned when the people moved to the hilltop site in the Early Bronze II, founding the fortified town of Khirbat al- Batrāwī.

If Junayna probably provided the bulk of the inhabitants of Batrāwī, other groups apparently participated in this process coming from other abandoned EB I hamlets of Upper and Middle Wādì az-Zarqā’, including also those north of the turn of the river to the West near Jabal Mutawwaq, which were also the object of the 2007 survey (see below § 4). Moreover, the

10. Topographical map of the surroundings of Khirbat alBatrāwī and Junayna.
growing centre possibly attracted also semi-nomad population into a more stable life, acting as a catalyst of people and exchanges.

A central role within these "urban" dynamics (Synecism and Catalysis; Nigro in press: § 2) was probably played by the temple erected on the easternmost terrace of the site, overlooking the tracks from the steppe and the desert, which with its traditional plan (still retaining the broadroom typology of Chalcolithic and Early Bronze I), possibly had inherited the function of central cult place, previously performed by the temple of Jabal al-Muṭawwaq (Fernández-Tresguerrez Velasco 2004).

The survey of the site surroundings also allowed us to fix the limits of the territory under the city of Batrāwī control (Fig. 13). To the south the main pinpoints were two wadis flowing into the Wādī az-Zarqā', where some hamlets were located in the Early Bronze Age. The southernmost limit was of course the major set-

11. General view of the site of Junayna on the western side of Wādì az-Zarqā', south of Khirbat al-Batrāwī.

12. Cup-marks excavated on the rocky spur of Junayna.
tlement of Khirbat ar-Ruṣayfah ${ }^{14}$, where a consistent EB II-III occupation was documented. North of Batrāwī the Wādī az-Zarqā’ becomes narrower and around 1 km before the junction with Wādi aḍ-Dulayl there was the site of Tall
as-Sukhna North, which was a relatively big rural village within the Batrāwī countryside, lying on the eastern bank of the river. To the north, after a turn of the river, a larger site, Tall al-Bira, stood up on the western bank on top of a basalt hill, possibly marking the northern limit of the Batrāwī district. The latter was crossed eastwest by a valley, which allowed one to shortcut the road to the Jordan Valley, and which crossed the western hilly portion of the district, where olive tree cultivation was extended (in the surrounding of the sites of Massarrah ${ }^{15}$ and up to at-Tall to the west; Fig. 1).

## Survey of the Upper and Middle Wādī azZarqā̄ (M. Sala)

Within the framework of the "Pilot Project of Archaeological Excavations and Restorations at Khirbat al- Batrāwī, Upper Wādī az-Zarqā Valley", a survey was carried out in the 2007 season from south to north in Upper and Middle Wādī az-Zarqā’, mainly focusing on Early Bronze Age sites, in order to both outline the trends and shifting of early urban developments in the Upper Wādì az-Zarqā’ Valley in the late IV-III millennium BC, and to check the edges and extension of the territory under Batrāwī control within the turn towards the west described by the az-Zarqā’ river (Fig. 13).

Examined sites were all already known, and
14. Excavations at Khirbat ar-Ruṣayfah have been carried out by the Department of Antiquities of Jordan under the direction of Mr Romil Ghrayib.
15. JADIS n. 2317.021. This Roman and Byzantine site, excavated by the Department of Antiquities of Jordan
under the direction of Mr Romil Ghrayib, has also provided some sparse Early Bronze Age remains, suggesting that it supplied, with its olive trees, oaks and pines, basic resources (olive oil and wood) for the major urban sites as Khirbat al-Batrāwī.

13. Aerial view of the ancient territory under Batrāwī control, inside the big turn towards west of the az-Zarqä' river.
have been selected among those of sure or possible Bronze Age occupation within a radius of 25 km from Khirbat al-Batrāwī, and north of the junction with Wādī aḍ-Dulayl up to the EB I sites on the right side of the river (Fig. 14).

At the beginning of the Early Bronze Age the Upper Wādī az-Zarqā' attracted new groups of semi-nomads gradually settling in encampments, hamlets and villages along both banks of the river and on the hills surrounding it (Kafafi in press). EB I rural villages were distributed along the river banks from its sources (Douglas 2006: 50-51) down to the big turn towards the west, where some big sites, such as Marājim, Manṣūb, Khirbat Manṣūb and Riyāshī, were grouped around the major religious centre of Jabal al-Muṭawwaq. These sites of the Middle Wādī az-Zarqā' were concentrated on its north bank, while in Upper Wādī az-Zarqā' hamlets and villages were almost regularly distributed in the valley. In the transition from the Early Bronze I to the Early Bronze II most of EB I sites in the Middle Wādī az-Zarqā' were abandoned, while
in the Upper Wādī az-Zarqā' a synestic process brought to the foundation of the fortified centre of Batrāwī, inducing also other groups of seminomads to settle both in the town itself and in the rural villages under its control, such as Khirbat ar-Ruṣayfah, Tall as-Sukhna North and Tall al-Bīra (see above § 3).

## Catalogue of the Surveyed Site

From south to north, the visited Early Bronze Age sites were the following:

Khirbat ar-Ruseifah (JADIS n. 2415.076): the site (Fig. 15) was visited in the 1930s by N. Glueck (Glueck 1939: 206-207, site 261), who recognized an extensive Early Bronze Age occupation in the area. Heavily threatened nowadays by modern urban expansion, Khirbat ar-Ruṣayfah has been drastically damaged by bulldozer cuts which reduced its dimensions to almost one fifth of its original extension (probably up to 10 ha.; Nigro ed. 2006: 5, note 4). It had substantial occupations in the Early Bronze Age II-III ${ }^{16}$ and Middle Bronze III/Late Bronze I: a MB III/LB I

14. The area and sites surveyed by Rome "La Sapienza" Expedition in 2007.
monumental building (possibly a governor's residency), which provided a rich set of materials (pithoi, jars, jugs and painted vessels), hints at the role of central place for this town in the azZarqā${ }^{\bar{\prime}} /$ ar-Ruṣayfah district during the II millennium BC , when the city of Batrāwī was definitively deserted. The site shows also substantial Roman and Byzantine occupations.

Tell es-Sukhne South (JADIS n. 2517.002): the site (Fig. 16) has a major MB II-III occupation (around 1 ha.), followed by an Iron Age I-III occupation and a Roman-Byzantine small farm along the eastern bank of the river (Glueck 1939: 212, site 316).

Tell es-Sukhne North (JADIS n. 2517.027): the site (Figs. 16-17) lies on the eastern bank of the Wādì az-Zarqā', around 1 km from the junction with Wādī aḍ-Dulayl, and it was already surveyed in the 1990 s, when a cylindrical seal impression was also found (Chesson et al. 1995; Palumbo et al. 1996: 385-386, 401-403, tab. 6; Palumbo et al. 1997: 14; Nigro ed. 2006: 4, note
2). The new visit by Rome "La Sapienza" Expedition has checked the chronology of the site, which represented a substantial EBII-IIIA rural village in the Batrāwī countryside (Fig. 18).

Tell el-Bireh (JADIS n. 2417.021): one of the main sites visited along the western bank of the Wādī az-Zarqā̀ was Tall al-Bīra (Glueck 1939: 213-214, site 320; Nigro ed. 2006: 4, note 2), on a basalt spur overlooking a turn of the river (Fig. 19). EB II pottery sherds collected during the survey (Fig. 20) hint at the presence of a rural village underneath later more massive occupations and fortifications, possibly integrated in the Batrāwī territorial system, like Tall as-Sukhna North. The site has had a continuous occupation in most recent periods, mainly Hellenistic, Roman, Byzantine and Umayyad (also Iron Age II-III is perhaps present), hosting a fortress in Roman and Byzantine periods.

Khirbat Mansub (JADIS n. 2318.019): the site (Fig. 21) represents one of the EB I villages on the northern bank of Middle Wādi az-Zarqā'.

15. Topographical map of Khirbat ar-Rusayfah and its surroundings.

16. Topographical map of Jabal ar-Ruhayl, Tall as-Sukhna South, Tall as-Sukhna North and their surroundings.

17. General view from south of the site of Tall as-Sukhna North, nowadays crossed by bulldozer cuts.

Already visited by N. Glueck (Glueck 1951: 87, site 265), it was surveyed in 1984 by J.W. Hanbury-Tenison, who recognized its substantial EB I occupation (Hanbury-Tenison 1987: 155, site 18). Some cup-marks detected in the bed-rock during the recent Rome "La Sapienza" survey (Fig. 22) may be ascribed to this protourban occupation. After the main EB I occupation, Khirbat Manṣūb was probably frequented in the Middle Bronze and Iron Ages, and then, more substantially, in the late Roman and By-
zantine periods (Fig. 23).
Mansub (JADIS n. 2318.018): the site represents one of the largest EB I occupations of Middle Wādī az-Zarqā’, firstly visited by J.W. Hanbury-Tenison in 1984 (Hanbury-Tenison 1987: 154-155, site 17), with EB I sherds scattered over a surface of $300 \times 200 \mathrm{~m}$.

Riyashi (JADIS n. 2318.017): another substantial EB I large occupation (around 4 ha.) has been detected at Riyāshī, just north of Khirbat Manṣūb (Hanbury-Tenison 1987: 154, site 16).

18. Early Bronze II-IIIA surface objects and pottery from Tall as-Sukhna North.

19. Topographical map of Tall al-Bīra and its surroundings.

Also abandoned at the end of the IV millennium BC , the site was sparsely frequented in the Middle Bronze, Iron Age, Roman and Byzantine periods.

Tell al-‘Ain (JADIS n. 2418.025): the most easterly EB I village visited during the survey was Tall al-‘Ayn (Fig. 24). Already visited by N. Glueck (Glueck 1951: 84, site 305) and surveyed by J.W. Hanbury-Tenison in 1984 (Han-bury-Tenison 1987: 155, site 28), this site shows a long-lasting occupation from the beginning of the Early Bronze Age, with scattered EB I-II, MB II-III and LB sherds, and a later more sub-
stantial occupation in the Iron Age, Roman, Byzantine and Umayyad periods (Fig. 25).

Et-Tell (JADIS n. 2317.032): the site occupies a panoramic hill in an unconquerable location above 700 m , in a region of oak forest and pines, suitable for wheat and olive cultivations. Its occupation dates back to the Early Bronze I (as it seems attested to by cup-marks and a rockcut circular cistern in the bed-rock), followed by remains of an EB II-III (fortified?) town, almost completely erased by the later Persian fortress and its annexed devices (Gordon and Knauf 1987: 291-292, 294, site 4). Scattered MB, LB and Iron Ages fragments are also present at the site (Fig. 26).

## EB I dolmen fields in the Upper and Middle Wādī az-Zarqā’ (A. Polcaro)

Like the other Wadis running east-west from the highlands to the Jordan Valley, Wādī azZarqā̄ hosted many dolmen fields (Fig. 27) ${ }^{17}$. Their disposition fairly corresponds to the different areas exploited by pastoral communities in different seasons (Polcaro 2008; SteimerHerbert 2004: 27-30). It is probable that dolmen fields were used as funerary areas and cult places by EB I pastoral communities of Transjordan in some seasons during the movements of herds (Polcaro 2006: 139-146; Polcaro and Polcaro 2006). The dating to Early Bronze I is proved for all the megalithic necropolis of Wādī az-Zarqā${ }^{1}{ }^{18}$ : here the excavation at the dolmen field of Dāmiya/Ala Safat, at the confluence of the river with the Jordan Valley, proves the attribution of these structures to the Early Bronze I, mainly because of pottery material from the site (Stekelis 1961: 63; Yassine 1988: 51; Prag 1995: 77). Furthermore, our study of dolmens orientation has suggested a link between the cultural ideology of pastoral society, the funerary costume of secondary burial, and the topographical disposition of dolmen fields in the

[^20][^21]

EL-BIREH.07.S.0/1


EL-BIREH.07.S.0/3


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EL-BIREH.07.S.0/2


EL-BIREH.07.S.0/5


EL-BIREH.07.S.0/4


EL-BIREH.07.S.0/6
20. Surface pottery from Tall al-Bīra: Early Bronze II (from El-Bireh.07.S.0/1 to El-Bireh.07.S.0/4) and Byzantine (ElBireh.07.S.0/5, El-Bireh.07.S.0/6) sherds.

21. Topographical map of Khirbat Mansūb and its surroundings.

## Early Bronze ${ }^{19}$.

The dolmen fields of Wādī az-Zarqā’ are located in various areas: on the higher places along the river and on the flanks of northern affluent Wadis. Most of these dolmen fields are small necropolis of a dozen structures maximum, with only two exceptions, Dāmiya and Jabal Muṭawwaq, which included hundreds of dolmens. In past surveys, catalogued by the JADIS database, 18 dolmen fields were identified in Upper and Middle Wādī az-Zarqā’; out of these,

22. Cup-mark excavated in the bed-rock at Khirbat Manṣūb.
only Jabal Muṭawwaq was partially investigated by the University of Oviedo under the direction of Prof. Fernández-Tresguerres (FernándezTresguerres 2005: 365), while on the other sites only sporadic information is available. During the 2007 season, we were able to identify five more dolmen fields ${ }^{20}$, without including those in the 'Amman vicinities ${ }^{21}$.

Architectural features of Jordanian dolmens are now well known due to many recent studies ${ }^{22}$. In general, a megalithic structure is com-
19. The orientation of dolmens mostly directed along the north - south direction was in fact interpreted as a precise astronomical alignment, linked to the culmination of Orion constellation in the Winter Solstice (Polcaro and Polcaro 2006: 169-170). This fact, statistically proved, was suggested to be connected with the Dumuzi's mythology and the particular funerary costumes of EB I pastoral society (Polcaro 2008; Polcaro and Polcaro 2006: 170-174), that probably used the dolmens and other megalithic structures as places to leave the dead until the decomposition of the bodies (Polcaro 2006: 283-292).
20. The first three site, A, B, C, were identified thanks to the indication of Prof. Khaled Douglas (University of Zarqa) and Dr. Hugo Gajus Scheltema (Royal Netherlands Embassy in 'Amman), who collaborated with us in 2006 during the orientation measurements of different megalithic structures along the Wādì azZarqā' valley (Polcaro and Polcaro 2006).
21. Many of these dolmens have now disappeared; the same destiny occurred to the dolmen fields in the Mādabā area, in this case due to the expansion of the rock quarries (Piccirillo 2001).
22. Zohar 1992; Steimer-He.

23. Surface pottery from Khirbat Manṣūb: Early Bronze I (from Khirbet Mansub.07.S.0/1 to Khirbet Mansub.07.S.0/12) and late Roman (from Khirbet Mansub.07.S.0/13 to Khirbet Mansub.07.S.0/16) sherds.

24. Topographical map of Tall al-'Ayn and its surroundings.
posed of a horizontal rock slab, lying on top of two or three vertical slabs; sometimes another rock slab is added to these to close the opening of the structure, as in Dāmiya, where the fourth slab often shows a small hole in the centre. This typology is called "box-like" type and it is sometime completely covered by earth and stones, assuming the form of a tumulus or a cairn. Common in Jordanian dolmens are circular or rectangular platforms on which these structures are built: these platforms are foundations composed by alignments of big stones, 4-6 meters in diameter (Kafafi and Sheltema 2005: 11). Out of the six known typologies of dolmens, the most com-

25. Surface pottery from Tall al-‘Ayn: Early Bronze (El‘Ain.07.S.0/3, El-'Ain.07. S.0/6), Middle Bronze (El‘Ain.07.S.0/4, El-‘Ain.07. S.0/5), Byzantine (El'Ain.07.S.0/1) and Umayyad (El-‘Ain.07.S.0/2, El-'Ain.07.S.0/7, El'Ain.07.S.0/8) sherds.

26. Surface objects and pottery from at-Tall: Early Bronze II (Et-Tell.07.S.0/3, EtTell.07.S.0/6, Et-Tell.07.S. 0/7), Middle Bronze III/Late Bronze I (Et-Tell.07.S.0/1, Et-Tell.07.S.0/2, Et-Tell.07. S.0/8), and Iron Age II (EtTell.07.S.0/4, Et-Tell.07.S.0 15) sherds.
mon in Wādī az-Zarqā’ are Types A and B: the first consists of two vertical slabs surmounted by a horizontal slab; the structure is closed by a further slab and sometime by a fourth one on the rear side. Type B is formed by two or four long vertical slabs and two or more horizontal slabs that form the roof, which sometimes reaches a length of ten meters (Kafafi and Sheltema 2005: 12). In the sites of Upper Wādī az-Zarqā̄, we recognized also Type E, formed by a double chamber, one over the other, often divided by a wooden horizontal slab. Finally, Type F is also present in Wādī az-Zarqā': the latter typology, called "pseudo-dolmen", is similar to rock cut
graves excavated in a single block of rock (Kafafi and Sheltema 2005: 12).

## Catalogue of JADIS Dolmen Fields

In the inner fluvial river basin the JADIS database indicates three dolmen sites:

## El-Qesir

JADIS reference: n. 2216.003 (coordinates: UTME: 7656; UTMN: 35527; size: 35000 mq ; elevation: +806)

Description: site 282 of Glueck's survey (Glueck 1939: 198-199). The site is recorded as an EB II-III fortified settlement; dolmens are near the site. According to JADIS also an EB IV

27. Topographical map of dolmen fields in the az-Zarqa' region.
village is present.

## El-Shelqeman

JADIS reference: n. 2215.018 (coordinates: UTME: 7642; UTMN: 35467; size: unknown; elevation: +860)

Description: no other structures or indications different to dolmens are recorded for this site.

## Umm en-Nafat

JADIS reference: n. 2315.126 (coordinates: UTME: 77055; UTMN: 354596; size: unknown; elevation:+1045)

Description: site 58-31.1 of Abu Dayyah's survey (Abu Dayyah et al. 1991: 392). Some wall structures and the presence of a possibly modern cemetery are recorded near the dolmen field.

Along the river valley the JADIS database indicates nine dolmen sites:

## Rujm et-Tai

JADIS reference: n. 2517.006 (coordinates: UTME: 2234; UTMN: 35637; size: unknown;
elevation: +660)
Description: presence of dolmens nowadays lost.

## Rujm Nebi Hadad

JADIS reference: n. 2417.013 (coordinates: UTME: 7816; UTMN: 35634; size: unknown; elevation: +765)

Description: presence of EB I pottery within the dolmen field; according to JADIS pottery sherds date back from EB IV.
Arqub Ibn Haddad
JADIS reference: n. 2417.008 (coordinates: UTME: 7813; UTMN: 35637; size: unknown; elevation: +675)

Description: site 324 of Glueck's survey (Glueck 1939: 216). Some standing stones are recorded in connection with the dolmen field (attributed to Early Bronze IV by JADIS).
Kharaysin
JADIS reference: n. 2417.002 (coordinates: UTME: 7824; UTMN: 35673; size: 30000 mq ; elevation: +460)

Description: site 24 of Hanbury-Tenison's
survey (Hanbury-Tenison 1987: 155). The presence of dolmens in this Neolithic site is probably linked to the nearby greater Jabal Muṭawwaq EB I dolmen field.

## El-Qeniyeh

JADIS reference: n. 2418.024 (coordinates: UTME: 7835; UTMN: 35691; size: unknown; elevation: +600 )

Description: site 260 of Glueck's survey (Glueck 1951: 84-85). Only the presence of a dolmen field is recorded.
Jebel Mutawwaq.
JADIS reference: n. 2418.011 (coordinates: UTME: 7825; UTMN: 35683; size: 240000 mq ; elevation: +590)

Description: this is the only dolmen field recorded in JADIS database visited during the survey of Rome "Sapienza" University. The site is one of the best preserved dolmens field in Jordan, with hundreds of intact structures. The first survey carried out by J.W. Hanbury-Tenison (Hanbury-Tenison 1986: 245) recognized one thousand dolmens. We identified the two best preserved areas on the site: one on the east of the EB I settlement, connected to the dolmen field (Fernández-Tresguerres 2005), and one more extended on the northern side. The first area is near a natural spring, around which many caves are visible; here we identified at least ten dolmens, well preserved, aligned on different rows, all oriented north-south. The northern dolmen area is divided into three groups of structures, located on two slopes, one in front of another, and on the valley in between them. Also the dolmens of this area are mostly oriented northsouth; we analyzed twenty well preserved structures of different type, mostly ascribable to the A and B typology.
Khirbat el-Abbareh
JADIS reference: n. 2318.058 (coordinates: UTME: 7736; UTMN: 35694; size: unknown; elevation: +456)

Description: site 268 of Glueck's survey (Glueck 1951: 89). Some walled structures in connection with surface Roman pottery are recorded with the dolmen field.
Khirbat Mansub
JADIS reference: n. 2318.019 (coordinates: UTME: 7757; UTMN: 35710; size: unknown; elevation: +540 )

Description: sSite 265 of Glueck's survey
(Glueck 1951: 87). Only the presence of a dolmen field is recorded; pottery from EB I to Byzantine period is registered.

## Jerash HS Site 29

JADIS reference: n. 2318.009 (coordinates: UTME: 7756; UTMN: 35721; size: unknown; elevation: +540)

Description: the presence of a dolmen field is recorded with pottery from Late Chalcolithic to EB I (Leonard 1987: 354).

Along the northern river valleys the JADIS database indicate six dolmen sites:

## El-Hedeb

JADIS reference: n. 2418.019 (coordinates: UTME: 7814; UTMN: 35726; size: unknown; elevation: +664)

Description: site 300 of Mittmann's survey (Mittmann 1970: 114-115). Only the presence of a dolmen field is recorded.
Zakhireh
JADIS reference: n. 2418.027 (coordinates: UTME: 2229; UTMN: 35747; size: unknown; elevation: +800)

Description: site 306 of Glueck's survey (Glueck 1951: 73). Some walled structures in connection with the dolmen field are recorded.

## Jerash HS Site 15

JADIS reference: n. 2319.008 (coordinates: UTME: 7748; UTMN: 35814; size: unknown; elevation: +1020)

Description: only the presence of a dolmen field is recorded; pottery mostly dated to the Early Bronze I (Leonard 1987: 351). Jerash HS Site 13

JADIS reference: n. 2319.006 (coordinates: UTME: 7749; UTMN: 35833; size: unknown; elevation: +1000)

Description: some walled structures in connection with the dolmen field are recorded; pottery mostly dated to the Early Bronze I (Leonard 1987: 348).
Wadi abu el-Buhaysh
JADIS reference: n. 2419.012 (coordinates: UTME: 7784; UTMN: 35822; size: unknown; elevation: +850)

Description: site 257 of Glueck's survey (Glueck 1951: 77). Only the presence of a dolmen field is recorded.
Khirbat El-Fedein
JADIS reference: n. 2619.001 (coordinates:

UTME: 23678; UTMN: 358213; size: 75000 mq; elevation: +708)

Description: site 247A of Glueck's survey (Glueck 1951: 1-2). The site shows a long occupation from Iron Age to Umayyad period.

## Catalogue of New Discovered Dolmens <br> Umm Rummana - Site C

Coordinates: Lat: 3205,462; Long: 35 54,196
(in the inner fluvial river basin)
Size: unknown
Elevation: +900
Description: the dolmen field is near the modern village of Umm Rummana and it is heavily threatened due to the modern agricultural works that have destroyed many megalithic structures. We identified at least ten dolmens well preserved, mostly of A typology, sometimes constructed with a foundation pit. The dolmen field was clearly more extended, probably also along the nearby hills, where many big broken stone slabs are visible. Noticeable is the presence of a big dolmen of E typology, recognizable by the parallel notches cut on the side of the vertical slabs. Also near the site some rock-cut tombs have been identified.
Site A
Coordinates: Lat: 32 09,772; Long: 35 58,480

Size: unknown
Elevation: +715
Description: the site is extended on two connected hills. On the northern one two well preserved dolmens were identified, but the presence of many broken stone slabs points to the original presence of a big dolmen field. On the southern hill some walls, as well as many cupmarks on the natural bed-rock, were identified. The stone alignments seem relative to platforms and enclosures more than houses. Many pottery fragments dated to the Early Bronze I were recognizable on the surface.
Site B
Coordinates: Lat: 32 11,287; Long: 35 54,500

Size: unknown
Elevation: +458
Description: the site is extended on a slope descending to the Wādì az-Zarqā’ Valley, apparently not connected with EB settlements. Two dolmens were identified: one of B typology,
with a great rectangular platform around it and a particular closure made of small stones; and one of F typology, excavated in a single block. Between the structures some EB I pottery was recognized. The presence of a cairn near the site, possibly with a dromos entrance, is noticeable. Site E

Coordinates: Lat: 32 15,584; Long: 36 01,846

Size: unknown
Elevation: +625
Description: the site lies on a hill, along the southern side of the modern street to Tall al'Ayn. Here at least two well preserved dolmens have been identified. Both of them belong to A typology, of small dimensions without platform or others connected structures, oriented northsouth.

## Site D

Coordinates: Lat: 32 15,311; Long: 36 00,543

Size: unknown
Elevation: +654
Description: the site was identified at 2.10 km west of Site E. Only a well preserved dolmen of A typology was recognized. It is possible that this dolmen and the two of Site E were originally part of the same megalithic field, completely destroyed except for these few specimens.

## Conclusions (L. Nigro)

The third season of excavations at Khirbat alBatrāwi was devoted to the protection and the valorization of some major monuments at the site, i.e. its magnificent city walls and city gate with an inner staircase, dating back to the Early Bronze II-III (2900-2300BC). In the meantime, Rome "La Sapienza" Expedition carried out a further survey of the Upper Wādì az-Zarqā̀, especially focused on Early Bronze Age remains, in order to situate the site in its regional context, and to reconstruct its historical development.

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# BETHANY BEYOND JORDAN "THE HEART OF THE HOLY LAND" 

Rustom Mkhjian

The Authenticity of the baptism site is as pure as the testimonies of the Gospels, the pilgrims' accounts, the mosaic map of the Holy Land, and the archaeological discoveries at the site since 1997. All of these sources are crowned by official documents sent to the Royal Commission of the Baptismal Site by heads of churches throughout the world saying that Jesus was baptized east of the Jordan and the baptism site is one of the holiest sites for Christianity, asking for pieces of land to build their new churches, monasteries, and pilgrims' houses at the site; giving the site back its spirit after having been abandoned for a considerable amount of time. In other words, history is being written again; one generation after the other will understand the reason why the monastic life continued at the site and how the site became once again a pilgrimage site for believers who wanted to follow the trails of the prophets and be in physical contact with holy sites.

## Important Biblical Events in Bethany Beyond Jordan

Many important Biblical events took place at our cherished site, among the most important chronologically speaking after the death of Moses, are:

- Joshua crossing the Jordan River from this land towards Jericho with the 12 tribes of Israel after the death of Moses in the area of Mount Nebo (Joshua Chapters 1 to 5).
- Elijah dwelling in John the Baptist's spring (Brook Cherith), when the ravens brought him flesh and bread morning and evening (First Kings Chapter 17).
- Elijah and Elisha' coming from Jericho, crossing the Jordan River, and the ascension of Elijah to the heavens in a chariot and horses of fire (Elijah's Hill). Elisha' taking Elijah's mantle,
and going back towards Jericho the same way he had crossed it with Elijah (second Kings Chapter 2).
- John the Baptist coming in the spirit and power of Elijah to the place where Elijah ascended to the heavens (Elijah's Hill / Bethany beyond Jordan) (Luke Chapter 1:17)
- Jesus coming to Bethany beyond Jordan where John was baptizing and being baptized at the site (John 1:28 / John 3:26).


## Examples of Sites Closely Related with Bethany beyond Jordan

## Mount Nebo and Livias (Tall ar-Rāma)

After the death of Moses in the area of Mount Nebo, Joshua took over, rested in the area of Livias, hence from the plains of the area of Bethany beyond Jordan led the 12 tribes of Israel toward Jericho crossing the Jordan River (Exodus and Joshua Chapters 1 to 5).

We note that Mount Nebo, Livias and Bethany beyond Jordan were important stops by many pilgrims following the trails of the Prophets in Holy Land. Parts of the pilgrimage route, a few stations, and some Milestones were discovered by a team of the Department of Antiquities during the last few years.

## Listib / Tishbe / Tall Mār Ilyās (Prophet Elijah)

Now Elijah the Tishbite, from Tishbe in Gilead, said to Ahab "As the Lord, the God of Israel, lives, whom I serve, there will be neither dew nor rain in the next few years except at my word".

Then the word of the Lord came to Elijah: "Leave here, turn eastward and hide in the Kerith Ravine, east of the Jordan. You will drink from the brook, and I have ordered the ravens to feed you there". So he did what the Lord told him.

He went to the Kerith Ravine, east of the Jordan, and stayed there. The ravens brought him bread and meat in the morning and bread and meat in the evening, and he drank from the brook. Some time later the brook dried up because there had been no rain in the land (First Kings 17:1-7).

That is the reason why a large basilica is built at the top of the hill overlooking Listib having an inscription, which includes the name Elijah.

In short we can say that Elijah was born in Listib and ascended to the heavens from the area of Bethany beyond the Jordan. For this reason we have two sites in Jordan having the name (Elijah's Hill / Tall Mār Ilyās).

## Mukāwir / Macharius (John the Baptist)

When John heard in prison what Christ was doing, he sent his disciples to ask Him "Are you the one who was to come, or should we expect someone else?" Jesus replied "Go back and report to John what you hear and see: The blind receive sight, the lame walk, those who have leprosy are cured, the deaf hear, the dead are raised, and the good news is preached to the poor" (Matthew 11:1-6).

At that time Herod the tetrarch heard the reports about Jesus, and he said to his attendants "This is John the Baptist; he has risen from the dead! That is why miraculous powers are at work in him". Now Herod had arrested John and bound him in prison because of Herodias, his brother Philip's wife, for John had been saying to him: "it is not lawful for you to have her". Herod wanted to kill John, but he was afraid of the people, because they considered him a prophet.

On Herod's birthday the daughter of Herodias danced for them and pleased Herod so much that he promised with an oath to give her whatever she asked. Prompted by her mother, she said "Give me here on a platter the head of John the Baptist". The king was distressed, but because of his oaths and his dinner guests, he ordered that her request be granted and had John beheaded in the prison. His head was brought on a platter and given to the girl, who carried it to her mother. John's disciples came and took his body and buried it. Then they went and told Jesus (Matthew 14:1-12).

We can therefore conclude that John the Baptist started his ministry in Bethany beyond the Jordan, Baptized the people in the spring formed
at Elijah's Hill, Baptized Jesus on the eastern bank of the river Jordan, and was beheaded after being imprisoned at Mukāwir/Macharius.

## Umm Qays / Gadara (Jesus Christ)

Jesus calms the storm while crossing to the eastern bank of Lake Galilee. When He arrived at the other side in the region of the Gadarenes, two demon-possessed men coming from the tombs met him. They were so violent that no one could pass that way "What do you want with us, Son of God?" they shouted "Have you come here to torture us before the appointed time?" Some distance from them a large herd of pigs was feeding. The demons begged Jesus "If you drive us out, send us into the herd of pigs".

He said to them "Go!" so they came out and went into the pigs, and the whole herd rushed down the steep bank into the lake and died in the water. Those tending the pigs ran off, went into the town and reported all this, including what happened to the demon-possessed men. Then the whole town went out to meet Jesus, and when they saw him, they pleaded with him to leave their region (Matthew 8:18-34).

From Umm Qays Lake Galilee can be seen and the entire story of Jesus sending the demons into the herd of pigs, healing the demon- possessed men can be remembered.
N.B. The same story mentions the region of the Gerasenes (Luke 8:26) instead of the Gadarenes.

Therefore we can link many sites with the Baptismal Site as pilgrimage stations from where they can visit other sites spiritually linked with Bethany beyond the Jordan where Jesus was baptized, turning it once again into a pilgrims station as it once was.

Pilgrims throughout history paid attention, visited, and described the Holy Land. Following the trails of the prophets, many of these sites were discovered east of the Jordan and can be effectively used to encourage religious tourism starting from Bethany beyond the Jordan, enabling us to build the bridges of love and peace between different religions and cultures.

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The Holy Bible


1. A helicopter view of Bethany beyond the Jordan (Mr. Zohrab Markarian).

2. A helicopter view of Mount Nebo from the east (Rustom Mkhjian).

3. A view from Mount Nebo to the Jordan valley plains (Rustom Mkhjian).

4. View of Listib from the east (Rustom Mkhjian).

5. The large basilica built in memory of Elijah (Rustom Mkhjian).

6. The peristile area at Macharius (Rustom Mkhjian).

7. A general view of Macharius (Rustom Mkhjian).

8. A view from Umm Qays with Lake Galilee in the background (Rustom Mkhjian).

# A NABATAEAN ROCK-CUT SANCTUARY IN PETRA : SECOND PRELIMINARY REPORT ON THE "OBODAS CHAPEL" EXCAVATION PROJECT, JABAL NUMAYR (2005-2007) 

Laurent Tholbecq, Caroline Durand and Charlène Bouchaud

This paper provides a preliminary account on three excavation seasons carried out on the «Obodas Chapel» (Jabal Numayr - Petra area) in 2005, 2006 and 2007 ${ }^{1}$. The first results of the previous campaigns were published in this journal in 2002 and $2005^{2}$. This project aims to improve our understanding of the spatial organization of a religious complex that developed between at least the end of the second century BC and the beginning of the second century AD in the southern suburbs of the Nabataean capital. The newly discovered structures will be discussed in addition to the ceramic material found in the complex's cistern that includes poorly documented Nabataean pottery types.

## The Newly Excavated Structures

## The Southern Entrance to the Complex

The «Obodas Chapel» complex of Jabal Numayr is accessible from the south through an 11.2 m long $\mathrm{N}-\mathrm{S}$ rock-cut passageway (PN2006.20000) (Fig. 1.1 and Fig. 2). This corridor was constructed through artificially enlarging a very narrow wadi up to 1.9 m by carving its western side. This corridor is slightly sloped towards the north and is equipped with a few low steps carved into the bedrock. Main access to the religious complex is a 1.58 m wide door at
the passageway's northern end (PN2005.13000). This gate includes a ca. 3 m long and ca. 1.8 m wide paved porch that was originally covered by a roof supported by two arches. The arches start at a height of ca. 1.6 m on both sides of the rock-cut hallway and rise up to ca. $1.75-1.80 \mathrm{~m}$. The roofing system somehow was bounded, on its eastern side, to a wall connected to a newly discovered stibadium (see infra). The northern half of the porch is paved with irregular flagstones (Fig. 3). In 2007, a 7.60 m by $5.20 \mathrm{~m} \mathrm{sec}-$ tor was opened immediately north of the main gate (PN 2007.21000). Part of the destruction levels of both the threshold and the eastern doorjamb were excavated. This gate clearly marks the limit of the sacred space since the majority of the cultic niches of the complex are concentrated immediately to its northern side. Nine of the ten cultic niches of the complex were identified in this area, at the entrance of the complex, some of which are remarkably preserved.

## A Circular Structure - Stibadium ? - Connected to the Niches Brünnow and Domaszewski Inv. \#

 289East of the entrance to the complex, a structure that is tentatively interpreted as a stibadium was unearthed (PN 2005.15000) (Fig. 1.2). It is

[^23][^24]

1. The «Obodas Chapel» complex: general map of the rock-cut and excavated structures.

2. Southern closed hallway giving access to the complex.

3. Porch pavement.
situated in the centre of a $3.4 \times 3.2 \mathrm{~m}$ open-air, rock-cut platform that rises ca. 1.8 m above the first century AD occupation level. This structure was originally reached by several roughly carved step-like notches. The structure itself consisted of a 1 m diameter circular aperture associated with a 0.6 m wide narrow space to the north (Fig. 4). Its maximum depth is $0,48 \mathrm{~m}$. Two major decorated niches are sculpted on the back wall of the structure, 1.27 m above the top of the platform (Brünnow and Domaszewski Inv. \# 289). The back of the eastern niche was clearly
cut to reveal a betyl and its associated base. The sector situated at the bottom of the structure (PN 2007.21000) revealed a 5.20 m long and 0.80 m high curved wall built against the bedrock that defined the eastern side of this area (Fig. 5). It is made of reused architectural fragments, has no proper foundation and must be related to the building phase of the «Obodas Triclinium». On the northern side of the square, an isolated segment of an east-west built canalization $(2.27 \mathrm{~m}$ by 0.27 m ), was found at the same level as the summit of the following described triclinium.

4. Possible Stibadium connected to the niches Brünnow and Domaszewski Inv. \# 289.

## The Open-Air Triclinium

Besides the «Obodas Triclinium» itself, the complex includes an exceptional open-air triclinium partially exposed in 2004 (Fig. 1.8 and Fig. 6) ${ }^{3}$. This is a U-shaped structure open to the north and has a maximum height of 0.87 m ( PN $2006.23000)^{4}$. The ca. 10.5 long by ca. 6.30 m wide triclinium contains three ca. 1.2 m wide couches and is not limited by any exterior wall. The triclinium is asymmetric since its eastern 8.54 m long bench is smaller than the west one. On their inner faces, the couches were constructed of three courses of fine rectangular sandstone blocks. The southern and western couches are covered by flagstones while the surface of the eastern one is plastered. The three couches have on their inner edges the characteristic recess of the banqueting halls. The usual slope towards the inner side of the triclinium present on the summit of comparable structures is equally clear on the south and west benches, where the original covering flagstones remain.

In 2007, a 10.80 m by 2.90 m trench was opened in the central area of the triclinium (PN 2007.23000). It revealed occupational layers extending from the second century BC to the first century AD. At least two major occupation phases have been tentatively identified so far. A

5. Curved wall PN 2007.21021.
3. Tholbecq and Durand 2005: 303.
4. To complete the excavation of the triclinium, the central north - south balk (PN 2006.21000) and the central
east-west balk (PN 2006.22000) visible in Tholbecq 2006: 483, fig. 14 , (with a wrong caption) were removed in 2006.

6. The open-air triclinium.
first structure must be associated with a major ash pit (PN2007.23017) containing late-Hellenistic material (post-150BC - pre-50BC) that is tentatively interpreted as the result of cooking that took place in an early phase of the sanctuary's use. Whether this wall was part of an early phase of the triclinium remains unclear. The triclinium structure seems to have been built during the first century BC , in use through the first century AD and was apparently destroyed at the end of the same century. If the preliminary ceramic readings are correct - and this needs to be confirmed by further examination of the finds, the built triclinium would have been in use in concert with the rock-cut «Obodas Triclinium» itself. The south-eastern limit of the built triclinium is slightly curved and provides some space for a narrow two-stepped stairway wedged between the built triclinium and the «Obodas triclinium» (Fig. 7). Similarly, a 1.10 m wide by 7.5 m long hall (PN2006.19000 - PN2007.22000) skirts the eastern side of the built triclinium. Its excavation revealed several successive floors dating from the first century BC to the year 20AD onwards. The floors all seem to predate the building of the Obodas complex associated with the eastern annex rooms ${ }^{5}$. All these elements tend to prove that the openair triclinium might be somehow connected to

7. The two-stepped stairway between the open-air triclinium and the «ObodasTricilnium».
the early sanctuary referred to in the main dedication of the Obodas triclinium (CIS II 354) but

[^25]might also have remained in use contemporary with the new complex ${ }^{6}$.

Similar open-air triclinia are exceptional in Near-Eastern contexts. The best published parallel that comes in mind is the «garden triclinium» (AL94) excavated on a court associated with the «Twin Palaces» in Jericho. According to its excavators, this structure «might be dated slightly before the Twin Palaces» which means, before the reign of Queen Alexandra ( $76-67 B C)^{7}$. The Blocked Rock-Cut Chamber Discovered in 2004 on the Eastern Side of the Esplanade

The entrance of the rock-cut chamber discovered in 2004 on the eastern side of the esplanade (PN 2005.12000) was unfortunately vandalized during the winter 2004-2005 (Fig. 1.7). The excavation of the remaining layers revealed a destruction layer containing major architectural fragments dating to the early second century AD. The layer situated under this destruction level and associated to a wall blocking the entrance of the chamber contained ceramic material dating from the second quarter of the first century AD. Consequently, this blockage of the chamber must be connected to the construction of the main Obodas triclinium dedicated in 20AD. This means that this rock-cut chamber belongs to the earlier complex. The original limits of this chamber can be traced: this 1.53 m high rock-cut room opening towards the west was 2.60 m deep and 2.45 m wide. Topographically, this rock-cut chamber is articulated with the eastern bench of the open-air triclinium, its presence might actually have justified its limited length. We can therefore reasonably assume that this chamber was somehow used in connection to the banquets held on the open-air triclinium.

## The Rock-Cut Chamber Dalman Inv. \# 1296

The excavation of the rock-cut chamber Dalman Inv. \# 1296 (PN 2005.11000) revealed a rectangular chamber of 3.20 m deep by 4.20 m wide, opening towards the north-east (Fig. 1.10). Its maximum height is 1.71 m . A pit situated near the entrance of the cave attests a limited Ayyubid - Mamluk occupation. Under this level, a ca. 0.50 m high abandonment layer was found. The earliest occupation trace discovered in this rock-cut chamber consisted of a few
architectural fragments including a column base and its connected column drum that was reused as a working place (grain mill?). We assume that the secondary wall (all its material consists of reused stones) blocking the entrance of the cave was connected to this early occupation. Traces of the first occupation of the room consisted of a few centimetres of ash layer predating the above mentioned reuse of the artificial cave. The area situated in front of the rock-cut chamber Dalman Inv. \# 1296 (PN 2005.14000 and PN 2006.18000) mainly consisted of several dump layers associated to the use and successive cleaning operations of this chamber as a domestic area. The first reading of the ceramic material seems to indicate that this sector was used during the Roman period, i.e. after the destruction of the triclinium of Obodas. This limited occupation should, therefore, logically be associated with the continuous use of cistern Dalman Inv. \# 1297.

## The Biclinium Nehmé Inv. \# N19

The ceiling of the rock-cut biclinium N19 partly excavated by L. Nehmé in 2001 collapsed during the winter 2004-2005 (PN 2005.16000) (Fig. 1.12 and Fig. 8). The earlier excavated occupation floor contained material dated to the very beginning of the first century AD (0-20AD painted plates). Residual ceramic fragments from the end of the first century BC were found in a basin-niche cut into the northern wall of the chamber.

## The Northern Sector

On the northern sector of the complex, the excavation of a major destruction level has been initiated. It consists of major debris of architectural blocks and fragments, isolated from the collapse of the «Obodas Triclinium» itself. The upper fill contained column drums of several diameters, column bases, at least one upper part of a Nabataean capital, several ashlars, fragments of portable altars and flagstones. This debris is the result of the destruction of a major structure that was apparently closing the cultic terrace on its northern side. Part of this destruction seems to predate ash layers dating from the end of the first century BC. In other areas, a flagstone path

8. The biclinium Nehmé Inv. \# N 19.
seems to have been arranged on its upper part, probably during the utilization period of the main «Obodas Triclinium». Its excavation will be the main objective of the 2008 season.

## The Finds (C. Durand)

In 2005, the ceramic material from the earlier excavation seasons was studied in order to give a general overview of the successive occupations of the complex. The majority of these ceramics come from contexts corresponding to the destruction of the «Obodas Triclinium» and its associated structures, dating to the end of the first century AD - early second century AD. Several earlier contexts were also identified; the ash layer PN 2004.9003 connected to the northern limit of the complex provided the first clear evidence of the presence of the earlier complex referred to in the dedication of the statue of Obodas the god (CIS II 354). Later occupation in the area is also suggested by a few Late Roman cooking pots fragments (third - fourth century AD) in PN 2003.2004. Surface layers also revealed isolated fragments from a Late Roman pilgrim flask probably produced in Aqaba (PN 2004.8000) and the neck of a painted handmade Ayyubid-Mamluk jug (PN 2002.1011). All these later occupations seem to be associated with the cistern that ap-
parently remained in use, despite the destruction of the complex in the early second century AD.

## The Ceramics from the Cistern Dalman Inv. \# 297

In 2003, the rock-cut cistern Dalman \# 297 (Fig. 1.11 and Fig. 9) was partly excavated ${ }^{8}$. It measures 4.60 m by 3.96 m , and is approximately 4.1 to 4.4 m deep. During construction, the sandstone material was extracted through an opening on the upper part of the eastern side of the cistern. Once construction of the cistern was completed, this hole was closed by a wall of which 5 courses are preserved ( 2.40 m by 2.20 m ). The entire surface of the cistern is covered by several hydraulic mortar layers extending up to the ceiling. A 2.20 m by 1.60 m probe was opened in the northeastern corner of the cistern, right under the drain which supplied the cistern with rainwater. Water was collected via a channel running from a small retaining reservoir situated behind the rock ledge under which the cistern was carved. The cistern delivered an impressive quantity of ceramic material that includes some significant finds that will be discussed below.
Stratigraphy: The cistern was found half full of debris.Thehighest0.40mdeposit(PN2003.4001) contained a few architectural blocks, and some

[^26]toration of this pottery assemblage; Marta Zambello drew the artefacts.

ceramic sherds from the second and third centuries AD. The rest of the cistern contained relatively homogeneous fill of mixed sand and clay, with an industrial quantity of pottery sherds (PN 2003.4002, depth: ca.0.5m and PN 2003.4003, depth ca. 1.50 m ). No micro-stratigraphy could be established within this fill during careful excavation of this probe. The ceramic material was very homogeneous in term of chronology, suggesting that the cistern was filled with debris over only a few decades. Moreover, the ceramic sherds are extreme porous, obviously caused by a long stay in water, which suggests that the cistern was still filled with water when the ceramics were dumped.
Typo-chronology: Many of the ceramics from the cistern were extremely well preserved, and were either recovered whole or could be reconstructed. The ceramics include a large variety of forms, some almost unknown in the Nabataean repertoire. All the ceramic categories usually present at a Nabataean site are represented in the cistern material. Most of these were coarse ware pottery, although some Nabataean fine wares were found. The decoration of the few painted vessels (Fig. 10A, B, D) was generally very damaged because of their prolonged stay in water. All of these painted forms can be dated from the end of the first century AD or the beginning
of the second century AD (Schmid 2000: phases $3 b-3 c$ ). Nabataean unpainted fine ware is largely represented (Fig. 10C, F, G, H; Fig. 11D) by many small cups with a vertical rim (Schmid 1996: group ${ }^{8}$; Fig. 10F), plates, small globular pots, jugs and juglets. Here again, the form of this corpus dates to the end of first century or beginning of second century AD. The commonwares provide a similar picture. For instance, most of the ca. 50 identified cooking-pots date to the same period (Fig. 10I), except for a few slightly earlier rim sherds that date back to the end of the first century BC (Stucky 1994: 15-Q, $15-\mathrm{S})^{9}$.

Beyond these chronological considerations, the ceramic material of the cistern Dalman \# 297 is of undeniable typological interest, especially for the first century AD jugs and liquid containers. This category of material is especially well represented and the discovery of several complete jugs allows us to establish a typological profile of these first century AD forms. The first category of jugs, which seems to be the most common, contains a narrow neck with a slightly widened straight rim, without a spout, but with a flat handle attached to the edge, a ribbed pear-shaped body and a ring foot (Fig. 11A, B). These jugs are of variable size. A second type of jug similarly has a pear-shaped

[^27]
10. Fine and Common Nabataean pottery from the cistern Dalman 297.

| Fig. 10 | Inventory ${ }^{\text {o }}$ | Description | Fabric | Diam. <br> (cm) | Parallets | Chronology |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 10-A | $\begin{gathered} \text { PN } \\ 2003.4003 .31 \end{gathered}$ | Painted juglet, traces of dark painting, straight rim, slightly widened, underlined by a small draft | Fine ware, orange, a few small white and grey grits | 5 | Not indexed form NPW ph. 3c. | Beg. $2^{\text {nd }}$ c. A.D. |
| 10-B | $\begin{gathered} \text { PN } \\ 2003.4003 .20 \end{gathered}$ | Globular pot, traces of painted decoration on the shoulder, rouletted pattern on the lower half of the body, ring foot | Fine and hard ware, pink to grey, small white and grey grits | $\begin{array}{\|c\|} 8 \\ 4,5 \text { (foot) } \end{array}$ | See Horsfield 1942: PI. XXVIII-70. NPW ph. 3c | Beg. $2^{\text {nd }}$ c. A.D. |
| 10-C | $\begin{gathered} \text { PN } \\ 2003.4003 .29 \end{gathered}$ | Small globular pot, small vertical rim with bevelled lip, two stripes of vertical rouletted lines on the lower part of the body, flat bottom | Fine ware, orange, a few small white and grey grits | 5 | Schmid 2000: 366 (handles? ph. 3) Schmid 2003: 61-22 (handles?) Khairy 1982: 63 | End $1^{\text {st }}$ c.-beg. $2^{\text {nd }}$ c. A.D. |
| 10-D | $\begin{array}{\|c} \hline \text { PN } 2003.4003 . \\ 43-44 \end{array}$ | Painted plate, partly rubbed out decoration, small vertical rim | Fine ware, orange, a few small white and grey grits | 20 | Schmid 1996: 701 (ph. 3b) | End $1^{\text {st }}$ c. A.D. |
| 10-E | $\begin{gathered} \text { PN } \\ 2003.4003 .08 \end{gathered}$ | Small open pot, widened lip, small bottleneck foot, possible broken handle | Fine ware, pinkishorange, white slip outside and inside (?) | 3.5 | Not indexed form | $\begin{aligned} & \text { End } 1^{\text {st }} \text { c.-beg. } \\ & 2^{\text {nd }} \text { c. A.D.? } \end{aligned}$ |
| 10-F | $\begin{array}{c\|} \text { PN } \\ 2003.4003 .12 \end{array}$ | Small cup with vertical rim, small decorated ring foot | Fine ware, orange, grey core, small white and grey grits | 7.5 | Schmid 1996: 661 Schmid 2000: 59 group 8 (ph. 3b-c) | End $1^{\text {st }}$ c.-beg. $2^{\text {nd }} c$. A.D. |
| 10-G | $\begin{array}{\|c\|} \hline \text { PN } \\ 2003.4003 .24 \\ \hline \end{array}$ | Plate, small vertical rim, small decorated ring foot | Fine ware, pale orange, traces of white slip on the outside of the lip, small white and grey grits | 19 | Schmid 1996: 657 <br> Schmid 2000: 55 <br> group 7 (ph. 3b-c) | End $1^{\text {st }}$ c.-beg. $2^{\text {nd }} c$. A.D. |
| 10-H | $\begin{array}{\|c\|} \hline \text { PN } \\ 2003.4003 .26 \end{array}$ | Plate with vertical rim and small bevelled lip, stripe of vertical rouletted lines on the lip, ring foot | Fine ware, orange, white slip on the outside of the lip, small white and grey grits, calcite | 16 | Schmid 1996: 666 Schmid 2000: 64 group 9 (ph. 3b-c) | End $1^{\text {st }}$ c.-beg. $2^{\text {nd }} \text { c. A.D. }$ |
| 10-I | $\begin{array}{\|c\|} \hline \text { PN } \\ 2003.4003 .01 \\ \hline \end{array}$ | Small cooking pot, unribbed body, bevelled rim | Fine ware, pinkishorange, external white slip, small black and white grits | 7 | Stucky et al. 1994: 16F | Beg. $2^{\text {nd }}$ c. A.D. |
| 10-J | $\begin{array}{\|c\|} \hline \text { PN } \\ 2003.4003 .02 \\ \hline \end{array}$ | Pot with broad mouth, small widened rim, flat foot, slightly ribbed body, small intentionnal hole on the higher part of the body | Fine ware, orange, traces of external white slip, small black and white grits | 9.5 | Schmid 2000: 211 (ph. 3c) <br> See also Tholbecq and Durand 2005: 13-D (painted) | Beg. $2^{\text {nd }}$ c. A.D. |

body, slightly ribbed on the neck, a broad opening underlined by a flat rim turned towards the exterior, and a flat handle attached to the rim (Fig. 11C). These two types of jugs present the characteristic Petra orange ware. According to the associated material, they should date to the end of the first century or beginning of the second century AD. The cistern material contains a third jug type whose form is particularly underrepresented in the Nabataean ceramic repertory (Fig. 12A, B). This jug is character-
ized by a high neck of variable diameter, and a carinated, broad and flattened body, with a single broad and grooved handle. Ten of these jugs were found, whose bodies have a diameter varying between 22 and 35 cm . Fragments (necks and handles) of similar jugs from other Nabataean sites were previously published. In Petra, some examples have been found in azZanṭūr (Schmid 2000: $\mathrm{n}^{\circ}$ 314), and in a cistern in theWādì Farasa (Schmid and Barnasse 2004: 333ff. and especially Schmid 2005: 77,

11. Nabataean jugs from the cistern Dalman 297.
fig. 18) ${ }^{10}$. The Nabataean oil press from Khirbat adh-Dharịh delivered a similar jug neck ${ }^{11}$.

This third category of jugs is similar to the category of the lagynoi characteristic of the Hellenistic repertoire that appears in the third century BC. Interestingly enough, one imported painted fragment of a similar Hellenistic lagynos was discovered in one of the earlier levels of Parr's excavation of downtown Petra (Parr 1965: 531, Pl. 132.2). These lagynoi are linked to quite particular uses in the Greek world, like that of the Dionysiac festival of the lagynophoria and its ritual banquets, which occurred in Alexandria in the third century BC, and during which each guest was supposed to bring his own lagynos (cf. Athenaeus, Deipn. 276a ; Bessi 2005: 242-243). This could suggest an Alexandrian origin to its appearance in the Nabataean ceramic repertory ${ }^{12}$. Therefore, the discovery of Nabataean lagynoi in a major first century AD dump from the «Obodas Chapel» banqueting hall complex is of a particular interest.

The corpus of liquid containers also includes the well-known spouted strainer-neck jar/jug characteristic of the Green or Cream Ware category (Fig. 13) ${ }^{13}$. They are characterized by their soft porous ware, greenish to pinkish-white in

| Fig. 11 | Inventory ${ }^{\circ}$ | Description | Fabric | Diam. (cm) | Parallels | Chronol ogy |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 11-A | $\begin{array}{\|c\|} \text { PN } \\ 2003.4003 .03 \end{array}$ | One-handled jug, no spout, straight rim, ribbed body, small ring foot, flat handle attached to the edge | Fine ware, orange, external white slip, grey and white grits | 6 | Not indexed form. | $\begin{gathered} \text { Beg. } 2^{\text {nd }} \mathrm{c} . \\ \text { A.D.? } \end{gathered}$ |
| 11-B | $\begin{array}{\|c\|} \text { PN } \\ 2003.4003 .16 \end{array}$ | One-handled jug, no spout, straight rim, ribbed body, small ring foot, flat handle attached to the edge | Fine ware, orange, external white slip, grey and white grits | 5 | Not indexed form. Same type as $n^{\circ}$ 11-A but a little smaller. | $\begin{gathered} \text { Beg. } 2^{\text {nd }} \mathrm{c} . \\ \text { A.D.? } \end{gathered}$ |
| 11-C | $\begin{array}{\|c\|} \text { PN } \\ 2003.4003 .32 \end{array}$ | Pear-shaped one-handled jug, slightly ribbed neck, ring foot, flat widened rim, traces of tool (or scratching ?) on the lower part of the body, flat handle | Fine ware, orange to grey, external white slip, small grey and white grits | 8 | Tholbecq and Durand 2005: 15-F (smaller) Schmid 2000: 343, 344 Murray and Ellis 1940: PI. IX-8, XXXI-128. | $\begin{aligned} & \text { End } 1^{\text {st }} \mathrm{c} .- \\ & \text { beg. } 2^{\text {nd }} \mathrm{c} . \\ & \text { A.D. } \\ & \text { (ph. } 3 \mathrm{~b}-\mathrm{c} \text { ) } \end{aligned}$ |
| 11-D | $\begin{array}{\|c\|} \text { PN } \\ 2003.4003 .04 \end{array}$ | Spouted one-handled jug, widened rim, underlined by a groove, five stripes incised under the lip, rouletted pattern on the body, bifid handle, possible ring foot (uncertain) | Fine ware, orange, a few small grey and white grits | $\begin{gathered} 5 \\ 6.5 \\ \text { (foot) } \end{gathered}$ | Close to Khairy 1982: 74 <br> Murray and Ellis 1940: Pl. XXXII-137. | End $1^{\text {st }} \mathrm{c}$. A.D. ? |

10. We thank S. Schmid to have carried this information to our attention.
11. Unpublished. Information kindly provided by the Jor-danian-French Mission of Khirbat adh-Dharịh (cour-
tesy Zeidoun al-Muheisen, François Villeneuve).
12. For lagynoi in Gerasa: Kehrberg 2004: 195.
13. Cf. table, fig. 14.

14. Lagynoi type jugs from the cistern Dalman 297.

| Fig. 12 | Inventory $\mathbf{n}^{\text {o }}$ | Description | Fabric | Diam. (cm) | Parallels | Chronology |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 12-A | $\begin{gathered} \mathrm{PN} \\ 2003.4003 .48 \\ \hline \end{gathered}$ | Jug, lagynos type, high vertical collar with small stripe of incised horizontal lines, flat widened rim, one broad ribbed handle, very low and wide body, ring foot | Fine ware, orange, external white slip, small white and grey grits | $\begin{gathered} 7 \\ \text { (neck) } \\ 22 \\ \text { (body) } \end{gathered}$ | Close to Schmid 2000: 314 and 334 (necks, ph. 3b) <br> Schmid 2005: 77, <br> fig. 18 <br> Dharih: inv. DH 87 V10 A24.14 (unpublished) | End $1^{\text {st }}$ c.-beg. $2^{\text {nd }} c$. A.D. |
| 12-B | $\begin{gathered} \mathrm{PN} \\ 2003.4003 .53 \end{gathered}$ | Jug, lagynos type, narrow neck with a widened rim, incised line on the base, small draft on top, ribbed handle, ring foot | Orange ware, white and grey grits, external white slip | 5,5 (neck) 25 (body) 9 (foot) | Schmid 2000: 351 (neck, ph. 3b) Horsfield 1942: PI. X-30 | End $1^{\text {st }}$ c.-beg. $2^{\text {nd }} c$. A.D. |

colour. Several physicochemical analysis programs showed that the clay used was very different to that of the Petra productions (Schneider 1996: 138-139; Bedal 1998: 353), but the exact origin of this pottery production remains unclear ${ }^{14}$. The reason for its large distribution within the Nabataean territory is still a matter of discussion ${ }^{15}$. This jug neck is thus one of the rare ceramic fragments extracted from the cistern that were not produced in Petra or in its immediate surroundings. Other non-local forms include two tiny Eastern sigillata sherds that are too small for identifying any major characteristic.

A last category of ceramics that deserves our attention is that of the ollae perforatae, recently identified in Petra by Macaulay-Lewis. At least two specimens were discovered in the cistern

Dalman \# 297. They are small open containers that have a small intentionally bored hole in the bottom (Fig. 14A, B). The discovery of several containers of this type in the Petra Garden Pool Complex parallel very similar examples found in various Roman gardens that have been identified as planting pots (Macaulay-Lewis 2006; in Jericho, Yellin and Gunneweg 1989). Our artefact illustrated in Fig. 14A is particularly characteristic of these flowerpots (MacaulayLewis 2006: 160 , fig. 1). Nevertheless, the presence of ollae perforatae in our context is surprising and might suggest secondary uses for these small containers, for instance as filters of funnels.

The ceramic material from the probe opened in 2003 in the cistern Dalman \# 297 is interesting in several ways. The discovery of this partial

[^28][^29]
but coherent pottery assemblage raises several questions. Is our knowledge of the Nabataean pottery chronology precise enough to determine the duration of the deposit, since the material seems to constitute a tight chronology from the end of first century / beginning of second century AD? So far, one is tempted to consider that this material results from continuous use of the gathering complex by one or two generations of worshippers around the end of the Nabataean
independent kingdom. Similarly, we hardly understand why intact containers would have been dumped in this cistern, especially if it remained in use ${ }^{16}$. Similar behavior is nevertheless evidenced in a cistern within Wādi Farasa, whose bottom was filled with complete Nabataean ceramics from the first century AD (Schmid and Barnasse 2004: 333-334; Schmid 2005: 76-77). The excavation of the Jabal Numayr cistern will continue in 2008.

14. Ollae perforatae from the cistern Dalman 297.

| Fig. 14 | Inventory | Description | Fabric | Diam. (cm) | Parallels | Chronology |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 14-A | $\begin{array}{c\|} \text { PN } \\ 2003.4003 .18 \end{array}$ | Small jar, string cut bottleneck foot, irregular, straight rim slightly widened, small hole in the bottom | Orange to grey ware inside, orange outside, white external slip, black and white grits | 5.5 | Macaulay-Lewis 2006: 160 , fig. 1 Bestock 1999: 245 , fig. 5 (no hole) Horsfield 1942: Pl. XXI-156 (no hole) | End $1^{\text {st }}$ c.-beg. |
| 14-B | $\begin{array}{\|c\|} \text { PN } \\ 2003.4003 .19 \end{array}$ | Small globular pot, one handle, string cut bottleneck foot, small hole in the bottom | Orange ware, gritty, white and grey grits | 6 | Close to Horsfield 1942: PI. XVIII129 (no hole) | End $1^{\text {st }}$ c.-beg. $2^{\text {nd }} \text { c. A.D. }$ |

## Specialized Analyses

Lamps and oil: A sample of ten first century AD Nabataean lamp fragments was given to the Laboratoire Nicolas Garnier for analysis of their oil residues. The preliminary analysis confirms that the residue is extremely well preserved through favourable conservation conditions. The results indicate among other things the presence of pure sesame oil in almost a third of the sampled lamps ${ }^{17}$.

Micro-rests and paleogeography: Archaeobotanical evidence was used to provide a glimpse on the natural and cultivated environment of the «Obodas Chapel» complex. The analysed archaeobotanical samples come from the second to the first century BC ash layer PN 2007.23017. Due to their interest, it was decided to publish the first preliminary results of Char-
lène Bouchaud's analysis below ${ }^{18}$.
Analyse des Macro-Restes Végétaux de la «Chapelle d'Obodas» (Charlène Bouchaud)

L'échantillon de macro-restes végétaux PN23017 a été prélevé en juillet 2007. Le sédiment provient d'une couche cendreuse, antérieure ou contemporaine à un premier état du triclinium de plein air (voir discussion ci-dessus). La céramique associée date cette couche de l'époque hellénistique tardive. Cette couche cendreuse contenant des macro-restes végétaux et des ossements animaux pourrait correspondre à un rejet de foyer témoignant d'une activité de cuisson liée à la réalisation de banquets. L'étude s'attache ici à l'analyse d'un seul échantillon. La principale question est donc d'expliquer la présence des espèces identifiées en lien avec la
17. N. Garnier, Chr. Chambon, forthcoming. Let's add that C. Tomé (Bordeaux) started the analysis of the animal bones found in the first century AD kitchen associated with the «Obodas triclinium» (see Thol-
becq and Durand 2005).
18. Charlène Bouchaud, Laboratoire d'archéobotanique de la MAE de Nanterre.
structure fouillée et de les replacer dans le contexte environnemental du site de Pétra à l'époque nabatéenne. Les données archéobotaniques de la région pour cette même période sont rares et disparates. Cette analyse et les études ponctuelles déjà menées ${ }^{19}$ formulent les premières bases de réflexion scientifique concernant l'économie végétale et l'évolution paléoenvironnementale à Pétra.

Du fait de la préservation par carbonisation des graines et des charbons présents dans l'échantillon, les 25 litres de sédiment prélevés ont été traités par flottation. Les macro-restes végétaux récupérés ont été étudiés en France au laboratoire archéobotanique de la MAE de Nanterre. L'échantillon a été examiné à la loupe binoculaire une première fois pour séparer les restes carpologiques (graines et inflorescences végétales) et anthracologiques (charbons de bois). Les restes carpologiques ont ensuite été observés à la loupe binoculaire, de grossissement x 10 à x 60 , et identifiés grâce à la collection de références actuelles. Les restes anthracologiques ont été observés au microscope à réflexion de grossissement x 100 à x 500 selon trois coupes - en transversale, radiale et tangentielle - et identifiés grâce aux atlas anthracologiques ${ }^{20}$ et à la collection de références actuelles. Les graines et les charbons trouvés étaient en très mauvais état de conservation, sûrement à cause d'une forte carbonisation. Les plupart des graines étaient éclatées et les charbons étaient petits et vitrifiés, ce qui a parfois rendu l'identification difficile ${ }^{21}$.

## Analyse Anthracologique

L'analyse des charbons de bois peut fournir des informations sur l'histoire de la végétation ligneuse autour du site, en supposant que le bois retrouvé sur le site a été ramassé à proximité du site et que la sélection n'a pas été trop forte ${ }^{22}$. Ces charbons de bois ne reflètent pas directement la couverture végétale, mais indiquent seulement les espèces utilisées par l'homme. Pour cette étude, il est important de garder à l'esprit que la prise en compte d'un seul échantillon limite fortement l'interprétation environnementale.

Deux cents fragments de charbons de bois
ont été observés et huit taxons ont été identifiés. Les résultats sont présentés dans le tableau 1.
Tableau 1. Résultats de l'analyse anthracologique.

| Analyse Anthracologique |  |  |
| :--- | :--- | :--- |
| Taxons | Pistacia spp. | 37 |
| Anacardiceae | cf. Pistacia spp. | 98 |
|  | type Salsola sp. | 1 |
| Chenopodiaceae | Cf. Euphorbia sp. | 1 |
| Euphorbia | Quercus sp. | 1 |
| Fagaceae |  | 5 |
| Cf. Leguminosaceae |  | 4 |
|  | Ccacia sp. | Clea europea L. |
| Oleaceae | 1 |  |
| Rosaceae | Prunus dulcis/persica | 1 |
| Cf. Rubiaceae |  | 1 |
| Monocotylédone |  | 11 |
| Indéterminé |  | 39 |
|  | Total | 200 |

L'échantillon est dominé par le pistachier, Pistacia spp. Il est difficile de pousser l'identification jusqu'à l'espèce mais il semble que plusieurs espèces de pistachiers soient présentes. Actuellement, on trouve sur le site de Pétra le pistachier atlantique, Pistacia atlantica L. et le pistachier thérébinthe, Pistacia palaestina L. Ce taxon, fréquemment trouvé dans les assemblages archéobotaniques du Proche-Orient est caractéristique d'une végétation de forêt-steppe. La découverte d'un fragment de chêne, Quercus sp., confirme cette hypothèse de l'existence d'espaces boisés ouverts dans les environs de Pétra.

Actuellement, à Pétra, la végétation ligneuse appartenant à l'ensemble phytogéographique de la forêt-steppe est très limitée. On trouve quelques pistachiers et amandiers sauvages, ainsi que des chênes verts subsistant en hauteur le long de la route entre Pétra et Beidha. La construction du chemin de fer du Hijaz au début du XXe siècle a fortement contribué à la diminution des espèces boisées ${ }^{23}$ mais la pression anthropique exercée sur les plantes ligneuses n'est pas récente. Les études anthracologiques sur les sites préhistori-

[^30]ques en Syrie et en Jordanie ${ }^{24}$ indiquent que la végétation boisée était beaucoup plus répandue par rapport à sa distribution actuelle. Ce phénomène serait a priori le résultat de l'action humaine sur son milieu plutôt que la conséquence de changements climatiques. Il est fort probable que le couvert arboré de type forêt-steppe était plus important à Pétra à l'époque nabatéenne mais la dégradation végétale progressive est difficile à suivre car pour l'instant les données anthracologiques sont trop ponctuelles pour observer les variations du couvert forestier sur une longue échelle de temps.

La présence d'Acacia sp. et d'un type de Chenopodiaceae dans l'échantillon indique l'utilisation d'espèces caractéristiques d'un milieu steppique. Ces plantes poussent facilement le long des wadis à sec de basses altitudes et sont bien adaptées aux sols sableux. À proximité de la Chapelle d'Obodas, le Wadi Numayr peut être un endroit adéquat pour la croissance de l'acacia et de certains types de chenopodiacées.

L'unique fragment d'olivier, Olea europea L., provient sûrement d'olivier cultivé. Cet arbre est un des premiers taxons fruitiers domestiqués au Proche-Orient et il revêt un rôle économique important dès l'Âge du Bronze. Ses demandes en eau ne sont pas très importantes et les flancs rocheux des monts de Pétra se prêtent bien à sa culture. Sa présence peut souligner l'existence de pratiques horticoles et l'utilisation des déchets de taille comme bois de feu. L'identification du Prunus amygdalus/persica pose problème. À partir de simples critères anatomiques, il
est difficile de faire la différence entre l'amandier, Prunus amygdalus L. et le pêcher, Prunus persica L. L'amandier pousse à l'état sauvage à Pétra et cet arbre, avec le pistachier et le chêne, est caractéristique d'une formation végétale de forêt-steppe poussant sur les hauteurs du site ${ }^{25}$. Le pêcher est une espèce venant de Chine introduite au Ier s. av. J.-C. au Proche-orient via la Perse ${ }^{26}$. Il peut croître dans les zones protégées et irriguées de Pétra et dans ce cas, sa présence sous forme de charbon de bois atteste de l'existence d'activité horticole sur ou à proximité du site de Pétra. Les taxons restants, Cf. Euphorbia sp., Cf. Rubiaceae et les monocotylédones regroupent une diversité spécifique trop large pour qu'ils puissent être reliés à un ensemble floristique précis (Tableau 2).

## Analyse Carpologique

Soixante-quinze restes de graines ont été identifiés. Elles sont réparties en sept taxons différents et représentent des espèces céréalières, des légumineuses, des restes fruitiers et une adventice (Tableau 2).

## Les Restes Céréaliers Cultivés

Les céréales représentent la majorité des restes carpologiques de cet échantillon. Malheureusement, l'état très fragmentaire des caryopses n'a pas permis de reconnaître ces céréales au-delà de la famille, mais la taille des grains permet de savoir qu'il s'agit de plantes cultivées. Seuls deux caryopses d'orge, Hordeum sp., ont été identifiés au genre. Dans la majorité des

Tableau 2. Résultats de l'analyse carpologique

| ANALYSE CARPOLOGIQUE |  |  |  |
| :--- | :--- | :--- | ---: |
| Taxons |  |  | Fgmt |
|  | Cerealia |  | 55 |
| Graminae | Hordeum sp. |  | 2 |
|  | Pisum sativum L |  | 1 |
| Fabaceae | Ficus carica L. |  | 6 |
| Moraceae | Cf. Fumaria sp. | Fgmt | 1 |
| Papaveraceae | Ziziphus sp. | 9 |  |
| Rhamnaceae | Vitis vinifera subsp. vinifera L. |  | 1 |
| Vitaceae |  | 75 |  |

24. Willcox 2003.
25. Crawford 2006.
26. Willcox 2002.
analyses archéobotaniques du Proche-Orient, l'orge est numériquement la plus fréquente des céréales, suivie du blé. On la considère souvent comme une plante fourragère, bien qu'il est sûr qu'elle fasse aussi partie des produits alimentaires destinés à l'Homme.

Les Légumineuses Cultivées
Une seule attestation de pois cultivé, Pisum sativum L., représente le groupe des légumineuses. Comme l'orge, le pois est très bien représenté archéobotaniquement sur les sites du ProcheOrient. Il fait partie des premières légumineuses domestiquées, accompagné des lentilles, Lens culinaris L., de l'ers, Vicia ervilia (L.) Willd. et des fèves, Vicia faba L.

## Les Restes Fruitiers

Il est généralement difficile de distinguer les fruits spontanés issus de la cueillette et les fruits cultivés à partir de critères morphologiques. La question est donc de savoir si la graine de Ziziphus sp., les akènes de figues et le pépin de raisin trouvés viennent de plants cultivés ou sauvages. La graine de Ziziphus sp. a une origine locale certaine. L'identification de l'espèce n'est pas possible mais Ziziphus spina-christi L., ou épi-ne-du-christ, pousse actuellement à Pétra et peut être une proposition d'identification. Cet arbre, de la famille du jujubier, croît de façon spontanée à basses altitudes, le long des wadis, sur des terrains rocailleux, et donne des fruits comestibles. On peut penser que la découverte de cette graine est le résultat d'une activité de cueillette locale. D'un point de vue phytogéographique, la vigne sauvage est largement distribuée des côtes atlantiques françaises et espagnoles jusqu'au Tadjikistan, dans des milieux humides et frais, et elle est absente de la Jordanie actuellement ${ }^{27}$. Le figuier sauvage s'étend autour du bassin méditerranéen et pousse principalement aux basses altitudes le long des cours d'eau. Quelques formes ensauvagées de figuier poussent le long du Siq aujourd'hui. L'état actuel des recherches ne permet pas de savoir si la vigne et le figuier sauvages poussaient à Pétra à l'époque nabatéenne mais ces deux arbres fruitiers font partie du pre-
mier groupe des arbres fruitiers domestiqués au Proche-Orient, et ce dès le Néolithique et la présence de culture fruitière à l'époque nabatéenne à Pétra est tout à fait envisageable. Des travaux morphométriques menés par l'Université de Bâle (Suisse) sur des pépins de raisin trouvés sur le site d'az-Zantūu à Pétra montrent que ces pépins proviennent a priori de raisins cultivés. De plus, la découverte de pressoir à raisin d'origine nabatéenne dans la région de Baydha, près de Pétra, confirme indirectement l'existence de la viticulture ${ }^{28}$ à Pétra. La présence d'akènes de figue carbonisés de l'époque nabatéo-romaine à Khirbat adh-Dharịh ${ }^{29}$ semblant provenir de variétés sélectionnées donne un argument supplémentaire pour supposer une culture du figuier à ces époques dans la région.

## Les Plantes Sauvages

L'échantillon étudié ne contient qu'une seule graine sauvage de la famille de la fumeterre, cf. Fumaria sp. Dix-huit espèces sont mentionnées dans la flore de Mouterde ${ }^{30}$. Elles sont liées à une activité humaine, plutôt dans des contextes de type rocheux ou sableux. Cette graine appartient probablement au cortège d'adventices accompagnant les cultures ${ }^{31}$. Elle a pu être récoltée en même temps que les plantes cultivées et se retrouver dans le même contexte de dépôt.

## Discussion

L'échantillon prélevé lors de la fouille de la chapelle d'Obodas est issu d'un ensemble résultant d'activité(s) culinaire(s) sûrement liée(s) à la présence d'un triclinium. Le bois de feu nécessaire pour ces opérations semble avoir été ramassé dans les environs et témoigne de l'utilisation de plusieurs milieux : la forêt-steppe, les espaces steppiques et éventuellement des territoires horticoles. Les restes carpologiques offrent un panorama assez complet des plantes alimentaires consommées: des céréales et des légumineuses, quelques fruits... Ce dépôt ou ces dépôts de matières carbonisées semblent ainsi correspondre assez bien aux rejets liés à la consommation de nourriture, soit pendant la préparation, par accident ; soit suite aux repas,

[^31]afin d'éliminer les derniers restes. Il est difficile d'appréhender la façon dont les Hommes ont acquis ces biens alimentaires. Les plantes cultivées proviennent de culture locale ou d'importation ? Les espaces agraires et horticoles ne sont pas bien connus à Pétra. Il est cependant possible d'envisager des cultures locales sur le site, avec ou sans irrigation selon les espèces. Il est absolument nécessaire de poursuivre ces analyses archéobotaniques, en multipliant les prélèvements de différents contextes et de différentes périodes, afin d'enrichir le corpus de données et d'élargir les problématiques dans l'espace et le temps.

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# THE FIRST PRELIMINARY REPORT OF THE SOUTH JORDAN IRON AGE II SURVEY AND EXCAVATION PROJECT (SJIAP): THE 2004, 2005 AND 2006 SEASONS OF EXCAVATION AT KHIRBAT AD-DABBA 

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## Introduction

This report presents the results of the 2004, 2005 and 2006 seasons of excavation at the late Iron Age (seventh and sixth century BC) site of Khirbat ad-Dabba (Fig. 1), which is situated in the Wādi al-'Arjā on the south Jordanian Plateau between ash-Shawbak and Wādì Mūsā. The site was first identified by the Dana Archaeological Survey directed by George Findlater (Findlater 2000).

Khirbat ad-Dabba is approximately 4.6ha in size and is situated at the highest point of a long spur surrounded on all sides by deep wadi cuts feeding into the Wādī al-'Arjā. The site comprises a large circular casemate wall enclosure, which intersects with a later rectilinear casemate wall system. The walls are built of large flint blocks up to $2.5 \times 1 \times 1 \mathrm{~m}$ in size and are preserved up to five or six courses in places. The walls surround substantial stone-built structural remains including at least two large-scale rectilinear buildings. Within the context of the Iron Age sites surrounding it, Khirbat ad-Dabba represents a major site in terms of size and complexity and provides important insights into the lifeways and subsistence patterns of late Iron Age communities in the area.

## Project Aims

The South Jordan Iron Age II Project (SJIAP) seeks to enhance our understanding of the nature of late Iron Age settlements in southern Jordan as a springboard for reassessing traditional models of late Iron Age society in the region.

Current models focus on the existence of ethnic groups, the very existence of which derives
directly from historical sources. By thinking in terms of bounded, homogenous ethnic groups, such as the 'Edomites' in the case of southern Jordan, explanatory frameworks have been severely constricted. This approach has led to a circular, self-referential use of historical and archaeological evidence to produce a history of Iron Age southern Jordan. Traditional archaeological theory - which associates material culture with ethnic groups and relies on frameworks provided by literary evidence in which to place archaeological data - has been successfully challenged in other areas of archaeology but remains unquestioned in the study of Iron Age Jordan.

In addition, recent studies have criticised the interpretation of national or ethnic material culture groups in Iron Age southern Jordan, based on the increasing recognition of regional variation in the Iron Age ceramics from this area (Bienkowski 2001a, 2001b; Whiting 2007). Furthermore, it has been demonstrated that the diverse patterning of ceramic use in Iron Age southern Jordan reveals that, in as much as pottery is indicative of social practices, particular styles of pottery were integrated within local Iron Age social practices in a variety of ways, with sites and their inhabitants participating differently in the available material culture (Whiting 2007). This implies that we must think in terms not of a homogenous Iron Age 'culture' but of an Iron Age world that encompassed the coexistence of diverse communities and lifestyles, from the standpoint of which particular types of pottery could be drawn upon to greater or lesser degrees.

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1. Plan of Khirbat ad-Dabba and main areas of excavation.

In line with these recent developments in Iron Age research on southern Jordan, SJIAP aims to provide a suitable dataset with which to explore these new ideas in more detail.

## Fieldwork Strategy and Methods

In order to pursue these aims, the fieldwork strategy had a double emphasis, focusing on the one hand on the excavation of Khirbat ad-Dabba, as well as the surface survey of a $400 \mathrm{~km}^{2}$
area surrounding the site based on aerial photographs and satellite imagery (Fig. 2). The results of the survey were mapped using GIS, with an emphasis on correlating this data with topographical, geological, hydrological, climatological, and vegetational information to allow detailed investigation of landscape use through time, especially with regard to the Iron Age II period ${ }^{2}$.

The combined use of excavation and sur-

2. Map of the SJIAP survey area showing the location of Khirbat ad-Dabba.
2. This report presents the preliminary results of the excavations at Khirbat ad-Dabba, the surface survey and GIS data will be published in a separate preliminary re-
port. Full integration of both datasets and their implications will be presented in the final report.
vey was to allow a macro-scale (regional) and micro-scale (site-by-site) approach to enable a detailed contextual analysis of the dynamics of individual sites and their local environs to be undertaken. By combining different scales of analysis, the project not only investigates the nature of economic and social structures at individual sites, but places them within a regional context. As a result, this research has implications for modelling late Iron Age society on both a local and a regional scale. At a local scale, the research investigates the nature of Iron Age lifeways at individual sites in southern Jordan. On a regional level, this research offers the opportunity to evaluate new and alternative models for understanding the nature of late Iron Age society in the southern Levant.

With these aims in mind, two areas of excavation were opened at Khirbat ad-Dabba to target specific areas of archaeological interest. The excavation of these areas was also determined to a large extent by the relative lack of structural collapse and unstable wall remains, which formed a hazard for excavation across large parts of the site. The western sector of the site, Area A, was excavated as Trenches A1 to A4 (Fig. 3). The eastern sector of the site, Area B, was sounded as Trenches B1-B3 (Fig. 3).

Area A revealed well-preserved architecture and associated floor surfaces with excellent finds relating to both the round and the rectilinear casemate wall systems. Area B revealed clear domestic structures with associated floor surfaces and superb finds, as well as valuable evidence for the use of external spaces.

Following removal of topsoil, the excavation and recording of definable archaeological layers and features followed the system of single context recording, according to the system established by the Museum of London Archaeology Service (Westman 1994), with minor alterations. A total station was used to map the site and the excavated areas. Soil samples for flotation were taken from all definable features such as hearths, pits, floors, and $t \bar{a} b \bar{u} n(\mathrm{~s})$. Samples of all floors were also dry-sieved using 5 mm screens.

## Architecture and Stratigraphy

Trenches A1 and A2 ${ }^{3}$ (SA)
In 2004, two test trenches were opened to investigate the depth of deposit and to establish the date of the major structural features on the site. Trench A1 was positioned across a section of the rectilinear casemate wall system (Fig. 3). A second, smaller, probe Trench A $2^{4}$ was located against the interior face of the circular casemate wall (Fig. 3).

Trench A1 revealed 2 parallel walls forming an outer [1] and inner [2] casemate wall. These two walls were separated into casemate rooms by a dividing wall [3]. The interior spaces bounded by this casemate structure were formed by long walls running into the interior of the site (a segment of which was excavated as wall [4]), forming a continuation with the casemate dividing walls and creating a series of long, rectilinear rooms (see Fig. 3).

After removal of topsoil, the section of casemate room that was excavated revealed large structural tumble in a matrix of light brown sandy soil. This overlay a compact earth surface [8] overlying bedrock. The area external to the outer casemate wall [1] revealed a similar sequence of deposits, except that after the removal of the tumble deposit, a compact plaster deposit was found overlying bedrock. The plaster did not form a smooth, flat surface and may therefore have formed some kind of bonding for the foundation of the walls rather than an occupational surface. The ceramics from both surfaces provide a secure Iron Age date for the walls.

## Trench A3 (JV)

In 2005, Trench A3 ${ }^{5}$ ( 7 x 4 m ) was opened to investigate the circular casemate wall and the interior space it enclosed (Fig. 4). The placement of the trench was determined by the location of exploratory Trench A2 from the 2004 season (see above) and by the location of visible structural remains from the surface.

The massive circular outer casemate enclosure wall [24] appears to have been the first structure built in this part of the site and was visible prior to excavation. Its maximum width

[^33][^34]
3. Plan of the 2004, 2005 and 2006 excavation trenches.


## 4. Plan of Trench A3.

is 4.55 m . Its outer face was constructed of large, well-hewn rectangular blocks, the largest one measuring $2.13 \times 0.48 \times 0.60 \mathrm{~m}$. These blocks all lay above ground in the north-western and western part of Trenches A3 and A4. The inner face consisted of stones measuring $20-30 \mathrm{~cm}$ in diameter, but the central part consisted of large flat rectangular slabs of roughly hewn stone, forming a middle wall face and measuring up to $0.82 \times 0.61 \mathrm{~m}$. The space between the outer and middle faces was filled with rubble and smaller stones. It is possible to see circular wall [24] as consisting of two components: an inner wall with large rectangular slabs on the outside, reinforced in its north-western part by another parallel stretch of much larger rectangular blocks.

Following the removal of topsoil in Area A3, the tops of walls emerged dividing the area into 4 separate rooms. Rooms 3 and 4 represented the outer casemate rooms forming part of the casemate wall structure (Fig. 4). They were all bounded by a massive, outer casemate wall [24] and by a smaller, interior wall [26] that ran parallel to the outer casemate wall. The rooms were divided by a small wall [29], running at rightangles between the outer and inner casemate walls. Radiating from wall [26] was straight wall [16], which extended from wall [26] towards the settlement's centre. This wall divided the interior space enclosed by the casemate wall into

2 rooms (Rooms 1 and 2). All the walls were founded on bedrock. Doorway [28] was placed in wall [26] allowing access between the outer and inner casemate rooms. The doorway was blocked in antiquity.

The sequence of deposits in the outer casemate Rooms 3 and 4 was identical. The floor of all these rooms appears to have been bedrock [22]. Just above this was a deposit of heavily mottled fill, consisting of lenses of very loose ash with charcoal inclusions interspersed with dense structural rubble, burnt mudbrick and domestic refuse. This deposit was an intentional fill or packing of the rooms, which bonded together external wall [24] and internal wall [26] to create a single massive enclosure wall measuring 4.55 m in width. It coincided with the doorways being blocked at the time of filling.

Rooms 1 and 2 represented internal rooms of the site enclosed by the circular casemate wall system. Similar to outer Rooms 3 and 4, the sequence of deposits in the inner rooms was identical. They were both founded on bedrock [22]. Just above this was a compact surface deposit of grey ashy material with thick lumps of whitegreyish plaster [20] and [25]. This layer was rich with artefacts including pottery vessels, figurines, and ground stone objects flattened on the surface in Room 1 and two large storage jars with stamped handles crushed in situ adjacent to
wall [16] in Room 2 (see Fig. 11.7). The highest concentration of these artefacts came from the interface between the ashy surface layers [20] and [25] and tumble and rubble deposit [17] and [18] above it. This suggests that the artefacts on the interface were lying in place at the time of abandonment. The ash layer was sealed by tumble deposit [17] and [18] which comprised of two discrete layers. The lower one consisted of architectural rubble and small cobbles while the upper one consisted of architectural tumble with much larger boulders. These two layers are deposits suggesting collapse after abandonment. Rooms 1 and 2 appear to be contemporaneous, based on the uniformity of their deposits. The same applies to Rooms 3 and 4.

## Trench A4 (MM)

In 2006, Area A3 was expanded by Trench A4 ${ }^{6}$ ( $10 \times 7 \mathrm{~m}$; Fig. 5), which was placed immediately adjacent to Trench A3. The architecture formed a continuation of the findings in Area A3 with a series of outer casemate rooms (Rooms $1-3$ ) surrounding three interior spaces (Rooms 4-6).

The sequence of deposits in Trench A4 was also similar to that in Area A3. The floor of the outer casemate rooms was bedrock, above which was an intentional deposit of heavily mottled fill, consisting of lenses of very loose ash with charcoal inclusions interspersed with dense structural rubble, burnt mudbrick and domestic refuse. The interior Rooms 4-6 were also founded on bedrock, above which a compact surface deposit of grey ashy material with thick lumps of whitegreyish plaster [36] and [18] was present. Although producing less spectacular finds than the surfaces in Trench A3, Iron Age ceramic sherds were found trampled flat into the upper surface of this deposit as well as a worked Tridacna gigas (giant clam) shell (see discussion of small finds below; Fig. 11.8). Three doorways were found providing access between Rooms 1 and 4, Rooms 4 and 5, and Room 1 to the north.

In the north-western corner of Room 5, a stone-built structure [27] was present. It was filled with very dark ash and burnt pottery and was constructed directly above bedrock. Sur-
rounding this installation, a white greyish deposit forming a hard compact layer had accumulated from bedrock into a 40 cm thick layer.

Feature [17] abutted the eastern face of interior casemate wall [3] / [47]. It sloped upwards towards the north-west, and consisted of roughly hewn rectangular blocks laid in alternate courses of headers and stretchers. It is tempting to see it as a ramp or, possibly, a staircase. Structure [17] was contemporary with floor [36] since this surface lapped up against [17].

Feature [12] was a curving structure parallel to walls [3] / [47] and [24] and was constructed of roughly square blocks. It was disturbed by the digging of a foundation trench [42] for Feature [40], a structure of unknown function built of haphazardly placed stone blocks of varying sizes.

## Trench B1 (JF)

In 2005, excavations were undertaken in Trench B1 ${ }^{7}(5.5 \times 6.0 \mathrm{~m})$ to investigate an area thought to represent a possible entrance to the site (Fig. 6). Walls 1, 2, 3 and 5 were visible on the surface and divided the trench into three distinct spaces: Room 1, Room 2, and an external area between these rooms and the north baulk of the trench.
Room 1: Room 1 was defined by Walls [1], [2], [3] and [4]. Following the removal of topsoil, a layer of rubble packing [6] dating to the Nabataean period was excavated sitting on a series of Iron Age surfaces and associated deposits. The latest surface [14] had been cut in places by three shallow cuts [15], [16] and [17] in the fills of two of which were found a clay bovine figurine (see discussion of small finds below; Fig. 11.11) and a copper-alloy fibula (idem; Fig. 11.3).

Surface [14] overlay an earlier surface [22], separated by a thick ashy deposit [19]. The ashy deposit had accumulated from $t \bar{a} b \bar{u} n$ [21], which sat on surface [22]. Surface [22] was very thin, and very quickly bottomed onto virgin soil [23], which in turn overlay bedrock [24]. Walls 1, 2, 4 and 6 all sat on either virgin soil or bedrock, depending on the slope of the bedrock and the shallowness of virgin soil.
Room 2: Room 2 was located west of Room 1,

[^35]

## 5. Plan of Trench A4.

and was bounded by Walls [2], [5], [10] and [3]. A doorway between Wall [2] and Wall [5] acted as the doorway into Room 2 from an unexca-
vated room to the immediate west.
The removal of topsoil and layers of structural tumble revealed surface-like yellow sandy-

6. Plan of Trench B1.
silt deposits [59] and [61], which were overlain by a lensing brown fill [60]. These levels overlay a plastered surface [63] in the eastern half of the room, which ran across to the doorway and up to Walls [10], [6] and [2]. The surface had been shallowly cut north-south for 1.00 m from Wall [10], into which stone feature [66] had been constructed. This feature consisted of a series of
medium stones in a U-shape in the junction between Wall [10] and Wall [5] and was filled by an ashy-silt [62]. An identical ashy-silt deposit [64] filled a pit against Wall [2], which was also cut from the plastered surface [63].

Feature [66], its fill [62], and the plastered surface [63] overlay a compact earthen surface [68]. This surface extended across the western
half of the trench, whereas the top of bedrock began to emerge in a NW-SE diagonal across the centre of the trench. The bedrock dived to the NE, and a brown ashy-silt [69] filled this depression. The surface [68] marked the earliest occupation of Room 2. This is despite the fact that surface [68] overlay an earlier surface [70]. This thin, clean surface ran beneath Wall [5] and was therefore probably a construction surface for Wall [5] rather than an occupation surface pre-dating the room itself. All fours walls sat directly on the virgin soil, on bedrock, or on both. External Area: An area ( $4.80 \times 2.25 \mathrm{~m}$ ) was opened to the immediate north of Room 1 in the hope of excavating an external area in contrast to the two rooms. Far fewer wall lines had been mapped in a large area north of Rooms 1 and 2, and there was far less architectural tumble in the area. This situation suggested that this area of the site was clear of architecture, and may have served as a broad, external space. In addition, a large rectilinear structure protruded from, and beyond, the enclosure wall of the site that defined the east side of this apparent open area, and this structure may have marked an entranceway into the site from the gentle saddle to the east and south-east (see Fig. 3).

The area excavated to the north of Room 1 contained a series of laminating Iron Age surfaces that are likely to have been external, probably representing street-surfaces. Indeed, they all gently sloped to the northeast, all were thin and ephemeral, all were reasonably clean of material, and all lensed off each other.

## Trench B2 (IKM)

Trench B2 ${ }^{8}$ ( $4.0 \times 8.0 \mathrm{~m}$ ) was opened during the 2006 season (Fig. 7). The trench was located in the closest possible place to the centre of the site enclosed by the rectilinear casemate wall to investigate the occupation activities of this area. Most of the area enclosed by both the circular and rectilinear casemate walls was inaccessible and unsafe for excavation due to the presence of large amounts of structural tumble and unstable standing wall remains.

The layout of Trench B2 focused on a central wall line [2], visible at the modern surface level, running E-W. This wall was bonded with a large

7. Plan of Trench B2.
visible wall line running $\mathrm{N}-\mathrm{S}$, which was connected to a large, collapsed structure located in the centre of the site, which was not suitable for excavation due to safety reasons. Following the removal of topsoil and structural tumble, Trench

[^36]B2 featured 6 rooms, or parts of rooms (Rooms $1-6)$. As in the other trenches, the walls were founded on bedrock or virgin soil, or both.

All the rooms featured a similar sequence of superimposed occupation surfaces associated with the walls. The first of these surfaces were composed of a packed orange matrix overlying bedrock or natural. The undulating nature of the bedrock meant that these initial deposits appear to have served as a form of packing layer above the bedrock and natural virgin soil. At the same time these deposits appear to have been occupational in nature. The deposits varied dramatically in thickness (in respect to the depth of bedrock/natural) but their upper surface was flattened and each deposit had built up against corresponding wall lines.

Following these initial deposits, further superimposed surface layers were discovered in each of the rooms. Each of these layers comprised of a packed, mixed deposit with patches of organic material and burnt charcoal, representing several surfaces built up over time. At this stage, 2 stone-built features were also constructed. Feature [17] was a large square storage installation composed of 3 walls, 1 to 3 courses high, built against walls [34] and [77]. Feature [57] was a small rectilinear feature, a single course high, built against walls [21] and [04]. Feature [17] most likely served as a large storage installation, whereas the small size of feature [57] suggests a function other than storage (possibly a hearth or something similar).

Following this, another series of occupational surfaces of a similar composition to the earlier packed superimposed layers was found. However, in Room 1 two superimposed plaster floors were found, the upper one of which was heavily damaged by the layer of structural tumble which overlay it. Contemporary with these occupation surfaces were 2 features. The most significant of these was the blocking [73] between walls [34] and [77] after which a storage installation, a sub-circular stone lined pit [38], was constructed butting up against the western edge of feature [17]. Above the packed occupation layers (except in Room 1), a loose fill of windblown silt was found which may represent abandonment of the site. Overlying these loose
fills in all the rooms was structural tumble, a further indication of collapse and abandonment.

## Trench B3 (GR)

In 2006, Trench B3 ${ }^{9}(6.0 \times 6.0 \mathrm{~m})$ was opened to further investigate the external and internal spaces uncovered in Trench B1 and to examine visible wall lines thought to form structures as close as possible to the centre of the site (Fig. 8).

Topsoil and surface rubble were removed revealing wall lines [56]-[60]. Walls [57] and [58] formed a room 6 m long and 1.5 m wide. These walls both turned northeast at the western end forming a "corridor" linking the southern room with the central room. Structure [59] also appeared to terminate on a similar plane. This formed two cell-like rooms, with access from the West and North. Surfaces [38], [34], and [32] were present in the central room, the southern room and the eastern room respectively. Each surface was made of plaster and based on levelling material spread over the bedrock.

A pit [55] cut from surface [34] was present in the southern room and had a single fill with no significant finds. Subsurface features [41] and [39] beneath surface [38] in the central room were deposits within natural bedrock hollows. They were shallow fills but both contained finds including a bead, ground stone, and pottery from feature [39]. They appeared after the removal of all other layers down to bedrock.

Three features were identified as structures within the main walls of Trench B3. At the east end of the central room the remains of the foundation of a small storage bin [37] were found. Two further stone features were found, most likely indicative of subsurface packing and make-up than of structures. This is supported by the fact that the similarity in the excavated layers in both the central and southern rooms tends to imply only a single phase of use without later structural boundaries.

In the central, southern and eastern rooms a layer of rubble had collapsed directly onto the surface shortly after disuse (or possibly during use). In the central and southern rooms this appears to have been levelled off by the laying of a consolidated mud and plaster compound (22)

[^37]
and (20). These layers contained rubble but in general were workable surfaces. They may represent a second phase of use, potentially as external surfaces between roofless buildings. These layers were particularly significant for the amount of ground stone they produced. This may provide evidence for a secondary function of area B3 in a later phase. These layers were then themselves abandoned as the surrounding walls tumbled in two phases, whilst being filled by wind blown and water born silt.

To the north of wall (59) packing layers (24) and (25) demonstrate that this area was used as a levelled external surface at the time when the plaster floors were in use.

## Ceramics (CMW)

The ceramic assemblage from the Khirbat adDabba excavations is generally similar to other Iron Age sites in the area and fits in well with Oakeshott's classification of the late Iron Age ceramics in southern Jordan (Oakeshott 1978). The formal classification of Iron Age vessels presented here therefore follows the terminology used in Oakeshott 1978).

Nabataean sherds were retrieved from the later phases of the site, as were very occasional handmade medieval wares from topsoil contexts. All excavated architecture and associated occupational deposits clearly date to the Iron Age however. Although all the ceramics from
the site have been analysed in full, only a basic discussion of fabrics and forms is presented here to provide a sense of the nature of the assemblage. Parallels and a detailed breakdown of fabric form and surface treatment according to context type and excavation area will appear in the final report.

## The Assemblage

The assemblage contains the standard range of bowl, jar, jug, and cooking pot forms found at late Iron Age sites in southern Jordan. In addition, a considerable number of 'Negev Ware' vessels were present.

Fabrics were generally similar to other Iron Age sites in the area, the majority of vessels falling into the fabric category described by Oakeshott (1978: 59-61) as Fabric 1. The main inclusion in this fabric is calcite, followed by basalt, quartz and grog. Size, quantity and frequency of inclusions vary from well levigated fine wares to coarse wares. The fine to medium versions of Fabric 1 were used for bowls, jugs and juglets, while the coarsest version was used for storage jars. Cooking pots were almost all produced from Fabric 3c (Oakeshott 1978: 5961). The clay in this fabric has a high silica content, with quartz forming the main inclusion. The rough handmade 'Negev ware' vessels were all produced from medium to coarse versions of Fabric 1, with the methods of construction and firing lending it a distinctive coarse appearance and feel. Several other fabrics were present in the assemblage, but occurred much less commonly. Particularly striking was the range of fabrics represented among the jars with stamp seal impressions, many of which were different from the local common wares. This implies that they may have been produced elsewhere (this is currently being investigated by Neutron Activation Analysis, the results of which will be presented in full in the final report). All fabric types will be described in detail in the final report.

Decoration is present mainly in the form of painted bands applied in combinations of red, white, and black paint both on the interior and exterior of vessels. Geometric designs in the same paint colours are also present on certain vessel forms, although less commonly. Similarly less common are slipping and burnishing,
as well as plastic decoration in the form of denticulated edges applied to the rims of flat open bowls. The majority of decoration was applied to bowls (see percentage breakdown below).

Bowls: Bowls form the majority of the ceramic assemblage at $36 \%$. In addition, like other Iron Age sites in the region, the bowl repertoire at Khirbat ad-Dabba comprises the widest range of forms (15) in the ceramic assemblage as a whole. Bowl D represents the most common bowl form (34\%), followed by significant numbers of Bowl N (13\%), Bowl F (10\%) and Bowl J (8\%). Negev Ware bowls also form an important part of the assemblage ( $10 \%$ ). In quantity, these forms are followed by Bowls A (5\%) and B (5\%). Although present in smaller proportions, it is significant that rarer bowl forms such as Bowls H, K, O are present at Khirbat ad-Dabba. These forms occur at Busayra, located to the north of Khirbat ad-Dabba, but are less commonly found at smaller Iron Age sites. $28 \%$ of bowls were decorated, thus rendering bowls the most highly decorated form category in the assemblage.
Cooking Pots: Cooking pots form $16 \%$ of the assemblage. The cooking pots are present in 4 distinctive forms, the most common of which are Cooking Pot A (38\%) and Cooking Pot B ( $38 \%$ ). Less common are Cooking Pot C, cooking jugs, cooking pots with folded rims, and frying pans with a long flat loop handle. Although the largest amount of pottery overall was found in Area B2 - and hence the largest number of bowls, jars and jugs derive from this area - the largest number of cooking pots was found in Area A3. $0.7 \%$ of cooking pots were decorated. Jars: Jars make up $17 \%$ of the assemblage and comprise of 4 different forms. The most common jar form is Jar A, its rim sometimes marked by a distinctive triple-ridge on its upper surface. This is followed by jars with a folded rim (8\%) and Jar form C ( $2 \%$ ). However, a large proportion of jars ( $61 \%$ ) fall into a miscellaneous category as bases, bases with side profile, or jar handles indicate the presence of a jar, but do not allow for precise form classification. The proportions of Jar form A, Jar form C and so on, are therefore probably much higher in reality. $5 \%$ of jars were decorated.

The largest proportion of jars was excavated in Areas A3-A4 and B2. Although the archi-
tecture of Area B2 suggests a focus on storage, which tallies with the high proportion of jars found in good contexts from this area, the outer casemate rooms in Area A3-A4 seem to have functioned as dumps for domestic refuse which produced a large proportion of the jar sherds present in this area. This suggests less of a focus on storage in this area.
Jugs: A small $5 \%$ of the assemblage is made up of jugs. The low proportion of jugs in the overall assemblage may in part be due to the fact that in many cases rim sherds were classified as jug/jars, since it was impossible to tell from fragmentary rim sherds whether the vessel represented a jug or a jar. The jugs can be split into 5 form categories of which the most common is Jug B (18\%), followed by jugs with folded rims ( $14 \%$ ). One example of a less common jug form - Jug Form C - was also found at Khirbat ad-Dabba. This is in addition to several less common forms of juglet. The latter two form categories all derived from contexts in Area B2, the area closest to the centre of the site and the source of many of the interesting figurines and other small finds. Only $3 \%$ of jugs were decorated.

## Chipped Stone (HM)

Overall, the chipped stone materials from the Iron Age site of Khirbat ad-Dabba, Southern Jordan, comprise 4,624 pieces. The majority of these were analysed following the 2006 summer season at the Council for British Research in the Levant, 'Ammān, followed by a further period of analysis of material from the 4 and 2 mm heavy fraction in January 2008, at the University of Liverpool. Due to the general lack of chipped stone assemblage reports from sites of later prehistoric periods, the site of Khirbat ad-Dabba, while small, makes a vital contribution to this field of study. The assemblage is for the most part homogenous and attributed to the Iron Age occupation, although there are a few instances of intrusive chipped stone elements from earlier periods (Tables 1 and 2).

## Methodology

Artefacts were classified by debitage category (flake, blade, bladelet, core, core trimming element, chip, chunk, burin and spall). Further attribute analysis was recorded for core technology, core trimming element type, and tools, which
were classified according to Rosen (1997).

## Raw materials

The raw materials used on site came from the surrounding hillsides and wadi bottoms. For the most part it is medium to fine grained, caramel to dark brown flint although grey banding is common. A number of pieces retain rolled and weathered cortex consistent with the local wadi cobbles. One piece of chipped basalt, a retouched flake, was recovered from area B3. The source of the material is unknown, as is the source of a fine grey flint that has a limited representation in the tool categories, but is absent from the debitage.

Identification of intentionally chipped stone and classification of pieces recovered was made particularly difficult due to the nature of the material used in the construction of the architectural features. For the most part this was identified as the local chert, the same source as the wadi cobbles used in the chipped stone industry.

Among the items thought to be intrusive to the sample, tabular flint with a large proportion of cortex, as well as fine grained grey, and pink/ purple materials were recovered. No evidence of these materials has yet been recovered in the locality and there is no evidence of associated debitage. This may suggest that the products were brought to the area rather than knapped there.

## Technology

The debris category of chips and chunks dominates the assemblage. This is followed in number by flakes, tools, cores, core trimming elements, bladelets, blades, spalls and burins.

The large representation of debris may be explained in part due to the nature of the frag-

Table 1: Chipped stone technology by excavation area.

|  | A3 | A4 | B1 | B2 | B3 | Totals |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Tools | 17 | 18 | 12 | 125 | 499 | 671 |
| Cores | 4 | 1 | 2 | 1 | 4 | 12 |
| Flakes | 15 | 6 | 11 | 142 | 1579 | 1753 |
| Bladelets | 1 |  | 1 | 1 | 7 | 10 |
| Burin | 1 | 1 |  | 1 | 1 | 4 |
| Spalls |  | 2 |  |  | 3 | 5 |
| Chunks/ <br> Chips | 2 | 1 | 4 | 280 | 1882 | 2169 |

Table 2: Tool typology by excavation area.

| Tool Typology | A3 | A4 | B1 | B2 | B3 | Totals |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: |
| Retouched flake | 11 | 6 | 8 | 86 | 394 | 505 |
| Retouched CTE |  |  | 3 | 1 | 5 | 9 |
| Retouched bladelet |  | 4 |  | 12 | 9 | 25 |
| Retouched blade |  |  |  | 1 | 1 | 2 |
| Retouched fragment |  | 4 |  | 18 | 83 | 105 |
| Scraper |  | 1 | 1 | 2 |  | 4 |
| Notch |  | 1 |  | 4 | 2 | 7 |
| Denticulate |  | 1 |  | 1 | 1 | 3 |
| Awl |  | 1 |  |  | 3 | 4 |
| Retouched Burin |  |  |  |  |  |  |
| Intrusive elements | 1 |  |  |  |  | 1 |
| Truncated retouched blade | 1 |  |  |  |  | 1 |
| Tabular scraper | 2 |  |  |  |  | 2 |
| Retouched flakes | 1 |  |  |  |  | 1 |
| Retouched bladelets |  |  |  |  |  |  |

menting building material and bedrock. As a result, chips and chunks have not been counted separately as it is particularly difficult, in this instance, to determine natural from intentional removal. However, it is also notable that areas with the highest concentrations of debris also have the most debitage and tool evidence. These excavation trenches were the closest to the archaeological remains at the centre of the site, as well as the main areas of collapse. As a result, the high proportion of lithic material could be representative of the internal archaeology of the structure, therefore indicating knapping floors or other activity areas. It is also possible that these areas had better preservation due to the overlying collapse, or that archaeological recovery was more intensive.

Flakes are the second most common debitage group and are the most prevalent tool blank type. Flake production is un-standardised with extensive variations in terms of length, thickness and overall shape. In general, this is an example of the expedient nature of the assemblage. Blade and bladelets were rarely recovered either as
debitage, or as tool blanks. Blade and bladelet technology was also expedient in nature and followed no particular reduction strategy.

Burins and their associated spall products are infrequently found on the site. 8 burins have been recovered in total, four of which were retouched. Burins can be created accidentally through use, or purposefully to aid hafting, increase robustness of implement or create spalls. None of the 5 recovered spalls were retouched, which suggests that these were not the objective pieces. Further to this, reasons for burin retouch are unclear.

The number of cores (Fig. 9.1) that were recovered during the excavation is vastly underrepresentative of the rest of the material. Only 12 cores were found and core to removal ratio is very low at $1: 203$. This may suggest that the knapping areas of Khirbat ad-Dabba have yet to be excavated, that cores were discarded elsewhere after reduction, or that materials were knapped away from the site and products brought back. If we attribute the debris elements to knapping activities, it is likely that cores were

9. Chipped stone from the 2005 and 2006 excavations.

| Fig. 9\# | Area - Context \# | Description |
| :---: | :---: | :---: |
| 1 | B2-31 | Single Platform Core |
| 2 | B3-34 | Retouched Flake |
| 3 | B3-34 | Retouched Flake |
| 4 | B3-34 | CTE |
| 5 | B3-32 | Retouched Bladelet |
| 6 | B3-32 | Retouched Bladelet |
| 7 | B2-12 | Endscraper |
| 8 | B3-34 | Notch |
| 9 | B3-34 | Awl |
| 10 | B3-34 | Denticulate |

discarded elsewhere. However, the unclear relationship of the debris to the architectural collapse makes this link tentative.

Core trimming elements are present suggesting some level of investment in core preparation and maintenance. All CTEs recovered also exhibit retouch, suggesting that blank selection for tools was not exacting.

## Typologies

A large proportion of the assemblage was retouched and for the most part, the typologies that have been recovered are expedient forms that are common to most archaeological chipped stone assemblages.

Retouched flakes (Figs. 9.2 and 9.3) were the most common tool group but whether this was the result of true preference or representative of the type of blanks generally being produced is unclear. Flake production is the simplest type of chipped stone strategy; therefore it is possible that this prevalence reflects the skills of the Iron Age knappers. After retouched flakes, un-diagnostic retouched fragments occur most frequently, followed by retouched CTEs (Fig. 9.4) and bladelets (Figs. 9.5 and 9.6), and retouched blades.

Formal tool types are restricted in frequency as only limited numbers of scrapers (Fig. 9.7), notches (Fig. 9.8), awls (Fig. 9.9), and denticulates (Fig. 9.10) were recovered. The technology used to create these tools was again relatively simple retouch removal.

One scraper and a single truncated backed blade are of Chalcolithic/Early Bronze Age date and intrusive into the sample.

No geometric sickles of the Iron Age were recovered. Three large, flat retouched flakes from Trench B3 may be evidence of this type of tool as some of the retouch is notably steep and does resemble backing in places. However, there is no evidence of gloss and these pieces are not standardised. They have therefore been classified as retouched flakes, but their difference from the majority of the assemblage tentatively marks them out for further assessment.

## Conclusion

The lithic assemblage from Khirbat ad-

Dabba is largely of a homogeneous nature with few intrusive elements. It is notable for being a small assemblage, largely comprising expedient tool types made on locally available flints. The small sample size and lack of core pieces makes it difficult to gain more in depth information regarding the technological strategies pursued by the Iron Age inhabitants of the site. Nevertheless, the presence of these items, particularly the large numbers of tools in relation to debitage and cores suggests that, while use of flint technologies in general certainly decreases in the Metal Ages, the uses and properties of the material are not forgotten, nor completely abandoned. The informal nature of the assemblage suggests that these tools were made as and when they were needed, possibly for expedience sake, or because flint was the logical material choice under certain circumstances, for certain activities.

## Ground Stone (IKM)

In the past, the recording and analysis of ground stone tools has too frequently been neglected. This situation is beginning to be remedied and many site reports now include a summary of ground stone tools. However, these discussions are often brief and ground stone tools are frequently grouped within small finds analysis (for example at Buṣayra (Bienkowski 2002) and Țuwaylān (Bennet and Bienkowski 1995).

The artefacts from Khirbat ad-Dabba classified here as 'ground stone' tools ( $\mathrm{n}=178$ ) cover a variety of objects ${ }^{10}$ and have been broadly divided into five categories: handstones (further sub-divided into pounders, pestles, hammerstones and grinders), upper millstones, lower millstones/querns, and mortars (each of these categories can be further sub-divided on the basis of size and shape, and thus possible function of the implement), perforated objects (broadly sub-divided into larger weights, smaller spindle whorls and beads) and a smaller number of miscellaneous objects.

The terminology used for the descriptive analysis of the stone tools from Khirbat ad-Dabba has been adapted from definitions developed
10. The term 'ground stone' applies to items ground in production, as well as to items used for grinding activ-
ities. The ground stone assemblage from Khirbat adDabba includes items belonging to both categories.
by Wright $(1991,1992)$ and draw on comparisons from contemporaneous sites. The ground stone artefacts from the excavations at Khirbat ad-Dabba exhibit a typical use of available natural resources. The major raw materials in use at Khirbat ad-Dabba are flint (accounting for approximately $38 \%$ of the assemblage), limestone (approximately 35\%), and sandstone (approximately $14 \%$ ). All of these are available locally, with a small amount of possibly imported material, particularly basalt (approximately 4\%) and two red carnelian beads. Without geochemical or petrological examination of the material, however, exact provenance remains uncertain.

In comparison to the low frequency of artefacts classed as high status, there is a rather high percentage of ground stone artefacts associated with food processing and possibly craft related activities. The following is a brief discussion of the different categories of ground stone items found at Khirbat ad-Dabba. A comprehensive analysis, incorporating studies of the distribution of artefacts by context and area, will be published in the final report.

## Handstones ( $n=81$ )

Items classified here as handstones (for all definitions see Wright 1992) include a variety of sub-types (as outlined above) used for a range of functions (crushing, hammering, grinding) and are used in conjunction with other ground stone items such as mortars, lower millstones and querns. In the Khirbat ad-Dabba assemblage a large percentage of these items have been further classified as pounders, with several that could possibly be classified as hammerstones (the vast majority of these pounders were made of flint; see Fig. 10.3). Eight have been classified as pestles, eleven as hammerstones, seven as grinders (see Fig. 10.4) and four miscellaneous stones which have been grouped broadly under the category of handstones, but may have served another, currently unrecognised, function.

Upper Millstones $(n=9)$, Lower Millstones and querns ( $n=28$ )

An upper millstone (or grinding slab) is a large and elongated implement held with both hands and used in conjunction with a lower grinding slab, quern (see Fig. 10.1) or stone working surface. An upper millstone is usually thickest in
its mid section and tapered at both ends. A lower millstone can be quite similar in appearance and form to an upper millstone. However, it is distinguished here by a concave depression at one end, or in the centre, of the use surface. Querns perform the same function as lower millstones.

## Mortars ( $n=12$ )

A mortar can be an immobile or mobile implement, characterized by a shallow or deep depression in which material may be ground (Wright 1992: 21; see Fig. 10.5). Used for crushing, grinding, or hammering, the mortar should probably be considered a multi-purpose tool as it is used both in food processing, and possibly in a variety of crafts and industries (grinding and pounding tools have been observed to serve a variety of functions, see Kraybill 1977: 48891). The size and shape of the particular vessel is presumably dependant on the particular material being ground. The mortar is used in conjunction with a grinding implement, more specifically a pestle, hand-stone or grinder. The forms of mortar represented at Khirbat ad-Dabba are many and varied, and probably served a range of functions. A number of the items classified here as mortars could be distinguished as a vessel (for definitions see Wright 1992: 21). However, for the purposes of this preliminary report they are included in this section as mortars only.

## Perforated Objects $(n=34)$

This category includes a variety of perforated stone objects (in addition to one glass and one ceramic object). These have been further subdivided into larger weights or loom-weights (n $=22$ ), smaller spindle whorls $(\mathrm{n}=7)$ and a small collection of beads $(n=5)$. The majority of the large weights are fabricated from limestone and are fragmentary. The beads demonstrate the use of a variety of materials (red carnelian, flint and polished glass). Both of these sub-categories demonstrate quite simplistic forms and cannot be securely dated to any given period.

The most common type of spindle whorl represented at Khirbat ad-Dabba is a small, cylindrical spindle whorl, made of smooth limestone with incised decoration (a trellis pattern between two parallel lines) on the exterior surface (see Fig. 11.1). These are recognised as the most common form of spindle whorl at other

10. Ground Stone from the 2005 and 2006 excavations.

| Fig. 10\# | Area - Context \# | Description |
| :---: | :---: | :--- |
| 1 | A4-20 | Quern |
| 2 | B3-2 | Roof Roller |
| 3 | B2 -75 | Hammerstone |
| 4 | A3-23 | Grinder |
| 5 | B3-9 | Mortar |

Iron Age sites in the area such as Țuwaylān (Bienkowski 1995: 89, fig. 9.29), Buṣayra (Sedman 2002: 408-411, Pl. 10.165-10.178) and Umm alBiyāra (Bennet 1966: Pl. 25b). However, they are quite rare elsewhere, with notable examples from Tall 'Ira (Beit-Arieh 1999: 469, fig 14: 26, 14: 27).

## Miscellaneous ( $n=14$ )

A number of objects, with no definable func-
tion, have been grouped into this final sub-category. These objects will not be discussed in any great detail, but include a possible bead maker (see Fig. 11.2; for a possible parallel see Bi enkowski 1995: 90, fig 9.32.11). The object is composed of friable sandstone and is largely unworked but has a shallow channel ground into one (the upper?) surface. Also included in this category is a large cylindrical stone, smoothed flat on either end, with a shallow depression at one end. It is possible that this object represents a roof roller (see Sedman 2002: 402, Pl.10.152; see Fig. 10.2), although it is equally possible that it served a different, unknown, function.

## Small Finds (IKM)

The small finds from Kirbat ad-Dabba ( $\mathrm{n}=$ 75) exhibit the use of a range of local and imported material types (bone, metal, shell ${ }^{11}$, stone, ceramic and clay). In this analysis the finds have

[^38]sistance with the identification of many of the shell species included in this preliminary report.
been organized by artefact type, rather than material type. For this reason, those artefacts classified as beads or spindle whorls, including a single ceramic example, have been examined as ground stone due to their manufacturing technique. The Khirbat ad-Dabba small finds have been grouped broadly into six main categories following definitions applied at contemporaneous sites (see Bennet and Bienkowski 1995 in particular). These categories include personal adornments; tools; re-worked sherds; stamp seals, stamped sherds and pot marks; figurines; and a collection of miscellaneous items. For the purposes of this preliminary report parallels with contemporaneous Iron Age material will be minimal, and information pertaining to context will not be addressed. These more detailed aspects of analysis will be published in the final report.

Although the Khirbat ad-Dabba small finds exhibit a variety of artefact types typical of the Iron Age period, they represent a reasonably simple domestic assemblage, which does not include a large number of luxury, or high status objects. The small finds assemblage is comparable to contemporaneous Iron Age sites, in particular Buṣayra (Bienkowski 2002) and Ṭuwaylān (Bennet and Bienkowski 1995).

## Personal Adornments ( $n=11$ )

This category includes a variety of artefacts that can be considered as personal adornments. These include a number of shell pendants, a single perforated bone, metal item identified as jewellery, and a single fibula. The fibula (see Fig. 11.3) has been identified as Stronach's type III: 4, "fibula with a triangular bow" (Stronach 1959: 193). It is recognised as the most common form of fibula in the Near East from the eighth century BC onwards (Stronach 1959: 193). Parallels can be found at many contemporaneous Iron Age sites including Ṭuwaylān (Bienkowski 1995: 81, Fig 9.5.3, 4). Also included here are four Copper/Copper Alloy rings or earrings. These are of such a common and simple form that parallels can be found at many contemporaneous sites. Finally, six shell pendants, including two cowrie shells (Cypraea annulus) and four
dog-cockles (Glycymeris), have been identified as possible pendants. Each pendant displays a central perforation and a single clavicle bone, in addition to a small perforation at one end.

## Tools ( $n=16$ )

This category includes a collection of tools and equipment (all of bone or metal) that can be associated with various crafts and industries. It is difficult to identify a particular tool type for many of the bone artefacts classified here as tools. The possible function of these items therefore remains obscure. In general, most of the bone pieces ( $\mathrm{n}=9$ ) have been worked into points or smoothed into a rounded edge like an awl or spatula. Two iron knives or blades, a possible iron arrowhead, an iron rod, and a number of Copper nails are also included in this category.

## Re-worked Sherds ( $n=13$ )

The re-used (worked) sherds from Khirbat ad-Dabba exhibit a range of shapes and possible functions ${ }^{12}$. Three of the sherds have a central or off-centre perforation. Suggested functions of the rounded/oval and triangular shaped sherds include gaming pieces (Bienkowski 1991: 90; London 1991: 414), jar stoppers (Bienkowski and Adams 1999: 161; Davies 1939: Pl.103), or possible systems of accounting (London 1991: 417).

## Stamp Seals, Stamped Sherds and Pot Marks (n $=10$ )

In this category are five jar handles from the same vessel that bear the impression of a square stamp seal (Fig. 11.7), a rim of a jar and a handle of a jar each bearing the impression of an ovoid stamp seal, and a lug handle that bears a square stamp seal impression. Also included are a body sherd, a shoulder fragment, and a jar/jug handle each inscribed with a different potter's mark. Finally, a perforated scaraboid stamp seal and a medium stamp seal complete this corpus.

The ovoid seal impression on the jar rim is badly preserved and nearly illegible, though it is clearly divided into three registers. The details of the imagery cannot be deduced however. The second ovoid seal impression is also divided into three registers. Whilst the top register is il-

[^39]
11. Ground stone and small finds from the 2005 and 2006 excavations.

| Fig. 11\# | Area - Context \# | Description |
| :---: | :---: | :--- |
| 1 | B1 -61 | Spindle Whorl |
| 2 | B2 -31 | Bead Maker |
| 3 | B1 -13 | Copper Alloy Fibula |
| 4 | B2 -72 | Head of Anthropomorphic Figurine |
| 5 | B2 -58 | 'Scaraboid' Stamp Seal |
| 6 | B1 -62 | Stamp Seal |
| 7 | A3 -18 | Handle with Stamp Seal Impression |
| 8 | A4 -18 | Worked 'Giant Clam' Shell |
| 9 | A3 -18 | Head of Horse Figurine |
| 10 | A3-23 | Head of Horse Figurine |
| 11 | B1 -11 | Body of Bovine Figurine |

legible, the middle register appears to depict two opposing uraei, and the lowest register appears to depict the Egyptian plough sign. The square seal impression appears to depict an abstract, curved design composed of four elements.

Both the large stamp seal (Fig. 11.6) and the smaller scaraboid stamp seal (Fig. 11.5) are cut from a soft chalky limestone. The large stamp has a rough (largely un-worked) lower surface, with smoothed upper and side surfaces. The incised decoration is in negative relief on the flattened (upper) surface. Three indented circles are each enclosed in irregularly shaped polygonal shapes carved in rather heavy lines. The design is itself enclosed in an irregularly shaped rough ovoid shape. The scaraboid is pierced longitudinally with the decoration also incised in negative relief. The decoration on the scaraboid comprises several straight lines that radiate from a central, indented, point which is enclosed in a roughly depicted circle. The decorative motifs on both seals are quite simplistic in design and are poorly executed. Neither of the stamp seal corresponds to any of the stamped impressions on the ceramic sherds.

## Figurines ( $n=11$ )

This category includes a small collection of anthropomorphic ( $\mathrm{n}=3$ ), zoomorphic ( $\mathrm{n}=4$ or 6) and, as yet, unidentifiable figurine fragments ( $\mathrm{n}=2$ ). With two exceptions (see below) all the figurine fragments are ceramic. Two of the anthropomorphic figurines - the fragment of a small head (Fig. 11.4) and the bust of a figurine - have been identified as Pillar-Figurines (for parallels and a detailed bibliography see Kletter 1999: 383). Two of the zoomorphic figurines can be compared to the characteristic hollow horse figurines with applied decoration found at Buṣayra (Sedman 2002: 381-387, Pl.10.66, 10.86; see Figs. 11.9 and 11.10). Also included here are a possible bovine figurine (see Fig. 11.11) and two elongated cone-shaped figurine fragments, which may be identified as the legs of animal figurines (for comparable examples see Kletter 1999: 39).

Shell ( $n=11$ )
This category includes the shell items that are not considered as personal adornments and include a considerable number of land snails
(Sphincterochiliolae). Of note are two giant clams (Tridacna gigas) which may have served as cosmetic palettes (for comparisons and discussion of inscribed examples see Reese 1995: 455-457; see Fig. 11.8).

## Miscellaneous ( $n=3$ )

This category includes two, as yet, unidentifiable metal objects. Also included is a fragmentary clay pipe.

## Animal Bone

Numerous well-preserved animal bone remains were recovered during the excavations. Micro-faunal remains were also retrieved through flotation of excavated deposits. At the time of writing, the analysis of the animal bone is underway by Alex Wasse and Louise Martin.

## Botanical Remains

Flotation of soil samples taken from all definable features such as hearths, pits, floors, and $t ̣ \bar{a} b \bar{u} n(\mathrm{~s})$ was conducted. Well-preserved carbonised plant remains were collected and are currently being analysed by Andrew Fairbairn. Carbonised wood fragments from secure deposits are being submitted for 14 C analysis, subject to their suitability currently being assessed by Eleni Asouti. Carbonised seeds from secure occupational deposits will also be submitted for radiometric dating once their archaeobotanical analysis is completed.

## Summary and Conclusions

The excavations at Khirbat ad-Dabba have shown that the site consists of a series of occupation phases dated to the late Iron Age. Although the analysis of the samples for radiometric dating is not yet complete, these phases can be provisionally dated based on the recovered ceramic assemblage. Iron Age ceramics in southern Jordan are still dated based on historical sources, which place them in the seventh and sixth centuries BC . One of the main aims of the project is to refine this chronological framework by linking the securely stratified ceramic assemblage from Khirbat ad-Dabba with 14C dates from the site. This will have widespread implications for current understandings of the South Levantine Iron Age, especially when compared to recent dates
from the Wādī ‘Araba (Levy et al. 2005).
In addition, since the analysis of all the finds assemblages has provided some of the few reports on securely stratified Iron Age material in the region, the site of Khirbat ad-Dabba, while small, makes a vital contribution to this field of study. The combination of artefactual and environmental data analysis allows the project to address key issues such as the materiality of everyday life and the economic, social, and political functioning of communities during the Iron Age - research questions which until now have received little attention. By doing so, the project hopes to reassess traditional understandings of the Iron Age in the southern Levant.

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# INTO THE LAND OF RESEARCH: 2007 BROWN UNIVERSITY PETRA GREAT TEMPLE DOCUMENTATION 

Martha Sharp Joukowsky

The Petra Great Temple is seemingly a wellspring of architecture, artifacts and complex stratigraphy. In each of our last 15 seasons of excavations, we have been overwhelmed with the cornucopia of data and details that had to be processed before any further work at the site could be carried out. Our need to document everything as completely as possible could scarcely be avoided any longer. We were determined that 2007 was the time to discontinue excavations and train our sights on reclaiming the pressing interests of publication, consolidation and restoration, and create a master plan for future site management. Measuring $11,524 \mathrm{~m}^{2}$ of area unearthed, we wanted to capture the Great Temple's rich legacy from the past. The following discussion provides a perspective on the 2006-2007 activities - one of our most defining years of research and reflection ${ }^{1}$. The site plan is shown in Fig. 1.

## Sponsors

This 2007 campaign would not have been possible without the goodwill and generous assistance of the Jordanian Department of Antiquities, Fawwaz al-Kraysheh, Director, and Suleiman Farajat, Director of the Petra National Park and the Department of Antiquities Representative, as well as Mohammad Abdel Aziz AlMarahleh. We are also grateful to the American Center of Oriental Research and Barbara A. Porter, the Director, the Luther I. Replogle Foun-
dation, the Brown University Expedition Fund, the Joukowsky Family Foundation, and the numerous private donors who have continued to support this year of archaeological research both in Providence, RI, and in Jordan at the Petra Great Temple. We would also like to express our thanks to Brown University for making this season possible.

## Staff

Brown University archaeologists included Martha Sharp Joukowsky, Director, Artemis W. Joukowsky, photographer, and two supervisors who served as most valued staff members, including Elizabeth Smolenski and Süreya Köprülü. Restoration efforts in the field were expertly undertaken by a workforce of 20 devoted Bedouin, directed by Dakhilallah Qublan, Foreman. Aude and Ismaeen Qublan and Ali Wieri undertook the 2007 fieldwork. Since publication dominated the greater part of the year, we will begin by describing that effort and then move into the field at Petra at the Great Temple and discuss the consolidation and restoration of the site, concluding with an update on the Great Temple artifact analysis.

For 15 field seasons, 1993 to 2006, Brown University archaeologists have excavated a total of 126 trenches and 86 Special Projects at the Petra Great Temple. Preliminary reports have been published in $\underline{A D A J}$ each year. In 1998, the first five years of excavation were published in,

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## Petra Great Temple

Brown University Excavations


1. Plan of the Petra Great Temple Precinct (Marshall C. Agnew).

Petra Great Temple Vol. I. (Joukowsky 1998), and to date 215 additional publications have become part of the public record. 2006 and 2007 was devoted to writing and editing, Petra Great Temple Vol. II: Archaeological Contexts of the Remains and Excavations, Brown University Excavations at the Petra Great Temple, Jordan, 1993-2006. This volume is devoted to the examination of each precinct area: Propylaeum, Lower Temenos, Upper Temenos and the temple(s) proper. It presents the impressive quantity of our intensive field research from the beginning of our excavations at the site in 1993. Not only is there an abundance of new research since our preliminary reports, but also the potential integration of each area's excavation shows insights well beyond what our 1998 results produced.

Now, 12 years later, this volume has been published, and it examines the magnificent archaeological evidence for the Great Temple in the Nabataean and Roman periods. The Great Temple continues to be a most productive and surprising site. In Providence RI, during the summer of 2003, part of the team, including Emily Catherine Egan and Christian Cloke, began to wrestle with the stratigraphy. It is they who spearheaded the research for this volume, and for the past four years the whole team has been devoted to the completion of this volume. The agenda for documentation was demanding with a close examination of the $200+$ trench notebooks plus the trench supervisors' final reports, site balk and wall drawings, and thousands of artifacts to consider. Linking together the stratigraphy and chronology by trench, the cross analysis of trenches by area (Propylaeum, Lower Temenos, Upper Temenos and Temple), the establishment of the 15 Site Phases was a challenge, however the greatest challenge of all was the placement of each trench and locus into one of the site phases. Often we were dealing with data that was totally unexpected and the data itself raised puzzling and complex issues - we had to wrestle with the ambiguities provided by the evidence. Overall, we sought to know who, what, when, and how the Nabataeans built and used the Great Temple. An immense amount was learned, and, now, after years of excavation, there is a better understanding of the Nabataean concept of this monumental precinct in their capital city. A perspective has also been gained
on how Roman rule impacted the precinct and the city as a whole.

Any archaeological publication is fraught with layers of field data collection and interpretation. Like Volume I, Volume II is the collaboration between members of the Great Temple staff. From 1995 until the present, Deirdre G. Barrett has compiled the site catalog and lamp analysis; in 2003 Emily Catherine Egan and Christian F. Cloke sleuthed the stratigraphy and phasing, joined in 2005 by Eleanor A. Power. The staff of Gilbert Design in Providence undertook the design layout for Volume II, and the text was edited and the index compiled by Nan Sumner-Mack. Additionally for the Volume II publication, all site plans had to be re-worked, and measurements as well as elevations had to be re-checked. Marshall C. Agnew and Eleanor A. Power performed this task. Marshall C. Agnew also reconfigured all of our site plans and worked with Lynn Carlson, Systems Analyst of the Brown University Systems Data Center Geographic Information, to update the Petra Great Temple topographic map using GIS data. These results are shown in Fig. 2. Also documenting a detailed 3-D plan for publication and future reconstruction, Agnew prepared plans for the conservation and protection of each area, endangered by being exposed to the elements. It has taken four years to carry out the research for this volume's excavation report.

All of these researchers have the critical fiber from years of field experience and are able to bring their firsthand experience and knowledge of the Petra Great Temple archaeological record to the project, as well as their important analytical perspectives. In addition, Volume II greatly benefited from the cogent remarks of peer reviewers. Brown University's Petra Expedition Fund and the Joukowsky Institute for Archaeology and the Ancient World underwrote the financial support for this volume's publication.

Because our Brown University Great Temple Web site <http://www.brown.edu/Departments/ Anthropology/Petra/> could not allocate the sufficient space we needed to share our data with other researchers and the public around the world, I elected to use Open Context, an archaeological web site, [http://www.opencontext.org](http://www.opencontext.org) to publish the enormous compendium of materials we had collected over the years. All of the

2. Petra Great Temple Topographic Map (Lynn Carlson, Geographic Information System Analyst, Brown University).
trench and special project reports as well as our phasing charts and separate databases (catalog of small finds, architectural fragments, coins, and 'Grosso Modo' artifact collections) now are available on Open Context. This is an open access publication system enabling our Great Temple researchers to publish on line not only the primary field data like trench reports and databases, but also media such as photographs, annual site plans, stratigraphic drawings, aerial photographs, plus annual $A D A J$ reports. Open Context provides an easy to use, yet powerful, framework for exploring, searching, and analyzing excavation results, survey data, and the artifacts deposited in the Petra Museum collections, because the content is linked together as an integrated and cohesive resource and is freely available. It is unique in that it provides a framework for sharing archaeological research; it is free of burdensome copyright restrictions, and protects independent scholarly attribution.

Our Great Temple videos, undertaken as part of our NSF grant, were also prepared for publication by Michael S. Zimmerman for the World Wide Web and can be found on 2005-2007 (Web pages and for digital videos and 3D images) <The Joukowsky Institute Workplace>, <The Petra Great Temple Database Project>, <http:// proteus.brown.edu/PGTdata/Home $>$, or http:// lems.brown.edu/.

More definitive conclusions will be addressed in Volume III, which is currently underway. Projected is that Volume III, Petra: Great Temple Brown University Excavations 1993-2006, Architecture and Material Culture, will focus on specialist studies including analyzes of the architecture of the temple and the theater, the sculpture, the iconography of the stucco decoration, and the vast hydraulic systems of the precinct, as well as the Roman-Byzantine Baths. It will also include specific artifact coverage of the coins, pottery, figurines and lamps, bone objects, metals, glass, archaeobotanical and faunal analysis, as well as shell analysis, and the results of the several Great Temple databases, including architectural fragments, 'Grosso Modo', the artifact small finds catalog and coins. Specialist reports include contributions (in alphabetic order) by Marshall C. Agnew (surveying and 3-D reconstructions), Donna Jean D'Agostino (FileMaker Pro databases), Christian Augé (nu-
mismatics), Deirdre G. Barrett (small finds catalog and lamps), Joseph J. Basile (pilaster relief sculptures), Christian F. Cloke (numismatics and the site hydraulic systems), Emily Catherine Egan (stucco revetments), Rune Frederiksen (theater-in temple analysis), Yvonne Gerber (ceramic typology and analysis), Sarah Whicher Kansa (faunal analysis of 3800 samples), Margaret O'Hea (glass analysis), Eleanor A. Power (the Roman-Byzantine Baths), Shaher M. Rababeh (construction techniques of the Great Temple), David S. Reese (shells), Shari Saunders (ceramic analysis), and Christopher A. Tuttle (figurines). This author will edit the volume and submit essays devoted to the elephant-headed capitals, Great Temple capitals, the betyls and nefesh sculptures. At this writing most of these studies are at an advanced stage of preparation.

As all of the aforementioned reports have extensive tables and graphs. We have elected to have these accessible as well on Open Context. Those researchers who publish with Open Context retain the copyright of their material - this means all contributors are free to publish their material with other venues (including journals, books, and other Web sites). Each item in Open Context is licensed with an open, Creative Commons license, giving explicit permissions for users to freely use the material so long as they properly attribute the source. Creative commons licenses include machine-readable metadata that is captured by commercial search engines such as Yahoo and Google (Kansa 2005; Kansa, Schultz and Bissell 2005).

This metadata facilitates discovery of openly licensed content, including Open Context resources. Such openness ensures the Open Context content is of maximum value for reuse in both instructional and research applications. Finally, to facilitate scholarly applications, citation information is automatically generated for each item in the database. The stable URLs to each item in Open Context facilitate citation and later retrieval. We believe this is a community approach to data integration, because it builds meaningful links across diverse archaeological data sets.

## Restoration and Preservation

Even before this 2007 summer when Petra was acclaimed as one of the Wonders of the

World, tourism had emerged as the site's largest industry. Responsible tourism in Petra (ecotourism) has proven to be a sustainable economic reality. Now more than ever, with increased tourist impact, we had to continue to implement a more aggressive conservation strategy. After holding several meetings, the Great Temple team created a master plan as a blueprint for the precinct's restoration as well as its infrastructure. This was a challenge in reconciling conservation needs with financial constraints.

The conservation and restoration of the Great Temple precinct involves the scientific application of intervention measures that add to the unique precinct's permanence. Our aim is to monitor, protect and conserve the greater Great Temple precinct (including the Roman-Byzantine Baths, plus our excavations of the Small Temple to the west) and to conserve these sectors' integrity and cultural meaning. Our restoration design gives priority to areas or architecture at high risk due to tourist traffic, natural forces, such as flash floods, or due to our archaeological investigations.

The fundamental philosophy of the Petra Great Temple excavations from the beginning has been that the site is a fragile, non-renewable resource that would require protection. The measures we have taken are geared only to the reversible preservation of the structural integrity of the precinct. Exposure of the architectural features has been of serious concern, for the site is susceptible to the havoc created by heavy rains and earth tremors. This has been acknowledged and instituted by the incorporation of several additional consolidation procedures that have become part of our research design. Each year we envision a more extensive, organized plan for the consolidation of the Great Temple architecture, which has been on going for 13 years under the expert guidance of D. Qublan and some 20 local workmen who have now become local artisans in their own right. We have also made several studies of consolidates for the conservation and restoration of standing structures, and also have diagnosed a wide variety of sensitivities in order to slow the process of sandstone and limestone deterioration. With this in mind, yearly conservation surveys of the excavated portions of the temple have been carried out with a view to preserving and restoring various architectural fea-
tures.
Before discussing the 2007 summer work, the consolidation and preservation measures put in place during the 2006 fall and spring of 2007 will be presented.

The Petra Great Temple conservation measures in 2006-2007 undertaken during the in-ter-excavation season included a multitude of projects in the principal areas of the precinct. All of these projects were generated by our Great Temple master plan team with D. Qublan, restorer, and were reviewed and approved by S. Farajat, Director of the Petra National Park, and approved by the Jordanian Department of Antiquities, Dr. Fawwaz al-Khraysheh, Director.

The Nabataeans built this district of the city to reflect their own success, and the Great Temple precinct is one of the earliest freestanding precincts to be constructed in central Petra. Facing north, the precinct is situated on the southern slope just far enough removed from the hustle and bustle of the city, protecting the Great Temple's view to the incredible nature preserve of the adjoining Garden Pool Complex to the west, as well as to the opposing ridge on the north side of the mightiest river in Petra, the Wadi Musa. This district also enjoyed a splendid view to the north with the Temple of the Winged Lions, the valley and the hills. It is set back approximately 5.25 m from the Roman Road overlying the ancient Nabataean path. This sector of the Roman Road, beyond the Colonnaded Street (Zimmerman 2000) followed the Nabataean sacred way - the main artery into the central Petra city.

## Propylaeum

One approaches the Great Temple from the road by a curb and sidewalk, and a 17.00 m north south long x 7.40 m wide central staircase of the Propylaeum, which directly accesses the Lower Temenos. This central staircase was a seriously eroded hodgepodge of 42 steps, with upper portions being added well into our Site Phase IX after the 363AD earthquake. The eight lower steps and platform abutting the Portico Wall we attribute to Site Phase IV of the Nabataean period. The midlevel of this stairway was constructed in Site Phase VII, dating to the Roman period or the mid-second century AD; however, it had undergone fill-ins, build-ups and repairs until Site Phase IX. When excavated, these stairs were
composed of irregularly sized, unstable and uneven ashlars that had to be completely removed, reworked and reset for "comfortable" visitor access. Near the top of the upper flight there was a considerable cavity that had to re-fill. With the addition of re-cut ashlar Propylaeum steps, the central stairway was restored and ease in access is now assured. These stairs were extended as a regularized flight of their original span to the west - the flight of earlier stairs constructed in Site Phase VI ca. 106AD were purposefully left open for view.

There has never been such a grand Nabataean staircase found as the Great Temple west entry stairs. How this stairway survived over 2000 years of collapse and neglect is surely a miracle. It is amazing to see the craftsmanship exhibited in this monumental stairway with four exquisite limestone platforms with individually cut flagstones fitting so snugly that it was not necessary to consolidate them for a tighter fit. This stairway is constructed in Site Phase IV or during the time of the Great Temple Grand Design dating from ca. first century BC to the first century AD . These grand west entry stairs from the Roman Road had an additional three new steps added for ease in visitor access from the Roman Roadsidewalk. Additionally, at the top of the West Entry Stairs, three steps that had fallen away in antiquity were replaced with re-cut ancient ashlars from our lapidary storage to complete the stairs. Today the complete flight, nearly 40 m north south x 4.60 m width has been returned to its former glory. The most striking feature as the visitor ascends the stairs, is the nefesh reproduction on the upper platform, which we installed (replacing the original) in situ in 2006.

Future plans include a path to the west to assist tourist access from the top of the stairway to the Roman-Byzantine Baths. At present there is danger for the unsuspecting visitor of falling into the 6 m deep room excavations of the West Baths-Palatial complex, which were excavated some years ago by the Jordanian Department of Antiquities.

## Lower Temenos

The Lower Temenos triple colonnade with its elephant-headed capitals is the "upper floor" of the Lower Temenos in Site Phase IV, intended for use by the public. Ongoing is our consoli-
dation of the various Lower Temenos elements, and consolidation has included the re-erection of additional column drums to regularize the East Triple Colonnade.

In the niches of the East Exedra, we mounted five of our pilaster reliefs (the female with a wet drapery style chiton, two women holding cornucopias and one male) for ease in public viewing as well as to ensure their safety and protection. Unquestionably, they do not belong in these niches, but their display in the East Exedra is to keep them out of harm's way. Future plans are to build up the height of the East Exedra to equal the height of the West Exedra.

Below the west triple colonnade and hidden away is an enormous basement gallery of twin parallel galleries or cryptoportici, measuring 38.89 m north south x 12.08 m east west by 5.18 m depth. Yet again, additional anastylosis of the west cryptoporticus west gallery wall (Fig. 3) had to be undertaken where the ashlars were in a state of collapse (Fig. 4), and threatened to plummet into the west cryptoporticus. Slumping into and over the west cryptoporticus, this wall, which was damaged under the weight of collapse, has taken two inter-excavation seasons to restore. At the same time there was also the restoration of the window ducts in the west cryptoporticus west wall. These windows controlled light, air circulation and ventilation for the west Cryptoporticus.

Subsequent to the 2005 excavations in the west cryptoporticus east, the corridor floor pavement had been removed for the excavation of a sondage. This sondage had to be refilled with clean sand and the original pavers had to be replaced according to their original in situ positions. This meant the leveling, replacement, and restoration of each block, which proved to be a great success. Another project involved the erection of a protective grill fronting the west cryptoporticus east, which had to be installed to increase the security and protection of our sculpture repository where decorative capital elements and ballista balls were stored. Unfortunately we found that some of these carved architectural elements had been stolen and others moved from their former position. This brings up the sticky issue of site protection in Petra, which unfortunately has been sorely lacking during our excavations.

Sculpted facsimiles of the elephant headed

3. Lower Temenos West Cryptoporticus west gallery wall (Christopher A. Tuttle).

4. Lower Temenos West Cryptoporticus west gallery wall (Christopher A. Tuttle).
capitals had been commissioned from Dakhilallah Qublan. Four smaller scale capitals, each with four heads were transported to the United States, for the understanding and enjoyment of the Nabataean sculptors' extraordinary abilities. One such capital, clearly demonstrating the prowess of our Bedouin foreman-restorer, Dakhilallah Qublan, can be seen in Fig. 5.

## Upper Temenos

Since the east Upper Temenos has a large plaza with the east perimeter wall flanking it to the east, it is at a rather remote side of the complex. Together with the Great Cistern, the Sword Deity and the canalization system on its west, the east perimeter casemate wall has interior rooms. The west facing entrance of Room

5. Elephant-headed capital, reproduction sculpted by Dakhilallah Qublan.

A is directly opposite the west corridor wall of the temple. The inside of Room A is well hidden from view and here we uncovered traces that the room had been used as a toilet. A grill gate preventing access to Room A was installed to deter users from further compromising the integrity of this room.

Today the Site Phase II central stairs that originally had been the central artery from the Lower Temenos to the forecourt of the distyle temple are always subjects of interest to visitors. Constructed in the mid first century BC, these once grand ceremonial stairs, 5.90 m north south $\mathrm{x} 4.56-4.70 \mathrm{~m}$ east west, had been blocked completely in Site Phase IV by the construction of the east west retaining wall of the Lower Temenos, and when excavated we found that the treads had been robbed out in antiquity leaving only their plaster bedding exposed. There was concern about the erosive nature of winter storms. These stairs can be identified today, because of the 20 steps exposed, every other step, 10 steps, were replaced with lighter-colored sandstone steps, thereby displaying the difference between the Site Phase II central stairs and the Site Phase IV east and west stairways that flank the earlier stairs and also lead up to the temple forecourt.

By gravity, the subterranean canalization system drains water from most of the temple area to take its course down into the interconnected Lower Temenos extension (which in turn flows under the Propylaeum and from there it drains further under the Roman Road, hypothetically, to empty into the Wādì Mūsā). In the temple forecourt, a see-though iron grill was placed over the central water passage system, an area measuring only $1.30 \times 0.80 \mathrm{~m}$. The missing or cracked cover slabs covering the conduit opening were
replaced. Intentionally a grill was placed over the forecourt canalization so the visitor could view the feature - this grill ensures the safety of visitors and animals by preventing them from accidentally falling into the system, and at the same time protects the excavated remains. In the Upper Temenos, in addition, a major undertaking was the replacement of the temple forecourt small hexagonal pavers, covering an area 3.70 m north by 11.50 m east west. Again, we were concerned with the erosion that had taken place in the forecourt, exposed, as it is to flood damage. When possible, the temple forecourt original hexagonal pavers were cleaned and repaired, and set between them were the newly cut facsimiles. Additional rows of hexagonal pavers stabilized the forecourt from further erosive action, as can be seen in Fig. 6.

The Roman-Byzantine Bath Complex added probably in the Late Nabataean - Roman period and dated to Site Phase VI, ca. 106AD, offsets the strict symmetry of the Great Temple. As mentioned previously, building begins in Site Phase VI and the baths partially collapse in the 19 July 363AD earthquake of Site Phase X. They are then remodeled and are in use until the devastat-

6. Great Temple forecourt with restored hexagonal pavement (Artemis W. Joukowsky).
ing earthquake of 551 AD . Measuring 32 m north south x 28.40 m east west, this complex is located on the west side of the temple resting against the west perimeter wall for support. The 2005 excavations recovered a 'well,' a small court, a marble clad vestibule-frigidarium and a settling tank. Recovered in 2006, a platform, an apsed caldarium, a second caldarium, the praefurnium, a splash bath, tepidarium or laconicum, and a service passage, as well as a small cistern, bathroom (toilet), a hypothesized apodyterium, and a colonnaded corridor. The immediate conservation of the baths was complex especially because the delicate hypocaust system in the apsed caldarium had two partially fallen arches under the entrance floor, which had to be supported from further collapse. Using wooden struts, we shored up the entry entrance pavement and the two arches that were about to implode under the pavement. Additionally this room was in particular danger because of the exposure of its fragile hypocaust system to being deteriorated by the winter rains. The only interim measure we could take for the integrity of the friable hypocaust system was to create a temporary zinc shelter to cover the complete caldarium chamber and hope that this would protect its needs until consolidation could be undertaken.

Future conservation measures for the complex are on the drawing board and will be put into effect as soon as possible. Moreover, the baths are a complex area for tourist access. Again such plans have to be implemented so that tourists and scholars alike can easily visit these impressive remains.

## Temple

Work also continued to restore the West Corridor murals to show the embellished Nabataean corridor of antiquity. In 2000, unobtrusive informative bilingual signs had been placed to identify the major decorative components of the Great Temple corridor walls, but these signs have been mysteriously "lost" for some time.

The centerpiece of the Site Phase V Great Temple, dating to the first century AD , is the more than 600-seat theater placed in the middle of the structure. In 2006 two rows of the lowest theater seating were removed to excavate below them to better understand the stratigraphy. Our earliest strategy was to refill the sondage with
clean sand, but that would defeat the purpose of the stratigraphy being studied by future archaeologists. Carrying out a later plan in 2007 we designed a robust frame of metal uprights and struts set in a reversible mortar under the seats for support. Once the seats had been put back in place, reversible mortar was used as grout in between the blocks. Therefore, while the five rows of extant theater seating gives the impression of being a solid cavea, there is, in fact, more than a 5.00 m open sondage below the seating. This conservation scheme allows future researchers (albeit with some effort) the option of removing the seats to review the stratigraphy of the sondage. Whether or not these metal uprights with mortar consolidants have limitations is a complex question, but we are hopeful of their continued success.

As far as the theater orchestra was concerned, here in 2005 we had excavated an additional sondage. The sondage was a transverse cut located in the center of the orchestra floor of the theater in order to preserve as much of the in situ pavement as possible. The boundaries of the trench were the orchestra retaining wall and the pulpitum including the central niche in the pulpitum to the south and the north respectively. The trench itself was 6.96 m north south and roughly 1.96 m east west although terracing stones for the foundation of the floor made it difficult to keep the east west boundaries of the trench perfectly aligned. The uncovering of the central pivot stone used for laying out the apsidal structure of the theater was an unusual feature to find in situ, as was the recovery of the central artery of the subterranean canalization system with the majority of its capstones cracked in the middle. In our conservation of the feature, clean sand was placed on top of the south half of the orchestra opening and a metal grate was installed, positioned flat over the remains of the pivot stone, as well as the subterranean canalization system so that the structural integrity of the remains could be viewed. For added stability, the remaining orchestra floor was supported with replacement flagstones. Rune Frederiksen in Volume III will analyze the theater architecture, along with a study of comparable monuments.

## Erosion

In the winter of 2006 -spring 2007, a trou-
bling amount of soil erosion took place with appreciable soil loss, as can be seen in Fig. 7. The severity of erosion appears to vary markedly over various areas of the site. On site impact resulted in the washing away of the balk adjacent to the Upper Temenos cistern-reservoir. This threat will impact the long term sustainability of the walls and is a major cause for our concern. To counteract further erosion in 1999, we constructed a cross wall 110 m in length on bedrock to the south of the site. This wall does not span far enough to the west for the flooding water to have created a path to rush around its west end. To further protect the areas of the Upper Temenos west that are most vulnerable, a future project is planned to extend this wall some 40 m to the west, so that the impact to the site will be minimized.

Stone, particularly sandstone deterioration, is appreciable in the Temple's erosion, and the long-term efforts of the mortar on the sandstone are difficult to predict. It is a matter of judgment for the archaeologist and the conservator. For each stone there are differing porosities, differ-

7. Erosion in the Upper Temenos, 2007 (Artemis W. Joukowsky).
ing salt, water and acid absorption rates and a difference in how they react to sunlight, therefore each individual stone has its own problems of deterioration. One of our tasks is to monitor these factors, and therefore during 2007 "tired" ashlars were replaced.

## Information Systems

During the inter-excavation season, the Great Temple master plan process, one of the items raised by the team was not knowing where you are and what you are viewing within the monumental Nabataean Great Temple precinct. Petra as a tourist site has struggled to find its voice. In its labyrinthine environment and the visitor is often left confused. This remarkable site and its ruins are incomprehensible to many of the site's visitors. Local guidebooks carry little mention of the Great Temple, and local maps, for instance, don't even have the site marked on them! Our infrastructure plan included assisting the scholar-tourist, which had long been one of our priorities. The goals were to design and produce educational signs to increase awareness of the Nabataean Great Temple architectural and sculptural vocabulary and history. Communication was designed to take advantage of the experience when viewing a feature. As with a few of Petra's architectural monuments, the target audiences were tourists. The Great Temple team conducts all of its projects with environmental sensitivity and respect for Petra's historic landscape and the tourist needs of modern users. Working with the Jordanian Department of Antiquities and the Brown University Publication Services, we developed 37 educational point of reference signs to be placed on site. We sought to provide visitors with the opportunity to connect the enjoyment of visiting the Great Temple with information about what they were experiencing.

With funding from the Brown University Petra Expedition Fund, the Great Temple team worked with the technical assistance from the Brown University Publication Services and Graphic Design and the Jordanian Department of Antiquities to develop handsome bilingual signs in Arabic and English. The unobtrusive signs include information, interpretation, and identification, and provide information about the precinct and its history. The process was
initiated by our developing a design vocabulary with the most important information and interpretation. Using the city GIS data and master plan maps to develop highly legible precinct plans, we considered sign components including sign size, color, languages and text styles, graphics, stanchion design, and the materials to be used. Not only were there the knottier problems of writing, editing and reediting of the English by the author and Eleanor A. Power, but of the Arabic as well. Once the English texts were finalized, Brown University faculty members, Ramadan Hussein and Mirena Christoff, translated the English texts into Arabic. Kathryn deBoer, Art Director of the Brown University Publication Services designed the sign formats. As time went on we selected the manufacturer and reviewed shop drawings. Once the signs had been designed the final English and Arabic texts were sent to the Jordanian Department of Antiquities for their approval. A full set of matte laminated sandstone-colored signs were reviewed and manufactured. The three largest measured $113 \times 62 \mathrm{~cm}$ and presented the site plan, and six horizontal signs were designed for
explanations of the distyle in antis temple, the theater, the east propylaeum, the tetrastyle in antis temple, the Roman-Byzantine Bath complex, and the elephant-headed capitals. One example of such a sign is shown in Fig. 8. A set of 13 signs measuring $20 \times 15.5 \mathrm{~cm}$ explained specific features, such as the temple south passageway, the Lower Temenos east west retaining wall, the temple east and west chambers, the inner antae and the central arch. And another 13, measuring $20 \times 27 \mathrm{~cm}$, were devoted to offer explanations of features deserving lengthy explanations, such as the site phasing. Other signs measuring 40 x 28 cm highlighted the cultural history and architectural vocabulary of the precinct. In the end, finally, during this 2007 summer, we oversaw the sign installation as can be seen in Fig. 9.

In summary, ideally, our master plan team wanted to promote archaeology by education and increasing public awareness of and interest in archaeology, and the archaeology of Petra and the Great Temple, in particular. To enhance the archaeological record of the area and to promote archaeology by education, and to increase public awareness of and interest in the archaeol-

8. Great Temple sign (Artemis W. Joukowsky).

9. Sign installation, 2007 (Artemis W. Joukowsky).
ogy of the Great Temple, the Great Temple signs now provide interpretative guides to the site. The Great Temple's rich historic testimony now offers the visitor a greater understanding of the monument and its sectors of interest. Sensitive use of interpretative educational elements brings visitors closer to a cultural experience. Historic landscapes, like the Petra Great Temple, are places to interpret through signs, and thereby enrich the visitor's experience. Determining how to incorporate signs with interpretation into the Petra Great Temple fabric has been an important aspect of our 2007 fieldwork, bringing educational awareness, and thereby, increased visitor interaction with the Petraean cultural landscape. Already the signs are in constant use and enrich the experiences of visitors. As for brochures and other media like pod casts, we are beginning to develop concepts of design and oversee the fabrication of additional educational and interpretive information systems for the public edification of Petra Great Temple. Currently we are working on a podcast with video to introduce the site to the public, particularly to those who are unable otherwise to visit Petra. We are also working on
a brochure as a complement to the signs that can be handed out to visitors. As time moves on, we are finding new and expanding initiatives that simply require more thought and reflection.

## Artifact Analysis

Yearly implementation and the management of our various databases have helped us expand and ensure the continuity of information access and data preservation. Our goal has been to provide a continuous program of collections and archive management. This is of particular importance in relation to our coin catalog. From 1993-2006, we have collected approximately 681 coins. Some of the coins cannot be identified due to deterioration, which is typical of the coins found in Petra, because of the corrosive soil conditions.

Each year during excavation the coins are registered in the field, and cataloged in the site coin database with a preliminary reading. In Amman, Naif Zaban at the American Center of Oriental Research then cleans the coins; they are scanned, and are returned to the Petra Museum for their separate museum registry. After this process, which involves a time lag of several months, the coins are read by Christian Augé, Université de Paris I, and the final catalog is created by Deirdre G. Barrett. All the Petra Great Temple coins, except those of the 2005 and 2006 seasons, have been analyzed by Augé. This summer the 2005-2006 coins were read by Christian F. Cloke of the University of Cincinnati, who on special assignment, completed the examination and identification of all the site numismatics. Cloke also documented a comparative analysis of where the coins were found, their contexts, dates, (Nabataean, Roman, Byzantine or Islamic), and whether they came from local or foreign mints. The complete catalog of coins can be found in Open Context, and Cloke will present his numismatic analysis in Volume III of the Petra Great Temple.

Zeyad al-Salameen asked for permission to study and publish our 2005 coin collection, which was stored with the Department of Antiquities at the Petra Museum. His study will be of great interest to the team.

In conclusion, the pinnacle of the Nabataean state was from the first century BC to the second century AD. These were centuries in which

Nabataean freestanding buildings left their mark. The Nabataeans made every effort possible to demonstrate their power to their world. This was particularly the case when it came to constructing monumental buildings and unusual sculpture. The completion of the massive Great Temple excavation has now revealed the edifice in its entirety. Understanding the dynamics of the structure on a theoretical level has been continuing as well, but it is most difficult to define certain cultural traits that appear to reflect particular concepts evident in this structure. A considerable level of acculturation must be assumed, but there is a cultural clarity of evidence here: the Petra Great Temple with and in spite of the processes of cultural contact, diffusion and assimilation of architectural ideas, offers its own eclectic Nabataean statement.

Now a total 37 Great Temple signs are actually posted in ideal venues, and they have been extremely well received and are widely used by Petra Archaeological Park visitors. The number of visitors reading them and the compliments we have received has been some measure of our success. For sure, questions remain, as do the inherent problems due to further conservation measures and publication. Figure 10 illustrates the precinct as it appears today, and demonstrates that the physical dimensions of the Petra Great Temple are being preserved with close attention to the Nabataean
architectural character of the precinct. The Petra Great Temple project is moving into a period of renewed rigor that extends the reach of its scholarship and supports our commitment to the discovery, preservation and dissemination of the archaeological knowledge. We will continue to examine the ways in which the Great Temple architects confronted and challenged this religious and administrative edifice and the ways we continue to challenge it today. We know that the tourist visitor never sees the Great Temple the way that my team and I do right now. Our experience has become deeper and more profound over the years. Although we think we understand as much as we do, we still find wonder in the Great Temple precinct as well as questions that remain to be answered. The above comprehensive profile of the Great Temple research and preservation establishes the importance of 2007 in shaping the goals and the thought processes embedded in our consolidation of ideas as well as the remains. All of these factors will form the basis for further discussion.

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10. Petra Great Temple at the close of the 2007 season to south (Artemis W. Joukowsky).

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# TALL JUḤFIYYA PRELIMINARY REPORT ON THE 2004 AND 2007 SEASONS 

Roland Lamprichs and Ziad Al-Sa'ad

Under the joint directorship of Roland Lamprichs and Ziad al-Sa'ad the third and fourth seasons of archaeological excavations at Tall Juhfiyya were conducted from 17.05.2004-15 .06.2004 and from 15.04.2007-10.05.2007 (Fig. 1). ${ }^{1}$ The work mainly aimed at studying the archaeology of the early phases of the site, documenting its remains and increasing our knowledge and understanding of the site's history.

## The Season of $2004{ }^{2}$

Within six trenches more than 175 sqm were newly opened in 2004: four trenches, including a deep sounding, within the perimeter wall and two trenches on the slope of the tall (Figs. 2, 3).

Almost $92 \%$ of the more than 22,000 pottery sherds registered in 2004, date back to the late Iron Age. The remaining pieces date to the


1. Map of Jordan showing Tall Juhfiyya.
2. Both seasons were jointly funded by the GERA HENKEL STIFTUNG, Düsseldorf and the Faculty of Archaeology and Anthropology, Yarmouk University Irbid. The excavations were carried out with the constant support of the Department of Antiquities of Jordan and we would like to express our gratitude to its director
general, Dr. Fawwaz al-Khraysheh. Our thanks are also due to the inhabitants of the village of Juḥiyya, our excellent workmen and team members.
3. For more details see the final report on the 2002-2004 seasons which was released by the end of 2007 (Lamprichs 2007).

4. Area of excavation 2004.
early Iron Age, Persian and Omayyad periods. In addition the lower layers of the deep sounding (Fig. 4) brought to light pottery sherds of a late Bronze Age date for the first time at Tall Juḥfiyya. ${ }^{3}$

Furthermore new information concerning stratigraphy, dating, structure, function and so-cio-economic setting of the site were obtained. Within the already mentioned deep sounding which was dug for more than 6.50 m below surface level seven different stratigraphic units could be seperated. They are representing altogether two main phases of "occupation" and a later resettlement during Umayyad times, which could be summarized as follows:

4. Tall Juhfiyya 2004: deep sounding (photo by H. Debajah)

1. The first phase of "occupation" is characterized by a huge circular structure of still unknown function. It consist of several concentric walls made of huge stones (see Fig. 30). The space inbetween the walls was filled with small stones and pebbles. Pottery found within this structure belongs mainly to the late Bronze Age "chocolate on white" typus. By the end of this period the surface of the megalithic structure was partly levelled and beside other activities a perimeter wall, surroundig the plateau area, was built.
2. The following subphase 1 of the second phase of occupation at Tall Juḥfiyya was character-

3. Tall Juhfiyya 2004: view to the east (photo by H. Debajah).
4. For a detailed presentation and description of the 2004 pottery see Lamprichs (2007: 383-544 u. 595-600).
ized by small domestic structures dating to the early Iron Age (Fig. 5). They were built within the perimeter wall using some of the architectural remains of the late Bronze Age structure. Remains and objects like pestles, rubbers, mortars and clay vessels related to these structures point mostly to domestic and farming activities.
Subphase 2 is represented mainly by the remains of a farmstead excavated already in 2002 and 2003. More storage jars, grinding stones, pestles and other objects related to farming activities as well as in 2004 newly discovered bronze fibulae (Fig. 6), decorated stone vessels, beads, finger rings (Fig. 7) and more so called "luxury goods" confirmed the already given

5. Early Iron Age structures in the western part of the tall (photo by H. Debajah).

6. Tall Juhfiyya 2004: three bronze fibulae.

7. Tall Juhfiyya 2004: silver ring.
interpretation of the site as a quite prosperous farmstead consisting of a main building in the north and a storage and processing unit in the southern part of the tall (Lamprichs and al-Sa'ad 2004: 173-177).

A first stratigraphic and chronological analysis of the excavated pottery and objects furthermore showed that the farmstead was most probably set up by the end of the eighth or the beginning of the seventh century BC. According to our archaeological records it was in use at least until the end of the fifth century BC. It was only then, within the Persian period, probably connected to the death of Darius II, that the main building of the farmstead was abondened by its inhabitants.

During the following subphase 3 , which is covering the remainig part of the Persian period, that is mainly the fourth century BC as shown by a complete attic saltcellar (Fig. 8), only the so called storage and processing units in the southern part of the tall have been rebuilt and reused. A quantitative rise in open fire places, silos and garbage pits in the northern area does not exclude a temporary use of Tall Juḥfiyya during harvest times only (Fig. 9). By the end of

8. Tall Juhfiyya 2004: small attic saltcellar.

9. Tall Juhfiyya 2004: locus 6042, view to the south.
the Persian period Tall Juḥfiyya as a whole was temporarily abondened.

It was only after a gap of more than 800 years that the fringes of the site were resettled during Umayyad times. Characteristic remains of this resettlement at Tall Juḥfiyya are a cistern and several small rooms excavated mainly in 2002 (Lamprichs and al-Sa‘ad 2003: 104-107). By the end of the Umayyad period the site was finally abondened.

## The Season of 2007 (Fig. 10)

During our hitherto last season at Tall Juḥfiyya we looked into more than 220 sqm within seven

11. Area of excavation 2007.
trenches including a deep sounding (Fig. 11). New and conclusive information concerning the foundation level and pottery of the early phases as well as the first architectural remains, considered to be a circular megalithic structure, have been obtained (Fig. 12).

In all, 12,386 pottery sherds $(=430.00 \mathrm{~kg})$ were collected and registered. 1,244 pieces were classified as diagnostics (Figs. 13-23). Besides a huge amount of cooking pots and handles, many jars, bowls, bottoms, storage jars and decorated body sherds were found in 2007. Furthermore lids, spouts and lamps have been registered. Altogether 22 out of 28 defined wares could be identified in 2007. ${ }^{4}$ Pieces of the Iron Age are

10. Tall Juhfiyya: spring 2007.
4. For a detailed description of wares 1-24 see Lamprichs (2007: 115-122). Wares 25-27 have been registered for the first time in 2007 and have been defined as follows: Ware 25 - pieces of a fine, well burnt clay tempered with small particles of chalk, basalt and stone; reddishbrown slip inside and outside (2.5 YR 5/6 red - 2.5 YR 5/4-4/4 reddish brown). Ware 26 - a variant of
"chocolate on white" pottery. Ware 27 - medium-fine, well burnt pieces; roughly burnished and tempered with small chalk-, sand- and basalt-particles; beige to orange core and exterior (7.5 YR 7/4 pink; 7.5 YR 6/4 light brown; 10 YR 7/3 very pale brown; 10 YR 7/2 light gray; 2.5 YR 7/2 light gray); paint (stripes) decoration possible ( $10 \mathrm{R} 4 / 6$ red; $10 \mathrm{R} 3 / 4$ dusky red).

12. Tall Juhfiyya 2007 (post excavation): view to the south (photo by H. Debajah).
still dominant but the share of late Bronze Age sherds has been growing considerably (Fig. 22). Within specific squares (e.g. square 4) almost $71 \%$ of the sherds date back to the late Bronze Age. Pottery of the "chocolate on white" typus are very common in the lower levels of the site. Besides pottery sherds only bone-, flint- and ba-


[^42]salt-fragments, an arrow-head made of bronze (Fig. 28), a bead fragment and a few pieces of wood have been found in 2007 (Figs. 24-28). In general finds were very few in the lower levels and most of the finds made in the upper layers are still related to domestic and farming activities.

Following the results achieved in 2007, Tall Juḥfiyya was founded on natural bed-rock during the late Bronze Age as a huge circular "structure" measuring more than 50.00 m in diameter (Fig. 29). As shown by our excavations this "structure" was most probably made up of several concentric walls ( $>3$ ), each seperated by a distance of approximately 2.00 m (Fig. 30). Some of their inner faces carried a lime plaster. The same is true for some of the small dividing walls connecting the concentric walls. The areas in between the main circular walls were filled intentionally with medium sized lime- and flintstones forming a huge megalithic structure of still unknown function. Its general state of preservation is good and the excavated parts of the concentric and dividing walls still have a hight of more than 4.50 m . The width of the excavated walls measures up to $1,80 \mathrm{~m}$ (Figs. 31, 32, 33). A thick layer (c. 0.20 m ) of lime, sloping down to the center of the site, finally covered and sealed the megalithic "structure" (Fig. 34). The reason for this is not clear and convincing parallels are hardly known for the region.

Only the central(!) part of Rujm al-Hirì (Kochavi 1989; Zohar 1989; Mizrachi et al. 1996),

14. 1. ware 1, locus 6082 , sq. 6 ; 2. ware 27, locus 3088/97 (baulk), sq. 3; 3. ware 1; locus 3088/97 (baulk), sq. 3; 4. ware 1, locus 3073, sq. 3 .
15. 1. ware 27, locus 4055, sq. 4; 2. ware 21, locus 3078, sq. 3; 3. ware 27, locus 4056, sq. 4, remains of paint; 4. ware 27, locus 8041, sq. 8; 5. ware 21, locus 6082, sq. 6.
a site situated in the southern Golan area, has some features in common with the structure excavated in the lower levels at Tall Juḥfiyya. Based on this, an interpretation of Tall Juḥfiyya during the first phase of "occupation" as a late Bronze Age burial cairn seems possible. More scientific investigations and excavations, however, are badly needed to verify this hypothesis.

By the end of the late Bronze Age at around 1200BC and during the following Iron Age times the function of the site changed consid-
erably. The huge circular structure of stones was leveled by another fill of medium sized lime- and flintstones (Fig. 35). A perimeter wall was errected and most of the late Bronze Age walls were reused as foundations for a "fortified farmstead" already known from our excavations in 2002-2004 (Lamprichs and al-Sa‘ad 2003, 2004). The spaces in between the circular walls now became semicircular passageways (Fig. 36) connecting the main farmstead building in the north with the storage and processing facili-

16. 1. ware 1, locus 8042, sq. 8; 2. ware 4.1, locus 4047 , sq. 4, 5YR 7/6 6/6; 3. ware 1, locus 3508, sq. 3; 4. ware 1, locus 3063, sq. 3.
17. 1. ware 27, locus 6085, sq. 6; 2. ware 21, locus 4059, sq. 4; 3. ware 25, locus 3072.2, sq. 3; 4. ware 26, locus 6082, sq. 6; 5. ware 21, locus 8036, sq. 8; 6. ware 4.1, locus 4051, sq. 4, 7.5YR 7/6 6/6.
ties in the southern part of the tall (see Lamprichs and al-Sa‘ad 2004: 174-177). In this way the round structure of the site was maintained through time from the late Bronze Age down to the Omayyad period.

## Summary

Summarizing our results, we may say that the north Jordanian plateau during the late Bronze Age was most probably characterized by round megalithic structures like Tall

Juḥfiyya and many dolmens of an earlier date. Around 1200BC, however, the north Jordanian landscape changed considerably. Sites like Tall Juḥfiyya, Tall Bayt Yāfā, Tall ash-Shiqāq and others, most probably used as burial cairns during the late Bronze Age, changed their function and were used for domestic and farming activities from now on. Starting with small domestic chambers during Iron Age I they became flourishing and prosperous farmsteads during Iron Age II and III. After a gap

18. 1. ware 21, locus 4056, sq. 4; 2. ware 4.1, locus 3062, sq. 3, 2.5YR 5/6 red; 3. ware 25, locus 4062, sq. 4; 4. ware 26, locus 4055, sq. 4, white slip; 5. ware 4.1, locus 4060, sq. 4; 6. ware 21, locus 4060, sq. 4.

19. 1. ware 21, locus 6086, sq. 6; 2. ware 26, locus 4050, sq. 4, white slip, red (2.5YR 4/6 5/6 red) dots and remains of dark gray (7.5YR 8/0 8/2 dark gray) stripes; 3. ware 27, locus 6081, sq. 6; 4. ware 21, locus 4061, sq. 4 .
in occupation the fringes of the site were resettled again during Umayyad times. The circular structure of the site, however, was kept through the ages.

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20. 1. ware 4, Locus 6081, sq. 6; 2. ware 22, locus 4052, sq. 4; 3. ware 22, locus 4068, sq. 4; 4. ware 21, locus 4065, sq. 4; 5. ware 22, locus 4056, sq. 4; 6. ware 21, locus 6086, sq. 6; 7. ware 21, locus 2033, sq. 2.

21. 1. ware 27 , locus 4057, sq. 4; 2. ware 21, locus 6086, sq. 6; 3. ware 21, locus 4055, sq. 4; 4. ware 21, locus 3077, sq. 3; 5. ware 21, locus 4053, sq. 4; 6. ware 2, locus 2033, sq. 2; 7. ware 25, locus 6086, sq. 6; 8. ware 22, locus 4068, sq. 4.

22. 1. ware 26, locus 4054, sq. 4, 3 stripes (10R 3/4 dusky red); 2. ware 27, locus 4057, sq. 4, 4 stripes; 3. ware 4, locus 4056, sq. 4, 4 stripes (5YR 3/4 dark reddish brown), slip (5YR 7/6 6/6 reddish yellow); 4. ware 22, locus 3074, sq. 3, red paint (10YR 3/4 dusky red); 5. ware 26, locus 4067, sq. 4, white slip, red paint (10YR 3/4 dusky red); 6. ware 27, locus 4068, sq. 4, red paint (10YR 5/6 red), pink clay (7.5YR 7/4 pink); 7. ware 21, Locus 4057, sq. 4; 8. ware 22, locus 4066, sq. 4, red stripes (10R 4/8 red); 9. ware 22, locus 4500, sq. 4, red paint (10R 4/8 red); 10. ware 26, locus 4053, sq. 4, three red stripes (10R 3/2 dusky red); 11. ware 1, locus 4059, sq. 4, bar-handle.

23. 1. ware 4, locus 3061, sq. 3; 2. ware 4, locus 2032, sq. 2 .

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24. 1. mortar, red stone, 4.8 kg , locus 6052, no. 6323, sq. 6.

25. 1. mortar-fragment, basalt, $2,0 \mathrm{~kg}$, locus 10013, no. 10127, sq. 10; 2. mortar, basalt, $0,7 \mathrm{~kg}$, locus 3056 , no. 3250, sq. 3.

26. 1. mortar-fragment, basalt, $0,3 \mathrm{~kg}$, locus 3062 , no. 3229 , sq. 3; 2. alabaster-fragment, $0,15 \mathrm{~kg}$, locus 3060 , no. 3224, sq. 3; 3. bowl-fragment, basalt, $0,37 \mathrm{~kg}$, locus 3065, no. 3249, sq. 3 .

27. 1. pumice stone, $0,05 \mathrm{~kg}$, locus 14023 , no. 14067 , sq. 14; 2. clay-disc (spindle whorl), 0,005kg, locus 4045 , no. 4816, sq. 4; 3. clay-disc, 0,01kg, locus 6078, no. 6321, sq. 6; 4. clay- button, 0,02kg, locus 4500, no. 4506, sq. 4; 5. spindle-whorl, clay, 0,02kg, locus 4500, no. 4507, sq. 4; 6. clay-disc (spindle-whorl), 0.04 kg , locus 3507, no. 3516, sq. 3 .

28. 1. arrow-head (before restoration), bronze, $0,015 \mathrm{~kg}$, locus 4062, no. 4246, sq. 4; 2. arrow-head (after restoration); 3. bead-fragment, carnelian, $0,001 \mathrm{~kg}$, locus 4049, no. 4203, sq. 4; 4. glass-fragment, $0,001 \mathrm{~kg}$, locus 15006, no. 15018, sq. 15.

29. Architectural remains $-a$ general view of excavated areas 2007.

30. Circular structure of the late Bronze Age.

32. Excavated walls 2007: view from north.

33. Deep sounding 2007.

31. Excavated walls (1-3): a detail view from north.

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34. Artificial section (squares 3 and 8) showing the structure of the "cairn".
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35. Fill of small and medium sized lime- and flintstones.

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36. Example of a semicircular passageway.

# PRELIMINARY REPORT ON EXCAVATIONS AT AL-ḤUMAYMA, ANCIENT HAAWARA, 2004 AND 2005 

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## Introduction

The excavations at al-Humayma, a Nabataean through Umayyad period site in the Hismā desert midway between Petra and 'Aqaba, have focused in recent years on the Roman fort and the adjacent Nabataean and Roman period civilian settlement. For reports on previous campaigns, see Oleson et al. 1995, 1999, 2003. Between 2004 and 2006 Oleson, in collaboration with the Friends of Archaeology in Jordan, also directed the renovation of al-Humayma exhibition rooms in the 'Aqaba Archaeological Museum, and the provision of a photographic and informational display in the Visitor's Centre built at the site by the Ministry of Tourism in 2005. ${ }^{1}$ During this same period, under the direction of Sausan Fahkri and Manal Basyouni, the Department of Antiquities has undertaken several projects of clearing and stabilizing ancient structures around the site with the aim of tourism development.

## Nabataean Town and Roman Vicus (E125, E128)

Although founded as a Nabataean town, past
excavations (in Fields E125 and E077) revealed that the structures of Nabataean Hawara were largely dismantled to build the Roman fort. Subsequently, a new civilian community (a Roman vicus) developed outside the fort on top of the levelled remains of the Nabataean town. Since 1998 Reeves has been exploring the nature and extent of this Roman period vicus as part of an on-going project to examine the relations between soldiers and civilians in a garrisoned town of the Roman Near East. During 2004 and 2005 excavations were completed on a large multifunctional complex (E125), a small mound was probed to reveal another mudbrick structure (E128), and the geophysical team surveyed outside the fort in an attempt to locate other vicus structures.

## Roman Insula (E125)

Excavation in Field E125, located ca. 90 m southwest of the southwest corner of the Roman fort, has been ongoing since 1996 under of the direction of K. ‘Amr (1996) and M. B. Reeves (1998, 2000, 2004, 2005) (Fig. 1). The goals of the 2004 and 2005 excavation seasons were to

[^43]

1. Plan of site with indication of ancient structures.
determine the overall plan of the complex including its exterior walls and entrance points, to determine whether the interior areas of the complex formed one unit or several units, to uncover the full extent and appearance of the shrine, and to finalize the phasing in all parts of the complex. Although analysis is not yet complete, the data necessary to achieve these goals have now been collected.

With the exception of the later, differently aligned walls running northeast over the structure from Square 01, all of the walls shown in Figure 2 existed during the Roman phases of the complex (see Phase 3 below). At that time the complex was organized along the lines of a Roman urban insula, or city block. Architecturally, the complex formed a single entity, but the interior space was divided into at least three discrete structures: a shrine in the southeast quadrant, a
domestic structure in the northeast quadrant, and one or more unclassifiable structures in the western half of the complex. All of these structures shared party walls but were inaccessible from each other and had their own exterior entrances. The insula was large, containing over 30 rooms and occupying over 1200 sq. m, yet the Roman period complex was inelegant compared to the Nabataean structures that preceded it. The Nabataean structures were built with ashlar blocks and mudbricks, and their interiors were decorated with frescoes. In contrast, the Roman period insula contained an eclectic mix of reused ruins, and pisé and mortared cobble walls faced with potsherds or cobbles.

## E125 Phasing

The final definition of the complex phasing of E125 will not be possible until all the ceramics

2. Roman Insula (E125), Plan.
have been read. Preliminary readings and other chronological evidence suggest eight main phases for the structures in Field E125. This scheme supersedes that proposed in 1999 (Oleson et al. 1999: 421-26).

Phase 1 corresponds to the florescence of the Nabataean town (first century BC to early second century AD). During this phase, a cluster of buildings was carefully constructed out of fine sandstone blocks or neat mudbricks. Traces of such buildings have been found throughout Field E125, but the total number of Phase 1 structures is indeterminable. Significantly, however, two adjoining buildings (the square stone building enclosing Room H and the mudbrick building west of it in Square 03) did not share party walls, as was the norm in the Roman period. Instead each of these Nabataean structures had separate walls that abutted at the foundation level (Fig. 3). Since the stone building was probably a shrine, it is possible that the separation was maintained for religious reasons. The stone "shrine" (of which only lower courses

3. Abutting foundations of two Nabataean walls behind bins in Room H, E125.
survive) was constructed from large, freshly quarried ashlar blocks bearing the characteristic diagonal "Nabataean" trimming. Other Phase 1 structures (e.g. in Squares 02-05) were also constructed carefully, although at less expense, with mudbrick walls on multi-course cobble foundations. The cobble foundations were not dug into the surface soil, but sat at floor level. The floors consisted of hard packed soil in utilitarian areas and flagstones in more formal areas. Most rooms were roofed with stone arches that sprang from the side walls and carried either stone roofing slabs or plastered reeds. The walls, arches, and exposed ceiling slabs were all coated with wall plaster, which was sometimes left white and sometimes decorated with polychrome geometric designs and figural scenes applied by the true fresco method (Oleson et al. 1999: 422-23). Ceramic pipelines and hydraulic channels (e.g. running into Square 14) also seem to date to this period. It is impossible to know the full extent of the Phase 1 neighbourhood, as all the stone walls were levelled almost to their foundations, and all the extant architecture was renovated in the Roman period.

Phase 2 corresponds roughly with the Roman takeover of the Nabataean Kingdom in the early second century AD. The buildings in E125 (and the adjacent E077) were heavily damaged at that time, as exemplified by the robbing out of Room H's stone walls down to the foundation courses. This quarrying of stone from extant structures to build the Roman fort meant the physical destruction of the Nabataean town.

Some decades after the Roman garrison had established itself, an insula was constructed in Field E125 that used the remains of the earlier buildings. Phase 3 (late second to mid-third century AD) represents the heyday of this Roman period complex. The standard of construction of this large, multi-component insula was considerably below that of the original Nabataean buildings. Whenever possible, extant walls, ceilings, and floors were incorporated into the new structure. Mudbrick walls whose surfaces had been damaged were repaired and faced with pottery or cobbles. Adjoining, undamaged sections of wall, where sections of Phase 1 fresco remained in situ, were at this time coated in whitewash, presumably to conceal the remnants of fresco and present a uniform appearance.

Other Phase 3 alterations consisted of replacing arches with walls, lifting paving stones, and blocking or opening doorways. New walls often incorporated recycled construction materials (both stone and mudbrick) in their lower courses, whereas their upper courses reflected a new construction method (pisé). Sometimes (but not always) large pieces of pottery or cobbles were attached to their faces, matching the technique on the repaired walls. Where they survived the Nabataean period, the stone slab ceilings supported on arches remained in use. Other rooms were roofed with reeds and plaster. Although the buildings in this period were not as fine as those whose shells were being reused, this Roman period insula complex was both large and functional, containing over 30 rooms subdivided into at least three discrete structures. The extant community shrine dates to this Roman phase (Fig. 4).

To judge by the coins on the floor and the other objects found within the shrine's naos (Room H), this shrine remained in use until at least the mid-third century. Sometime after that, the shrine was abandoned (Phase 4). The naos may have been cleared out at the beginning of this abandonment, because almost no valuable or reusable objects were found in situ, only a betyl and an altar with Latin inscription. The subsequent abandonment lasted approximately twenty to fifty years, during which time 2030 cm of soil built up over the floor of the naos, and soil and ash accumulated in other parts of the insula (e.g. in Rooms B, C, and F). It is
tempting to link the abandonment of a community shrine patronized by Hawara's garrison with a time of military crisis when the garrison had to be redeployed elsewhere. Zenobia's uprising (270-272; cf. Graf 1989) provides a likely context, although further analysis of the pottery will be necessary before we can date the abandonment precisely. Whatever the reason, the departure of a 500 person garrison was a profound change for a small community, in which, during the previous century, the soldiers had probably formed over half of the resident population (Oleson 1997: 177). The families of the soldiers presumably followed the redeployed garrison. Those merchants whose livelihoods depended on the soldiers' business might have followed the garrison as well, leaving no one to take care of the shrine.

During this period of abandonment, many of the arches and ceilings in the E125 complex collapsed (Phase 5). In the shrine's naos the collapse broke both the betyl and the altar and also created a thick layer of tumbled stones that preserved the contents of the room. The pottery suggests this collapse occurred in the late third century. No earthquake is known to have occurred in the region at this time, so it is possible that the combination of the abandonment and the poor repairs of a century before had undermined the complex's structural stability.

The final ancient phase of occupation is characterized by limited and sporadic reuse (Phase 6 ). Squatters apparently moved in and reused parts of the rooms. They lifted some of the tum-

4. Roman period naos with betyl, legionary altar, and inscribed column fragment in place (Computer reconstruction by Chrysanthos Kanellopoulos and Platon Konstandopoulos).
ble and piled it elsewhere. In the cleared areas they installed domestic equipment such as basins, millstones, $t$ ābūns, and pottery bins. For example, in Room A the voussoirs of the northern and central arches were removed from the northeast corner of the room, while the voussoirs in the northwestern corner and all those of the southern arch were left where they had fallen. A kitchen area was set up in the cleared space, consisting of a $t \bar{a} b \bar{u} n$, a storage bin, and a millstone.

The squatter occupation ended with the final collapse of the walls still standing (Phase 7). In many areas, in situ domestic assemblages were trapped beneath the debris. For example, the mudbrick wall along the north side of Room F collapsed and crushed the pottery in an adjacent bin. This collapse, which occurred in the late third or early fourth century, marked the end of habitation in the complex. No one apparently even attempted to rebuild in this area in the fourth century, when the return of the garrison, reoccupation of the fort, and renovation of the bath house (E077) signalled the return of some prosperity to the town and to the vicus region.

After the final collapse of the walls, the ruins of the E125 complex and the objects trapped within seem to have been largely ignored. Over the subsequent millennium and a half there was some sporadic activity within Field E125, which sometimes coincidentally affected the buried ruins (Phase 8). During this period, ancient walls were dismantled, new walls were built over top (Squares 01, 03, 15, 20, 31, 37, and 40), and a burial was dug into earlier occupation debris (Square 19).

## Roman-Period Community Shrine

One of the most important discoveries of the 2000 excavation season was the presence of a one-room shrine located on the southern side of the E125 complex, in which the soldiers and civilians of Roman Heawara had come together to worship the guardian deities of their settlement (Room H, Fig. 4). A large betyl, probably representing the town's patron deity, was found in the centre of this shrine, facing east. Next to it stood an altar with Latin inscription dedicated by the soldiers of the Legio III Cyrenaica to Jupiter Ammon, their regimental deity, and adjacent to that a truncated column dedicated by a private
individual to Zeus Serapis (Oleson et al. 2002, 2003). Other votive objects found in the E125 complex (in reused contexts) included a faience ram's head amulet (showing Jupiter Ammon) and a mother-of-pearl or alabaster figurine of a goddess (Reeves, in preparation). These objects suggested much about the nature of the deities worshipped in Roman Hawara, but, at the end of the 2000 excavation season, the plan of Room H , the location of the entrance, and the relation between the shrine and the rest of the E125 complex remained unclear. The 2004 and 2005 excavation seasons resolved these questions.

Where the shrine room is currently located there once stood an impressive Nabataean building, the finely constructed stone walls of which can be seen running through Squares 09, 15, and 14 to form a square. Given that Nabataean shrines frequently contain a square naos housing the cult statue (Netzer 2003: 67-110), and given the presence and orientation of a Roman period community shrine on top of this structure, we believe the original building was probably the naos of a Nabataean shrine. This shrine, like the other Nabataean civic buildings, was damaged around the time of the Roman annexation, and all but the lowermost courses of its stone walls were taken for construction of the fort. Sometime later, the shrine was rebuilt, probably (given the presence of both a Nabataean betyl and an altar with Latin dedication by the legion) in an attempt to foster feelings of solidarity between the soldiers and civilians in this garrisoned town. The Roman period naos was undoubtedly less carefully built than the original Nabataean structure, yet more care seems to have been taken in restoring this room than in building the rest of the Roman period insula.

In the Roman period only the eastern arch of the naos was still standing, and the western wall of the room was levelled off and left to serve as a votive shelf. The mudbrick wall of the separate Nabataean building to the west was now converted into the rear wall of the shrine, and at least the lowermost section of this wall was coated with large pieces of pottery (Fig. 5). Hundreds of fragments of polychrome fresco in a variety of designs suggest that other parts of the room were again elegantly decorated. This fresco coated the mortared cobble walls that were erected over the foundations of the ashlar walls on the south,

5. Roman period naos with original west wall leveled and pottery attached to face of new west wall.
east, and north sides of the room. Mudbrick bins seem to have been constructed at the same time, directly on the Roman period floor. A wall stub, which on the basis of its construction technique should date to the Nabataean period, formed the back of both the small and large bin. The front of the stub-wall had been decorated with a frescoed design showing faux columns and marble veining (Oleson et al. 2003: fig. 12). This Nabataean phase fresco survived in situ through being sealed within the small Roman period bin which, like the large bin, abutted the stub-wall. The front and side walls of the two Roman bins were constructed out of mudbricks faced with wall plaster, possibly recycled from the previous structure. The three flagstones leading up to the
betyl and the flagstones comprising the processional way through the courtyard also appear to have been recycled for use in the Roman period shrine.

Given the extensive recycling of building materials throughout the Roman period shrine, as well as the incorporation of walls from more than one structure, it is difficult to draw firm conclusions about the appearance of the Nabataean religious structure. In contrast, the appearance of the Roman period sanctuary is much clearer (Figs. 2, 6, 7). The Roman community shrine constituted a distinct religious precinct, organized hierarchically as a box within a box within a box. The innermost box, centred at the back of Room H, was a large bin for the stor-

6. E125 shrine precinct, overview facing west from courtyard door.

7. Roman period shrine precinct (Computer reconstruction by Chrysanthos Kanellopoulos and Platon Konstandopoulos).
age of religious paraphernalia. Centred in front of it stood the cult statue (betyl) in a position matching that of the cult statues at Khirbat atTannūr (McKenzie 2003: fig. 179). This central cult nucleus was then enclosed by the square walls of the naos (cf. Netzer 2003). The naos, in turn, was enclosed within a rectangular open-air walled courtyard (the temenos), in whose northwestern corner the naos was situated. The main axis of the shrine ran east-west from the door of the courtyard (in Square 28), along a narrow, 20 m long paved processional way, through an external built-in altar (of which only the base now survives), through the door of the naos, and along a line of three complete large pavers which ended at the cult statue and the large bin. This east-west axis was visually reinforced by the symmetrical arrangement of two long planters (once filled with flowers or shrubs) that flanked the northern and southern sides of the processional way. In addition, the door of the naos was framed by a pipe-fed water basin on its north and a bench (or bin) on its south.

The Roman period naos comprised a square enclosure (Room H) roofed only on the east, with the result that the western half was open to the sky (Fig. 4). Two bins and a votive shelf lined the western wall. The betyl and all the votives had been placed along the western side of the room facing east. The votives included the inscribed legionary altar and column fragment (Oleson et al. 2002: 112-19, 2003: 47-49), an intact ceramic lamp, many lamp fragments, a
terracotta grape leaf (Fig. 8), a Roman coin with a hole drilled through its centre, and some Greek ostraka (as yet unread).

## The Northeast Domestic Structure

In addition to the shrine precinct, there is one other identifiable discrete unit within the E125 complex. This second unit occupied the entire northeastern quadrant of the complex and was accessed via an external corridor ( $\lambda$ ) located

8. Terracotta leaf from votive shelf in naos.
in the centre of the northern side of the insula (Squares 22 and 12). The door between Corridor $\lambda$ and the northeastern structure could be locked, thus ensuring privacy for the residents of the unit within. This unit, which included Rooms A, E, F, G, P, Q, R, S, T, $\zeta, \eta, \theta$, and $\rho$, took the form of a large courtyard house comprising a central courtyard (Area F) ringed by rooms on all sides. This house, like the rest of the insula, was built in the Roman period over the remains of one or more Nabataean structures. Also like the rest of the insula, it continued in use through several phases of collapse and reuse. The patterns of use within the structure over time are still being analyzed. There are a great many finds from this structure, including many crushed domestic assemblages, which will assist with the final interpretation.

## Western Half of the E125 Complex

As the plan of E125 shows, the western half of the complex is not as well defined as the eastern half. This is unfortunate, because the western half of the insula must have contained one or more self-contained units. Unfortunately, the total number of units, their function, and even the access routes between many rooms can no longer be determined. In contrast to the eastern portions of the complex (which remained relatively untouched since the fourth century), the western regions were greatly disturbed over the subsequent centuries. A burial was dug through a mudbrick wall in Square 19, and walls were built of robbed-out stones over the ruins in the Ottoman period. The worst damage, however, resulted from the presence of the modern road through the site. This damage penetrated to the foundations of the complex and completely obliterated mudbrick walls and sub-floor pipelines. For example, the western extent of the southern wall in Square 21 has completely vanished, even though a pot, which seems to have been embedded in the floor in front of it, remained in situ. Similarly the east-west walls in Squares 34 and 38 now come to an abrupt end, associated with piles of cobblestones.

The modern dirt road is shown in Figure 2, as is the Nabataean period pipeline that provided water for the shrine. Since the Nabataean pipeline dives under the modern road just north of the E125 complex, we believe an ancient road
was located in approximately the same place. Over the subsequent centuries, the path of this road has probably shifted closer to, and in places over (e.g. Square 40), the remains of the E125 complex, a hypothesis tentatively supported by the geophysics data (Oleson et al. 2003: 53, fig. 14). The encroachment of this major trackway through the site has probably led to the destruction of many of the features on the west side of E125. The seemingly random piles of cobbles in some of the areas adjoining the road most likely represent the remnants of the bulldozed cobble foundations of mudbrick walls. Since this dirt road has been regularly used by residents, tourist companies and the Jordanian army, it is likely that multiple attempts have been made to level the road bed, to the detriment of the ruins.

The damage to the western side of E125 makes it impossible to determine the plan of this section of the insula, but given the available space, it is likely that there were multiple units on this side of the structure. Moreover, given the hypothesized presence of the Roman period road, it is quite likely that the missing units would have included shops and taverns for which road frontage would have been highly desirable. As yet, no such businesses are known at al-Humayma, which highlights the urgent need to excavate the site's buried mudbrick structures before any more are lost.

## Mudbrick Structure (E128)

Directly south of E125 lies a small mound. No wall lines or large stones were visible on the surface, but, given the use of earthen construction in E125 and the proximity of the mound to the Nabataean and Roman structures in Fields E125 and E122, it seemed likely that the mound contained another earthen structure. A test probe, laid out over the highest point in the mound, confirmed the presence of a mudbrick building that seems to date to the Nabataean period of the site (Fig. 9). Two walls of this building were exposed, each constructed similarly to the Nabataean phase walls in Field E125 with mudbricks laid on cobblestone foundations. Moreover, since the walls abut and differ in width, there is likely more than one Nabataean phase to this building. Later floor levels suggest post-Nabataean reuse as well (in several phases). Given that the walls were preserved to a height of approximately 1 m ,

9. Mudbrick walls in Field E128, Plan.
preservation of much of the structure within the mound is likely. Full excavation (to be carried out next season) should clarify the phasing of this structure and, in conjunction with the work on adjacent areas, will enhance our understanding of the character and fate of the Nabataean town and of the Roman vicus that succeeded it.

## Geophysical Survey of the Vicus

A detailed discussion of the geophysical results is presented below. Although the survey did point to a few promising areas for future excavation, the techniques were not able to produce a clear map of the vicus, as had originally been hoped. Presumably the vicus contains additional mudbrick and pisé structures similar to the two already discovered. Unfortunately the very nature of such ruins (mud architecture surrounded by dissolved and rehardened mud) does not produce readily identifiable signals for the
geophysical devices. Future work on mapping the vicus will therefore rely on more traditional survey techniques.

## Field E116: The Roman Fort

The goals of the 2004 and 2005 excavation seasons in the fort were definition of the plans of the Praetorium (Area I) and Horreum (Area J), investigation of a major structure in the southwest quadrant (Area N), and further exploration of the road and water-supply systems (Fig. 10). Although some architectural sub-phases were identified in individual buildings, the overall phasing of the fort complex is uniform. Phase 1 (soon after 107) saw construction of the fortification walls and abutting parapet walk, and all interior structures, including the road system, pipelines, and drains, on largely unoccupied ground. Phase 2 begins with the partial destruction of the fort sometime in the second half of the third century, possibly by the forces of Queen Zenobia, followed by a period of abandonment. During this phase some roofs and walls collapsed, and debris accumulated in and around the structures. Diocletian's reworking of the system of frontier defence may have resulted in redeployment of the Havarra detachment at this time. Phase 3 begins with renovation and reoccupation of the fort early in the reign of Constantine. Some rooms were cleared of debris, which was dumped either outside the structures or into Phase 1 rooms that were not needed. Floors and walls were renovated, and storage bins were installed in rooms used for habitation. At least some parts of the fortification and internal road system were renovated at this time, as well. Phase 3 ends with the final abandonment of the fort in the late fourth century.

## E116 Area I: Praetorium

In 2000 excavation began on Area I, located in the northwest quadrant of the Roman fort, south of the reservoir and west of the Principia. Based on the location and plan of the structure (Johnson 1983: 135, 139; Webster 1998: 215-22, 224-25), the presence of extensive fresco decoration, and the use of mosaic flooring, so far unparalleled elsewhere at the site or in the Hismā, the building was identified as the Praetorium, the residence of the commanding officer of the fort's garrison (Fig. 11). Excavation during the

10. Roman fort, plan.

2004 and 2005 seasons focused on complete exposure of the mosaic flooring and the principal rooms in the Praetorium, and recovery of the plan of the entire structure.

Although a few ambiguities remain, the plan of the Praetorium is now well established. Since the excavation squares overlap the various rooms and lie at a slightly different orientation, this presentation will rely on room designations. With the exception of Rooms I and J (see below), where a small room with hypocaust floor was installed, the archaeological strata are remarkably uniform throughout the building. The rooms are filled with wall and roof debris mixed with ceramics, for the most part fragmentary and incomplete, that date from the later first century
to the mid-fourth century. The occasional coins show the same chronological range, and there is a constant scatter of iron nails in poor condition. Clearly the structure was cleared out prior to Phase 3 reoccupation, and possibly at the time of its final abandonment. The remarkably thorough fragmentation, scatter, and chronological mixing of potsherds in structures of various periods across the site of al-Humayma probably are a result of the constant traffic of sharp-hoofed, inquisitive ovicaprids through every corner of the site both during its occupation and after its abandonment.

Like all the other original (Phase 1) structures in the fort, built immediately after the conquest of the Nabataean kingdom by the Romans

11. Praetorium, plan of excavated sections, with indication of dimensions in Roman feet.
in 106, the Praetorium is a rectilinear structure oriented 4 degrees east of N. Now that the plan is known, the original design process can be deduced with a high degree of probability by applying the Roman Foot (pes monetalis, henceforth "RF", 0.296 m ) to the metric dimensions of the remains (Fig. 11). A square was laid out at the appropriate orientation, 90 RF on a side; an east-west line was then laid out across the square, 60 RF north of the south side. Two further lines were then laid out north-south, 20 RF in from the east and west sides. These lines defined a central courtyard 60 RF long north to S , and 50 RF wide. The long rectangles framing the east and west sides of the courtyard were then each divided into rooms theoretically 15 RF wide and 20 RF deep. Five long, rectangular rooms were
laid out across the northern third of the structure, all 30 RF long, oriented north-south: two outside rooms 20 RF wide (possibly subdivided in length); two at the northeast and northwest corners of the courtyard, 12.5 RF wide; a grand central room 25 RF wide. The present measurements of the structure vary slightly from these ideals, depending on whether the walls were constructed with their outer or inner face on the surveyed line, or the medial line of the wall itself. The walls in the Praetorium - built for the most part of rubble set in mud, with occasional use of blocks at corners and doorways -- range in thickness from 0.64-0.70m (2.16-2.36 RF), but the design width was probably 2 RF. As built, the outside, north-south dimensions of the Praetorium are just over 93 RF (27.16m), sug-
gesting that one east-west wall was built outside the surveyed line, and the other straddling it. Similarly, the courtyard is just over 50 RF wide ( 14.88 m ), but only 58 RF long ( 17.16 m ). In this case, the north-south walls and one east-west wall were built outside the survey line, but the other east-west wall was built inside it. The arrangement of doors in the original plan is probably that seen in Phase I (described below); as built, the doors range around 5 RF wide. This type of planning can be documented for most of the other structures in the fort.

Engaged piers for arches to support the roof so far have been found only in Room A and Room P, and possibly in Room K, although the blocks forming other piers only abutting the wall may have been robbed out. The recovery of ceiling plaster and large stone roofing slabs from soil loci within the structure, and the minimal appearance of roof tile fragments, suggests that the Praetorium had a flat roof supported by arches. It is also possible that some of the smaller rooms were roofed with poles and palm thatch covered with an impermeable roof plaster. The recovered roof plaster is often multi-layered, indicative of periodic repair and refurbishment. Nevertheless, the possibility of a pitched, tiled roof cannot be ruled out completely, especially for Phase 1 of the building.

Phase 1 of the Praetorium was built as part of the initial construction of the fort. The walls rest on undisturbed soil, and Nabataean finewares of the late first to early second century appear in some foundation deposits and beneath some paving slabs. Furthermore, the structure fits into the overall scheme of orientation, function, and the road system within the fort. Parallels with other Principate period praetoria make it likely that the main entrance door was in the centre of the south wall, leading directly into the courtyard, and on line with a central fountain and basin, and with the entrance to the central room in the north wing of the building. Unfortunately, this portion of the wall has been lost to stone robbing.

There is an entrance to the building through Room N, part of a small structure (ca. 4.40 m sq ; 15 RF ) projecting from the façade of the building near the southeast corner of the courtyard (Fig. 11). The entrance door faces west, onto the paved area in front of the Praetorium, and
leads by means of a descending step to a room paved with neat sandstone slabs. There is a low bench along the east wall, constructed for the most part with reused Nabataean blocks and a moulded architrave. A high, massive sandstone threshold on the north with two large pivots for inward opening door leaves provides access to the courtyard. The centre of the threshold is worn from use. The room has the appearance of a sentry booth, where visitors to the Praetorium could be examined, and perhaps detained until called inside. A small room inside the entrance to the fourth-century praetorium at South Shields has been identified as a room for a "doorkeeper" (Hodgson 1993: 3, no. 22). Unfortunately, damage to the walls has removed evidence of the phasing of this structure. Given the tendency towards entrances on the centreline, this feature should belong to a remodelling within Phase 1 or to Phase 3. It is equally difficult to date the doorway in the southeast corner of the courtyard, and associated paved area. Three sandstone bases suggest the presence of some sort of portico at this point, perhaps to shelter mounts arriving at the headquarters.

The courtyard seems to have been surrounded by a portico carried on columns of an unknown material that rested on square sandstone bases ( $0.59 \times 0.58 \mathrm{~m} ; 2 \times 2 \mathrm{RF}$ ) placed 2.9 m out from the east wall of the court 3.7 from the north wall. The two bases so far excavated are 2.25 m apart, centre to centre. At this spacing, there is exactly enough room for five columns across the north and south sides of the courtyard, and slightly more than enough ( $c a .0 .76 \mathrm{~m}$ left over) for five along the north and south sides (counting corner columns twice). It could be that the northern wing of the portico was wider than the rest, to accommodate individuals waiting admittance to the central room or adjacent offices. Longer blocks in the sandstone paving of the court and portico follow the line of columns. A probe in the centre of the court revealed an unpaved area of packed earth and pebbles, 0.20 m lower than the paved area; a damaged terracotta pipeline entering the area from the west disappears at nearly the exact centre of the court. Although no curb has yet been excavated, there may have been a basin here, or a basin with a water fountain, fed by the terracotta pipeline that enters the Praetorium near its northwest corner (see
below). Although the pipeline passed below the paving in Room P, it is not possible to determine whether this water system belongs to Phase 1a of the Praetorium, or to a later sub-phase. Since the pipeline enters the structure at a level too low to have served the room with hypocaust, it may well belong to the original construction period of the Praetorium.

Since only about half the structure has been excavated, the arrangement of doors in Phase 1a remains in part conjectural. If the unexcavated rooms resemble those excavated, the southernmost three rooms on the east and west sides of the court opened directly on the portico. Doors have been documented leading from the courtyard into the three rooms to the north (Rooms B, A, and P). Doors connect Rooms B and P with both the central Room A and with the two long rooms east of Room B (Room D/E) and west of Room P (Room O). Doors in the south walls of Rooms E and O provide the only access to Rooms F and S. These last rooms are slightly larger ( $4.5 \times 4.2 \mathrm{~m}$; $15 \times 14 \mathrm{RF}$ ) than the six rooms that open on the court (ca. 4.2 m sq ; slightly more than 14 RF ), because their north wall was set to the north of the east-west survey line defining the north edge of the court. The long space in the northeast corner of the Praetorium was divided into Rooms E and D by a cross wall with a door near its west end. Since this cross wall bonds with the other walls, it should belong to Phase 1a, and it is likely that Room O in the northwest corner was divided in the same fashion. The long narrow room between the central Room A and Room D/E was a single space in Phase 1a.

At the time of construction, most of the spaces within the Praetorium, like those in the Principia, were paved with rectangular sandstone slabs, varying in size, but presenting a regular appearance. The courtyard was paved in the same manner, although some of the slabs may have been salvaged from the centre of the courtyard to re-pave other rooms in Phase 3. An area at least 4 m wide was paved in the same manner south of the south wall of the Praetorium, most likely extending as far as the Via principalis dextra. Room K, facing on the courtyard, was
paved with rough, irregular stones, while the adjacent Room L had only an earth floor. The presence of a bin along the back wall of Room K , typical of the fourth-century reoccupation phase elsewhere in the fort, indicates that these rooms were reworked during Phase 3.

The four rooms in the northeast corner of the building were exceptional in that they were paved with polychrome mosaics with geometric designs and decorated with frescoes (Oleson et al. 2003: 44-5). ${ }^{2}$ The most common fresco motif consisted of a square or rectangular panel defined by thick red lines on the white background, usually framing a faux marble panel of yellow or red background with sinuous strokes of orange, yellow, or green to simulate the veining of decorative stone veneers. The mosaics were laid on a thin bedding of puddled mud and bits of lime (Th 0.02 m ), on a levelling course of sandy soil with bits of lime and chunks of stone, probably the levelling course for the whole Praetorium. There is no trace of any previous pavement of stone slabs, and the mosaics extend up to the walls and below the plaster, suggesting that the mosaics were laid as part of Phase 1. The mosaics nearly filled Rooms B/C, E, and D, each with a single, repeated geometric pattern contained within frames of red tesserae, each frame surrounded by a field of white tesserae extending to the walls. One large fragment of a plaster moulding was found, painted with a black dentil frieze, with red, yellow, and black detailing. The mosaic flooring, frescoes, and plaster moulding recall the elaborate decoration of the luxurious villa az-Zanṭūr at Petra, which may have housed the governor of the province (Kolb, Keller and Gerber 1998: 263; Kolb 2001). Room D, the largest and most elaborate, may have served as the dining room for the commander of Havarra.

At some point, probably at the beginning of Phase 2, the mosaics suffered heavy damage, particularly the eastern halves in Room D and E and the southern end of Room B/C. Large areas of mosaic have disappeared, and there are burn marks on the surviving portions. This damage was later repaired (at the beginning of Phase 3 , early in the fourth century?) by filling in the gaps with irregular flagstones set in a poor, ashy
2. Derek Klapecki of the University of Victoria is writing
his M.A. thesis about these mosaics and will prepare a

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mortar, and covering the entire floor area with a white plaster. The rough wall and door that subdivides Room B/C, built on top of the mosaic floor, probably belongs to this phase as well.

The Praetorium was extended 3 m ( 10 RF ) to the north in Phase 1b, perhaps not long after the initial construction phase. The walls of the extension do not bond with the original north wall of the Praetorium. Only a small portion of the north wall of the extension has been cleared, but it must have extended across the whole width of the structure, since there are doors in the north walls of Rooms O and B/C. Nothing is known about the western and central rooms, but Room J ( $4.2 \times 1.6 \mathrm{~m}$ ) was provided with a suspended hypocaust floor (suspensura), heated by fuel inserted beneath the floor through a small brick arch (praefurnium; W $0.50 \mathrm{~m}, \mathrm{H}$ 0.87 m ) in Room I. The suspensura was supported 0.81 m above the floor by piers of small rectangular bricks along the walls and by two rows of circular bricks ( D 0.195 m , Th 0.07 m ) in line with the piers down the length of the room (Fig. 12). An offset along the walls also helped support the floor. Only one set of supports was revealed, $0.60 \mathrm{~m}(2 \mathrm{RF})$ apart centre to centre. This is precisely the interval recommended by Vitruvius (De architectura 10.2). The suspended floor was destroyed at the beginning of Phase 2 , but the sub-floor, constructed of tightly fitting sandstone slabs, survives nearly intact. Recovered fragments of the bridging tiles that rested on the supports show signs of intense heat on their lower surfaces and construction mortar on the upper surface. Recesses ( $0.13 \times 0.08 \mathrm{~m}$ ) were built into the northeast and southeast corners of the room for the installation of chimney pipes to provide a draft for the fire at the opposite end of the hypocaust.

The absence of a separate furnace (hypocausis) and placement of the fire directly beneath the suspended floor of Room J is atypical in Roman baths. The arrangement may have been a response to a need to conserve fuel in the arid desert environment, but it also may indicate that the heated room was used for dining rather than bathing (cf. the heated triclinium in the Praetorium at South Shields; Hodgson 1993: 133). Restriction of the hypocaust to a single room might also suggest this function, but large chunks of hydraulic mortar were found in the destruction

12. View of hypocaust.
debris. Only a small amount of ash was recovered from Room I, indicating that the hypocaust and praefurnium were regularly cleaned out until the heating system ceased to operate. The layered deposit of ash and clay beaten into the lowest levels of the earth floor outside the arch contained only Middle Nabataean and Roman ceramics from the first and second centuries. These ceramics, and the use of circular pila bricks - as seen in the early, possibly Nabataean, phase of Bath E077 adjacent to the vicus connect the heated room and extension of the Praetorium in general to the first century of the fort's existence. Doors were built into the original north walls of Rooms C and D to provide access to the praefurnium room and the hot room, respectively.

The hypocaust structure was intentionally destroyed, either in the general destruction of Phase 2, or at the time of the reoccupation, the beginning of Phase 3, and the access doors to Rooms I and J were filled in again. Given the
difficulty of completely destroying a thick masonry floor, its final removal may have occurred at the beginning of Phase 3, to create more room for the dumping of debris left over from the destruction. Material collected from the dump included second and possibly third-century ceramics (including a small amount of Nile "mud ware"), ceramic pipe fragments, hydraulic mortar, window glass, mosaic tesserae, and a large quantity of mammal and fish bones and seashell. Two silver washed antoniniani of Probus were also identified, dating from 276-282, providing a terminus post quem for the deposit of the fill. Numerous pipe fragments recovered from the fill may have been used in the hypocaust room itself to channel water to a basin, or may have formed part of the pipe system that served the water feature in the courtyard. A stone water conduit found near the surface soil several metres north of the bath may also have had some role in supplying it with water (see below). The numerous
fragments of hydraulic mortar scattered through the fill may have formed part of a basin in the room. Window glass, hydraulic mortar, and terracotta pipes were also found in Roman Bath E077 (Oleson 1990; Reeves 1996).

## E116 Area J: Horreum

Excavation in Area J to the east of the Princip$i a$ 's courtyard during 2000 had exposed central and southern sections of a substantial structure, tentatively identified as a Horreum (granary). A very similar, early fourth-century structure at alLajjūn was identified as a horreum (Crawford in Parker 2006: 235-40). Excavation during the 2004 and 2005 seasons focused primarily on locating the exterior and interior walls of the Horreum, defining its plan and dimensions, and identifying any modules of Roman feet used in its construction (Fig. 13).

The core of the original structure was laid out by the Roman surveyors as three rooms, each


[^44]25 RF wide by 50 RF long ( $7.5 \times 14.88 \mathrm{~m}$ ), with a wide ( 5 RF ) door in the middle of the south wall. Since the walls, built of substantial blocks with rubble and clay cores, are $c a .3 .5-4 \mathrm{RF}$ thick (1.10-1.20m), the outside dimensions of the structure are $c a .85 \times 55 \mathrm{RF}(25.2 \times 16.4 \mathrm{~m})$. The planning of this structure from the inside out, so to speak, indicates a focus on the interior spaces that reinforces the identification as a granary, a structure critical to the garrison's survival in the meagre desert environment.

The careful execution of the interior dimensions was also required by the design of the roof, which consisted of large stone slabs carried on arches springing from piers (2 RF wide x 1 RF thick) bonded into the north-south walls. The arches, built of heavy stone voussoirs, were spaced from 3 to 4 RF apart ( $0.90-1.22 \mathrm{~m}$ ), eight arches in each room. Buttresses were built up the outside east and west walls of the building to counteract the thrust of these arches. Since these buttresses abut, rather than bond with the west wall, they may be later additions that were installed when the west wall, built on sloping ground, became unstable as a result of the lateral thrust from the arches carrying the roof and needed reinforcement. A curb separates the buttresses from a wide, paved street, which extends westward as far as the east wall of the Principia. There was a narrow north-south drain beneath the pavement.

The interior of the rooms was carefully finished (Fig. 14). The walls were faced with several layers of a hard, sandy white wall plaster, which in most areas extended over the intersection of the wall and pavement, ensuring a tight seal between walls and floors (an important consideration in a granary). Room A was paved with

14. Horreum, interior.
large square terracotta tiles ( $0.30 \times 0.30 \mathrm{~m} \mathrm{sq} ; 1$ RF ), a procedure not seen elsewhere at the site, and the door ( $1.50 \mathrm{~m}, 5 \mathrm{RF}$ wide) was built into the east end rather than the centre of the south wall. Rooms B1 and B2 were paved with large, carefully laid sandstone slabs. A sturdy drain was built into the southwest corner of Room A, leading from the Horreum out to a north-south drain below the paved street adjacent to its west wall. The branch leading out from the Horreum contained a large cache of broken glassware and ceramics, mostly cups and serving wares, dating from the second and third centuries, with possibly some early fourth-century material. The special door arrangement and flooring of Room A, along with the presence of a drain, indicate that this room was intended for the storage of different goods than those in Rooms B1 and B2, possibly liquids such as olive oil and wine.

Seven narrower spur walls extend north from the north wall of the core of the Horreum. They are less heavily built than the walls forming the storage rooms, and are spaced at irregular intervals. Further excavation is required to confirm the function and arrangement of these rooms, but finds of occasional jamb blocks in the rubble spill indicate the probable presence of interconnecting doorways or doorways on the north. No doorways, however, connect the rooms north of the north wall of the Horreum core with Rooms A, B1, and B2 in the central section of the Horreum, indicative either of the need to limit access to the main granary rooms, or of a different function for the northern section.

The area south of the three storage rooms was paved with neat sandstone slabs. Several spur walls extend across the paving, but it does not appear that this area could have been roofed. It may instead have been a reception area for delivered goods, or for distribution of rations to the garrison. Occasional ash lenses and deposits of refuse on this pavement indicate the presence of occupants in the fourth century. Abin or platform was built into the southeast corner of Room B2 at this same time, and a large amount of pottery and other rubbish was dumped on the east side of the wall framing the paving on the east.

The location, plan and design of this structure confirm its identification as the fort's Horreum. Granaries are commonly located in the central range on one side or the other of the Principia's
courtyard, where easy access is provided from the Via Principalis. They often incorporate several rooms side by side (Johnson 1983: 144-45), and they normally have external buttresses. The Horreum at al-Lajjūn also has three rooms, and is nearly identical to the Havarra Horreum in length $(25.6 \mathrm{~m})$, but slightly wider ( 25.66 m ) (Crawford in Parker 2006: 235-40). The dimensions of the module of the Horreum's central section fit within the known range of Roman military granary sizes elsewhere as well.

Not all granaries had raised floors, and stonebuilt granaries can have floors laid directly on the ground without provision for ventilation (Johnson 1983: 149), such as the plaster floors at al-Lajjūn. Columella (1.6.9) describes a vaulted granary with plastered walls and a floor consisting of packed earth mixed with oil lees and covered with tiles set in a lime mortar mixed with oil lees, a description that can be applied to Room A. Carefully mortared stone or tile floors and plastered thick stone walls would help to keep grain cool and free from insect infestation, as well as providing a hospitable environment for the storage of other foodstuffs

Stratigraphy within the central section of the Horreum shows homogeneous tumble mixed with rubble from wall cores, mud packing, and wind or water deposited soil. So far, evidence for occupation of the structure in the fourth century has been found only in Room B2 and the paved area in front of it. It may not be a coincidence that fallen arch voussoirs have been found only in Room B2; they were salvaged from the other large storage rooms and have disappeared. Perhaps the roof of Room B2 survived the event that damaged the rest of the Horreum and attracted reoccupation. The rest of the structure remained accessible long enough to be cleared out at some point in the second half of the third century, but was then left to collapse. Relatively little pottery was found in the course of excavation as compared to finds in other structures. Ceramic chronology in the areas excavated to depth ranges from Roman/Middle Nabataean to Byzantine, with dates ranging from the early second to the fourth century. Types include fine wares, coarse wares, and storage wares.

## E116 Area N: Industrial Area and Latrine

Area N , in the southwest quadrant of the fort,
was selected for excavation in 2004 because its distinct rise above the surrounding area, combined with the presence of significant amounts of mortar and wall plaster and several large blocks embedded on the surface indicated the presence of buried structures. The location close to the junction of the Via principalis and the Via praetoria suggested that the buildings had significant importance, and given the location of tribunes' houses in early imperial forts (Johnson 1983: 32-3, 267), it seemed likely that officers' quarters might be located in this quadrant. Finally, the fact that the southwest quadrant of the fort was almost untouched by excavation made investigation in the area a high priority. Excavation in 2004 of the central area of the mound revealed a latrine and basins for some sort of workshop. In 2005 the excavation was expanded to include the surrounding roads and their relation to the fortification wall (Fig. 15).

The latrine was part of a larger structure, on the same orientation as the other structures in the fort, with thick ( $0.53-0.67 \mathrm{~m}$ ) walls constructed of heavy blocks and boulders facing a core of rubble set in mud packing. Many of the blocks show Nabataean trimming and clearly were salvaged from pre-Roman structures at Hewara. The wall foundations were laid on sterile soil, and the earliest deposits contain Nabataean ceramics of the early second century. Most of the walls to the west and south of the latrine and associated basins have been lost to stone robbing. What remains are two large rooms sharing a party wall but no connecting door in a structure $8.33 \times 4.85 \mathrm{~m}$; the north wall gradually tapers to nothing 3.75 m west of the core structure, the west wall disappears 2.6 m to the south. To the east is a jumble of robbed walls, tumbled blocks,


[^45]and a fallen arch. Two narrow walls were built out from the north wall of the structure, across the adjacent road, during the last phase of occupation. The fill around the core structure has been very badly disturbed, and contained a mix of rubbish consisting of ceramics, glass, metal, and coins dating from the early second through the fourth century.

The latrine occupied the northern two-thirds of a room with regular, well-finished walls (inside dimensions $4.22 \times 2.00 \mathrm{~m}$; $14 \times 6.5 \mathrm{RF}$ ); there are traces of a door in the east wall. When excavated, a rectangular area of sandstone paving 1 m wide was found, extending 2 m south of the north wall of the room (Fig. 15). This paved area was surrounded by a U -shaped trench $c a$. 0.50 m wide, sloping gently from 0.70 m below the pavement at the northwest corner of the room to 0.86 m below the pavement at the northeast corner of the room, at which point there was a block-built drain through the wall. A wide, carefully formed terracotta pipe (rim D 0.077 and 0.12 m ) was built into the wall immediately above the trench at the northwest corner of the room, oriented downward to the south at a 45 degree angle. Narrow offsets on the inside faces of the east and west walls of the room supported four slabs that bridged the trench near the north end and at the south end of the paving. A row of blocks marked off an earth platform, at the same level as the paving that occupied the southernmost 1.25 m of the room.

The combination of water supply, sloping U-shaped trench, and drain leave little doubt that this installation was a latrine, a facility that would have been essential in a fort occupied by approximately 500 men. The seating, if it existed, was probably constructed of wood and has been lost. If a cosy 0.50 m is allowed for each occupant, the facility could have accommodated at the most 10 individuals simultaneously, 12 if the southwest and southeast corners are used. Clearly several other latrines, probably around the barracks in the southeast quadrant, would have been needed in the fort to serve the conjectured population.

The method of supplying water to the flush pipe remains problematic. The pipe enters the north face of the wall approximately 0.50 m above the paving of the road to the north, too
high to have been served by a subterranean pipeline. Either an elevated conduit originating at the reservoir served this and other high areas in the fort, or - more likely - water bags carried by men or animals were emptied into the pipe from outside at regular intervals to wash away the waste. It is also possible, although less likely, that the bins or tanks in the adjacent room on the west were used as the water source (see below). The fill above floor level in the latrine contained ceramics and glass dating from the early second through the fourth century, and included coins as late as the House of Constantine. The fill within the latrine trench, however, contained only a small amount of early second century ceramics, possibly indicating it was out of use in Phase 3.

The western portion of the structure containing the latrine is a roughly square room ( 3.5 x 3.79 m ) containing five plaster-lined bins or basins (Fig. 15). Two large bins were built up against the north wall of the room ( $2.25 \times 1.89 \mathrm{~m} ; 1.94 \mathrm{x}$ 1.76 m , all dimensions north-south by east-west), and three smaller bins along the south wall ( 1.40 x $1.36 \mathrm{~m} ; 1.35 \times 1.05 \mathrm{~m} ; 0.75 \times 1.25 \mathrm{~m}$ ), using the adjacent structure walls where possible, and separated from one another by narrow, irregular party walls built of mud and rubble. The floors of the bins are thick and sturdy, but the interior separator walls, which were at least 0.49 m high, are quite fragile. The white plaster is hard and sandy, with no obvious pozzolanic or ceramic additive to give it hydraulic characteristics. No water source has been preserved, and none of the basins has a drain. There is no visible door sill or jamb in the excavated remains, although the lost section of wall near the southwest corner of the room would be an obvious location for an entrance. If the walls were no more than 0.60 m high, individuals making use of the tanks could have stepped from one to another over the party walls. A probe beneath the bin in the northeast corner yielded a few sherds of Nabataean painted ware of the early second century, suggesting the bins were built at the time the fort was constructed.

A series of tanks of graduated size is characteristic of several types of industrial installation in the Roman world: pottery, fulling establishment, dye works, tannery, and fish-sauce factory. Production of fish sauce is extremely un-
likely, and textile dying would have left traces of dye on the plaster. Although appropriate to a military installation, and often making use of faeces and urine in their processes, both tanning and fulling require large amounts of water. Although the proximity of a latrine is appropriate, one would expect drains to be present in the tanks, and some obvious water-supply system. There is no evidence for the possible local production of pottery at Havarra, and in any case it is unlikely that the clay washing tanks and kiln would have been located within the fort. The bins would be suitable for storing grain or dried legumes, but the Horreum more likely served that function. The actual function of these bins or tanks remains uncertain.

The latrine and bin or tank complex remains somewhat isolated archaeologically as a result of the stone robbing in its vicinity. Traces of walls to the east, west, and south indicated that it was quite a large structure, with heavy door sills and jambs, and at least one room roofed with a cross arch carrying heavy roof slabs. The tumbled fill south of the complex yielded fragments of painted wall plaster bearing faux marble motifs, human figures, and fragmentary painted inscriptions. There were also fragments of thin-walled alabaster vessels finished on a lathe, resembling cosmetic or medical pyxides. All of these details suggest the presence of officers' quarters in this area.

Excavation immediately north of the complex revealed a paved east-west road 4.10 m ( ca. 14 RF ) wide. An extension of the excavation to the west and over the fort wall revealed in addition the paved intervallum, the strategically important peripheral road just inside the fortification: 7.98 m ( 27 RF ) wide. A probe at the face of the wall revealed an unanticipated second road pavement $0.70-0.85 \mathrm{~m}$ below the first. Ceramic and numismatic material recovered from between the two pavements dates the upper pavement to the fourth century, while the lower pavement dates to the early second century. This discovery strongly suggests that a major renovation of at least some portions of the fort was carried out during the period of reoccupation in the fourth century by an organized military unit, as opposed to the more haphazard reuse of structures such as the Praetorium and Horreum.

## E116 Area P: Ballista Platform

The clearing of the upper surface of the fort wall and definition of the surviving upper portions of its exterior and interior faces by the Department of Antiquities in 2005 revealed long stretches of ashlar blocks and unshaped stones that formed the original facing. At one point along the east wall, 18.25 m (probably 60 RF ) north of the interior face of the south wall, the clearing revealed a long, narrow platform built up against the inside face of the wall with ashlar blocks ( $4.43 / 4.83 \mathrm{~m}$ north-south $\times 1.65-1.80 \mathrm{~m}$ east-west) (Fig. 16). Further surface clearing revealed a similar construction just to the north of the fort's east gate. Similar platforms may lie hidden below the surface at other points around the fort's interior.

The parapet walk was removed in the spot where the platform was to be constructed, the platform was built into the gap with heavy ashlar blocks containing a sandy fill with rubble, and paved with stone slabs; access was provided by five stone steps on the north. This feature is either an ascensus providing access to the parapet of the fort wall, or an artillery platform, neither of which had been noted at the fort before. The earthen fill of the platform and careful ashlar construction would have been suitable for absorbing the recoil from artillery (Johnson 1983: 65-6). It could be that this feature served both as an access stair and as an artillery platform. PseudoHyginus, a military engineer probably operating in the East during the reign of Trajan, juxtaposes these two functions (On the fortification of camps 58): "In hostile country one should remember to make double access stairs (ascensus duplices) to the rampart and to build platforms for ballistae (tormentis tribunalia) around the gates, at the corners, and in place of towers".

No artefacts were found in the fill inside the platform, but a probe beneath the foundation yielded a rich variety of ceramics dating from the second to the fourth century. This renovation of the fortifications, along with the renewal of paving seen in Area N, indicate that significant efforts were being made to improve the condition of the fort in the fourth century.

## E116 Area O: Probe beneath Via principalis dextra

A $2.0 \times 1.0 \mathrm{~m}$ probe was excavated in 2004

16. Platform, plan.
through the Via principalis dextra, 20m inside the west gate of the fort, to investigate GPR readings suggesting the presence of several structures beneath the Roman road. Most intriguing was a U-shaped feature opening to the northwest defined by slices at depths from $2.68-2.83 \mathrm{~m}$, since the depth and orientation made it likely to have been a pre-Roman structure. The probe was positioned to bisect the bottom of the U at a right angle. The presence of well-preserved paving stones from the Roman roadbed reduced the excavation area, but it was possible to continue excavation to a depth of 1.40 m . The last 0.85 m of fill consisted of a compact brown-grey soil with lime inclusions, devoid of artefacts. This type
of soil is a natural deposit in the region around al-Humayma and can be seen, for example, in cuttings along the modern Desert Highway. The GPR readings must have recorded some natural feature in the undisturbed soil.

Nevertheless, the sounding provided interesting data concerning the main east-west road in the fort, including the possible presence of two layers of paving. The upper pavement consisted of sandstone pavers of very uniform thickness ( $0.065-0.080 \mathrm{~m}$ ), carefully fitted together and cushioned by a layer of soil and pebbles $c a$. 0.12 m thick. This stratum yielded several very small potsherds, one of Nabataean unpainted fineware, probably early second century in
date. Another layer of flat stones, very similar to the upper layer of paving stones, appeared beneath this bedding, laid on a similar bedding. It is unclear whether this represents an earlier phase of the road paving, packing for the upper paving, or cover slabs for the pipeline found immediately below. The soil below it also yielded a few small sherds of Nabataean unpainted fineware. Beneath this was a section of pipeline, consisting of a typical Nabataean sandstone aqueduct conduit block, liberally smeared with lime mortar, which retained the impression of a terracotta pipe, now lost. The insertion of a lead or terracotta pipe in a Nabataean stone conduit is a sign a Roman re-use; see, for example, in the water supply serving the Roman bath E077 (Oleson 1990: 305-6). The conduit was oriented WNW-ESE, crossing the line of the road at an angle. The conduit had been set into the limey red soil, and partly covered with the spoil from the excavation. The soil below this level was sterile.

Several interpretations are possible. Perhaps the open conduit was Nabataean in origin and preceded the construction of the fort. Alternatively, the pipeline was laid out in the early stages of the construction of the fort within reused Nabataean conduit blocks, then salvaged before the paving was laid down as plans for the water-supply system changed. Alternatively, the pipeline functioned for some time beneath the street, but then was removed - perhaps during repair efforts that were ultimately abandoned - the original roofing slabs were thrown back over it (to be misinterpreted as an early paving), and the paving slabs for the road were put back in place. Finally, it is possible that the pipeline functioned beneath an initial road level for some time, but both were damaged during the destruction in the second half of the third century. The pipes were then removed and portions of the early pavement salvaged for reuse during the renovation of the fort in the early fourth century. The discovery that the intervallum road in Area N was rebuilt in the early fourth century makes the last explanation most likely.

## Fort Reservoir and Probes of Water-Supply System

The water-supply system inside the Roman
fort depended on a reservoir ( $29.40 \times 14.20 \mathrm{x}$ $3.05 \mathrm{~m} ; 100 \times 50 \times 10 \mathrm{RF}$ ) located in the northwest corner, at the highest elevation inside the walls ( $c a .963 .00 \mathrm{~m}$ asl). Eight probes executed in 1987 and 1989 revealed the design of the reservoir, the depth at its northwest corner, and the presence of the branch that brought water to it from the Nabataean aqueduct. Soundings were carried out in and around the reservoir, and elsewhere in the fort, in 2004 and 2005 in order to determine the method by which the water was removed from the reservoir and distributed around the fort. Pipelines found in situ in the fort - in front of the Principia, filling a basin or fountain in the Praetorium, and possibly serving the latrine - can only have been served by the reservoir, either through a direct drain in the wall, or by means of a water-lifting device serving free-surface flow channels, a free-surface flow or pressurized pipeline, or a mixed system. Since the reservoir was continuously supplied with fresh water by an aqueduct, some arrangement must have existed to allow both a continuous outflow of surplus water and access for lifting water or simply diverting it to the closed system or systems.

Probe 9 (W 2m, L 1.5 m ) was excavated at the centre of the inside face of the southern reservoir wall where it was hypothesized that an outflow drain through the wall might have delivered water under pressure to other parts of the fort. The probe, cut through extremely hard, compact silt, found no outflow pipe or other water delivery system, but revealed unexpected features of the reservoir floor. From a point 2.40 m below the top of the wall, the hard cement wall slopes outward, meeting the flat reservoir floor at an angle of 24 degrees and a depth of 2.76 m . A probe in the southeast corner of the reservoir revealed the same arrangement: vertical walls, then a downward slope on both the east and south to the level floor at 959.74 m . At some point after the reservoir had been lined with its tough hydraulic plaster, the southeast corner was filled in with a solidly constructed masonry platform, triangular in plan, extending 2.5 m out from the corner to north and west, its level upper surface at 1.95 m above the lowest reservoir floor (Fig. 17). A similar platform, badly damaged, was subsequently discovered in the southwest corner of the reservoir at the same level (Probe 14),

17. Reservoir, view of southeast corner.
but none existed at the northeast corner (Probe 19). The purpose of these platforms is unclear. Since none was built at the northwest corner, where water flowed into the reservoir, or at the northeast corner, which is far from the waterconsuming areas of the fort, they may have had something to do with removal of water. They may have functioned as platforms for individuals working shadufs (counter-weighted tip beams with buckets) that lifted water to troughs on the reservoir wall. The corners may have been chosen because they help brace the installation, but it is possible that other platforms exist along the walls of the reservoir. Since the reservoir floor is horizontal at the northwest corner and meets the vertical walls with a simple quarter-round moulding, the slope seen in Probes 9 and 11 may indicate the presence of a sump for sediment along the south wall.

Probe 10 (W $1.5 \mathrm{~m}, \mathrm{~L} 1.5 \mathrm{~m}$ ) was located outside the southwest corner of the reservoir, contiguous to the south face of the south wall (Locus 10) and the east face of an extension of the west wall (Locus 11) of the reservoir, to determine whether the extension of the west wall beyond the south edge of the reservoir was linked to some water-lifting installation. The excavation revealed traces of crumbly stone and mudbrick walls $c a .1 \mathrm{~m}$ below the Roman level. These structures, possibly Nabataean, probably predate the construction of the reservoir. Probe 10 showed no obvious connection of the south extension of the west wall of the reservoir to any water extraction installation. Several further probes were made at the centre and along the exterior face of the south wall, also without result. The basins and troughs, like the water-
lifting devices that filled them, may have been made of wood, and in consequence have been lost.

The discovery of the terracotta pipeline entering Room P through the northern extension of the Praetorium and the open conduit block north of the room with hypocaust, presented an opportunity to investigate the water distribution system at the Roman reservoir by following these two conduits back to their origin. The pipeline, which probably served the water feature in the centre of the courtyard, was traced for 3.12 m north of the north wall of the Praetorium before being lost to ploughing or other surface disturbance. The pipeline was picked up again $9-10 \mathrm{~m}$ farther north on the same line, in Probe 18 , along with the continuation of the stone conduit revealed at the northeast corner of the Praetorium. The remains have been disturbed, but the two water lines originally intersected. Either there was a small basin here to distribute the water between the pipeline and the trough conduit, or the trough represents a first phase of distribution, later interrupted and superseded by the pipeline.

## E116 Area Q: Stable (?) and Basin

One goal of the 2005 excavation season was to establish the location of the fort's stables. The southeast quadrant seemed a likely location because it is downhill and usually downwind from the rest of the fort. A probe was excavated around two perpendicular lines of hydraulic plaster projecting through the surface in this area (Area Q). Excavation revealed a small ba$\sin$ (interior ca. $0.67 \times 1.02 \mathrm{~m}$ ) built of mortared rubble walls ( Th 0.15 m ) and lined with a plaster heavily tempered with pebbles and crushed ceramics (Fig. 18). The angle between the floor (at 960.405 m asl) and walls of the basin was reinforced with a quarter-round plaster seam, typical of Roman hydraulic installations. The walls survive to a maximum height of 0.37 m , but given their thickness, the walls could not have been much taller than 0.40 m . There was no sign of an intake for water, but a drain had been built into the northwest corner to empty the contents on a pavement of large sandstone slabs. The ba$\sin$ was built into the southeast corner of a substantial structure with solid stone walls 0.88 m ( 3 RF ) thick, which can be traced on the surface

18. Basin, view.
for several metres to the west and north. Given the 2.5 m drop from the reservoir, this area could easily have been serviced by a pipeline.

The location of this low basin at floor level rather than a height convenient for human use suggests that it was intended for animals, and that the structure housing it may have been a stable. Ceramics indicate that the basin in Area Q was constructed during the original occupation at the beginning of the second century. The ceramics in its fill date from the second to the fourth century.

## Geophysical Survey

A second season of geophysical survey was carried out at al-Humayma in 2004 under the direction of G. S. Baker. The overall goals of the project were the same as in 2002 (cf. Oleson et al. 2003: 50-4): to identify buried structures, to determine the strengths and weaknesses of various geophysical techniques, and to develop innovative methods for synthesizing and displaying geophysical survey data. The tools used in 2004 included ground penetrating radar (GPR) and magnetic gradiometry. Data were collected from four specific areas of the site: the Roman fort (E116), the vicus outside the fort, the Qaṣr (F103), and a suspected kiln site (D120) (Fig. 1).

A Geometrics Inc. G-858 MagMapper cesi-um-vapor gradiometer attached to a non-magnetic cart was used for the magnetic survey. The vertical separation of the magnetometers was 0.75 m for all zones and the lower sensor was 0.30 m above the ground surface. Data were collected every second while moving the cart along the profile line, resulting in one data point
roughly every 0.5 m along the profiles. A Sensors \& Software Inc., Noggin Plus 250 GPR unit was used for the GPR survey. The unit has 250 MHz antennas housed in a small case below the cart frame. The antenna orientation is fixed with a broadside EH polarization. An odometer wheel controlled the rate of data collection. Data points were collected every 0.25 m along the profile lines. The magnetic and GPR data were pre-processed and processed using standard techniques that will not be described in detail. No unique filtering, amplitude scaling, or display methods were used on initial data.

Within the Roman fort geophysical data were collected to search for suspected pipelines, to look for the continuations of known buildings, and to search for possible deep pre-Roman structures. These investigations met with mixed results. As discussed above, pre-Roman structures posited by the geophysics to lie beneath the Via principalis dextra were not found. In contrast, the GPR survey conducted around the fort walls produced excellent documentation of an external ditch system. Thirty-two profiles were taken around the perimeter of the fort to determine the location and geometry of the ditch, including five profiles radiating out from the southeast corner of the fort. After analyzing all of the profile lines collected, it was observed that the majority of detectable ditches were on the west side of the fort while the remaining sides of the fort showed little evidence of the ditch. No evidence was seen on the profiles from the north and south walls, and only two profiles showed the ditch on the east side of the fort. Of the five profiles collected on the southeast corner, three showed evidence of the ditch system. Figure 19 shows the location of detected ditch sections, with the approximate width of the ditch indicated by the thickness of the line.

GPR data were collected from two zones in the Roman vicus. The first zone was located within Field E125 up against the north and west edges of the area excavated prior to 2004 (Squares 01-29). The goal was to speed excavation by identifying the plan of the western side of the complex and the location of the northwest corner. The second zone was located on the northeast side of Complex E125, between E125 and the Roman fort. This region was surveyed to identify other possible vicus structures

19. Schematic drawing of ditch locations outside of the fort walls as predicted by GPR. The width of the line indicates the approximate width of the ditch at that location.
for future excavation. The surveys in both zones succeeded in suggesting the presence of some walls. Between E125 and the fort, for example, three possible buildings were identified. On the north and west side of the previously excavated regions of E125, only the east-west walls running through Squares 34 and 35 and the northsouth walls running through Squares 30 and 35 and Squares 32 and 34 were identified. Although these results seemed too meagre at first for an area that should have contained many rooms, excavation later revealed that most of the walls were robbed out. Significantly the GPR had even correctly suggested that the western extension of the wall in Room 34 would not be found. The GPR did however apparently miss the eastwest stone walls in Squares 30, 32, 39 and 40, the mudbrick wall in Square 31, and some of the features. Now that we have a better idea of the plan of this area, further refining of the data may suggest why these elements were missed.

After excavations in 1998 and 2002 discovered pre-Islamic period walls beneath the south
and west regions of the Abbasid Qaṣr (Oleson et al. 1999: 436-8, 2003: 59-60), it was decided to collect GPR data to the Qaṣr's south and west, looking for continuations of this pre-Islamic architecture. The data from the west side is still undergoing processing, but the data from the south side has already produced promising results. In a slice from 1.34-1.49m (Fig. 20a) there are several coherent linear features. In the northeast there are three north-south trending walls and an east-west trending wall. In the northwest region of the zone there are six northsouth and east-west line segments that outline a large polygon. A slice $0.45-0.60 \mathrm{~m}$ (Fig. 20b) revealed two long parallel north-south walls on west side of zone with a possible structure just to the north, and a highly reflective feature in south-central area bounded by east-west and north-south structures (perhaps flooring). These findings are yet to be "truthed" by excavation.

Earlier reconnaissance by our team members had suggested that one or more kilns may be located in Area D128, on the slopes approximately 740 m west of the Roman fort. This hypothesis was based on the profusion of potsherds, possible slag, burnt pottery, and brick pieces. As no previous excavation had been carried out in this area, it was decided to collect magnetic gradiometry data. This technique was chosen both because of its proven ability to locate kilns and fired objects and because the gradiometer did not need to contact the ground, making it easier to use on rocky terrain than the GPR.

After the data had been cleaned (e.g. to remove large spikes caused by metallic debris at the surface), two distinct types of subsurface features were apparent. First, there are numerous linear features that are observed to trend generally east-west and north-south (Fig. 21a). Some of these features, especially in the south side of the zone, suggest a closely-spaced series of rectilinear structures. Others, such as the prominent feature that trends east-west through the centre of the zone, may be terrace walls or natural features.

The second noticeable feature observed in the magnetic gradiometry data are the 19 roughly circular anomalies located throughout the zone (Fig. 21b). These features are representative of discreet objects or closely-spaced collections of objects. Given the number of anomalies, the

20. GPR slices south of F103 at depths of a) 1.34-1.49m and b) 0.45-0.60m.
fact that many of them are topped by piles of stones suggestive of graves, that broken tombstones have been found in the same general area (Oleson et al. 2003: 54-5), and that the surface scatter is consistent with disturbed funerary offerings, we now suggest this area was a cemetery.

## Conclusions from the Geophysical Survey

From an archaeological perspective, the value of the geophysical results obtained in 2004 is mixed. Geophysics provided a quick, non-evasive method for delimiting the ditch around the Roman fort, and geophysics has also suggested
the location of several new structures. Future excavation will confirm or disprove the veracity of these predictions. Excavations already completed in the Roman fort and E125 complex on the basis of geophysical suggestions have shown that sometimes the proposed targets are real, and sometimes they are not. Moreover, many features (including earthen walls) have been completely missed by geophysical survey.

## Preliminary Characterization of al-Ḥumayma Ceramics

Only the most "critical" loci from the 1998, 2000, 2004 and 2005 campaigns, including the

21. Magnetic gradiometry data from D128 showing a) linear and b) circular anomalies.
excavation areas A127, E116, E122 and E125, have been analyzed by the author so far, and they form the basis for these preliminary observations. ${ }^{3}$ The following statements are not definitive, since continued study of the ceramics could contradict or supplement the present conclusions. The ceramics from the campaigns prior to 1998 are being studied by K. 'Amr and have not been considered here.

Early Nabataean pottery (first century BC
-early first century AD ), as found at Petra in the habitation quarters on az-Zanṭūr (Gerber 1994: 288 , fig. 15) or in the early loci from the so-called "Southern Temple" (not yet published), is not present in the material from al-Humayma studied so far. The earliest evidence of Nabataean pottery begins in the second half of the first century AD with both fine ware, painted and unpainted, and common ware, all imported from pottery workshops at Petra. So-called Aqaba ware (defined in

[^46]Preliminary field dating of the ceramics (used elsewhere in this report) has been carried out by J.P. Oleson.

22. Ceramic vessels nos. 1-18.

Dolinka 2003) is also present in al-Humayma but accounts for less than 5 percent of the material studied. In addition, a few fragments of Eastern Terra Sigillata ware occur, along with so-called "green or cream ware" ('Amr 1992; Schneider 1996: 138, 148, figs. 579-91), whose production centre is not yet determined, and imported amphoras. These, too, account for less than 5 percent of the total. Local pottery production is not attested for this period.

Typical examples of the second half of the first century and first half of the second century are Nabataean fine ware bowls (Fig. 22, nos. 1-3), Nabataean storage jars, jars, cooking pots and bowls (Fig. 22, nos. 4-12). Some of the forms of the ceramic nos.13-18 may be later in date than their equivalents at az-Zanṭūr, possibly as late as the second century to first half of the third century (Gerber 1994, 1997). The contexts in Petra can be confirmed to date from the second half of the first century to the first half of the second century AD (Gerber 1994, 1997). Until al-Humayma pottery has been studied and published in its full stratigraphic context, the matter must rest. There is also the question of the homogeneity of al-Humayma loci.

Some al-Humayma vessels similar to nos. 13-18 may differ somewhat in fabric from Petra parallels in late first-early second century contexts. The different fabric does not call into question the Petra provenance; early types associated with greyish fabric simply are not usual in the known Petra assemblages. Could this indicate a later date for al-Humayma specimens? Conceivably, rim types of the early second century may have remained common for quite a while, while the well-fired, light-red, barely tempered, thin-walled specimens may gradually have been replaced by items with the same rim forms but with greyish or light-grey fabric. This kind of "intermediate" phase of pottery development seems to be missing in Petra due to the absence of well-stratified second or third century contexts. One of the rare Late Roman contexts is represented by structures in the northeast section of the "Lower Terrace" on az-Zanṭūr (EZ III). That pottery dates very roughly to the second or third century, pending a more detailed study (Gerber 2001, 2005). At al-Ḥumayma, until the pottery has been studied and published in its full stratigraphic context, the matter must
rest. To sum up: all vessel types numbered 4-23 are gathered in the catalogue under the early date heading (late first to early second century), whereas in the catalogue entries a possible later date of some al-Humayma specimens (nos. 13-23) is considered. No further clarification is possible right now.

Complex E125 yielded a remarkable collection of "Nabataean" pottery of the second to third century, some of which was discussed above. Besides these first century derivatives there is a group of rather small, thin-walled vessels (Fig. 23, nos. 19-23) that do not find many equivalents in Petra assemblages. They represent a kind of "fine" ware with a new repertoire of forms and shapes that "bypasses" the hitherto usual painted and unpainted Nabataean fine ware bowl types. The new forms and shapes are not a "break" in the Nabataean pottery tradition; rather they show a "logical" development of the first and early second century fine and coarse ware forms (in combination), a kind of re-design. Interestingly, one of the pottery kilns, documented by 'Amr during the Archaeological Survey of the Wadi Musa Water Supply and Wastewater Project, yielded pottery forms and fabric equivalent to those just described (lecture by K. 'Amr, held during the table ronde of "Coarse Ware Pottery in Jordan [HellenisticByzantine periods]", in August 1999, at IFAPO, Amman, Jordan).

Generally the second to third-century al-Humayma pottery (Fig. 23, nos. 24-30), especially from the Area E125, but likewise from the earlier layers from the fort (E116), shows a wider variety of forms and fabrics than attested in Petra. A small bowl with simple painting on its exterior (no. 31) recalls the shape of no. 20, but its light-red fabric is coarser. Many comparable samples, painted and unpainted, are known from Petra. On az-Zantūr this specific painting pattern on vessels of the very same form, and indeed of others, is known from mainly later second-third century contexts. The same kind of pattern is known from other sites in Petra, e.g. Area I Household excavation (excavated by K. Russell) and az-Zurraba (excavated by K. 'Amr) - neither pottery assemblage has yet been published. Their suggested dates are both much later than second-third century. No precise chronological framework for the pottery of

23. Ceramic vessels nos. 19-35.
the second-third century period in Southern Jordan exists yet. It is hoped the stratigraphy of alHumayma excavation will help to establish it.

The Byzantine pottery fragments (nos. 3233) I have studied from al-Humayma are small and lack the rich repertoire and variety seen at Petra. The single rim types can be roughly compared to the Petra types. There are no indications that the Byzantine pottery from these areas was locally manufactured. A large quantity of Early Islamic pottery is attested for the Qaṣr at al-Ḥumayma (Field F103), but that pottery is outside the scope of this report. Among the very few other samples from outside of Area F103 appear two fragments of the so-called Mahesh ware (nos. 34-35). Rim type, decoration, and fabric are comparable to those published by Whitcomb (1989) and date to the Early Abbasid period.

Catalogue of ceramics (Colour according to Munsell Soil Color Charts, rev. ed. 1994. All dates AD See Figs. 22-23)

Nabataean Fine Ware:
No. 1: bowl, undecorated, with slightly concave base; D $14.0 \mathrm{~cm} ; 2.5$ YR $6 / 6$ (light red). Parallels: Schmid 2000: fig. 53, type E 1c 8 (group 7), phase 3 (20/30-first quarter 2 nd C). [E125, Square 04 Room A, Locus 19, drawing no. 145].
No. 2: bowl, rouletted on its exterior, with ringbase; D $14.0 \mathrm{~cm} ; 2.5$ YR $6 / 6$ (light red). Parallels: Schmid 2000: fig. 63, type E 8a 95 (group 9), phase 3 (20/30-first quarter 2nd C). [E125, Sq. 08, L. 11, no. 05].

No. 3: bowl, painted; D 16.0 cm ; body 2.5 YR 6/6 (light red), decor 10R 4/4 (weak red). Parallels: Schmid 2000: fig. 92, type E 1b 10, decor phase 3c (first quarter 2nd C). [E125, Sq. 11, L. 10, no. 334]. Nabataean Common Ware (second half 1stfirst half 2nd C):
No. 4: storage jar with two (or more?) handles, thick straight rim and horizontal lip, two grooves on the rim; D 12.0 cm ; body 10R 6/6 (light red), slip 10YR 8/2 (white). Parallels: ‘Amr et al. 1998: 542, fig. 30.7, 2nd C; Gerber 1994: 290, fig. 16.D; Gerber 2001: 11, fig. 2.L, late 1st-first half 2nd C. [E125, Sq. 11, L. 12, no. 345].
No. 5: storage jar, with thick straight rim and
thinned lip, angular large rib on its exterior, two large grooves on its interior; D 16.0 cm ; body 10R $6 / 6$ (light red), slip 5YR 5/1 (grey). Parallels: Gerber 1994: 290, fig. 16.A, late 1st-first half 2nd C. [E125, Sq. 11, L. 08, no. 33].
No. 6: storage jar, with slightly convex, profiled rim and bevelled lip; D 12.0 cm ; body 10R 6/6 (light red), slip 5YR 6/1 (grey). [E125, Sq. 06, L. 05, no. 317].
No. 7: jar with two handles, slightly inverted rim and inwardly grooved lip, several ribs on its exterior; D 9.0 cm ; body 2.5 YR $6 / 6$ (light red), slip 10YR 8/2 (white). [E125, Sq. 05, L. 15, no. 123].
No. 8: cooking pot, rim with bevelled lip, two large grooves on the interior of the rim; D 12.0 cm ; body 2.5 YR $6 / 8$ (light red), slip 2.5YR 5/6 (red). Parallels: 'Amr et al. 1998: 509, fig. 4.12; 535, fig. 22.2, both 2nd C; Gerber 1994: 290, fig. 16.B, late 1st-first half 2nd C; Oleson et al. 1995: 339, fig. 19.9, early 2nd C. [E125, Sq. 11, L. 08, no. 331].

No. 9: cooking pot with two handles, slightly convex rim and bevelled lip, round base; D 14.0 cm ; body 2.5 YR $5 / 6$ (red), slip 5YR 5/1-6/1 (grey). Parallels: Gerber 1997: 409, fig. 4.A, second half 1st C. [E125, Sq. 11, L. 11, no. 337].

No. 10: cooking pot with two handles, slightly convex rim and bevelled lip; D 16.0 cm ; body 2.5YR 6/6 (light red), slip 10YR 8/2 (white). Parallels: Gerber 1997: 410, fig. 7; Gerber 2001: 11, fig. 2.A, second half 1st-early 2nd C. [E125, Sq. 06, L. 43, no. 112].
No. 11: small cooking pot, with slightly convex rim and bevelled lip; D 10.0 cm ; body 10R 6/8 (light red), slip 5YR 6/1 (grey). [E125, Sq. 11, L. 32, no. 347].
No. 12: bowl with two handles, everted rim and rounded lip, a fine, incised, slightly wavy line on the exterior of the body; D 22.0 cm ; body 2.5YR $6 / 6$ (light red), slip 10YR $8 / 2$ (white). Parallels: Gerber 1994: 290, fig. 16.I; Gerber 1997: 410, fig. 8, late 1st-first half 2nd C. [E125, Sq. 11, L. 08, no. 332]. Nabataean Common Ware (in Petra, second half $1^{\text {st }}$-first half 2 nd C ; in al-Ḥumayma may come from later contexts).

No. 13: storage jar with two handles, short, concave rim and bevelled lip; D 18.0 cm ; body 2.5YR 6/6 (light red), slip 10YR 8/2 (white). [E125, Sq. 08, L. 01, no. 87].
No. 14: jar, with outwardly straight and inwardly convex rim with inwardly grooved lip; D 12.0 cm ; body 2.5 YR $6 / 6$ (light red), slip 10YR 8/2 (white). [E125, Sq. 08, L. 01, no. 80].
No. 15: jar, with profiled rim and inwardly grooved lip; D 10.0 cm ; body 2.5 YR $6 / 6$ (light red), slip 10YR 8/2 (white). Parallels: Gerber 1994: 290, fig. 16,G, late 1st-early 2nd C. [E125, Sq. 05, L. 09, no. 83].
No. 16: storage jar with two handles, inverted rim, outwardly bevelled and inwardly grooved lip; D 15.0 cm ; body 2.5 YR $6 / 8$ (light red), slip 2.5YR 6/4 (light reddish brown). [E125, Sq. 04 Room A, L. 19, no. 144].
No. 17: cooking pot with two handles, inverted rim and bevelled lip, two grooves on its interior; D 14.0 cm ; body 10R $6 / 6$ (light red), slip 10YR 8/3 (very pale brown). [E125, Sq. 05, L. 11, no. 124].
No. 18: cooking pot, with straight rim and bevelled lip, one groove on its interior; D 14.0 cm ; body 10R $6 / 8$ (light red), slip 5YR 5.5/1 (grey). Parallels: Gerber 1994: 290, fig. 16.B, late 1st-early 2nd C. [E125, Sq. 06, L. 20, no. 105].
"Fine Ware" (2nd C to probably first half 3rd C).
No. 19: small pot, with everted rim and inwardly grooved lip, angular shoulder, ring-base; D 7.2cm; 2.5YR 6/6 (light red). [E125, Sq. 06, L. 12, no. 14].
No. 20: small bowl, with slightly thickened rim; D $8.0 \mathrm{~cm} ; 2.5 Y R 6 / 8$ (light red). Parallels: Fellmann Brogli 1996: 263, figs. 815-16, 4th C. [E125, Sq. 08, L. 03, no. 85].
No. 21: small bowl, with short everted rim and rounded lip; D 5.6 cm ; 2.5YR 6/6 (light red). [E125, Sq. 07, L. 09, no. 169].
No. 22: bowl, with straight rim and inwardslanting lip; D $14.0 \mathrm{~cm} ; 2.5 \mathrm{YR} 6 / 6$ (light red). Possible parallels: Oleson et al. 1995: 339, fig. 19.8, early 2nd C. [E125, Sq. 06, L. 19, no. 98].

No. 23: bowl, with outcurving rim and rounded lip; D 11.0cm; 10R 6/6 (light red). [E125,

Sq. 07, L. 11, no. 170].
"Nabataean" Common Ware (roughly 2nd/3rd C):
No. 24: jar, with outcurving rim and thickened, grooved lip; D 18.0 cm ; body 2.5 YR $6 / 6$ (light red), slip 10YR 4/6 (red). [E125, Sq. 05, L. 03, no. 204].
No. 25: jar with two handles, straight rim and grooved lip, two ribs on its exterior; D 12.0 cm ; body 2.5YR 6/6 (light red), slip 10YR 8/2 (white). Parallels: Gerber 2001: 11, fig. 2.C-D; Gerber 2005: 731, fig. 1.2, 2nd-3rd C. [E125, Sq. 08, L. 03, no. 56].
No. 26: jar with two handles, long, slightly convex rim and bevelled lip; D 10.0 cm ; body 2.5YR 6/6 (light red), slip 10YR 8/2 (white). [E125, Sq. 11, L. 08, no. 333].
No. 27: cooking pot, with inverted rim and bevelled lip; D 10.0 cm ; body 2.5YR 6/6 (light red), slip 10YR 8/2 (white). [E125, Sq. 07, L. 09, no. 165].

No. 28: jar, with inverted rim and bevelled lip, two grooves on its interior; D 10.0 cm ; body 2.5YR 6/6 (light red), slip 10YR 8/2 (white). [E125, Sq. 08, L. 05, no. 82].
No. 29: baking bowl, with straight rim and rounded, thinned lip; D 24.0 cm ; body 2.5 YR $6 / 6$ (light red), slip 10YR 8/2 (white). Parallels: Gerber 2005: 731, fig. 2.5, 2nd-3rd C. [E125, Sq. 07, L. 04, no. 146].
No. 30: casserole, with slightly everted rim and inward-slanting lip, clay strip with finger impressions on its exterior; D 14.0 cm ; body 2.5YR 5.5/6 (light red), slip 10YR 6/1 (grey). [E125, Sq. 06, L. 31, no. 89].
No. 31: small bowl, with slightly thickened rim, painted on its exterior; D 9.0 cm ; body 2.5YR 6/6 (light red), slip 10R 5/6 (red), decor: N5/ (grey). [E116, Sq. G76, L. 05, no. 361].
Byzantine Coarse Ware:
No. 32: jar, with inverted rim and thickened, inward-slanting lip, incised wavy lines on the rim; D 14.0 cm ; body 7.5YR 7/4 (pink), slip 2.5Y 7.5/2 (light grey-white). [E125, Sq. 05, L. 11, no. 210].
No. 33: bowl, with short, slightly inverted rim and thinned lip; D 28.0 cm ; body 2.5YR 6/6 (light red), slip 10YR 8/2 (white). [E122, Sq. 02, L. 05, no. 61]. Early Islamic Pottery:

No. 34: bowl, with short, slightly everted rim and rounded lip, incised wavy lines on the rim; D 34.0 cm ; body 10YR 7/1 (light grey), exterior $2.5 \mathrm{Y} 8 / 2$ (white), interior 2.5Y 7.5/2 (light grey-white). Possible parallels: Oleson et al. 1995: 345, figs. 25.2; 25.4, mid-8th C; Whitcomb 1989: 279, fig. 2.C, second half 8th C. [E122, Sq. 01, L. 03, no. 324].
No. 35: bowl, with short, straight, under-cut rim and rounded lip, incised wavy lines on the rim; D 22.0 cm ; body 10YR $7 / 3$ (very pale brown), exterior: 2.5 Y 8/2 (white); possible parallels: Whitcomb 1989: 279, figs. 2.c; 2.g; 2.i; 280, fig. 3.a, second half 8th C. [E122, Sq. 06, L. 01, no. 326].

## Conclusions and Future Plans

The site of al-Humayma continues to surprise and delight its excavators. The civilian centre and shrine have provided important new information about the history of the site and the transition from Nabataean to Roman rule, and about cult activities. It has become increasingly clear that the fort was an early and culturally very characteristic projection of Roman authority into this isolated but important region of the Provincia Arabia. Excavations will continue at the site under the direction of M. Barbara Reeves.

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# PRELIMINARY REPORT OF EXCAVATIONS AND SURVEY AT KHIRBAT AL-MUDAYNA ATH-THAMAD AND IN ITS SURROUNDINGS (2004, 2006 AND 2007) 

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## Introduction

Two seasons of archaeological excavation were carried out from June 18-July 27, 2006 and 1June 18-August 2, 2007 at Khirbat al-Mudayna ath-Thamad, both in the fortified Iron Age town and the Nabataean-Early Roman settlement. Excavation was also undertaken at a number of cemetery sites by M. A. Judd (including WT-112), and at the Roman castellum of az-Zūna (WT-24), directed by J. Ferguson. In 2004, C. M. Foley and L. Foley directed excavations at the Neolithic village of Umm Mishrat (survey sites WT-40+WT-104), and in 2007, A. Lykke and M. Ladurner revisited several sites previously located in the Wādi ath-Thamad Survey area as part of a special Nabataean survey
project. ${ }^{1}$ The senior project director is Dr. P. M. Michèle Daviau; Dr. Robert Chadwick is Assistant Director and Dr. Michael Weigl is Associate Director (2007). Team members included scholars, volunteers and students from Canada, the United States, the Netherlands, Denmark, Austria, the United Kingdom, Nigeria, Iraq, and Jordan. Colin Cadieux served as camp manager and in 2006, Zoë McQuinn was the chief photographer. Eighteen local workers also assisted the team each season. This report will present the results of excavation in Field B, Fields C (south) + D, and Field E in the Iron Age settlement (Fig. 1). Also included are the results of investigations of burials at cemetery site WT112 and in Fields U and V at the south end of


1. Khirbat al-Mudayna athThamad with excavation and survey sites excavated in 2006 and 2007; aerial photo courtesy R. Bewley and D. Kennedy
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Khirbat al-Mudayna ath-Thamad, as well as the salvage excavation at az-Zūna $(2006,2007)$ and at Umm Mishrat (2004).

## Field B (Michael Weigl)

Excavation continued in Field B during the 2006 and 2007 seasons in Buildings 205 and 210 which are part of a series of three textile production buildings, built up against the casemate wall on the east side of the Iron Age settlement.

## Building 205

In 2006, excavations resumed in the central pillared building (B205). The precise tasks involved the excavation of debris layer B2:26, to clarify the stratigraphy and phasing of Rooms 210-R214 and to more accurately define the northern (W2005) and southern (W2020) walls of the building.
Results: Left in place at the end of 2006 was the soil covering Wall 2022 and forming the eastern perimeter of Room 211. Upon excavation, it became clear that this wall was the western support wall of Staircase B2:52 and was most likely built in the last occupation phase of B205. Each support wall of the staircase, W2022 on the west and Wall 2023 on the east, has a monolithic pillar at its northern end footed on bedrock, while the boulder-and-chink wall units were constructed above a hard-packed floor layer filled with potsherds and animal bones. The staircase itself was composed of five steps up to a landing (Fig. 2), located above corbelled Arch B2:24, connecting Rooms 211 and R212 (Daviau et al. 2006: fig. 11) on the ground floor. Each step had a rise of $13.0-16.0 \mathrm{~cm}$, an average width of 50.0 cm , and a depth of approximately 25.0 cm .

In the three parallel rooms to the east of the staircase, bedrock was located under the beat-

2. Staircase B2:52, looking south.
en earth surface in north Room 214, providing evidence that North Wall 2005 was footed on bedrock and dates to the earliest use phase. In central Room 213, the stratigraphy was more complex, because the bedrock begins to slope as it approaches the eastern edge of the mound. On the north side of R213 is pillared Wall 2018 (Fig. 3), which separates this room from R214.

There was a pillar (B12:30) with a footing stone ( $\mathrm{B} 12: 75$ ) located in the wall for support. Approximately 40 cm below the base of the footing stone was a later soil layer (B12:69). It was a beaten earth floor which was covered with ash and oil spots from the $t \bar{a} b \bar{u} n(\mathrm{~s})$ directly across the room on the SE end. The next soil layer (B12:67) was also a beaten earth floor with ash spots, also from the $t \bar{a} b \bar{u} n(\mathrm{~s})$. Cut into the floor was a boulder mortar (B12:56) in the NE corner. A footing stone ( $\mathrm{B} 12: 71$ ) was discovered wedged underneath supporting it (Fig. 3a, b). Plaster (B12:64) was also found partially surrounding the mortar to keep it from moving. Covering these loci was a soil layer (B12:35) which could possibly be wall debris from the wall (B12:4). On top of everything was a layer of debris (B12:0.5) which

3. a) Boulder mortar, b) Wornthrough mortar.
had collected over the year.

## Building 210

Two other squares were opened (B3, B13) to the south of Building 205. At the beginning of the season, it seemed reasonable to assume that these squares contained the remains of yet another pillared building (B210) that might be related to B205 by a party wall (W2020). The entryway and the western half of three parallel rooms of a new building (B210) were indeed excavated. This (third) pillared building excels in very substantial architecture, especially two very well built and massive North-South walls flanking a doorway at the western side of the building.
Results: The southern room (R223) of Building 210 was filled with collapsed wall stones and ceiling material sloping toward the northwest. In this debris, there were pillar bases from the upper storey and a saddle quern which fell onto an ash layer above a cobbled floor. Under the cobble floor, there was a sterile fill layer above bedrock. Room 223 is separated from the central room (R222) by a pillared wall (W2033) and a doorway. Room 222 was separated from northern Room 221 by a second pillared wall running east-west. In each of these walls, there were limestone basins between each pair of pillars.

A cistern-like installation carved in bedrock (B3:46) in the northern room (R221) undoubtedly represents one of the significant features of B210 (Fig. 4). It was found associated with an earlier, very well constructed wall which served as the foundation for North Wall 2020. Although far from being fully understood, the discovery

4. Interior of cistern/storage cellar in B210.
and partial excavation of B210 represented one of the most important insights of the 2006 season.

Rooms 221, 222, and 223 were reopened in 2007 to the east and found to extend the full length of B210 up to the inner casemate wall (W2002), revealing a tripartite plan (Fig. 5). There were 10 pillars in the south wall with intervening basins supported by elaborate plastered footings. Nine pillars were exposed in the north wall (W2034), and nine basins, although its full length remains unexcavated. In total, an uninterrupted sequence of 9 pillars, 9 basins, and 7 lintels connecting the pillar-tops were excavated (note that two pillars and one basin were left unexcavated in the balk between B13 and B23). Above the lintels were the remains of an upper-storey wall.

In south Room 223, there were two industrial size basalt saddle querns fallen upside down from an upper storey. A collection of textile tools was recovered from both the central and northern rooms, including 51 loomweights, 3 bone spatulae, a spindle whorl, 2 limestone jar stoppers, 3 perforated stones, a tripod motar, 2 zoomorphic figurines, 3 limestone altars, a miniature table, and a large limestone "table" or stool.

Field C (South) and D (Christopher J. Gohm)
Excavations were carried out in four principle areas of Fields C (South) and D during the 2006 and 2007 seasons, including the eastern street system and three large buildings situated west of the street itself. Seven squares were investigated, including the north-south line of C98, C99 and C100 along the street, the east-west line of D71, D81 and D91, plus C90. ${ }^{2}$ This area was

5. Tripartite Building 210 with pillars and basins, and a large inverted saddle quern fallen from the upper storey.
largely unexplored in past seasons, aside from the partial excavation of the "Central Roadway" in Squares C100 and D91, immediately west of Pillared Building 200 in Field B (Daviau et al. 2006: 257). Here excavators noted the presence of large walls, which have now proven to belong to two buildings of very dissimilar plans, the rectangular Building 300 to the north and the much larger Building 306 to the south. Immediately to the west another structure was identified, Building 303, along with what may prove to be part of the western street system. ${ }^{3}$ Only one Field Phase (FP 1) was identified during these excavations (Fig. 6), dating to the Iron IIB and IIC periods, with clear distinctions between construction phases (FP 1C), use/modification phases (FP 1B) and destruction/abandonment phases (FP 1A). For the purpose of this summary, emphasis will be placed on the construction and use phases. This Field Phase appears to have been fairly long-lived, as between one and two construction phases ( $1 \mathrm{C}-1$ and $1 \mathrm{C}-2$ ) and two use/modification phases (1B-1 and the later 1B-2) were identifiable in each area.

The Eastern Street System (S220)
The principle goal of the 2006 excavation season was to investigate the area immediately southwest of the six-chambered gate and Courtyard 150, and west of pillared Building 200, in order to better define the nature of the settlement's eastern ('central'?) street system and, more importantly, its stratigraphy. This area was initially explored in 2005 , resulting in the discovery of several large walls along the west and a unique ramp installation along the face of B200 on the east. During 2006 and 2007, excavations were carried out in Squares C98, C99, C100 (reopened) and D91 (reopened), several parts of which were excavated to bedrock to obtain a complete sequence of deposition. The results were very similar in these four squares, and a series of laminated surfaces, up to 0.73 m in depth, were identified overlying bedrock and hard-packed pebble and cobble fill layers. These were much deeper in the south due to the increased amounts of traffic and debris between the buildings, with northern areas consisting of approximately 4 superimposed layers (matching

6. Major wall lines of Field Phase 1 in Fields C (South) and D.
2. Square Supervisors for the 2006 season were C. Dahlke,
S. Edwards and J. McDermid, while those for the 2007
season were G. Braun, C. Dahlke, and E. Zeran.
3. The investigation of the area west of Buildings 300 and

306 will be the focus of the 2008 season in Field D (under the supervision of S. Edwards) to locate the settlement's western street system and Building 303's relationship with the western casemate wall.
well with the past results from Courtyard 150), compared to 10 in the south.

The most complete sequence was identified in an east-west section across the street from Building 300 to the ramp of Building 200, where the deposition was deepest. Here layers associated with leveling of the bedrock during the construction phase 1 C were identified (D91:34=C100:34=C99:14) (Fig. 7) and the earliest intentionally laid surface (D91:33). Later accumulations of surfaces (D91:32, D91:29, D91:27-23, D91:21), as well as the latest Iron II street surface (D91:20), correspond to use phases 1B-1 and 1B-2. Finds from these various surfaces include over 560 animal bones, small ceramic sherds, broken ceramic figurines, perforated shell pendants and broken spindle whorls, just to name a few. Most notably, the latest Iron II surface (D91:20) was very hard and grey in colour, possibly lightly baked by fires associated with the destruction/abandonment phase of Field Phase 1. Over this, extensive accumulations of windblown soil, rockfall, animal bones, Iron II sherds (plus a few belonging to the Roman period), fragmentary limestone containers, stone altars, ceramic figurines and numerous other finds were identified, all of which were
extremely dirty and caked with lime, possibly due to decaying limestone mixing with seasonal rains in the years following abandonment. ${ }^{4}$

Another goal for the excavations in Street 220 was the investigation of the ramp installation initially discovered outside Building 200 in 2005. This ramp proved to have a very complex history, and three principle phases were identified (Fig. 8). First, the entrance to B200 consisted of a simple porch consisting of two walls (C100:18 and C100:6), finished with a slightly raised sill along the north (C100:38). These features enclosed an area of $1.30 \times 2.25 \mathrm{~m}$ marked by an oval depression in the bedrock in the southwest corner. The earliest layer D91:34 acted as a foundation for the western porch wall in places where the bedrock dipped, suggesting that the initial porch construction should be assigned to the construction phase (1C). Later, as the street surface was raised due to debris and soil accumulation, modifications were made to the entrance in the form of a raised step (C100:8, C100:35). This addition extended northwards for approximately 3.15 m beyond the sill (Phase 1B-1). Finally, as the street surface continued to rise, an additional step (C100:30; $1.42 \times 1.30 \mathrm{~m}$ ) was added over the northern end of the earlier step, which maintained a level high-

7. East-west section through Street 220.
4. Soil layer D91:6, a layer filled with ceramic sherds, animal bones and fragmentary artefacts that was previously identified as the latest surface of the street, can more accurately be called the earliest layer of this accumulation.

As excavations continued and our understanding of the street sequence improved, it became clear that this debris layer overlaid the latest street surface.

8. Architectural modifications to the entrance ramp leading into Building 200: the entrance porch (a), the single tiered ramp (b) and the two-tiered ramp (c).
er than that of the street (Phase 1B-2). These efforts were likely aimed at preventing water, sewage and other runoff from flowing into the main room of Building 200, whose floor was at a much lower elevation.

## Building 300

Following the discovery of the eastern wall of an unidentified structure during the 2005 season, Building 300 was fully excavated in 2006 and 2007. This building consists of a single long rectangular room (R301) measuring 8.70 x 3.20 m , enclosed by walls 1.0 m thick on average (W3005, W3001, W3004 and W3000), yielding an overall exterior measurement of 10.70 $x 5.20 \mathrm{~m}$. These walls were footed on sculpted bedrock ledges, with clearly visible tool-marks along the north and south (Phase 1C). Access to the building itself was rather restricted, as the sole doorway (threshold D91:41) was located in the southeastern corner approximately 1.07 m above the earliest street surface. Considering the difference in elevation between this surface, the threshold of the doorway and the earliest surface of R301 (D91:58), it is plausible that in its earliest phase access was gained to this building via wooden ramps or stairs. During this phase a 1.69 m high plastered pillar of fieldstones (D91:44) was erected over bedrock in the northeast corner of R301, and a hard packed surface (D81:35, D91:53, D91:55, D91:58) accumulated over the bedrock and an unusual trapezoidal depression in the centre of the room.

In the earliest use phase (1B-1) a rectangular arrangement of flat-lying cobbles (D91:52) was laid in the southeast corner as a foundation for a monumental stone staircase (D91:40), which itself consists of 6 large steps (ranging in width from $1.25-1.36 \mathrm{~m}$ and extending over an area 1.62 m long). This staircase does not bond with the surrounding walls, indicating that it was not part of the original building plan (Phase 1C). A low north-south partition wall was also set up at this time between the pillar and the north wall (W3014), creating a small, enclosed area of unknown function. Hard packed layers accumulated in the eastern part of the room (D91:50) and similar layers accumulated further to the west (D81:29 and D81:31). These layers in turn sealed against an unusual and roughly rectangular formation of stones set against the western wall (D81:30). This formation, likely a platform or foundation for another type of installation, measured $2.53 \times 1.63 \mathrm{~m} \times 0.23 \mathrm{~m}$, and acted as a focal point for the long room (Fig. 9). Although initially thought to have acted as some sort of subfloor fill for a bedrock void, excavations beneath the stones of the installation identified a hard-packed soil layer (D81:36) containing dozens of sherds and faunal bone fragments over the earlier construction surface (D81:35), negating this possibility. The function of the building's earliest phase of use is difficult to ascertain owing to the near complete lack of material culture remains, aside from Iron II ceramic sherds and limited faunal material. Whatever the function,

9. View of B300 looking west with pillar in the bottomright and rectangular stone formation along the rear wall from the first use-phase (1B-1). Floor layers excavated in the centre revealed bedrock voids and depressions visible here.
either for storage, habitation or even religious activities, the room was cleared out prior to its reuse later in the Iron II.

In the building's second phase (1B-2), the rectangular installation went out of use, and it was covered with a fill layer of loose soil and cobbles (D81:33) above which a later packed earth and plaster surface was laid (D81:22 and D81:24). This latest surface covered the entire room, sealing against the existing staircase and pillar as well (D91:48 and D91:51). This later use-phase was clearly associated with a food processing and/or industrial function, as numerous grinding tools, such as an anvil (MT 2179), several upper loaf-shaped millstones (MT 2180, MT 2161) and a quern fragment (MT 2147), were found on the floor and immediately above, amongst burnt beams and fragments of ceiling material. This burning was very pronounced around the staircase area, with ashy layers and burnt beams deposited at steep angles down and off the side of the steps (D91:42).

## Building 303

A secondary goal of the 2007 excavation season was to explore the area west and south of the monumental Building 300, which led to the discovery of a new rectangular structure oriented east-west. This building was only partially excavated, but its general layout was identified and its stratigraphic history thoroughly documented. Building 303 consisted of at least two parallel
rooms (R302, R303) divided by a pillared wall (W3008) with regular spacing of 0.70 m , with an entrance in the northeastern corner separating its northern wall (W3006) from the western wall of Building 300. These pillars (Phase 1C-1) were laid over both bedrock outcroppings and arrangements of flat-lying boulders (D71:39), filling voids in preparation for the earliest hard packed construction surface (D71:37 in R302; Phase 1C-2).

Over this, a series of beaten earth layers accumulated during the use phases of Building 303, including surface D71:34 (Phase 1B-1) and the latest surface D71:26 (Phase 1B-2). In the latest phase, modifications were made to the central aisle and an area of stone paving was installed (D71:32) along with two low partition walls between the pillars (W3009 and W3010). Finds from the floors of the building were related to food preparation and industrial activities, including a basalt mortar (MT 2301), a basalt anvil (MT 2303), a stamp seal (MT 2317) and an upper loaf-shaped millstone (MT 2311) from the earlier phase 1B-1, plus a mortar fragment (MT 2289) and hand grinder (MT 2277) from phase 1B-2. In the debris layer associated with the ceiling collapse further finds of a similar nature were made, such as basalt mortars (MT 2209, MT 2266), a basalt upper loaf-shaped millstone (MT 2219) and a basalt lower grinding stone (MT 2195), along with two limestone basins, D71:25 ( $0.65 \times 0.44 \times 0.21 \mathrm{~m}$, with a depth of 0.14 m ) and basin D71:11 ( $0.69 \times 0.58$ x 0.40 m , with a depth of 0.24 m ), which fell at angles from the second storey floor and the uppermost roof, respectively.

Based on the finds and the lack of parallels to the industrial pillared buildings along the east side of the settlement (i.e. the lack of loom weights, intra-pillar basins, etc.), this structure may instead belong to the domestic realm. Excavations outside of the northeast doorway of this structure also identified the latest Iron II street surface in this area (D71:51) beneath layers of windblown soil and wash, much like those over the eastern Street 220. A probe through this layer, which sealed against a stone threshold (D71:54) across the doorway, resulted in the discovery of the earlier street D71:55, and excavations were halted in anticipation of a sequence similar to Street 220.

## Building 306

Immediately south of Building 300, a third structure was identified, whose eastern wall was first noted in 2005 as D91:9. ${ }^{5}$ Judging from wall lines visible on the surface of the mound, the building (B306) appears to have measured approximately $6.25 \times 7.50 \mathrm{~m}$, with a central hall (unexcavated) and doorway along the central street system, with rooms to the north and south. Building 306 was only preliminarily explored along its north side, with one room in the northeast (R305) completely excavated to bedrock and a room to the west (R306) left partially unexcavated. This structure appears to have been contemporary with Building 300, as the corners of W3001 and W3003 were bonded in the lowest courses. However, Building 300 was certainly completed earlier than Building 306, as the uppermost courses of W3003 abutted those belonging to W3001 and were on a slightly different orientation. The western wall (W3007) of B306 also abuts the southern wall of Building 300 (W3001).

Excavation results from the two rooms on the north side indicate that B306 had rather unique architectural features. Just below topsoil, a line of 6 pillars was discovered (W3011), measuring on $0.50 \times 0.30 \mathrm{~m}$ on average spaced at intervals between 0.70 and 1.00 m , suggesting at first that the layout may be similar to the pillared buildings in Field B. Over the course of excavation in the northeastern room, however, a different method of building was noted (Phase 1C). The pillar in this room is footed on an east-west stone wall (W3012) rather than on the floor itself, with a height difference of 1.20 m from the top of the wall to the earliest surface (D91:70). At this time the west wall of R305 (W3013) was built as well, which terminated short of northern W3001 to create a doorway between R305 and R306. Based on the preliminary results, the pillars appear to belong to the second storey, unlike any of the pillared buildings investigated to date (Fig. 10).

That the structure was in use for a lengthy period of time is supported by the recognition of several superimposed floor surfaces in R305.

10. Details of architecture from $R 305$ in the northeast corner of Building 306, with pillar footed on east-west W3012.

The earlier floor (D91:70) was packed over bedrock and likely functioned as a construction surface (Phase 1C). Over this two distinct layers accumulated, including the earlier layer D91:69 (Phase 1B-1) and the later layer D91:61 (Phase 1B-2). Over the latest surface an interesting layer of soil and debris from collapse was identified (D91:57); it contained large amounts of mendable sherds, small finds and high status goods, including a beautiful female figurine applied to the neck of a painted jug (MT 2402). Unique finds were also made in the unfinished R306 in the form of a well-made stone table (MT 2425), bowl fragment (MT 2359) and gaming board (MT 2412), likely deposited during the collapse of the uppermost storey. Excavations in 2009 will focus on the further exploration of this unique structure and the complete documentation of its history and layout.

## Field E (Annlee Dolan)

Five seasons of excavation in Field E have exposed the casemate fortification system that runs around the perimeter of the site, along with an adjoining structure, Building 400 (B400). ${ }^{6}$ Excavation has indicated that B400 is much larger than initially anticipated and though specific aspects of B400 are well defined, the extent of the building was not yet known at the end of the 2005 season. Therefore, the 2006 and 2007 seasons focused on delineating B400, and at-

[^47]6. For a full description of previous excavations in Field E, see Daviau et al. 2006.
tempting to understand its function (Fig. 11).
B400 is unique at Khirbat al-Mudayna, not only for its unusual sprawling plan, but also in that it appears to be the domestic area of the site. Constructed against the inner casemate wall (W2002), B400 is rectangular, measuring at least $17.00 \mathrm{~m}(\mathrm{E}-\mathrm{W}) \times 12.5-15.00 \mathrm{~m}(\mathrm{~N}-\mathrm{S})$, though the eastern extent of the building is still not certain. On the west side of B400, Wall 4013 extends from the casemate for 12.5 m , conforming to the fortification system as it curves north around the site. This wall was constructed in a boulder-and-chink style with mud mortar. The size of the stones is considerably smaller and less well hewn than those that were used in the northern sector of the site near Gate 100 . Some walls in B400 had a well-preserved fine plaster facing, while others were not faced. The discovery of two staircases indicates that a portion of the building had a second storey. Evidence for
this second storey was preserved in Room 419 (above R405) and Room 410 (above R402).

The finds from B400 support the theory that this was a domestic complex, with common utilitarian objects found in abundance. These include cooking, storage and serving vessels, grinding tools, loom weights, bone implements, stone weights, limestone basins, and other utilitarian items. It is possible to suggest functionally specific use areas for B400, based on concentrations of artefacts. The 'work areas' of B400 were located in the west and the south. Situated next to the casemate wall, R402 contained more than 20 loom weights, along with groundstone tools, mortars, and pounders. To the east of W4005, R403/R406 had a large basin situated between two pillars, along with a bone spatula, an iron sickle, two pieces of worked bone, a wooden spool, pounders, groundstone tools, a mortar, a spindle whorl, and a stopper. This suggests that

11. Building 400 after the 2007 season.
small-scale textile production took place in the southern sector of B400. Similarly, on the west side of B400, R413 contained two basins that were situated between the pillars which span the distance between W4010 and Staircase B. Finds from R413 include loom weights, a bone spindle, a limestone table and a limestone utilitarian container (Fig. 11).

The remains of a kitchen were found on the east side of the building in R415 (Fig. 12). This kitchen contained two ovens, one of which sealed against W4015 and was surrounded by a thick plastered platform, as well as a layer of ash. Many animal bones and cooking pots were also recovered from R415. To the west of the kitchen in the central portion of B400, was a possible storage area, with several intact storage vessels in R416, and bin-like installations in R420.

Not only was the 2007 season successful in better defining the function of B400, along with delineating its northern and western perimeter walls, but also in clarifying its phasing; it is now evident that there are three distinct phases of occupation in B400.

12. a) Pillars and basins in Room 413, with Staircase B to the right; b) Kitchen in Room 415.

## Interpretation and Phasing in Field E

Field Phase 2C-1: Construction Phase of Fortification System

The earliest phase in Field E is represented by the construction of the casemate fortification system. The inner casemate (W2002) and outer casemate (W2001) walls bond with cross walls to form the casemate rooms. The revetment system (in Field H) may also have been constructed at this time running from the south end of the site eastward around the curved perimeter. This revetment consisted of a tightly packed layer of rubble, located at a consistent depth and sealing against the outer casemate wall. It was exposed in the 2004 season on the south and southeast side of the site, but does not appear to continue north along the east side. Nor does it extend around the southwest perimeter of the town. As noted in the 2004 season, it is likely that this cobble and boulder fill was placed against the outer casemate in order to maintain the structural integrity of the fortification system. However, it should be noted that these stones were laid relatively flat, forming a pavement-like surface. The stone pavement extends approximately $1.20-2.40 \mathrm{~m}$ from the outer wall. It is also worth noting that at the very south end of the site, the stones of the outer casemate appear larger than those which are visible near the southeast corner where the pavement ends; those in the south end average $0.60-1.00 \mathrm{~m}$ in length, while those east of the pavement range between $0.30-0.40 \mathrm{~m}$ in size.

Field Phase 2C-2: Construction Phase of Building 400

Following the construction of the casemate fortification system, B400 was built abutting the inner casemate, W2002. In order to form a level building platform, the unevenness in the bedrock was packed with a cobble and pebble fill. The walls of B400 were then constructed either directly on bedrock or on this fill layer. From west to east, the original north-south walls extending from the inner casemate include W4013, W4001, W4005 and W4008. W4013 bonds with North Wall 4017 in what appears to be the northwest corner of the building. Thus, W4017 and W4016, separated by Doorway H, are likely the northern limit of B400, with access through Doorway H from the north. Building 400's in-
ternal walls belonging to this initial construction phase include W4002, W4007, W4009, W4010, W4021, W4014, W4015 and W4019. Although the eastern extent of the building has not yet been determined, it appears that there are at least 16 first storey rooms which belong to the earliest phase of the building. The earliest surfaces of B400 sealed against the bottom of these walls.

Field Phase 2B-I: Earliest Use Phase of Building 400

The earliest use phase of B400 is marked by the surfaces that were initially placed over the fill and bedrock, sealing against the walls of B400. Fully excavated rooms that have surfaces sealing against the lowest courses of the original walls include Rooms R405, R412, R421, R413, R402, R403, R406, R420, R416, R414 and R415. Based on the pottery from these surfaces, the earliest use phase of B400 began in the Iron II Period and extended into the Late Iron II Period.

Field Phase 2B-II: Secondary Use Phase of Building 400

This phase is represented by several major additions or alterations to Building 400. In areas where these later alterations occurred, it seemed to be indicative of a change in function of an area. It should be noted that not all rooms contained evidence for more than one surface. This is due to the fact that if the room did not have any major architectural changes, the original floor of the room likely remained in use throughout the life span of the building.

There are 10 rooms that have evidence for secondary floor surfaces including; R405, R421, R413, R402, R403, R406, R420, R416, R417 and R414. Some rooms also exhibit evidence architecturally for this secondary use phase. In R421, several architectural features were added. Wall 4020 was constructed abutting Wall 4017 and ends abruptly to allow access to Staircase B. Bench E77:24 was also constructed at this time, abutting both W4020 and W4017, next to Doorway H .

W4018 is also a secondary wall which was constructed upon the earliest surfaces of Room 416. Wall 4018 abuts Wall 4010 and has a new surface sealing against it. The addition of this wall is significant because it cuts R416 in half,
turning the area east of it into a narrow corridor or passageway, R417. At this time, access between R416 and R417 was through Doorway J in W4018.

In the 2006 season of excavations, it was apparent that the eastern-most portion of Wall 4015 was secondary and was constructed of smaller stones. This secondary portion of W4015 was faced with a very thick layer of plaster (up to 0.50 m in depth) to level out the face of the new extension with the rest of W4015. The extent of this wall is still not clear, but the second surface level found in R414 sealed against it.

## Phase 2B-III: Final Use Phase of Building 400

This phase is represented by several minor modifications to Building 400; however, these are significant due to the fact that they resulted in a third (and final) surface in some areas. In the 2005 season it was noted that Room 409 was a later addition with Wall 4011 enclosing a small area against the inner casemate (W2002) and Wall 4005. During the 2005 season it was unclear how R409 was entered. However, it is now evident that R409 can be entered from casemate room R401. Wall 4011 was constructed on top of the Field Phase 2B-II surface in R402, placing it in Field Phase 2B-III.

In the 2007 season, this phase was also identified in a blocked up doorway (J) within W4018, closing off access from R417 to R416. As a result, a new use surface was laid over the Field Phase 2B-II floors of Rooms R416, R417 and R420. The blocking of Doorway J drastically altered the function of R416; turning it in a storage room, with many pithos fragments found just west of the blocking wall. Similarly, many pithos fragments were found in the northern portion of R417, thus turning what had once appeared to be a main corridor into a storage area.

Although it cannot be said with certainty, as it has not been fully exposed, it is probable that Wall 4022 also belonged to the latest use phase, blocking up Doorway M and restricting access to R408. This wall is made of small cobbles in a similar manner to blocking wall E88:54, which blocked Doorway J.

## Field Phase 2A-Abandonment

This phase is represented by the destruction and abandonment of Building 400 and the
casemate system. B400 was not destroyed by a massive conflagration, nor did the south end of the site suffer the same destruction as the north end did. However, it would seem that the final occupants of B400 left in haste, as the building was not cleared of its contents. Instead of being destroyed, this structure gradually and naturally gave way to erosion processes with walls tumbling and roofs collapsing, preserving the floors beneath. This phase was represented by the postoccupational debris that is situated above all latest and second storey floor surfaces.

## Field Phase 1

Phase 1 is represent by the Medieval burials which were found in E99 and G9 in the 2004 and 2005 season of excavations. For full details of these burials and this field phase, see Judd in Daviau et al. 2006.

## Cemetery Excavation and Bioarchaeology, 2006 (Margaret A. Judd)

Introduction: The bioarchaeological ${ }^{7}$ field goals of the 2006 field season were to first conduct a test excavation at the low-lying area that extended south of Khirbat al-Mudayna athThamad that was believed to be a large cemetery. The second goal was to fully expose the burial complex at WT112 that was begun in 2005 (Daviau et al. 2007: 275) and extend the excavation vertically to determine if the site had an earlier use.
Khirbat al-Mudayna ath-Thamad: Variations of linear and circular clusters of stones suggested that the low-lying mound that extended south from the main tall of Khirbat al-Mudayna was a multi-period cemetery; the annually increasing pockets of looting implied this activity although no bone was found. Eleven suspected burial features were contained within three 6.00 $x 6.00 \mathrm{~m}$ squares (U29, U30, and V21), and of these, three features were completely excavated and are presented here.

## Burial MT U29:4

Grave: A one course ring of free standing, unhewn limestone boulders (MT U29:4) marked the grave cut that contained a rubbly fill consist-
ing of soil, pebbles and cobbles. Large rectangular medium-sized limestone boulders lined the sides of grave cut to form a crypt $0.75 \times 0.30 \mathrm{~m}$ at the greatest points; the eastern most section formed a small niche where the lower legs of the skeleton (U29:14) extended. The skeleton was supine upon the bedrock ( 616.00 masl ) 1.14 m from the surface and oriented west-east about $220^{\circ}$ (Fig. 13). Both arms were extended along the sides and pronated so that the ulnas were lateral. The legs were fully extended and bowed laterally at the knees.
Objects: A wooden two-sided comb (MT 1775) was placed beside the left elbow; six large beads encircled the right wrist (MT 1766a-f) and five large beads were associated with the left wrist (MT 1756a-e). A metal ring with a square stone had discolored a proximal phalanx green; a cloth disc was associated with the ring (MT 1774a-b). A necklace of small beads (MT 1778, MT 1816a-p) surrounded the neck region, and finally a round metal-trimmed glass disc (MT

13. Burial MT U29:4. Subadult within a lined burial pit, wooden comb and beads in situ.

[^48]1814) wrapped by a piece of cloth and bound by a thin cord (MT 1765) was just under the right shoulder. No pottery was recovered.
Skeleton: The skeleton (U29:14) was about 10 years old $\pm 30$ months, based on the dental eruption sequence (Ubelaker 1978: 47). The skeleton was well preserved and nearly complete, with only some extremity bones missing. No visible pathological lesions were observed, but the right upper first premolar was erupting at an angle.

## Burial MT U29:2

Grave: A ring of free-standing limestone boulders (U29:2) surrounded three rows of flat stones dry-laid in bolder and chink style to mark grave cut U29:16. The fill was moderately firm and rubbly sandy textured soil with pebble and cobble inclusions that covered a layer of unhewn and dry laid small boulders. The grave cut measured $1.35 \times 0.25 \mathrm{~m}$ at bedrock ( 616.42 masl) and was lined with flat stones. A completely articulated supine adult male skeleton (MT U29:20) was extended in a west-east direction about $300^{\circ}$ with head facing right to about $220^{\circ}$ (Fig.

14. Burial MT U29:20. Adult male laid supine in a lined burial pit.
14). The legs were fully extended and crossed at the ankles, left over right. The right arm was extended with the hand under the hip and the left arm was pronated so that it lay across the pelvis. No grave goods were recovered.
Skeleton: The preservation of the skeletal remains (MT U29:20) was exceptionally good and nearly all of the remains were recovered. Morphological features of the skull and pelvis were masculine, though not exceptionally robust (Buikstra and Ubelaker 1994: 16-20). The medial clavicle was completely fused so the individual was at least 30 years of age (Scheuer and Black 2000: 251). The pubic and auricular surfaces suggest 19-34 and 30-39 years of age respectively (Buikstra and Ubelaker 1994: 2332); the age of the individual at the time of death was likely between 30-34 years. Slight amounts of dental calculus and periodontitis were observed. Osteophytosis was noted on the vertebral column especially T7-T12; T11 and T12 were fused. A thick band of osteophytes extended from the joint margins of the three articulating bones of the right knee; surface osteophytes and eburnation were intermittent.

## Burial MT V21:4

A circular ring of soft limestone boulders (1.75-1.90m diameter) surrounded unhewn and dry laid pebble chink stones. Three large unhewn flat limestones and cobble chink stones lay immediately below this locus. Bedrock was reached at 616.02 masl with no evidence of human or animal skeletal remains in the burial fill. The grave cut (V21:12) measured $0.87 \times 0.46$ and was 0.76 m deep. It is possible that this feature functioned as a cenotaph.

## Discussion

Some of the 11 superstructures located within the excavation area, such as U29:2 and V21:4, surrounded a surface layer of large flat stones laid side to side along the long axis of the structure. The interior surface of other superstructures was filled with soil and cobbles with no distinct top layer of stone, although windblown soil and debris may actually cover a layer of stones. Graves marked by superstructures U29:2 and U29:4 contained a layer of large stones balanced on a lower limestone pit liner that appeared at approximately the same level
(616.00-616.33 masl). In both cases a space was hollowed at the east end of the pit to contain the lower legs and feet. Both individuals were supine, oriented approximately west to east and facing south. These similarities suggest that the two individuals were of the same kin group or culture and that biological sex or age-at-death were not factors in the grave construction or burial configuration. The burial pit of the child is somewhat deeper than that of the young man ( 1.14 vs. 0.66 m ) but this is more likely due to the bedrock barrier encountered. The structure of the graves were similar with both consisting of a circular stone superstructure, a stone lining and a lower leg niche.

No pottery was recovered from the excavated graves. The few pottery shards recovered from the grave fills were likely unintentionally included when the graves were infilled; shards spanned from Iron Age, Early Roman, Byzantine, Early Islamic and Umayyad periods. Based on the excavations in squares V21 and U29, bedrock was reached less than two meters below the surface; the presence of earlier (Iron Age) burials is therefore extremely unlikely, at least in this part of the cemetery. However, the two skeletons recovered from the features in Square U29, confirm the supposition that the ring-like stone structures on the southern expanse of Kh irbat al-Mudayna were burials and therefore form a large cemetery.

Ethnographic work records slight variations in historical Bedouin burials, but in all cases the funerary ritual was swift and any form of physical contact with the deceased was shunned; in the past non-Bedouins were often paid to perform funerary tasks, such as cleansing, dressing and burying the body (Burckhardt 1831: 99; Dickson 1949: 211; Musil 1928: 670-71; Toombs 1985: 93). Some variation for the burial pit and superstructure was recorded. For example, when the death occurred near the settlement the Ruwala Bedouin required that graves for females be at least shoulder height, while those of males need only be as deep as the knees at standing height (Dickson 1949: 212; Musil 1928: 670). Archaeological features associated with Muslim burials (Insoll 1999) were noted by Hobbs (1989: 65) who observed that graves among Egyptian Khushmaan Bedouin were six feet deep and long in an east-west direction. A
side niche on the north side held the body so that soil would not fall onto the face of the deceased during infilling; no grave goods were included (Hobbs 1989: 65). Among Kuwaiti Bedouin, Dickson (1949: 209) also noted the side-niche, but graves were no more than four feet deep; the deceased was placed on their side with the right hand under the right cheek facing the open grave. A stone was occasionally placed at the head and foot of the grave to serve not as a memorial, but as a marker so that the grave would not be dug into (Dickson 1949: 210). The Ruwala Bedouin also required deeper graves for females (Musil 1928: 670). A stone was placed under the head and the body laid on the right side facing south. Stones covered the corpse, then soil; two large stones were erected for a male and one for a female. When death occurred in transit, a shallow grave about $20-25 \mathrm{~cm}$ deep was dug; the body was laid in the same position and covered with stones or earth (Musil 1928: 670-71) or according to Burckhardt (1831: 121) the deceased was often interred in ancient ruins if conveniently located. Toombs (1985: 70-71) found that the interments of children less than three years of age were tended to with less care: the structures were more frequently simple pits, children were placed in a flexed position and they did not necessarily face Mecca. After the age of three years, children's burials followed patterns observed among adult interments, which led Toombs to conclude that their status within the family changed at that point. These ethnographic accounts can provide reasonable explanations for the funerary record, but also emphasize subtle regional variations in funerary practices. Without a large sample size any interpretation here would be speculative.

Burying an individual with a few or no grave goods to honor their life may be the normal practice for all adults interred in this area of Khirbat al-Mudayna regardless of other factors, such as status, wealth or cause of death. Alternatively, Toombs (1985: 93, 106-108) attributed the variation in burial wealth to the fact that the Bedouin were buried with the accoutrements that they wore or carried on their bodies at the time of death, such as beads, rings and armlets; pottery was extremely rare. Burkhardt (1831: 33) observed that male Bedouin did not favor jewelry or other adornment, thus supporting

Toombs' explanation. However, Toombs (1985: 92-3) pointed out that women's jewellery was found frequently in the graves of subadults and men, likely placed there by bereaved wives and mothers.

The jewellery observed in the burial of the child here was typical of that worn by historic female Bedouin (Dickson 1949: 156; Toombs 1985: 104). The large beaded bracelets of amber, coral or mixed stones were universally worn on each wrist by the Bedouin females with whom Dickson lived among in Kuwait. It is also noteworthy that wood combs were also interred with unmarried females by traditional Jordanian villagers (Granqvist 1965: 63). Although it is tempting to conclude U29:14 was female based on the grave goods, as has been suggested for other skeletal samples (e.g., Levy et al. 2004: 81), the biological sex of this individual cannot be confirmed macroscopically from the skeletal remains as dimorphic skeletal features only develop during puberty (Chamberlain 2006: 9394).

While it was assumed that V21:4 marked the grave of a child, the complete lack of bone fragments suggested that if functioned as a cenotaph. The age-at-death of this individual for whom this cenotaph was dedicated cannot be confirmed, and it cannot be assumed that the small size of the feature reflects the age of the absent individual. If this feature was indeed a cenotaph it suggests that the person's body was not recovered for burial in their homeland and tradition dictated that some form of marker be erected to mark their passing or memory.

## Site WT112

Site WT112 sits atop a small hill at the tip of a terra rosa finger formed by the wadi and erosion just west of Khirbat al-Mudayna (Daviau et al. 2007: fig. 21). The eroded wadi walls reveal little in the way of material culture or stratigraphy and the landscape is littered with small to large limestone boulders. It was believed that this site served as some type of funerary monument or cemetery owing to the continued looting of the site and last season's recovery of at least three individuals partially exposed by local looters (Daviau et al. 2007: 275). The goals of this season were to establish the horizontal extent of this complex and to extend the excavation verti-
cally to determine if the site had an earlier use.

## Field B

A $10.00 \times 10.00 \mathrm{~m}$ area encompassed the previously excavated area Field B and an additional few meters to the east and south. Fresh looting was noted on the northern edge of the 2005 excavation and more disarticulated human bones were recovered from the surface. Following cleanup and the removal of a thin layer of topsoil numerous large stones that ran in rows formed a three wall perimeter of a small building rather than numerous individual burial features (Fig. 15). Two large rectangular stones ( $\mathrm{B} 1: 36$ ) ran parallel to the north wall (B1:32) and created a space that was reminiscent of the stone crypts in Field U at Khirbat al-Mudayna described above (Fig. 16). However, further excavation revealed that the stones were intentionally placed on top of two well-preserved crossed innominate bones following the robbing (Fig. 17). Remarkably the bones were undamaged.

Three solid walls ran along the north (B1:32), east (B2:2) and south (B2:4) sides of the structure leaving the west side of the building (Building 1) open (Fig. 18). An interior hard-packed clay surface ( $\mathrm{B} 2: 16$ ) sealed against the walls of the $2.34 \times 5.01 \mathrm{~m}$ room. The interior of the building is best described by quadrants. The north and east quadrants formed a space measuring $2.34 \times 2.27 \mathrm{~m}$. The north quadrant contained a threshold or small partition (B1:33) that extended perpendicularly from the north wall. A small oblong rock feature (B1:36) that may have

15. Large rectangular stones $(B 1: 36)$ exposed by looting following the 2005 season. Numerous disarticulated bones were recovered within the space created by the stones and the north wall.

16. Large rectangular stones (B1:36) exposed by looting following the 2005 season. Numerous disarticulated bones were recovered within the space created by the stones and the north wall.

17. Innominate bones and vertebra in situ below B1:36.
functioned as a container support was nestled into the northeast corner. No features were associated with the east quadrant.

The west quadrant is on the south side of the threshold B1:33 and it is this area that suffered extensively from robbing, which resulted in the partial destruction of wall B1:32. It was above this area that many commingled bones were re-

18. Building 1 final photograph looking west towards the wadi.
covered in 2005 (Daviau et al. 2007: 275). The floor of the south quadrant contained a circular fire pit area that extended 1.2-1.5m. Small human bones were recovered above the ash but none were charred, signifying that they were deposited on this surface at some point after the fire was extinguished and cooled. The burnt area was superficial, less than 1.0 cm deep and likely served to provide light for the robbers or warmth for those seeking temporary shelter. A circular structure (B4:4) abutting the end of the south wall B2:4, which was complemented by a similar structure (B2:7) at the east end of the same wall. A rectangular limestone rock ( 0.88 x $0.30 \times 0.22 \mathrm{~m}$ ) abutted against this structure to form a convenient bench at the entrance to the small room; however, this stone has been moved at least two times and its exact provenience is unknown. A few small human bones were found on the south side of B4:4 but may have naturally shifted after the skeletons were disturbed. Over time layers of flat lying stones were placed over the south quadrant above the hearth on at least two different occasions demonstrating that the building had been reused. It was above the final stone floor that the majority of commingled human remains were found this season.

The final evidence of use was in the historical past. An infant (B2:19) was buried in a hollow created within the exterior portion of wall B2:4 (Fig. 19). A small crypt was formed within the wall and with additional small cobbles. The body lay on its right side facing west. Only the thorax, upper body and skull were in situ; other bones were scattered nearby, likely due to scav-

19. Infant (B2:19) burial in south wall of Building 1.
enging animals rather than looters.
Few artifacts were associated with the interior of the building aside from an occasional partial utilitarian stone artifact, such as a broken iron tool (WT 768) that may have been used to rob the graves. A copper coin was found near B4:4, but was so corroded that any contextual evidence was obliterated. Pottery was consistently Nabatean and Early Roman at all levels. Robbing took place on at least three occasions: 1) during antiquity as evidenced by the stone floors (B2:13, B2:8) over disarticulated bone and the fireplace; 2) within the last few years as shown by the robbing discovered in 2005, and 3) during the intervening year prior to the 2006 season.

## Skeletal Remains

Because the skeletal remains from Field B were disarticulated it was first necessary to reassemble complete individuals and determine the number of people actually represented. Bones were sorted by type, conjoined when broken, paired when matching left and right elements were identified, and articulated if joint surfaces matched (White and Folkens 2005: 339). Five individuals were discerned and included two children and three adults. However, one child (B2:19) was not associated with the other individuals as it had been interred externally in the wall of the building rather than within the building. The demographic profile of the adults was determined using the protocol summarized in Buikstra and Ubelaker (1994: 15-32). Biological sex was ascertained using the dimorphic features of the innominate (ventral arc, ischiopubic
ramus, subpubic angle, auricular sulcus); the skull (supraorbital ridge, mastoid process, orbital margin, mental eminence and nuchal crest); and long bone measurements if neither innominate nor skull were present. A summary of the inventory and paleopathology are presented here.

WT112 B:19: Female, 35-44 years. The majority of the bones of this individual were recovered in 2006 in two large clusters of disarticulated bone west of B1:34 (Daviau et al. 2007: 275). The long bones, vertebral column, mandible and extremities were complete and in excellent condition. Slight calculus and moderate wear was noted on the mandibular teeth. One abscess was associated with the upper right first molar. A healed Colles fracture, commonly caused by a fall on an outstretched hand, was observed on the left radius (Fig. 20a). Osteophytic outgrowths occurred on the cervical and lumbar vertebral bodies; the articular facets of the atlas were grooved and eburnated. Gross osteophytic extensions and eburnation, caused by bone rubbing against bone, were on both big toes (first metatarsal and proximal phalanx) (Fig. 20b)
WT112 B: 16 Female, older adult. This individual was fragmentary with portions of arms, innominates, mandible, maxillae and assorted small bone and fragments present. Dental abscesses were associated with the lower left second molar (Fig. 20c) and the right first molar. Complete resorption of three molar tooth sockets and interproximal dental caries contributed to the poor dental health of this individual. Webby bone growth resulting from active sinusitis was visible in both sinus cavities that may have been aggravated by or were the consequence of the dental abscesses. Osteoarthritic lipping affected the vertebral margins, metacarpals and humeral heads. The deltoideus and costoclavicular insertions were particularly robust suggesting that the individual was routinely involved in activities requiring upper arm strength. Although the pubis suffered postmortem damage, a partial parity scar was detected on the dorsal surface. These features are indicative of a female and according to some researchers (Kelley 1979) they are associated with childbirth.
WT112 B1:39 Male, 30-40 years old. The complete skull of this individual survived, but the face and frontal bone were found on the south

20. a) Healed Colles fracture on left radius of male, WT112 B:19; b) Gross osteophytes extending the head of the first metatarsal and base of the first proximal phalanx of the right toe of individual WT112 B:19; c) Dental abscess of left second mandibular molar of older female (WT112 B:16).
side of the rectangular stones (B1:34) deposited by the looters while other broken pieces of the skull were located within the soil filling the 'crypt' and amongst the bones from the previous season. The innominates from this individual were below two rectangular stones (B1:34) and the long bones were scattered to the south. Of the long bones only the right humerus and distal fibula were not recovered. All of the cervical, thoracic and lumbar vertebrae were rearticulated; scapulas, innominates, the sternum and the right patella were present; 29 teeth were associ-
ated with the skull. Slight calculus flecks were visible on the dentition. Large craters of bone resorption surrounded posterior teeth of the right mandible denoting the presence of periodontal disease. Deep cortical defects occurred at both costoclavicular insertion points of the clavicles. WT112 B2:19 This infant found within the east wall was between $0.5-1$ year old as determined by the lengths of the humerus and fibula (Scheuer and Black 2000: 289, 426. Bones recovered included the major skull bones; clavicles, scapulas, humeri, femurs; manubrium and sternum; portions of the left radius, ulna, innominate; portions of the left innominate, tibia, and fibula. Seventeen vertebral elements were present to some degree; sacral arches; eight hand bones, two foot bones, 22 ribs. Slight porosity was noted in the orbits and may be the result of the body's response to red blood cell depletion. WT112 B: 13 Child's remains found in 2005 consisted of fragments of the left scapula, forearm; right fibula and assorted hand bones. This individual was aged between 0.5 and 1 year based on the fibula (Scheuer and Black 2000: 426). The duplication of the left forearm and right fibula confirms that these remains did not belong to the disturbed skeleton B2:19.

## Field C

A $2.00 \times 2.00 \mathrm{~m}$ test square, WT 112 C 1 , just south of Field B was opened to determine whether or not the features represented by lines of three to four stones were indeed burials. Clandestine digging throughout Fields B and C indicated that local looters also believed this to be true. Once it was ascertained that the stones formed part of a single course wall rather than a burial marker, the square was extended north to determine the wall's relationship with other similar features throughout the site and the Field B structure, however no clearly associated walls were exposed. This single course wall rested on hard soil and consisted of two rows of large rocks with smaller fill-stones in between (Fig. 21). As in Field B, pottery was consistently Roman and Nabatean.

## Discussion

WT112 did not prove to be an Iron Age cemetery or a dedicated cemetery from any other period. Only a single building (Building 1,

21. Final photo of WT112 Field C showing single course walls.

Field B) that may have functioned as or been reused as a mausoleum was constructed at least by the Nabatean period. No articulated skeleton was found to represent the last burial within the building. No grave goods were present, which suggests that there may have been a motive for robbing these burials more than one time. The suspected grave in Field C (as well as the many other similar features at this site) was part of a single course wall that was unconnected to Building 1, although continued tracing of the wall may reveal otherwise.

Networks of single course walls, particularly those associated with wadi slopes, have been explained as features associated with run-off farming popular in less favorable agricultural regions. The apogee of this irrigation technology was achieved during the Byzantine period, notably in the Petra, Wādī Faynān and Negev regions (Lavento et al. 2007: 146-49). In all cases, and here at WT112, Nabatean potshards were ubiquitous, but more likely served to 'manure' the land (Lavento et al. 2007: 149). Alternatively, these simple nondescript walls may have functioned as land ownership markers similar to the modern 'fences' constructed in the Wādi ath-Thamad region. Small multi-functional agricultural buildings were associated with the rural Nabatean landscape, but also may be more modern in construction (Lavento et al. 2007: 152). Building 1 at WT112 may have served
originally to store equipment, to provide shelter for the field laborers or shepherds, or to give temporary shelter for travelers, or some combination of these functions. Its open wall facing west provided an attractive vista of the setting sun, as well as a strategic vantage point of the western wadi. The use of ancient architectural ruins as a convenient place to bury the deceased of the later nearby villages or passing nomadic groups is the most plausible explanation for the interment of human remains in this context.

## The Wādī ath-Thamad Project Regional Survey (Jonathan Ferguson)

The Regional Survey of the Wādì ath-Thamad Project studies the archaeological heritage of the Wādì ath-Thamad and its surrounding region in central Jordan. Although the central Iron Age and Nabataean site of Khirbat al-Mudayna is the main focus of excavation, the project's Regional Survey has studied homesteads, fortifications, cisterns, caves and other sites from the Neolithic through modern periods. To date, 141 sites have been identified within this area. From 2005 to 2007, the Regional Survey has conducted surface survey and excavations at Khirbat az-Zūna. ${ }^{8}$

In 2005, the Regional Survey conducted detailed topographic and architectural surveys at az-Za‘farān and Khirbat az-Zūna (Daviau et al. 2006: 275-281). Discoveries during that season's work prompted ongoing, small-scale excavations at Khirbat az-Zūna in 2006 and 2007. The site of Khirbat az-Zūna (WT-24) is a late Roman to Early Byzantine castellum of square quadriburgium plan, about 3.0 km east (upstream) of Khirbat al-Mudayna. Located on the steep northwest bank of the Wādī ath-Thamad, the castellum stands more than 40.00 m above the valley bed.

Although the site had been visited by Brünnow and Domaszewski (1905:335) and appears on the map accompanying Alois Musil's Arabia Petraea (1907), the first plan and detailed descriptions were produced by Nelson Glueck (1934: 27, 30, 90). Glueck, however, did not in-
8. Thanks must be here extended to the Wādi ath-Thamad Project's director, Dr. P.M. Michèle Daviau, as well as to the Jordanian Department of Antiquities staff, the international student volunteers and the Jordanian workers who have worked with the author on the Regional Sur-

[^49]dicate a gateway on his plan, saying that it "was not clearly defined" and mistakenly reported that its walls were "razed almost to the foundations" (1934: 30). Subsequent plans produced by S. Thomas Parker (1979: fig. 12) and David L. Kennedy (2004: 133) included a main gate at the midpoint of the eastern wall.

In 2005, the Wādī ath-Thamad Project's Regional Survey created a three-dimensional topographic and architectural model of the site and its landscape, from the fort down to the wadi bed (Daviau et al. 2006: 275-281). The subsidiary architecture inside and outside the castellum was also mapped, showing a large, curving enclosure around the fort. Geographic information systems (GIS) software allows a virtual model of the fort itself to be seen from whatever direction desired, under various lighting conditions and with the architecture reconstructed to postulated heights (Fig. 22).

When seen side-by-side with earlier maps, the plan produced in 2005 was surprisingly different, with the identification of a gate flanked by towers on the western side of the fort (Fig. 23).

## Excavations at Khirbat az-Zūna, 2006-2007

Given the discrepancies between older plans and the 2005 survey, it was decided that excavation at the gate would clarify the castellum's layout. In 2006, a 60.00 m grid, subdivided into 100 square units, was designed to overlay the castellum and was designated as Field Z.

Square Z15 bisects the axis of the gate and
includes part of the northern gate tower's interior room. Excavations at Khirbat az-Zūna began here in 2006 and continued in 2007, corroborating the 2005 plan's location of the gateway. At the ancient floor level, the passageway of the gate included a stone threshold and a paved walkway leading into the castellum's interior (Fig. 24). A small covered drain leading out from under a corner of the threshold extends westward away from the gate (Fig. 25).

The room in the tower north of the gate was excavated down to its roughly paved floor (Fig. 26) where many copper coins were found. A lintel shows the location of a door in the room's eastern wall, communicating with the interior of the castellum. Of particular note is the tower's construction, the walls were built of ashlar masonry on their outside faces, but of boulder-andchink construction on the inside. Whether this difference was primarily for defensive or aesthetic reasons remains unclear.

Two probes were excavated below the final occupation surface in unit Z15 to shed light on the construction history of the fort. Surprisingly, the walls were built on low, rough foundations that were themselves laid directly on bedrock.

In 2007, square Z75 was opened inside the castellum's courtyard, to investigate the interior opposite the gate (Fig. 27). Based on the presence of many fallen stones with some spolia, and in comparison with other castella in the region, ${ }^{9}$ it was thought that a principia or military headquarters might be located at the rear of the fort. Having excavated through more than a

22. Three-dimensional model of Khirbat az-Zūna, with reconstructed architecture.

[^50](Kennedy 2004: 148-51, 219).

23. Plan of Khirbat az-Zūna, showing the castellum and Field $Z$ (grid north is to northeast).
metre of stone debris and boulders, however, no walls were found; rather, we discovered a postoccupational soil layer over a stone platform (Fig. 28). This platform would have been just in front of the rear interval tower, and may have acted as its porch or entrance. It is hoped that the remainder of this unit can be excavated in a future season to expose more of this area, including the remainder of the stone platform.

A collection of small copper coins was found on the top edge of the stone platform in Z 75 (Fig. 29), suggesting that it may have been in a change purse dropped during the abandonment phase of the castellum. These coins await further study and may shed more light on the timing of Khirbat az-Zūna's abandonment.

Another area studied in 2007 was square Z49, the southern interval tower that had previously been cleared by looters, up to 2 m deep. The looting of this tower had disturbed its contents, including one of the many Bedouin buri-
als on the site. In 2007, the loose material was removed from the tower so that the interior faces of the walls could be recorded and drawn. As with the tower room beside the gate, the interior wall faces are of boulder-and-chink construction (Fig. 30).

The walls of the fort include many reused blocks of stone or spolia. These appear to have come from a monumental Hellenistic or Nabataean building, perhaps a temple or mausoleum. Examples of spolia include a column base, a capital from an engaged column (Fig. 31), two triglyph-and-metope blocks, and bossed stones. A Nabataean inscription was also found built into the fort's gate in Z15. Bearing five lines of text, this inscription was photographed and traced, but has been left in situ, since it is an integral part of the gate structure (Fig. 32). However, Hellenistic or Nabataean ceramics were not found at the site in quantities sufficient to suggest that any such dismantled structure ever

24. The passageway of the gate in Z15, showing the paving stones, with the threshold at top.

25. The covered drain outside the gate in Z15, leading away from the threshold (top).
10. While publication of the pottery collected at Khirbat azZūna during the surface survey and excavations by the Wādì ath-Thamad Project must await further analysis, preliminary findings are consistent with those of Parker and his postulated foundation in the late third cen-

26. The room in the northern gate tower in Z15, showing the pavement and the lintel of the door leading towards the fort's interior.

27. Square Z75 in the eastern portion of the fort's interior, showing the heavy overburden of boulders.
stood at this site. ${ }^{10}$ Umm al-Walīd is the nearest known contemporary source for monumental architectural elements, ${ }^{11}$ although other sites such as Mādabā were also nearby. It appears, then, that the Roman army founded the castellum at Khirbat az-Zūna on a virgin site overlooking the
tury AD during the reign of Diocletian (1979: 80, 283, 304-5; 1986:45).
11. See, for example, Tristram 1874: 178-82; Tohme 2000: 91; Kennedy 2004: 31-32.

28. The stone step or platform in Z75, in front of the eastern interval tower.

29. The coin hoard found on the stone step or platform in Z 75 .

30. The southern interval tower, after clearing the talus and debris left by looters, showing the interior boul-der-and-chink walls.

Wādī ath-Thamad, perhaps to control movement east-west along the wadi and north-south along the limes Arabicus (Parker 1979: 80, 1986: 45).

31. Capital from an engaged column, found reused in the gate structure in Z15.

32. J. Ferguson tracing the Nabataean inscription built into the gate in Z15.

## Conclusions

The 2005 survey and 2006-2007 excavations at Khirbat az-Zūna by the Wādī ath-Thamad Project's Regional Survey have shown some of the advantages of revisiting sites that have been known for over a century. New techniques and technologies can be applied to verify longstanding descriptions and ideas, and to correct them when necessary. With limited field seasons and small crews, it has been possible to conduct digital surveys and targeted excavations, in order to more fully document this site and address specific research questions. As a result, detailed plans, stratigraphic sequences and construction designs have been obtained from surveys and small-scale excavations. The Wādì ath-Thamad Project and its Regional Survey plan to continue investigating Khirbat az-Zūna and other sites in central Jordan.

An Early Pottery Neolithic Site - Excavation at Umm Meshrat (Christopher M. Foley and Laura Foley)

## Introduction

Beginning in 1998, the Wadi ath-Thamad Project Survey identified six areas of Neolithic settlement and activity along the course of the Wādì ath-Thamad to the west of Khirbat al-

33. a) Location of WT-40 and associated Neolithic sites along the Wādī ath-Thamad; b) Neolithic sites on the Wādī ath-Thamad.

Mudayna ath-Thamad. Since these sites came to our attention separately, they were given separate site numbers (WT-40, WT-95, WT-96, WT-97, WT-104, T-105), for the purposes of our recording system. However, they appear to represent different spatial components of one large continuous area of Neolithic occupation, with evidence of a Natufian presence.

These sites are located in the graben that defines the Wādì ath-Thamad drainage basin where two wadis, the Za'farān and the Thamad, run through a major depression, which serves as a catchment for the surrounding upland areas (Fig. 33a). WT-40 is situated on the remains of an alluvial terrace immediately above a spring on the western embankment of the wadi. Site WT-105, a "cup hole" site, is situated on an exposed limestone shelf just below the terrace and slightly north of WT-40. WT-104 is located immediately west of WT-40 at the point where the terrace gives way to the limestone slope (Fig. 33b). This heavily eroded slope has alternating areas of exposed bedrock, some with cup holes, and pockets of sediment, replete with fragments of circular and linear walls. WT-95 is an area of dense lithic scatter up-slope and west of WT104. It is in a plough zone along the eastern face of the limestone ridge that separated the Thamad from the Za'farān wadi plains. WT-96, south of WT-95, also lies along the eastern portion of the ridge overlooking the Wādī ath-Thamad. During a preliminary investigation of WT-96 in 2001, the survey identified the fragmentary wall lines of at least 28 structures (Cropper, Foley and Rollefson 2003). ${ }^{12}$ Two probes were excavated at WT-96, uncovering the wall of a round structure, some burnt bone, and pottery sherds. The surface was littered with lithic material, including many burins, indicating the value of this area for major excavation (Cropper, Foley and Linnanae 2003; Cropper, Foley and Rollefson 2003). The focus of this report is WT-104 and WT-40. ${ }^{13}$
and working grids. Partial funding was provided by the University of Saskatchewan, St. Thomas More College, and the College of Arts and Science, and Wilfrid Laurier University. Additional team members included two workers from the Madaba office of the Department of Antiquities, Mr. Gaith Essa Salman Alhrout and Mr. Abdulla Khaled Mohmmad Abu-Alghanam, and three local villagers, Musleh Salem Al Awaysheh, Musa Salem Al Awaysheh and Sayil Sleem Al Awaysheh.

WT-40 first attracted attention in 1998 when the survey recovered Natufian lithics from the Pleistocene terrace overlooking the Thamad. In 2001, several $1.00 \times 1.00 \mathrm{~m}$ probes were excavated. While little Natufian material was recovered, early ceramic Neolithic lithic material, diagnostic Yarmoukian pottery sherds, and several fragmentary features were noted. ${ }^{14}$ By 2004, the terrace, already degraded by erosion, had been disturbed by ploughing, and salvage excavation seemed necessary.

The goals of excavation at sites WT-40 and WT-104 were modest, namely to recover representative samples of archaeological data before further damage. Both sites were laid out in 6.00 $x 6.00 \mathrm{~m}$ squares in proximity to features identifiable on the surface. Three squares were opened at WT-40 (Field A) and two additional squares at WT-104 (Field C).

## Excavation of WT-40

In Field A three squares, (A47; A53, A54) were laid out adjacent to the probes opened in 2001. The stratigraphy was similar in all three squares; immediately below the surface matrix was a substantial layer of hard packed, waterwashed sediment containing cobbles and small boulders, identified as a colluvial deposit. Below the colluvium, a layer of loose fine-grained sediment covered portions of walls and fragmentary occupation surfaces of oval or circular structures. The wall segments in A47 were not as sturdy as those in A53 and A54. The eastern wall (A47:8) is formed of a series of upright boulders one row wide ( $2.26 \times c a .0 .30 \mathrm{~m}$ wide), although the western wall (A47:5) consists of two rows of boulders with a maximum width of 1.05 m . Here Wall A47:5 measures 3.10 m long and 0.77 m in height. Between the two walls is a gap of 0.95 m , possibly an entrance (Fig. 34a, b). Associated with these walls are interior surfaces (A47: 22, A47:23), and Burial B401 (Fig. 35) was located under a fragmentary compacted mud surface (A47:25). The human remains had been interred in a shallow pit; the skeleton was tightly flexed, lying on its right side fac-

34. The structure in A47; a) diagram of deposition ( $D$. Cropper); b) final photo (L. Foley).
ing south. The lack of fusion of epiphysal and cranial sutures, together with a full set of adult teeth exhibiting little wear, suggests that the individual died early in adolescence. Although there were no grave goods, the stratigraphy and associated incised pottery, links the burial to the Yarmoukian occupation, one of only a handful attributable to this phase of the Pottery Neolithic period (Banning 1998: 224).

In Square A53 there is a double wall with the inner wall (A53:13) being more substantial, attaining a maximum width of 1.25 m at the point
14. Similar lithic concentrations are present at both WT-95 and WT-96; WT-96 appears to be a burin site with substantial architectural remains. Burin sites are common in the PPNB period (Banning 1998: 202), but sedentary, or semi-sedentary, communities are rare. Moreover,
test squares at WT-96 yielded pottery that is analogous to the Jericho IX ceramic tradition. Anomalous though they are, the attributes of WT-96, like those of WT-40, indicate that the site belongs to an early phase of PNA development.

35. Burial 401 in situ.

36. Double walls in Square A53.
where it abuts wall A53:27 (=A54:5). Assuming that the structure flanked by these walls was circular, its diameter would have been $c a .4 .00 \mathrm{~m}$. This wall reaches five courses ( 0.63 m high) and is $4.60 \times 0.52 \mathrm{~m}$ thick (Fig. 36). In the western part of the square, the curve of wall A53:7 parallels that of Wall A53:13, while as it extends to the east, it approaches and almost intersects wall A53:13, leaving a gap of only 0.05 m . There were the remains of a compacted mud surface between walls A53:7 and A53:13. This surface, together with the alignment of the two walls, suggests that A53:7 is the earlier wall, cut and replaced by the later construction of A53:13. The structure contained a number of fragmentary surfaces (A53:17, 19, 28, 29) and chunks of mud plaster-like material that may have adhered originally to the walls or ceiling/roof of the structure.

Square A54 contained two large boulders protruding from the surface sediment sugges-
tive of a large semi-circular wall line. The walls in this square are more fragmentary than those of A53. The remains of wall A54:11 are 1 row wide, 1-2 courses high, and are composed of 4 large boulders with a 1.98 m gap in the center. The wall-line continues north as A53:26 (Fig. 37). Excavators uncovered a second wall line (A54:5) just to the south of A54:11 and following a similar alignment. Wall A54:5 reaches a maximum length of 5.75 m within Square A54 and stands 2-6 courses high for a height of 0.410.72 to 1 m , and is $1-2$ rows wide. Wall A54:5 is composed of much smaller stones than A54:11. There are a number of stones between the two walls, which might be either fall or rubble fill. This type of construction - walls with a cobbled exterior face, cobbled fill, and large interior boulder face - is attested elsewhere at Site WT-40; for example walls A47:5, A53:26 and A53:27. Thus stones assigned the locus number A54:5 probably are the remains of the lighter, southern face of Wall A54:11. The southeastern extension of the inner wall in A53:13 abutted the double wall line A54:5 and A54:11 to form a complex structure apparently composed of two interconnected circular or oval units. While this type of building plan is not common, Kenyon identified a similar structure at Jericho (Kenyon 1981: fig. 227c, pls. 277, 278a; as cited in Garfinkel and Ben-Shlomo 2002: 73).

Three partial surfaces (A54:27, 26 and 22), together with a hearth (A54:20), were uncovered in Square A54. Noteworthy is Surface A54:27, a compacted mud layer that seals against the hearth but does not meet Wall A54:5. The hearth A54:20 is a simple circle of limestone cobbles with a diameter of $c a .0 .45 \mathrm{~m}$. Nothing other than silt and ash sediment was recovered from the hearth's interior.


[^51]
## Excavation of WT-104

The maximum dimensions of Field C are 240 x 100 m . Due to the shallow depth of the sediment, there was little stratigraphy to preserve features, artefacts or ecofacts. Squares C64 and C75 were opened to expose the area around a large 2 -rowed curving wall fragment (C64:2= C75:3), visible on the surface, with the hope of determining its function and cultural affiliation. The wall parallels the slope line and extends through Squares C63, C74 and C84 for 17.75 m . Square C64 was established at the western extremity and inside the curve of the wall, while Square C75 was offset to the south of C64, with the wall running through the middle of the square. The wall is dry laid and constructed of a double row of stones and boulders, some longer than 0.50 m . The southern face is composed of cobbles and rests on a foundation of small stones and soil over bedrock. The inward, north face of the wall is formed of large boulders placed upright on their ends directly on bedrock.

Excavation uncovered the remains of two fragmentary ovoid features consisting of a line of stone on the north side of Wall C64:2, one in each square. Feature C75:9 measures 2.3 m x 0.40 m wide and consists of stones arranged in a haphazard fashion except for one large central boulder, $0.45 \times 0.40 \mathrm{~m}$ high that may originally have stood on end. Similar large boulders are found along walls in WT-40 (A54:11, A47:5). The base of the wall rests on a soil layer that was used to level the slope. The curved wall (C64:6) in C64 is similar, save for the lack of a large upright boulder (Fig. 38). This configuration sug-

38. Ovoid features adjacent to Wall C64:6.
gests a temporary, seasonal circular habitation, perhaps a tent (Banning 2003: 16), lean-to, or wind break. These curved walls appear to represent a different and less substantial occupation than that attested by major wall C64:2.

An installation formed of a series of stones (C75:12) abuts a baked clay surface (C75:8) $0.60 \mathrm{x} c a .0 .30$ wide. While this feature shows discoloration due to fire, no loose ash or ashy sediment was associated with it. Cycles of erosion can be seen in the matrix of laminated hardpacked light grey soil and cobbles. Below the sheet-washed sediments was a thin (ca. 0.02 m ) fragmentary layer of huwwar ( $3.00 \times 1.00 \mathrm{~m}$ ). This fragmentary surface was identified in all exposed areas of the square.

Due to the impact of erosion, few artefacts or faunal remains were recovered in situ in Field C. It is noteworthy that no pottery was located on surface (C64:8), due perhaps to the small area excavated; there were only 14 sherds in total, with no diagnostic elements. Like Field A, the majority of pottery recovered comes from areas external to any feature.

## WT-104 Surface Survey

Twenty-two features were located on the surrounding slopes, five are circular wall segments, the largest suggests a diameter of $c a .8 .00 \mathrm{~m}$, although circles of between $3.00-3.5 \mathrm{~m}$ are more common. The smallest circle is 1.50 m in diameter. Eight other wall fragments have the appearance of terracing or retaining walls.

Cupholes occur either singularly or in clusters in exposed bedrock at WT-104. Feature 10 is a group of 5 cupholes, two pecked depressions, and an alignment of 15 pecked depressions arranged in two rows, with another depression to the west (Fig. 39a, b). This pattern has the appearance of a gaming board or tally sheet. The average diameter of the cupholes is $0.15-0.18 \mathrm{~m}$, although one has a diameter of 0.27 m with a depth of 0.11 m . The largest group of cupholes (WT 105) is located on the western edge of the wadi, below and east of WT-104; here are 26 holes in four groups.

## Artefacts and Faunal Material

Pottery: The ceramic material confirms that both WT-40 and WT-104 date to the early Pottery Neolithic period. Below the cobbled deposits,

39. Bedrock cupholes at Site WT-104.
the ceramics are Pottery Neolithic A. The forms represented include various sizes of cups, open bowls, wide and narrow neck jars with both knob and loop handles, and large storage jars. Preliminary analysis indicates that decorated sherds represent $12.85 \%$ of the total number of sherds. Those fragments decorated with incised chevrons and borders, and red paint are typical of the Yarmoukian industry (Banning 1998: 208-209; Eirikh-Rose and Garfinkel 2002: 86-138). There also are examples of ware decorated with red painted bands on a cream slip that might have an affinity with the Jericho IX industry (Fig. 40). Decoration is found on both the exterior and interior of many open bowl fragments.

Square A47 yielded a high incidence of incised sherds of the classic Yarmoukian type, together with some painted ware. The majority of the decorated ceramic material from Squares A53 and A54 was painted ware, with red to orange diamond-like designs on burnished areas of the sherds. Similar material was recovered in 2001 upslope from the test square in WT-96. Generally speaking, the fabric is not well levi-

40. Incised chevron examples on the left; red painted bands on a cream slip on the right.
gated and exhibits numerous voids indicative of organic temper. Firing temperatures were low. The result is a friable, unevenly fired fabric. In Square A53 excavation uncovered the remains of an in-ground storage jar (A53:11) set into a compacted mud surface (A53:17) along the exterior face of Wall A53:7 (Fig. 41). The jar was in fragmentary condition probably due to collapse from wall A53:7. A number of stones were interspersed among the sherds. While only a few large body sherds were in situ, the outline of the vessel was clear, indicating a vessel approximately 0.50 m in diameter, with a height of well over 0.20 m . The majority of sherds in WT-40 were recovered from loci external to the architectural features. This observation holds for other artefacts as well. The distribution may reflect behavioural tendencies concerning activity areas or the disposal of waste material.
Lithics: Over 30,000 lithics were recovered during the 2004 season. These range from cores to

41. Square A53 in situ jar.
formal tools, including reduction debris (debitage) and shatter, utilized flakes, and retouched flakes. Consistent with the results of the surface survey and exploratory probes of 2001, the assemblage reflects a predominantly flake technology, dominated by expedient tools. This is typical of Late Neolithic assemblages (Banning 1998: 203-204; Cropper, Foley and Rollefson 2003). Of the over 300 formed tools, burins on concave truncation, drills, and awls are the most common. There are a number of Haparsa and Nizzanim points, and knives fashioned on tabular flint. In Square A47, a lithic concentration was found in sediments outside and adjacent to the opening in the wall alignment of the round or oval structure. Among the more curious artefacts related to knapping at WT-40 are a number of micro-cores suggestive of gaming pieces or tokens (Cropper 2006).

Conspicuous by their absence are sickle blades, denticulates and bifacial tools such as axes and adzes. At the time of writing, only two sickle blades and a single denticulate have been identified. Also under-represented are ground stone implements for processing cereals. Five small grinders from A47, several rubbing or polishing stones, and a possible fragment of a shallow basalt bowl represent the ground stone inventory. We did not recover samples of sizable upper or lower grinding stones. It is possible that the large number of cupholes in the environs compensates for the scarcity of food preparation implements.

Thus far, apart from the decorated pottery, typical early Neolithic or Yarmoukian "art" objects, such as incised pebbles and "coffee-bean eye" figurines have not been identified in the assemblage. The closest objects that we have to "art" are one worked piece of dab'a marble and what appears to be an ivory "Egyptian"-styled ear stud. This latter piece came from a particularly interesting context in WT-40, Square A54. Inside the oval structure and immediately above a compacted earthen surface (A54:22) was a 0.06 m thick stratum of loose silt (A54:18), perhaps collapsed building material, that yielded a large number of lithics, 10 Neolithic sherds and a wooden comb (Fig. 42). An analogous sediment matrix (A54:16) contained 402 lithics, a piece of carved stone, and a grinder. The location of artefacts inside the structure in A54 con-

42. Comb from A54.
trasts with A47, where the majority of artefacts were recovered outside the structure.

The lack of tools associated with sedentary agriculturalists is curious in light of the sites' proximity to a spring and the wadi bottomland. Not withstanding the incised Yarmoukian pottery, the assemblage recovered thus far appears atypical when compared to other Yarmoukian sites. The apparent divergence form the "norm" may be the result of a limited exposure. Conversely, it may be a reflection of adaptation in a marginal zone to the increased aridity of the early 8th millennium BP, by a group moving into and adapting to a new environment, or possibly to both factors.

While analysis of the faunal material is far from complete, several observations can be made. The bones are all comparatively small fragments, indicative of intensive processing. The vast majority are ovi-caprids. According to Banning, this is a typical reflection of Pottery Neolithic subsistence strategies (Banning 1998: 214-215). Thus far we have yet to identify wild animals in the assemblage, though the small sample and fragmentary nature of the remains
are undoubtedly factors here. The lack of game is at variance with both the general environment of the site and the number of projectile points recovered, particularly from A47. Some hunting activity is to be expected. Possibly game was processed at special activity camps away from the main habitation.

## Observations

The 2004 salvage excavation of WT-104 and WT-40 confirmed that both sites were occupied in the early Pottery Neolithic period, based on the typical Late Neolithic flake technology and the incised and painted potsherds. The majority of artefacts and ecofacts come from WT-40, a distribution which is undoubtedly the result of heavy erosion suffered by WT-104. Many of the surface artefacts at WT-40, and in the uppermost strata, undoubtedly originated up slope at WT104 , where the sediment is shallow and there is a lack of stratigraphy.

At this point in our research our tentative conclusion is that WT-104 and WT-40 represent occupation by a group or groups that are to be identified with the Yarmoukian industry. The occupation is substantial, though as yet the degree of permanency is difficult to ascertain. The various wall configurations and fragmentary remains of surfaces suggest either multiple phases of occupation or frequent repair and renovation to existing structures. The animal remains and lack of plant harvesting and processing equipment suggest a heavy reliance on pastoralism rather than cereal agriculture.

The location of the site is on the southern margins of the normal Yarmoukian settlement zones (Garfinkel and Miller 2002: 4). The location and nature of the assemblage give rise to the question: to what extent are WT-104 and WT-40, along with the extended settlement represented by WT-96, WT-96, WT-97 (possibly) and WT105, typical of the Yarmoukian industry?

The nature, dynamics and relationships among early Neolithic Pottery groups is also far from clear. The Pottery Neolithic period has been neglected until recently and its characteristics and even chronology remain uncertain (Banning 1998: 188; Garfinkel and Miller 2002: 1-2). Our reconstructions are based heavily on a number of "type-sites" that provide paradigms, which may or may not be universally applicable
(Banning 1998: 189-198). The Pottery Neolithic occupation of the Wādi ath-Thamad has the potential to provide important new information for our understanding of cultural development and diversity during this seminal period in social and economic development in the southern Levant.

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# THE TALL ZAR‘A AND THE GADARA REGION PROJECT IN THE YEARS 2007 AND 2008 

Dieter Vieweger and Jutta Häser

## Introduction

There are only a few areas in Palestine where its history can be studied in such a concentrated manner as in the Wādì al-‘Arab. This valley, which is located roughly five kilometres southwest of the ancient Decapolis city of Gadara (today Umm Qays) provided excellent living conditions: numerous springs, fertile soils, and a moderate climate. In addition, a trade route ran through the wadi which once linked Egypt with Mesopotamia. The economic success and industriousness of the wadi's inhabitants have left plenty of traces. Over one hundred sites mark out the distinguished history of human settlement in the region from the advent of sedentism to the Islamic period. The most imposing hill in the valley, Tall Zar'a, possesses its own artesian spring and the very best potential for settlement. It is therefore not surprising that it was continu-
ously inhabited for over 5000 years (Fig. 1).
The German engineer Gottlieb Schumacher was the first European to visit the region since the crusades when he explored Transjordan in 1885 and happened upon the Wādì al-'Arab. The valley, which had prospered for millennia had, however, changed a great deal since the Ottomans arrived. The Bedouins told Schumacher that the wadi had degenerated into a "favourite hideaway for fugitives and criminal riffraff" (Steuernagel 1926: 80-83).

## The 2007 and 2008 Campaigns

The 'Gadara Region Project' was initiated by Prof. Dr. Dr. Vieweger in the year 2001. The first extended excavation was carried out in 2003. Since 2004 the project is co-run by the Biblical Archaeological Institute in Wuppertal and the German Protestant Institute of Archae-


1. Tall Zar'a from south (spring 2008).
ology under the direction of Prof. Dr. Dr. Dieter Vieweger and Dr. Jutta Häser.

The German team works twice a year on the Tall Zar‘a. The campaign in 2007 was carried out from the fourth of March to the 10th of April and from the 31st of July to the 17th of August; in 2008 it took place between the seventh of March and the 14th of April and the 18th of July and the second of August.

## The Tall Zar'a in the Wādī al-‘Arab

Tall Zar‘a is the most central and strategic place the Wādì al-‘Arab (Fig. 2). It lies at the confluence of it with its largest tributary, the Wādi az-Zaḥar, and rises impressively 22 to 40 m above the surrounding countryside (depending on the direction). The circular-shaped hill has a diameter of 240 m at its base and 160 m at its plateau, and boasts an artesian spring in its centre. It was used for farming up until very recently, as expressed in its name: 'hill of agriculture'.

The artesian spring on Tall Zar‘a always supplied enough fresh water for the people who lived there. The neighbouring wadis with their plentiful water supply, to which the many disused water mills in the area still bear witness, enabled the inhabitants to maintain a high standard of living and concentrated settlement activity, even in the Roman period when the tall was somewhat overshadowed by Gadara.

With its 12 m of cultural layers, Tall Zar' a is as yet the only place in northern Jordan where settlement history from the Early Bronze Age to the Islamic Period - a period of over 5000 years - can be investigated at one single site. The tall contains information on all of the most significant historical periods in Palestine since the fourth millennium BC. As such, it sheds light not only on the local history of the area, but also exemplarily on thousands of years of cultural development in Palestine.

## Areas I-III (Fig. 3)

The main original objective of opening Area I in the western part was to understand the stratigraphy of the tall (Vieweger 2003, 2007; Häser and Vieweger 2005a, 2005b; 2007b, 2007c; Vieweger and Häser 2005a, 2005b). The topographical situation was also seen to be particularly suitable here. The natural slope of the hill is at its least protective in this spot: only 22-25m height difference to the foot of the hill. For this reason it was logical to expect the inhabitants to have built fortifications on this side. The gain from this area is impressive: the successive layers have given us a valuable insight into the history of northern Transjordan from the late Bronze Age to the Umayyad period.

By summer 2008, $1075 \mathrm{~m}^{2}$ had been opened and a further $500 \mathrm{~m}^{2}$ are prepared for excavation in Area I. The depth of the excavations at present

2. Tall Zar'a (center) between the Wadi az-Zahar (above) and the Wādī al-‘Arab (below) above the modern dam from the north (Umm Qays).

3. Overview plan of the tall and its three areas [Sketch by Ernst Brückelmann, Brüggen-Born/BAI Wuppertal].
is a mere 4.5 m of the presumed 12 m ; chronologically, the latest period of the Late Bronze Age has been reached. For logistical and, more importantly, safety reasons it is not possible to continue any deeper into the older strata until the Late Bronze Age stratum is excavated in the entire area and all the baulks are removed (Fig. 4).

Area II was opened in the spring campaign of 2006 in the north of the tall (Fig. 5). It lies at the most prominent part of the tall's plateau, and was well protected from external enemies by the 44 m high cliffs that form the slope to the north. Prestigious and/or administrative buildings are expected in this part of the tall. By spring 2007 there were $800 \mathrm{~m}^{2}$ opened in that area.

Area III was chosen in spring 2007 for future excavations. It is an area of about $1000 \mathrm{~m}^{2}$ in the
southern part of the tall which contains a large amount of rubble and Roman-Byzantine sherds on its surface, suggesting it houses the remains of a late antique rural settlement. A cistern was discovered in earlier years, which is currently accessible through a hole in its roof, and its dimensions are impressive: 10.5 by 6 m at the base, and almost 5.75 m high with an 8 cm plaster lining. The fact that such a large cistern was necessary a mere 80 m away from a bubbling spring and that a large ground plan could clearly be seen in the aerial photographs pointed to an imposing and significant installation (Fig. 6).

## Area I

Excavations have been taking place in Area I since 2003, and the yearly reports have appeared

4. Aerial photograph and interpretation of Area I.
in previous issues of ADAJ (Vieweger 2002: 157-77; Häser and Vieweger 2005b: 135-46, 2007b: 9-20, 2007c: 21-34). In the following, therefore, the focus will be on the discoveries made in 2007 and 2008, which concern above all the strata of the late Bronze Age and the Iron Ages I and II.

The initial surface surveys already yielded great amounts of Early Bronze Age pottery in the northwest of the tall, suggesting that one would find considerable settlement remains from this period in this area. This has been verified, but due to the large number of other cultural layers above, this stratum has only been investigated in the form of the outermost, and very large, city wall. The wall does, however, give first impressions of the size and significance of the city: a well fortified settlement typical of the Early Bronze Age in Palestine.

A few meters above the Early Bronze Age wall, the remains of two strata of Middle Bronze Age structures have also been excavated (in layered trenches because of the gradient). They are domestic houses whose outermost walls have eroded down the slope. The tall will not only give insights into Early Bronze Age urban culture, but also the period of re-urbanisation in the Middle (1800-1550BC) and Late (15501200/1150BC) Bronze Ages.

At this stage we still know very little about the transition from the Middle to the Late Bronze Age, although the middle stratum of the Late Bronze Age has already began to appear in some areas. The northern courtyard house (AL-AO 117-119), for example, already shows a similar size and ground plan in the middle Late Bronze Age stratum as in the later stratum of this period, although the later Late Bronze Age casemate

5. Aerial photograph of Area II.
wall clearly cut off the western part of the building. A closer look at the water chute (AM 117; later Late Bronze Age) reveals that this was also already in use in the middle phase. In the later Late Bronze Age stratum, the chute is extended upwards using fieldstones. This basic concept of drainage in the Bronze Age city using vertical shafts with dry stone lining is, however, perhaps even older. A structurally identical shaft can be found in AM 115/116, outside the walls of the Late Bronze Age city and presumably part of the Middle Bronze Age stratum.

Other observations also appear to support the idea of a certain amount of architectural continuity between the Middle and Late Bronze Ages.

Under the courtyard of the southern courtyard house a second bottle-shaped, stone-lined 'hollow' in the ground (AF 116) was uncovered in 2008. It has been excavated to a depth of 1.4 m . An Egyptian faience figurine and a mace head were among the special finds from this context. The same structure could be seen in AH 115 in the later stratum of the Late Bronze Age court-
yard house. It has not yet been clearly identified, but it seems likely it was a large silo used for storing grain.

## Late Bronze Age (Later Stratum)

The earliest layer that has been extensively excavated is the later Late Bronze Age stratum (14th to 13th century BC) (Fig. 7) (Häser and Vieweger 2007a; Vieweger and Häser 2007a). The most significant structure uncovered so far is the massive casemate wall that once protected the city on its north-western edge. The pottery dates it to the Late Bronze Age and the scientific analysis of charcoal remains confirms this, giving an approximate dating to somewhere between 1450 and 1300 cal. BC. Six casemate chambers have been excavated thus far. In peacetime they were used as storage rooms, in wartime they could be filled with earth and stones to produce an enormously thick wall that would protect the inhabitants of the city from attack. Behind the wall was a large courtyard with three covered channels. These collected

6. Aerial photograph of Area III.
the rainwater that accumulated behind the city wall into a settling basin in one of the casemate chambers, and from there into the vertical chute discussed above.

In the south the casemate wall ended in a large, inward-facing tower in two parts. In the southern half we found a large room which had seen a number of conversions, the latest of which involved a low partitioning wall in the west, creating behind it a small room only 1 m wide. On this wall were two large basalt column bases which once supported wooden columns that held up the roof. The peculiar character of this small partitioned structure calls to mind the Bronze Age gate sanctuaries found elsewhere. A large stone, cut flat on the bottom and with a symmetrical peak towards the top, which lay toppled beside the column bases, may be a cultic stone due to its similarity to such cult stones found in Palestine.

To the south of the 'gate sanctuary', we uncovered a 2.75 m -wide gate opening. This gate would have provided the most direct access for
pedestrians to the lower cities to the north and west.

To the south of the gateway is also the bottleshaped, stone-lined 'hollow' in the ground mentioned above (AH 115), the entrance to which was covered by a meticulously worked, discshaped stone with a diameter of roughly 1 m and bearing a 15 cm wide hole in its centre. The hollow has been excavated to a depth of 2.6 m . Due to the problem of collapsing it is not possible to investigate this structure further until the surrounding layers have been removed.

Among the objects that were found on the paving surrounding the hole were the remains of a large red and black on beige painted jar with two handles bearing a number of animal scenes, one of which includes a human. Further pieces were found in the area in spring 2007, so it was possible to almost completely reconstruct the neck and base of the jar. The animal scenes in the middle frieze have now also been joined by a lizard. The images may depict scenes from legends or mythology, but it needs further research
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7. Architectural plan of the Late Bronze Age (youngest stratum) from the 14th to 13th century BC [Drawing by Marianne Vogt-Werling/BAI Wuppertal].
to know for sure. This jar, its context, and the other pottery sherds found with it date to Late Bronze Age. A charcoal sample from the layer of loam in which the sherds of the vessel were situated dates to between 1440 and 1300 cal . BC.

In the spring campaign of 2006, the first domestic structures were found inside the casemate wall. Unlike their Iron Age counterparts, these houses have sizable ground plans. The width of their walls suggests that they possessed a number of floors. Three courtyard houses have been excavated to date, as well as two monumental buildings in the north and south of the excavation area. While the ground plans of the houses in AG-AI 115-116 and AL-AO 117-119 can already be surmised from the existing evidence, this is not the case with the building complex in AK-AM 117-119. In fact, none of these large house complexes have been excavated in its entirety, so in order to make sense of the contents and form of these buildings, it is planned to extend the excavation area to the east in 2010 and 2011.

The monumental buildings in the north and south deserve a special mention, even if they have only been partially excavated at this stage. The monumental house in the north consists of a large roofed room with a column base, a part of a staircase, a little uncovered part of the courtyard and one more adjacent room. Two radiocarbon samples from this context have yielded dating of 1450/1440 and 1300BC with $95.4 \%$ probability. The valuable finds that were made in this structure suggest it may have had a special function. Among these is a cylinder seal measuring 3 cm in height and 1.3 cm in diameter. It is made of faience and covered with a green glaze. It is engraved with the image of two stags colliding and looking over their backs. They are divided by a further line and the seal also bears an interlaced border. The seal belongs to the western group of the so-called 'Common Style' of the Mitanni glyptics and can be dated to the 14th to 13 th centuries BC. ${ }^{1}$ Examples of the western version of this style have mainly been found in Palestine and Syria.

On the floor very close to where the seal was found, in an area of 1.5 m by 1.5 m , another

23 cylinder seals of varying quality and image type were found. It would seem that the seals, together with a silver pendant decorated with a standing figure (Fig. 8; $5.8 \mathrm{~cm} \times 3.4 \mathrm{~cm}$ ), a large scarab (Fig. 9; $3.7 \mathrm{~cm} \times 2.4 \mathrm{~cm} \times 1.4 \mathrm{~cm}$ ) and dozens of beads, fell to the ground from a higher surface (a table, cupboard or shelf) during the destruction of the house and were left scattered over the floor.

Cylinder seals were used both to identify and to certify. Because each seal had a different engraving, the seal's impression could be used to identify the seal's owner over large distances. Clay seals with such impressions were used, for example, to seal the knots tying various documents together or around the lids of closed containers of goods to protect their contents from unauthorised use, alteration or removal. The seals were an important element of legal procedure for thousands of years and played such a vital role in the economy, communications and politics that they were seen as signs of authority

8. Silver pendant decorated with a standing figure.

[^52]with identifying the cylinder seals.

9. Scarab, found in the youngest Late Bronze Age stratum.
and worn as jewellery.
Most cylinder seals from Tall Zar‘a are made of faience and are green-glazed. This material contains $90 \%$ ground quartz or natural sand with added lime and alkaline carbonates. Burning this produces a sintered material which is not completely melted, and, as such, is not quite glass. The motifs were engraved using a cutting wheel and a drill with a spherical head (Salje 1990: 103).

Adjacent to the large roofed room with a column base, another part of the building can be seen in AR 119/120: a staircase consisting of two thick, parallel wall structures. Permitting an interpretation of the barely-excavated area in AR 120 as a courtyard, based on its floor of carefully-laid pebbles between two layers of white plaster, the staircase can be interpreted in the following ways:
a) A single flight structure would lead up from east to west. At the top, the person would walk back parallel to a second flight that would lead, again from east to west, to a presumed third floor. In this case, a realistic estimate for
each floor height would be 2.2 to 2.4 m .
b) If it was a double flight structure, one flight would lead from east to west to a landing half way between the floors, a second would then lead from that landing from west to east to the next floor. In this case, a room height of 3 to 3.2 m would be more realistic.
The large number of glass beads that have been found in this house complex and the appropriate industrial pottery vessels suggest that the tall may also have been home to a glass processing workshop in the Late Bronze Age. Further excavations are needed to answer questions concerning the function of the complex and the special activities in each room. The complete excavation of this complex is planned for 2009 to 2011. The preparation for this extension (removal of the waste soil from previous campaigns in 2003 and 2004 and of the colluvium) by another $500 \mathrm{~m}^{2}$ to the north and east was undertaken in summer 2008.

The monumental building in the south of the excavation area is similarly significant. Alone the 1 m high mud brick walls with their white plaster rendering are impressive in their solidity. The monumental architecture of the new, partly uncovered, house in the south of Area I also points to an important function of the complex and an important owner of the house. Despite this, it is at this stage not possible to plan an appropriate extension of the excavation area $500-600 \mathrm{~m}^{2}$ to the south due to the focus on the stratigraphy of Area I.

The wealth of the city in this period and its wide-reaching trade links are reflected in the manifold finds of this period, among them five scarabs (one inscribed with the praenomen $A$ -wsr-re, a Hyksos ruler with the throne name Apophis, who reigned from about 1590 to 1550 BC ; $12 ; 1.5 \mathrm{~cm}^{2} 1.0 \mathrm{~cm}^{2} 0.7 \mathrm{~cm}$ ). Apart from the scarabs, cylinder seals and the numerous glass beads, a terracotta figurine of a naked, standing woman was found in one of the courtyard houses (Fig. 10). The middle section of a figurine depicts the Syrian-Palestinian fertility goddess Ashtarte/ Ashera standing with her arms hanging down the sides of her body. Among the more interesting of our bronze objects (needles, awls and a chisel) was an arm of an originally wooden (?) figurine (Fig. 11). Noteworthy is also a calcite vessel carved with figures of birds (Fig. 12) alongside

10. Fragment of a terracotta figurine of the Syrian-Palestinian fertility goddess Ashtarte/Ashera. Height: 8.1 cm ; Width: 4.9 cm [Drawing by Ernst Brückelmann, Brüggen-Born/BAI].

11. Bronze arm of an originally wooden (?) figurine from the Late Bronze Age stratum. Height: 4.3 cm ; Length: 4.9 cm .

12. Calcite vessel carved with figures of birds from the Late Bronze Age stratum. Height: 7.8 cm [Drawing by Ernst Brückelmann, BrüggenBorn/BAI].
numerous sherds of imported pottery from Mycenaean Greece, Cyprus, and Egypt, and a decorated bone tool handle. Imported faience wares from Egypt include vessels with papyrus images and rings with seals (Fig. 13). Finally, a wellpreserved kernos, a miniature silver vessel (?), an Egyptian/Egyptianising painted figurine and well-preserved daggers were found.

## Iron Age I

The settlement on Tall Zar'a appears to have
experienced a dramatic cultural upheaval in the period that followed (12th to 11th century BC). This is directly or indirectly related to the disintegration of the Late Bronze Age Canaanite city-state system caused by the arrival of the Sea Peoples in Palestine. In place of the fortified city now stood an open village inhabited by farmers, without even an outer wall (Fig. 14).

The inhabitants of Tall Zar'a in the 12th to 11th centuries BC used the Late Bronze Age ruins for their own buildings (AO-AI 115-119).

13. Faience ring. Length: 2.1 cm ; Width: 1.3 cm ; Thickness: 0.4cm [Drawing by Ernst Brückelmann, Brüg-gen-Born/BAI]

The remaining foundations of the city wall were furnished with storerooms and workrooms for various agricultural activities. The walls of stables and simple sheds were built against the remains of the Bronze Age walls. What has been found corresponds to the traditional scholarly view of the beginnings of other settlements to the east of the Jordan such as Ammon, and of Israelite and Judaean settlements in the highlands west of the Jordan as being small and villagebased.

On the other hand, in the northern (AP-AR 118-120) and southern part (AI-AE 115-116) of Area I, very large and well constructed buildings were uncovered. The house in the south (AI-AE 115-116) was built with a paved floor at the entrance and with thick and elaborately constructed stone foundations. A door hinge stone was found in its original position. This courtyard house shows clearly the extent of continuity between Late Bronze and Iron Age architectural
style. The courtyard (AG-AH 116) contained a large water container and a ṭābūn oven and grinding stone in the southwest corner. While stone-lined silos dominate the middle area of the Iron Age I stratum (e.g. AK 116; AM 117; AN 117-118 and AO 117-118), the southern building contained at least two large, plaster-lined silos that reach deep into the Late Bronze Age layers (AG 115-116; AE 116). Of particular interest is also a well-preserved oven made of various layers of mud, lime and pottery sherds that was found in the courtyard in AE 116. It is not yet clear whether this area contains two attached or one single dwelling.

The northern building (AP-AR 118-120) was uncovered in 2008. With its large courtyard (AP-AQ 119), its long, narrow rooms built to the north and south of the yard and its well-preserved main room in AQ 120, it can possibly be defined as a so-called " 4 -room house" which is typical of the Iron Age I. Further excavations in 2009 and 2010 will provide an answer to this question.

In summary, in the Iron Age I period, Tall Zar'a was an agricultural settlement without fortifications, but with some larger buildings. Two charcoal samples from this stratum give a dating of between 1220 and 970 cal . BC, and 1270 and 1040 cal. BC respectively.

## Iron Age II

The architecture of the Iron Age IIA/B period points to a considerably larger population on the tall than in the Iron Age I period (Figs. 15 and 16). The settlement takes on an urban character and is once again protected by a town wall, albeit this time in zigzag form and a great deal less solid than its Late Bronze Age counterpart. Altogether the settlement appears to have developed in an agglomerate pattern, with houses built very close together and domestic and administrative structures directly next to each other. House and property boundaries are signified in many cases by double walls (two walls built directly next to each other).

It can be presumed that an earthquake, a fire or an attack must have damaged parts of the town in around 900 BC , as many buildings have two construction phases. The houses, with their large courtyards, were used not only for living but also storing supplies and producing food and

14. Architectural plan of the Iron Age I stratum in Area I [Drawing by Nicole Karagiannidou/BAI Wuppertal].
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15. Architectural plan of the Iron Age II (older phase) in Area I [Drawing by Nicole Karagiannidou/BAI Wuppertal].

16. Architectural plan of the Iron Age II (younger phase) in Area I [Drawing by Nicole Karagiannidou/BAI Wuppertal].
wares. In one of the houses, three column bases of piled field stones divided a roofed space from a courtyard with oven and a large storage vessel. At the end of the row of column bases stands a cultic stone in its original position. The adjoining part of the house to the south was divided into four rooms and used as workshops: in the south-easternmost room, which was partially paved, a (metal or glass?) smelting furnace with a crucible was found. It was carefully excavated and is now being examined in the German Mining Museum in Bochum. Further to the north was a room or yard with an elaborate fireplace and five baking ovens that had once been used simultaneously.

Other remarkable finds were excavated in the Iron Age II layer, including a 2.4 cm high cylinder seal, similar to the one described above. It shows two stags facing each other with their heads turned backwards and their bodies partly fused together. A naked man stands next to them holding a so-called bouquet tree. This depiction, like the other one, is in the style of the Mitanni glyptics and as such is also dated to the 14th or 13th century BC. As it was found in a later Iron Age context, it would appear to have been an heirloom.

The head of a terracotta figurine portraying Ashtarte/Ashera with a so-called Hathor-hairstyle was also found in one of the houses. It is a remarkable piece due to the working of the face and profile; from the front it is the face of a woman, while from the side it is the profile of a lioness. This kind of representation is as yet unique in Palestine. The closest parallels are two Ashtarte figurines with Hathor wigs from Tall Massad al-Jisl (Rahmani 1959: 184-85 Pl. XXIV, 1-3) and Bayt She'an (Rowe 1940: Pl. LXVIII, 3) which, however, do not have the face of a woman but of a lioness and present a combination of the goddess Ashtarte with the Egyptian goddesses Hathor and Sekhmet.

Further interesting finds were made in the later Iron Age II stratum, the layer of rebuilding after the catastrophe, including a small, seated gold and silver-plated bronze figurine ( 7.5 cm high) depicting the Syrian god El (also worshiped during this time in Israel and Judah) in a blessing stance (Fig. 17). The figurine was found above a burnt layer beneath the wall of an Iron Age dwelling, and perhaps served as a

17. Seated gold-plated bronze figurine depicting the Syrian god El in a blessing stance.
foundation sacrifice. The previous building was destroyed sometime between 1270 and 980 cal . BC , so the deposition of the figurine was later.

An oval seal impression in clay ( $3.6 \mathrm{~cm} \times 2.7 \mathrm{~cm}$ x 1.7 cm ) also depicts a deity, this time Hadad or Baal standing on a bull. Imcpressions of tie fastenings can still be seen on the back of the piece.

Another fascinating find is the basalt head of a man ( $19 \mathrm{~cm} \times 12.5 \mathrm{~cm} \times 8.5 \mathrm{~cm}$ ). Although the facial features are not very clearly worked, one can easily make out the mouth, the nose, the eyes, and the ears. On the forehead is a small protrusion that suggests the head once had some sort of cap. The figure was buried face-down under a wall of an Iron-Age house, and, as such, must be older. It is unclear who is portrayed. Perhaps it also represents a god or one of the city's important men.

Everything changed dramatically with the Neo-Assyrian occupation of the eighth century BC; the cities of northern Transjordan ceased
to exist. Tall Zar'a also lost its urban character in this period. While the kingdoms of 'Ammon and Moab further south flourished and produced great cultural feats under Assyrian control, northern Gilead became a rural backwater.

## Hellenistic, Roman and Byzantine Era

During the Early Hellenistic period (fourth to second century BC) Area I was used but not inhabited. The people lived in other parts of the tall. Area I was mainly used for waste disposal. Three large pits for storing grain had also been dug and carefully lined with stones. Among the more interesting objects of this era is the bronze head of a bear.

In the late Hellenistic period the settlement pattern on the tall changed fundamentally once again. Wādī al-'Arab and its settlements now lay in the hinterland of the new city of Gadara. Even the Roman roads ignored topographical sense and aligned themselves with the new urban centre. The tall ceased to be the central urban settlement of the region. But it was not deserted; on the contrary, it remained densely settled, probably due to its excellent water supply and fertile soils.

Five large houses have been uncovered from this period in Area I along a cobbled street that follows the contour of the hill (Fig. 18). Apart from pottery, glass, and metal finds, also a number of coins came to light that attest to continuous settlement from the first century BC to the eighth century AD.

## Islamic Period

A catastrophic earthquake in the eighth century AD spelt the end of the flourishing city of Gadara. It was not rebuilt and was very soon abandoned and forgotten. Added to this were the fundamental political alterations and climatic changes to much drier conditions of the early Islamic period. The Wādī al-‘Arab again gained importance, albeit only locally, perhaps due to its continued excellent conditions for settlement and agriculture. Umayyad architecture in two different strata is known in Area I.

## Area II

Area II is situated in the northeast of the tall plateau. Because of its high position this area is expected to yield administrative and/or cul-
tic buildings. By the end of spring 2008 an area of $800 \mathrm{~m}^{2}$ (AT-AX 128-133) has been opened. A large building with several building phases of the Roman-Byzantine period has been uncovered which was reused in the Islamic period. It was built over smaller houses which probably date to the Roman period (Fig. 19).

The southern extension of the large RomanByzantine building excavated in the last two years could be followed. Three rooms and two courtyards have been found which show a reorganisation of the large structure after heavy destruction which can be dated to the Byzantine period. In the debris inside the rooms two complete and two almost complete amphorae were found. The entrances were blocked at the end of the occupation. A ṭābūn, a storage basin and a pillar base were found on an earlier occupation level in the northernmost room. In the room south of it a floor covered with lime plaster was found. A large oven was also found in the eastern room as well as in one of the courtyards. Some fragments of wall paintings discovered in the debris show that the house was originally decorated with frescoes.

In the easternmost square, a separate building with several building phases could be identified. In AV 132 and AW 132 the easternmost extension of the large Roman-Byzantine building complex could be verified. In the squares AV 132 and AV 133 the eastern extension of the thick wall could be found which was already recognised in the squares AV 128 to AV 131 in the years before. However, in AV 133 all walls break off down the slope. In squares AY 131 and AX 132 the northern limit of the large Roman-Byzantine building could be identified.

In the next campaigns, the southern limit of the building phase has to be clarified. From the stones just under the surface it can be expected to be $2-3 \mathrm{~m}$ to the south of squares AT 128-133. The western limits of this building complex also have yet to be found.

Work will continue in 2009 with an extension of the excavation area in order to see the complete extent of the building.

## Area III

The excavations on Tall Zar'a in Summer 2008 focused on the new Area III in the southern part of the tall plateau. This area is the highest

18. Architectural plan of the Roman-Byzantine stratum in Area I [Drawing by Nicole Karagiannidou/BAI Wuppertal].

19. Aerial photograph of Area II with interpretation (All pictures BAI Wuppertal /DEI Jerusalem Amman).
on the plateau and has a large number of stones and wall structures on the surface. The survey of 2001 yielded a great deal of Roman and Byzantine pottery in this area, suggesting a large Roman-Byzantine building complex. Closer initial investigations also revealed the existence of two large Roman cisterns. In Spring 2007 all surface stones not obviously belonging to walls were removed and aerial photographs were taken using a helium balloon. In summer 2007 a test trench was opened in the western part of the area, revealing a Roman-Byzantine-period wall with gateway and part of a courtyard with some mosaic floor still intact.

Summer 2008 was the first large-scale excavation campaign. 24 squares of $5 \mathrm{~m} \times 5 \mathrm{~m}, 600 \mathrm{~m}^{2}$ in total were opened in the central part of the area. These were U 123-128, V 123-128, W $123-128$, X 123-128. The entire area, especially in the south, was badly disturbed by holes dug by grave robbers.

The oldest layer of settlement uncovered
in summer 2008 is part of a Byzantine-period building complex consisting of a large courtyard with some adjacent rooms. The main courtyard entrance ( X 124 ) was a 2 m -wide gateway of finely dressed stones which had a hole in the threshold for locking the gate. Towards the east, the courtyard contains the entrance to one of the large, barrel-vaulted cisterns mentioned above. The floor of the courtyard consisted of a layer of yellow plaster covered by a layer of white plaster which once formed the bed of a mosaic surface across the entire yard. This mosaic is now only preserved in parts near the gateway and in the middle, where a large roundel of patterned mosaic stones (red, black, white) was uncovered. A further section of mosaic is preserved near a ba$\sin$ and drain leading into the cistern from what may be the courtyard's northern wall. A similarly worked basin was found in the 2007 test trench (and in the meantime stolen) next to the gateway of the courtyard where it had served to collect rainwater from the gutters via a downpipe and
to redirect it via pipes below the courtyard surface into the cistern to the east. Together, these installations bear witness to a sophisticated and well-built rainwater catchment system and, considering the proximity of the artesian spring, a high water consumption of the building's inhabitants. Various large rooms measuring approximately $5 \mathrm{~m} \times 5 \mathrm{~m}$ with smaller partitioning walls and white plaster floors were also uncovered adjacent to the courtyard to the south. Opposite the gateway across an alley a large wall (preserved to circa 1 m ) runs parallel to it with a badly damaged area that nevertheless suggests a similar gateway to that of the courtyard, albeit walled in at a later stage. Attached to this wall to the east is a low, long shelf consisting of a row of stones filled in with earth and an upper layer of mortar which may have been used to place containers or troughs on. The filling of this structure yielded only Byzantine sherds, showing it was also part of the original Byzantine structure, albeit perhaps a later addition.

The earthquake that destroyed Gadara in the mid eighth century AD can be expected to have also wreaked havoc on the settlement on Tall Zar‘a and can perhaps be seen as the cause of the destruction of the Byzantine period building complex described above. It did not, however, stay uninhabited for long, as the next building phase in the complex used the older walls as foundations for new buildings, albeit with narrower, less well-built walls constructed from both rubble and from natural fieldstones. In squares U 123-125 and V 123-125 previous walls were leveled and incorporated into the flagging of a large, well-built courtyard, the stones for which were also taken from the rubble of the Byzantine buildings. This courtyard also contains a tābūn. A dwelling of this period appears to have been built over the eastern part of the Byzantine courtyard. Various layers of floor excavated in the courtyard and in W 125 and X 125 belong to this construction phase and date it to the Islamic period, whereby sherds of the Mamluke period represent a large portion of the finds, next to some from the Abbasid and perhaps Umayyad periods. A number of pits dug in the area of the Byzantine courtyard also date to this period.

At a later date, but while the walls of the previous buildings were still visible, a further small building was constructed using the older walls
as a foundation in the southeast of the excavation area. The filling of this building also contained a large number of Mamluke sherds.

At a much later date, the area was used again, but, unlike in the previous phases, the structures of this period do not use the bases of the earlier walls, nor do they very often follow their alignment, suggesting the area lay uninhabited for long enough for them to have disappeared from view before this last layer of settlement activity. The structures of this period are those which had been visible on the surface, and it was an important insight that there is little connection between these structures, which proved to be very shallow, and the layers that lie beneath. It is difficult to date this last phase, but it is likely to be well into the Ottoman period. The irregularity of the lines of stones and the fact that both foundations and floors are missing for this phase complicate matters further, and suggest that these were either destroyed as a result of use of the surface of the tall for farming, or that the structures from which the stones originate were very simple in the first place.

The remaining two trenches in the eastern part of the excavation area, squares U-X 127128 must at this stage be treated separately, as, although adjacent to the rest of the area, they lie further up the slope. This and the fact that a large, multi-phased wall which has yet to be investigated in detail lies between this area and the rest of the excavation mean that it is as yet impossible to identify the structural link between the buildings and layers in this area and the rest of Area III as described above.

As of summer 2008, squares U-V 127-128 of this area were only excavated to just below the colluvium due to the intensity of work required in the northern section (W-X 127-128) where many walls and layers of floor were found. In this section, the two oldest walls form a right angle in the northeastern corner and are preserved to a height of over 1 m . Further walls were added to the complex to the south and west at a later date, and all of these walls possess doorways with carved frame stones and holes for attaching the door. One of the rooms of the complex was filled with charcoal and ash, and the remains of a well-built door were found in the form of nails, hinges and handles. The courtyard of the complex was used over a long period: various levels of floor were revealed, each with a tāāūn
still embedded into the floor. In the room created by the two oldest walls, a well preserved oil mill was uncovered, consisting of a round surface made of segment stones and bordered by a thin wall toward the outside. In the middle, the stone hub of the wheel contained a square opening to hold the structure supporting the arm of the mill. The mill sits circa 40 cm high in the room, but the bottom has not yet been reached. The mill was built into a later partitioning wall in this room. A țābūn on the floor of this room also dates to this later phase.

The chronological sequence of this section is still far from clear. The fillings of the various floor levels in the courtyard and rooms yielded a mixture of Islamic and late Roman sherds, whereby the lowest floor excavated in the courtyard is clearly dated by the pottery to the Mamluke period. The picture is, however, clouded by the fact that the two oldest walls mentioned above are similar in structure to those of the Byzantine building to the west. Moreover, on the last excavation day a small section of floor was revealed below the Mamluke layer in the courtyard which was paved with almost identical mosaic to that of the Byzantine courtyard described above, suggesting the oldest stratum of this building complex may indeed be much older and in some way tie in with the Byzantine courtyard building, perhaps via a flight of steps which have yet to be revealed (as this section lies much higher up the slope). It is hoped that all will be revealed in the next excavation campaign, when the large wall that divides the western section of the excavation from the complex described in this and the previous paragraph will be carefully dismantled and the southern part of this section excavated to a lower level.

In all, the building structures uncovered in summer 2008 show a very large-scale ground plan for the Islamic and in particular for the Byzantine period. For this reason it will be necessary, in the next campaigns, to extend the excavation area to the east, north and west to reveal more of the buildings that were grouped around the courtyard and to determine the general extent of the building complex (es). At this stage it is impossible to say very much about the type of buildings in Area III. Together with the findings from Area I and II, however, it is clear that Tall Zar'a housed a large rural settlement in
the Byzantine and pre-modern Islamic periods, and that agriculture played an important role in its existence. It is also possible to say from Area III that at least parts of the settlement were used over a very long period of time, as buildings dating to the Mamluke period still used the Byzantine walls for foundation and alignment, and there is no clear horizon of destruction from the mid-eighth century earthquake, suggesting that, at least in Area III, the buildings were cleaned up and rebuilt quite soon after the event. In this respect, it is hoped that the findings from this excavation will be able to shed much-needed new light on the nature of the transition from the Byzantine-Christian to the Early Islamic period in this region of the Near East.

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# PRELIMINARY REPORT ON THE ARCHAEOLOGICAL INVESTIGATIONS OF AṢ-ṢADAQA, SOUTHERN JORDAN, $2007{ }^{1}$ 

Zeyad al-Salameen, Saad Twaissi, Fawzi Abudanah

## Introduction

The first season of excavations and surveys at aṣ-Sadaqa was carried out by a team from the Nabataean Centre for Archaeological Studies at al-Hussein Bin Talal University. Archaeological fieldworks, which took place between August 26th and September sixth under the direction of Dr Zeyad al-Salameen and Dr Saad Twaissi, involved limited excavations and detailed surface and survey work.

Aṣ-Ṣadaqa is located about 23 km west of Ma ${ }^{〔} \overline{\mathrm{an}}$ and is situated at a level of 1490 m to 1520 m above sea level. It is located geographi-
cally along the well-known Via Nova Traiana (Fig. 1).

Aṣ-Ṣadaqa's name is attested in many historical sources. It appears in the Tabula Peutingeriana ${ }^{2}$ under the name Zadagatta and is located according to this Tabula 18 Roman miles south of Petra. It is mentioned also in the Notitia Dignitatum ${ }^{3}$ from the Byzantine era which confirms the military role of the site (Fig. 2).

Its name is attested also in Greek Graffitie discovered in Wādī Haggag in Sinai which refer to the "Fortress of Zadacatha" "K $\alpha \sigma$ т $\rho 0 v$ $Z \alpha \delta \alpha \kappa \alpha \theta \alpha$ ".


1. Map showing the geographical location of Aṣ-Ṣadaqa.
2. Many thanks are due to al-Hussein Bin Talal University for sponsoring this project. Special thanks are due also to Hani al-Falahat of the Jordanian Department of Antiquities who joined the team during their fieldwork.
3. A map of the Roman roads compiled in the fourth cen-
tury AD.
4. The Notitia Dignitatum was an official document of the early fifth century AD, which recorded every military and governmental post in the late Roman empire.

5. As-Sadaqa in the Tabula Peutingeriana.

The Greek archive which was uncovered in the Petra Church contains documents indicating the importance of agriculture in the Petra region's suburbs especially those regions to the south, west and east of Petra. They mention names of geographical sites in the vicinity of $\mathrm{Pe}-$ tra such as Augustopolis = Udhruḥ, Zadakatha = aṣ-Ṣadaqa (Bikai 1996: 487), Math Lawza $=$ Umm Lawza, al-Raphida =ar-Rāfid (Gagos and Frosen 1998: 474).

Several archaeological surveys conducted in the southern part of Jordan have considered the site, as remains and traces of ruins are covering most of the site, including a watchtower and traces of rectangular castellum? Whose remains are still to be traced southwest of the spring at 'Ayn as--Ṣadaqa. The southern and western walls of this building are still preserved.

About 1 km east of the settlement is Rujm asSCadaqa, a well preserved watchtower which occupies the hilltop. This watchtower was dated by Glueck to the Classical Periods (Nabataean and Roman) and he mentioned that it formed part of the chain of the Nabataean watchtowers. It should be noted that as-Sadaqa was one of the major stations along the Nabataean trade route.

## Past Researches

No systematic excavation has been conducted at the site and only two archaeological soundings have been carried out there; one by Hanan Kurdi of the Jordanian Department of Antiquities in early 1970s which revealed a Nabataean tomb containing many loculi which was dated, depending on the discovered pottery, to the first century AD (Kurdi 1972: 85-87). The second sounding was conducted in 1989 by David Graf and focused on the supposed fort (Graf 1992:

253-260). These archaeological fieldworks have demonstrated extensive occupation and confirmed that the site was important during the Nabataean, Roman, Byzantine and Islamic periods. Recently an archaeological survey has been conducted in the area from Ayl to Rās an-Naqab which considered the site. The area to the north of aṣ-Ṣadaqa was systematically surveyed by Abudanah in 2003 (Abudanah 2006).

## Aṣ-Sadaqa and the Ancient Routes

A sophisticated network of roads was constructed during the Nabataean and pre-Nabataean period in order to facilitate the flow of essential commodities from Arabia to the consumers and vice-versa. These routes were furnished with watchtowers to ensure sufficient security for travellers and caravaners and to provide them with their essential needs. Remains of such structures have been recorded by the team who managed to document the following routes which are furnished sometimes with watchtowers (this includes the first and second routes mentioned below). During the survey, many routes coming to aṣ-Sadaqa and springing from it have been recorded and these include the following:-

1. The Sadaqa-Petra route starts from ȘadaqaKh. Saud- att-Tayyiba- Dhaha- Bir Sarah- Petra (Graf 1995: 214-267)
2. The Șadaqa- Fardhakh- Ayl- Basta- Petra route. During our survey we found possible traces of this road (Abuudanah 2006).
3. The Sadaqa- Gharandal route. This road has not been visited during our survey but it is mentioned frequently in various applications. It starts from aṣ-Sadaqa to Dilāgha- Wādī as-Siq- Gharandal (ancient Aridella in the Notitia Diginitatum).

The water sources along these routes made it ideal for small agricultural villages, as indicated by the type of the discovered sites along the routes. Additionally, there are numerous agricultural terraces along these routes that were noted but not recorded in our current survey.

## 2007 Field Research

The first step of our project involved documentary research whose principal aim was to identify all recorded structures and features located within the area. Historical data was used to predict the nature and extent of archaeological remains within the area and to formulate an estimate of previous disturbances to the area. Therefore, topographic maps of the whole area were reviewed prior to our archaeological survey. These maps were supplemented by aerial photographs. Once formal permission was granted to the team by the Jordanian Department of Antiquities to survey and excavate the area, we conducted a simple aerial survey using a kite. Additionally, a total station survey was undertaken under the supervision of Mr. Ali al-Farajat of the Petra Region Authority. The goals of this survey were to record a topographic map of the site and to establish a four-meter grid system for excavation units as well as to map all extant unexcavated surface architecture.

Then we started our second task which was to survey the whole area and to ascertain the location of the archaeological remains. The primary aims of the 2007 season were as follows:-

- to investigate the visible archaeological remains and to determine the geographical extent of the ancient site.
- to establish a detailed record of the principal cultural strata preserved at the site.
- to locate the extent of the visible architectural features.
- to determine an excavation strategy for the following seasons.
- to interpret the value of the as-Sadaqa area in an archaeological, historical and cultural context.
- to explore the ancient road-networks from and to aṣ-Ṣadaqa.


## Result of the 2007 Survey

During our survey in the area which was not planned before, twenty eight sites have been iden-
tified and these sites include watchtowers, remains of ancient roads as well as villages. They have been fully recorded and photographed but have not been drawn. The survey covered areas located to the north, south, east and west of aṣ-S.adaqa.

One of the most significant results of the archaeological survey is the large number of villages and watchtowers discovered. Another noticeable result is the date of these structures (Nabataean, Classical and Islamic).

A short description for these sites, their altitudes, coordinates and probable dates is found below:-
Site 1, (The fort)? (Fig. 3)
Altitude $1505.71-1514.85 \mathrm{~m}$ asl
Coordinates N $30^{\circ} 09.539^{\prime}$ E $35^{\circ} 29.632^{\prime}$,
N $30^{\circ} 09.615^{\prime}$ E $35^{\circ} 29.691^{\prime}$
This very extensive site occupies the centre of the modern village of aṣ-Sadaqa. It has been suggested by early scholars that it was a fort. Only soundings were carried out in this area in the late eighties and demonstrated extensive occupation but revealed no information about the function of the site. Long-term and systematic excavations might reveal more details about the date and nature of this site. Pottery sherds dated from the Nabataean up to the Islamic periods have been collected.

The main structure in the site is seemingly rectangular. It is very difficult to discern the eastern borders as it is obstructed by the construction of the modern village, however the western border is clearly visible. Along this side there are indications for the existence of towers. This thick wall is running northward and its length is approximately 134 m and there are many internal divisions within the structure.

There are also indications that some of the stones used in the construction of this fort were taken by the local villagers to build their traditional houses and to delineate their agricultural fields. It has been noted in some of the traditional houses built east of the site that many dressed stones and weighing stones were reused in the construction of these houses and it is likely that they were all taken from the fort site.

There is a water spring north of the site.
Site 2 The castellum?
Altitude 1511 m asl
This site is located west of the aṣ-Ṣadaqa

3. Aerial photo showing Site 1.
spring. It is a small structure that has straight wall lines and built with medium sized stone blocks with one and sometimes two courses visible above ground. Additionally, there are numerous scattered building blocks in the surrounding fields. It has been identified by earlier scholars as castellum. Our first season of excavation has been carried out to determine the function of the structure. However, it was very limited due to many technical obstacles. So, only a few soundings have been conducted and these revealed limited information (for further details see the following parts of this report).

Date: Classical.
Site 3
Altitude 1500 m asl
Coordinates N $30^{\circ} 09.626^{\prime}$ E35 ${ }^{\circ} 29.731^{\prime}$

Dimensions 15.5 square meters
Low agricultural terrace located east of the fort. Abundant Nabataean pottery sherds but no wall lines have been recorded. Additionally, remains of a broken column have been recorded and this might indicate that there were some structures built at the site.

Date:- Nabataean

## Site 4 Janab al-Bahar (Figs. 4, 5)

Altitude 1528 m asl
Coordinates N $30^{\circ} 10.773^{\prime}$ E $35^{\circ} 29.575^{\prime}$
Dimensions 6 m north-south x 5.5 m east west

Upper part of a watchtower located now at the ground level of a road, which was made and used seemingly after the destruction of the watchtower. This watchtower was constructed

close to an ancient route whose traces are still visible. The entrance of the watchtower is located east of the structure and opens towards the route. The structure measures approximately 33 square meters.

## Site 4 A (Wādī al-Asāwir)

Altitude 1551.73 m asl
Coordinates N $30^{\circ} 11.256^{\prime}$ E $35^{\circ} 29.312^{\prime}$
This site is located in Wādī al-Asāwir. A rectangular structure located at the bottom of a hill. Very difficult to discern the outline as it is obstructed by the piling of small stones resulting from the clearance of the surrounding agricultural fields, however the south-eastern corner is
clearly visible. From this corner there is a wall running northward and measures approximately 14 m and another one running westward and measures approximately 10 m .

Date:- Nabataean and Roman.
Site 5 (Wādī al-Asāwir) (Fig. 6)
Altitude 1583 m asl
Coordinates N $30^{\circ} 11.356^{\prime}$ E $35^{\circ} 29.392^{\prime}$
Traces of an ancient road leading from AṣṢadaqa to Rājif have been recognized. It is missing in some places due to recent agricultural activities. Its width is approximately 5 m and its borders are clearly visible.

Date:- Classical.


## Site 6 Kh. ar-Ruwayha (Fig. 7)

Altitude 1588.08 m asl
Coordinates N $30^{\circ} 11.371^{\prime}$ E $35^{\circ} 29.361^{\prime}$
This site is called Kh. ar-Ruway a by the local inhabitants. It is a huge structure built of medium and large hewn limestone blocks with one and sometimes two courses visible above the ground. There is a water cistern within the site as well as rock-cut caves. There is a rocky outcrop east of the site which suggests quarrying activities. Collected pottery is dated from the first century AD .

Date:- mostly Nabataean.
Site 7 (Fig. 8)
Altitude 1575.81 m asl
Coordinates N $30^{\circ} 11.276^{\prime}$ E $35^{\circ} 29.448^{\prime}$

There are two main structures within this site; the first one is square. Another square structure is located near the first one and both were built of dressed and semi-dressed limestone blocks which were seemingly taken from the nearby quarries.

Date:- undetermined yet.

## Site 8 (Fig. 9)

Altitude 1573.36 m as
Coordinates N $30^{\circ} 11.036^{\prime}$ E $35^{\circ} 29.383^{\prime}$
Huge structure built over a hill, which is located opposite to sites number 6 and 7. This structure measures approximately $50 \times 25 \mathrm{~m}-50 \mathrm{~m}$ east west and 25 m south north. This structure overviews the route that leads to Råjif. Two flint tools have been found in the vicinity of the site.

Date:- Classical.

7. Site 6 (Kh. ar-Ruwayha).

8. Photo of Site 7.

9. Site 8 .

Site 9 Kh. Umm Naqāt (Figs. 10, 11)
Altitude 1567.58 m asl
Coordinates $\mathrm{N} 30^{\circ} 11.026^{\prime}, 30^{\circ} 11.059^{\prime}$, $30^{\circ} 11.033^{\prime}$, $\mathrm{E} 35^{\circ} 28.878^{\prime}, 35^{\circ} 28.823^{\prime}$, E $35^{\circ} 28.831^{\prime}$

Huge Village with irregular shape measuring approximately 7000 square meters. There is an underground spring located to the east of the village which can be reached by crawling 13.5 m underground. Inside this chamber there is a water spring coming out of the rock and flowing slowly in to a basin; this spring is called 'Ayn Umm Naqāṭ.

This complex site with many structures was built of medium sized stone blocks, some show-

10. Photo of the entrance of the Umm Naqāt spring.

ADAJ 52 (2008)

11. Aerial photo showing the geographical location of Kh. Umm Naqāt.
ing to a height of two or three courses above the ground. Located on a shallow hill with several limestone outcrops, the main built site and rock-cut outcrops are within an area of agricultural fields. Ancient wall lines are abundant in the fields.

Date: undetermined yet.

## Site 10

Altitude 1618.79 m asl
Coordinates N $30^{\circ} 11.077^{\prime}$ E $35^{\circ} 29.174^{\prime}$
This structure was built at the summit of a mountain. Built of medium and large hewn stone blocks, with one and sometimes two courses visible above the ground. The structure is like a structure-within-a-structure building. Its dimensions are: 7 m east west and 6 m south north. This site is surrounded by agricultural fields. Few flint scatters have been collected from the site.

Date: undetermined yet.
Site 11
Altitude 1580.38 m asl
Coordinates N $30^{\circ} 11.088^{\prime}$ E $35^{\circ} 28.717^{\prime}$
Rock-cut cistern associated with a threshing floor. This cistern is located west of Kh . Umm Naqāt. The cistern, as mentioned by some local inhabitants, is pear-shaped, and there are remnants of hydraulic plaster on the interior. Its
depth could not be determined as it is full of debris. The diameter of its opening hole is 80 cm .

Site 12 Kh. 'Ayn Khalīl (Figs. 12, 13)
Altitude 1639.51 m as
Coordinates N $30^{\circ} 11.034^{\prime}$ E $35^{\circ} 28.390^{\prime}$
This site is called Khirbat 'Ayn Khalìl by the local inhabitants. An extensive site built of hewn and undressed limestone blocks, it is located on a flat area on the mountain slope. The site has many internal divisions and structures, up to two or three courses can be seen at the surface. Islamic tombs have been found between the walls of some of the internal divisions which have were mostly been robbed.

Remains of grinding stones have been noticed near the site. Many agricultural fields and wadi barriers of unhewn medium sized stone blocks and deeply buried terrace walls have been noticed around the site. The spring of 'Ayn Khalil is located west of the khirbat but it is dried up now.

Abundant sherd scatter was noticed at the site.

Date:- Classical.

## Site 13 (Fig. 14)

Altitude 1625.49 m asl
Coordinates N $30^{\circ} 10.901^{\prime}$ E $35^{\circ} 28.538^{\prime}$

12. Photo of Site 12.

13. Photo of a robbed tomb in Site 12.

Wall lines, of somewhat large stones. There is a junction of two ancient roads:

- The first one is coming directly from aṣ-Ṣadaqa Village. This could only be traced for a short stretch to the east and is defined by smaller


14. Photo of Site 13.
stones.

- The second is coming from Khirbat Umm Naqāt and leading towards Khirbat 'Ayn Khalīl.
These roads are surrounded by agricultural fields and terraces.

Date: Classical and Islamic.
Site 14 Kh. Al-Wajdiyya (Figs. 15, 16, 17)
Altitude 1590.14 m asl
Coordinates N $30^{\circ} 10.127^{\prime}$ E $35^{\circ} 28.888^{\prime}$
A complex site with many structures. It is an extensive site built over a hill with many structures (wall lines) and internal divisions built of medium sized stone blocks, some showing to a height of two or three courses above the ground. Located on a hill with several limestone outcrops. The main built site and rock-cut outcrops are within an area of agricultural fields. Ancient wall lines are abundant in the fields.

15. Photo of Site 14.

16. A fragment of rock-cut water channel found in Site 14.

Two robber pits are located inside the site and some small pits have been seen.

Remnants of an ancient road leading to the site have been recognized. There is a huge pit north of the site. It is full of debris and huge limestone blocks and this might have been a cistern. Additionally, a fragment of rock-cut water channel has been found close to the cistern. Two caves have been recorded west of the site and some walls were built over these caves.

Abundant Nabataean pottery sherd scatter was noticed east of the site.

Date:- Classical (mostly Nabataean).

Site 15 Kh. Rajā (Figs. 18, 19, 20)
Altitude 1587.39 m asl
Coordinates N $30^{\circ} 09.991^{\prime}$ E $35^{\circ} 28.708^{\prime}$
This site is called Khirbat Rajā. It is an extensive site located at the summit of a mountain. Built of medium and large stone blocks, with one and sometimes three courses visible above the ground. It has many internal divisions of very straight lines. Some of the rooms are still preserved standing to a height of up to four courses above the ground. The plaster on the walls has largely eroded off, but some small areas of white plaster have been identified.

The size of the built stones as well as the construction techniques indicate that there were more than one occupational phases. West of the site there is a water reservoir connected to a square settling tank directly to the northeast. There are remnants of hydraulic plaster on the interior. The depth of the reservoir could not be determined as it is full of debris and large blocks.

The main built site is within an area of agricultural fields and ancient wall lines are abun-

18. Remnants of road leading to Site 15.

17. Remnants of an ancient road lead to Site 14.

19. The "Plastered-Room" in site 15.

20. Remnants of water collecting basin in Site 15.
dant in the fields.
There is a road leading to the site from the east and its remains are still visible. The road heads westward.

Abundant Nabataean pottery sherd scatters have been seen at the site.

Date:- Classical (mostly Nabataean).

## Site 16 (Wādī 'Imrān) (Fig. 21)

Altitude 1585.26 m asl
Coordinates N $30^{\circ} 10.099^{\prime}$ E $35^{\circ} 28.404^{\prime}$
This site is located at one of the banks of Wādī 'Imrān. It is an extensive site with many struc-

21. Site 16 (Wādī 'Imrān).
blocks, some showing to a height of two or three courses above ground level. The main built site is located within an area of agricultural fields.

There are remnants of an ancient road between this site and site 15 (Khirbat Rajā).

Date:- Classical.
Site 17 Wādī 'Imrān (Fig. 22)
Altitude 1659.94 m asl
Coordinates N $30^{\circ} 10.067^{\prime}$ E $35^{\circ} 28.002^{\prime}$
This site is located within Wādī 'Imrān area. It is a rectangular watchtower located at the top of a hill. Very difficult to discern the southern half as it is obstructed by the piling of small stones from the clearance of the surrounding agricultural fields, however the northeast and northwest corners are clearly visible. It consists of a building-within-a-building and the dimensions of the northern, internal half of the structure are: 7.3 m east-west and 2.6 m north-south.

Date:- Classical.
Site 18 (Fig. 23)
Altitude 1641.65 m asl
Coordinates N $30^{\circ} 09.781^{\prime}$ E $35^{\circ} 28.315^{\prime}$
Several structures with internal divisions

22. Site 17 Wādī 'Imrān.

23. Site 18.
built of medium sized stone blocks and located on a hill slope with limestone outcrop. Two walls border the site which measures approximately $26 \mathrm{~m} \times 26 \mathrm{~m}$. There is a probable route approaching the site from the east. The structure is located on a flat area between several hills and surrounded by agricultural fields.

Date:- Classical.

## Site 19 (Fig. 24)

Altitude 1634.94 m asl
Coordinates N $30^{\circ} 09.681^{\prime}$ E $35^{\circ} 28.373^{\prime}$
This site is located east of site number 18. A Thamudic graffiti has been found at the site. It is a relatively small structure that has straight wall lines and is built with medium sized hewn stone blocks and is located on a hill slope with limestone outcrop. Some courses are clearly visible.

Date:- Classical.

## Site 20 Kh. as-Ṣarāy‘a (Fig. 25)

Altitude 1595.018 m asl
Coordinates N $30^{\circ} 09.165^{\prime}$ E $35^{\circ} 28.691^{\prime}$
An extensive site with many structures built of medium sized stone blocks, some showing to a height of two or three courses above ground level. There are strong indications of quarrying activities within the site. Robber pits have been noticed in the site and these pits exposed some standing walls. Recorded structures within this site include a limestone basin and a small rock-cut basin (cup-hole), used most likely for agricultural purposes. The whole site is squareshaped and measures approximately $30 \times 30 \mathrm{~m}$. There is another square structure west of the site measuring approximately $27 \times 27 \mathrm{~m}$.

Date:- Classical.

24. Thamudic inscription in Site 19.

25. Site 20 Kh . aṣ-Ṣarāy‘a.

Site 21 Al-Miflisah (Fig. 26)
Altitude 1488.64 m as
Coordinates N $30^{\circ} 08.618^{\prime}$ E $35^{\circ} 29.606^{\prime}$
Wall lines of somewhat large stones seemingly remnants of an ancient road running south-north, constructed meters west of the modern road south of aş-S.Sadaqa. This road leads towards aş-Ṣadaqa and towards Kh. aṣ-Ṣarāy‘a. The road is marked in the east by a double wall. The width of the road is about 5 m . This road was constructed on an elevated area surrounded by obvious ancient terraced agricultural fields. This site is disturbed by modern agricultural fields.

26. Site 21 al-Miflisah.

Date:- Classical.
Site 22 al-Miflisah (Fig. 27)
Altitude 1470.35 m asl
Coordinates N $30^{\circ} 08.288^{\prime}$ E $35^{\circ} 29.798^{\prime}$
This site is located east of site 21. It has a small structure with few internal divisions constructed within low agricultural terraces. It is very difficult to discern the outline as it is obstructed by the piling of small stones from the clearance of the surrounding agricultural fields. Scarce pottery sherd scatter was noted at the site.

Date:- Classical and Islamic.
Site 22a al-Miflisah (Fig. 28)
Altitude 1471.87 m asl
Coordinates N $30^{\circ} 08.254^{\prime}$ E $35^{\circ} 29.806^{\prime}$
Relatively small structure constructed meters south-east of site 22. Its northern and western walls are still visible.

Date:- Classical and Islamic.
Site 23 Dawsin Area, Kh. al-Mukhaylīl (Fig. 29)

Altitude 1422.19 m as
Coordinates N $30^{\circ} 08.166^{\prime}$ E $35^{\circ} 31.316^{\prime}$
An ancient site, some of which has been recently occupied by a traditional village. This is an extensive site with many structures built of small and medium sized stone blocks, some showing to a height of three courses above ground level. Ancient wall lines are apparent at the surface. It is located northeast of 'Ayn al-

27. Site 22 al-Miflisah.

28. Site 22a al-Miflisah.

Mukhaylīl which has been dried recently. Islamic tombs are located east of the site as well as a traditional house. Robber pits have exposed Nabataean pottery fragments including Nabataean cooking pot, unguentarium and painted ware.

Abundant Nabataean pottery sherd scatters. Additionally, there are numerous scattered building blocks in the surrounding fields which indicate that there were many other structures at the site.

Date:- Classical (mostly Nabataean).
Site 24 (Fig. 30)
Altitude 1565.75 m asl
Coordinates N $30^{\circ} 09.465^{\prime}$ E $35^{\circ} 29.403^{\prime}$
Quarrying area located southwest of As-

Sadaqa. It seems that these quarries form the main source for providing building materials for the nearby structures of Kh. aṣ-Ṣadaqa (Site 1).

Date:- undetermined yet.
Site 25 (Rujum as-Șadaqa) (Figs. 31, 32)
Altitude 1554.48 m asl
Coordinates N $30^{\circ} 09.739^{\prime}$ E $35^{\circ} 30.348^{\prime}$
Nabataean in origin according to Neslon Glueck. It is a huge watchtower overlooking aṣSadaqa and the surrounding areas. It has been studied extensively before but no soundings or excavations were done at the site. Islamic tombs were constructed within the wall of the watchtower.

Date:- Nabataean.

29. Site 23 Dawsin Area, Kh. al-Mukhaylıll.

30. Photo of Site 24.

31. Site 25 (Rujum Aṣ-Ṣadaqa).

Site 26 Nabataean Tombs (Fig. 33)
Altitude 1539.84 m asl
Coordinates N $30^{\circ} 09.606^{\prime}$ E $35^{\circ} 29.983^{\prime}$
This site was excavated by the Jordanian Department of Antiquities in the early seventies (Kurdi 1972) and dated to the Nabataean period
(the first century AD). Many tombs were found at the site.

Date:- Nabataean.

## Results of the 2007 Soundings

Site 2 has been chosen for excavation this season because:- (1) it is a small structure and it is easy to control financially and to fit our limited team size; (2) the external walls of the structure are clearly visible; (3) it is hoped that this site might give indications about settlement type in this site as well as dates of occupation.

First of all, four squares were opened. Then we were informed by the Department of Antiquities that we should stop our excavation as there was a mistake and they did not intend to give us permission to excavate this site. We were obliged to continue in two soundings and to conduct a field survey at the site.

Two soundings measuring $4 \times 4 \mathrm{~m}$ were excavated. Prior to the actual digging, walls were visible on the surface and after excavating these trenches, three phases have been identified.

## Trench 07 (Fig. 34)

This was a 4 x 4 m trench. Excavations have revealed a wall running north-south. The progress of work has shown that this wall is associated with a doorway and extends further north and south outside the trench. The door way lies in the northwestern corner of the square and this doorway is furnished with a socket.

33. Site 26 Nabataean tombs.

34. Photo of Trench 07.

The trench contained three layers. Excavations continued into soil around and between the architectural remains as many of the faces of the walls were unclear due to the damage in the loci. All loci in this trench contain pottery. Excavation halted in this trench once the floor was discovered. In this trench we have identified three occupational strata.

For ease of reporting, it is preferable here to summarize the results by stratum:-
Stratum I: The earliest occupation level, Stratum I, was discovered at the bottom of the sounding at elevation 1509.46 meters. Flagstones paved the eastern part of the trench and a stone wall was built directly above this pavement. This wall, composed of a single course of limestone blocks, runs north-south for 1.8 m . There are two stone built piers west of the pavement. The thickness of this stratum is 1.04 m . There is a deposit of ash which indicate a collapse.

Stratum II: The next occupational layer is at 1508.95 m and comprised of a wall. This wall is of similar construction to the wall in Stratum I, but stands a few rough courses in height. The lower layers of this stratum were composed of yellowish gravel containing small and large stones.

Stratum III: The third occupational stratum covers the surface and spreads over the whole square.

## Interpretation

Walls indicate more than one phase of occupation. They are dressed in some places and undressed in others. Gravels and soils were used to fill the gaps between the limestone blocks. Two doorways have been uncovered and their widths are completely different. Flagstones have been discovered covering some parts of the floors.

The essential constituents of the architecture at aṣ-Ṣadaqa were bound to a significant degree by the environment. The principal limestone quarries are probably to be found south of the area (site number 24). Stones are dressed and undressed and their size differs. Small stones and gravels were used by the architect to fill the space between the huge blocks.

Without further excavation, precise dating of the phases described above is difficult. No objects such as coins and inscriptions were uncovered that could provide absolute dates for these phases. Pottery vessels do provide some help with assigning relative dates to each phase.

## Artifacts

Artifacts recovered in 2007 include pottery sherds, bones, glass fragments, architectural fragments, metal nails and grinding stones.

Objects and samples were uncovered from all the phases. Objects and samples collected include architectural and metal fragments, metal nails and grinding stones (Fig. 35).

The pottery assemblage included fragments

35. Stone-made fragments discovered in Trench 07.
of bowls, lamps and jar sherds. Ceramic vessels represent the majority of excavated artifacts and a selection is presented here. Almost all loci contained a mixture of vessels dated from the Nabataean period up to the Islamic periods.

A substantial amount of bones were uncovered during the excavation. The preliminary investigation of the ancient bones indicates that they belong to a variety of animals. They include a horse skull.

Glass vessel fragments were found in all phases of excavation. No complete glass vessel was discovered.

A systematic study of these finds will be published after the completion of the excavation of the surrounding areas and the analysis of the parallels. The information given here should be regarded as a very preliminary and short introduction.

## Trench 11 (Figs. 36, 37)

This sounding lies in the northern side of the main settlement cluster of Khirbat aṣ-Ṣadaqa and on about 30 m to the west of the spring (this

36. General view of Trench 11.

37. General view of Trench 11.
structure is normally known to scholars as castellum). The sounding has $4 \times 4 \mathrm{~m}$ dimensions and it was carefully chosen within a bigger rectilinear structure as indicated by external walls. The latter are fairly well preserved in terms of their orientation and extensions as well as their good stonework and this is especially clear in the western and northern sides of the curtain wall which have two faces and still retains the height of 1 m . The trench surface did not show anything significant except some shrubs and thorns whose roots appeared to extend underneath the topsoil. The digging process started with removing the shrubs and thorns from the surface and digging the topsoil layer which was no more than 20 cm deep at the deepest point.

Having removed the topsoil, multi-sized stones, mostly hewn, were distributed throughout most of the sounding area. While the process of digging and cleaning was in progress, two walls were uncovered, Locus 06 (to be called wall 1 henceforth) and Locus 07 (to be called wall 2 henceforth). Wall 1 runs almost northsouth while wall 2 runs almost west-east and the former cuts the latter at a right angle. With more progress in the work, the relationship between these two walls has become clear and a third architectural element has also been uncovered at the northern end of the wall of Locus 06. The new element appeared to be a doorway with a socket in the northern side of the doorway. It has also become clear that wall 2, although its southern face lies within the baulk, is very short and has a specific function. Not only the dimensions indicate that function but also the masonry on either end of the wall.

Very significant slab, over 1 m high, stands on the western end of the wall. It is not clear if this slab represents an arch-base or simply a
doorway. The latter function is indeed possible since another stone, which has almost the same dimensions, was found in the second sounding area and seems to have stood against this slab forming what might be a doorway. The eastern end of this wall is most likely an arch-base as indicated by the stones' layout and shape. Moreover, the space to the east of the wall and within the sounding area does not have another wall or an extension for the same wall. Therefore, it would be reasonable to suggest that the other arch-base lies outside the sounding area and is still buried in the area east of the sounding area no. 01 . The progress of work has also shown that wall 1 which is associated with the doorway extends further north outside the sounding area. The digging process has shown that a thick layer of debris and collapsed stones occupies the space around the walls especially the area east of wall 1 which represents almost two-thirds of the sounding area. In addition, pottery sherds and small pieces of glass have been found in association with this layer. Little space was available between wall 1 and the baulk; nevertheless it was enough to go ahead with the digging process. However, the space narrows towards the southwestern corner of the sounding area. The finds within this area are significant. A group of bones (human/animal?) were found within the debris and soil in an area that seems to have been deliberately enclosed by a group of stones lined to attach and cut wall 1 . The excavator suggests that the enclosed area was used as a grave for whatever was buried there. However, it is not clear if there is another line of stones within the baulk to complete the enclosed space for the grave. It is noteworthy that two worked shells were found within the supposed grave besides many pottery sherds and glass pieces. Having fully documented the alleged grave and its components, the digging continued in the same part of the sounding area and the stones of the assumed grave and the debris were removed. The result of that process was uncovering a new locus underneath the suggested grave. Shortly it appeared that the new locus extends all over the area between the baulk and wall 1. The new locus was a layer of ash associated with pottery sherds and seems to extend outside the sounding area, particularly towards the southwest corner. The discovery of some stones, with specific
shapes, near the southwest and southeast corners of the two sounding areas suggests that the ash layer is not a destruction layer but probably created as a result of industrial activity.

On the same level, in the eastern half of the square, the quantity of collapsed stones decreased and a soft and loose soil associated with some pottery sherds extends all over the area. The excavator and his team started coincidently to clear the ash layer west of wall 1 and the soft and loose soil east of it. The clearance process amazingly revealed paved floors on either sides of the wall. The pavement consists of stone tiles the surface of which is smooth and level and the tiles have different dimensions. Having reached the floor, digging was over and the team started to clean the floors and the walls. Finally, all of the architectural elements and the paved floors were drawn.

## Conclusions

From preliminary documentary research, a framework for the continued archaeological survey and excavations has been developed. Archaeological soundings within our area addressed a range of research questions about the history of the as-Sadaqa area and the living patterns of the people who inhabited this region, and promised solid evidence for answering these questions is expected in the subsequent excavations. Those include the dates of construction and architecture of the individual building areas. Religious life in the area over time will be addressed.

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# NATURAL AND CULTURAL STRATIGRAPHY OF 'AYN AS-SAWDA, AL-AZRAQ WETLAND RESERVE: 2007 EXCAVATION REPORT AND DISCUSSION OF FINDS 

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## Introduction

The drying of the 'Ayn as-Sawda Pool, located inside the al-Azraq Wetland Reserve, exposed a series deposits and a wealth of prehistoric artifacts. Survey and excavations carried out in 1997 recovered artifacts of ages ranging from Lower Paleolithic to the Epipaleolithic and Neolithic (Rollefson et al. 1997). The excavations produced large amounts of faunal remains in association with Lower and Middle Paleolithic tools, including extinct species (Dirks et al. 1998). Species such as Elephas namadicus, an extinct species of elephant closely related to the Asian elephant (Elephas maximus) was one of the most interesting finds, as well as a series of animals associated with savanna biomes (Dirks et al. 1998). To understand the habitat of the fauna better, the environment in general, and the means of subsistence of prehistoric populations, this study aimed at (1) dating cultural deposits, and (2) recovering microbotanical information (pollen and phytoliths). Samples for OSL dating were processed at the Radiation Dosimetry Laboratory at Oklahoma State University. Pollen and phytolith samples are being processed at the Applied Geoarchaeology and Paleoecology Laboratory at the Geography Department at Oklahoma State University. The collection of samples for dating and microbotanical studies involved a detailed classification and description of sedimentary units and zones, a task that was accomplished in June 2007.

This report presents the description of sedimentary units of two excavation units (AS-1 and AS-2) and a preliminary interpretation of local environmental events and their correlation with events recorded in other regions of Jordan and their relation with Marine Isotopic Stages (MIS) in the Late Pleistocene.

## Section AS-1

Section AS-1 is located on the northern side of the pool, three meters east of square AS97 E187N196, excavated by Phil Wilke in 1997 (Fig. 1). The exposure was cleaned by removing $20-50 \mathrm{~cm}$ of the section face. A $35-\mathrm{cm}$ pit was dug into the floor of the pool to expose a larger section of the lowest sedimentary unit. The total depth of the section is 3.03 meters. Nineteen sedimentary/soil zones were defined and grouped into four stratigraphic units (Fig. 2). Zones usually designate a single deposit or event, and/or a soil horizon. Units encompass a series of zones of similar origin (e.g., lacustrine, alluvial, aeolian facies, as well as cultural layers). Given the proximity to P. Wilke's square AS97 E187N196, it was possible to correlate strata between this square and the sedimentary zones of section AS-1.

Eighteen samples for microbotanical remains were taken from this section (Fig. 2). Three samples for dating using the Optically Stimulated Luminescence (OSL) method were collected using 20 cm -long tubes to keep sediment in the dark. Each set of OSL samples was accompanied by samples of the same sediment for dosimetry and water content. OSL samples were collected from the middle of zone 12 , the top of zone 4 , and the top of zone 2.

## Test Pit AS-2

This test pit had $100 \times 100$ centimeter area with a depth of 23 cm (Fig. 3). This pit was opened on a promontory at the center of the 'Ayn as-Sawda Pool where Middle Paleolithic material and fragments of partially fossilized bone were exposed. The purpose of test pit AS-2 was to test if the ground level of this promontory corresponds to Unit II in section AS-1 and stra-


1. Section $A S-1$ in relation to previous excavation in the 'Ayn as-Sawda Pool and stratigraphic units. Left side picture was
taken from the approximate location of test pit AS-2.
tum IX in square AS97 E187N196 and to search for the top of the green clay.

At 5, 10 and 20 cm depth in situ lithics and bone were found. The diagnostic lithic material recovered from test pit AS-2 is predominantly Middle Paleolithic (Fig. 4). Two ash pits containing burned bone were identified at depths $5-15 \mathrm{~cm}, 5$ to 18 cm , and 5 to 23 cm (Fig. 3). The deepest part of the ash pit in the SE corner of the excavated area had an oxidized layer. Given the consistency and apparent sedimentary characteristics, the layers of ash, gravel, lithics and bone are correlative with P. Wilke's Stratum IX, and with zones 3 and 4 in section AS-1. The pit was stopped once the sterile green clay layer was reached. Samples for phytoliths were collected from the ash pits for information on the type of fuel used in the fires and as a means of correlation with Unit II in section AS-1.

## Stratigraphic Units in Section AS-1 Unit I (Zones 1-2)

This unit corresponds with a layer of compact green clay. Its pale green color seems to indicate the presence of bentonite, suggesting a rather deep lake environment. The two sedimentary zones of this unit represent two facies of green lacustrine clay. Zone 1 contains only a few small fragments of rock. Zone 2 includes
embedded fragments of rock, all of which are unworked flint. The edges of these rock fragments are sharp, suggesting that they have not been transported by streams. Given the presence of a flint-rich rock outcrop twenty meters SW of the site, inside the pool basin, it is possible that these fragments are colluvial material that made it to the lake bed by means of gravity or perhaps by hominids mining the outcrop for flint. The age provided by OSL dating of the top of zone 2 suggests that Unit I is older than 93 ka BP .

## Unit II (Zones 3 and 4)

This unit comprises two zones with predominantly cultural sediments. Zone 3 is predominantly a deposit with ash with fragments of flint and green clay. Zone 4 is predominantly ash, silt, gravel, lithics and bone. These two zones correlate with stratum IX of P. Wilke's 1997 square. Lithics in this stratum were predominantly Middle Paleolithic, although a few Upper Paleolithic specimens were also recovered. An OSL date from the top of zone 3 provided a date of 29.1 ka BP. Unit II also correlates with the layer excavated in test pit AS-2. The correlative stratum IX was also rich in faunal remains, some of which contain a number of ungulates (cf. Dirks et al. 1998). Therefore, the microbotanical data from this layer will complement the

2. Section AS-1 stratigraphic units.
ecological picture of this occupation layer.

## Unit III (Zones 5 to 9)

This unit is represented by a series of black mat layers, which here are grouped into six major zones based on consistency, color, pedogenic development, and the presence or absence of ash. Zone 5 is a peat deposit that grades up into
a compact ash. Zone 6 is an organic mat deposit, similar to the layers above, but without shells and fragments of carbonates. Zone 7 is an organic mat with very firm consistency. Zone 8 is an ashy deposit similar to zone 5 , but with shell fragments and root marks. Zone 9 is an organic mat with carbonates and small shell fragments.

Unit III represents the presence of a wetland

3. Section $A S-2$ at the end of excavation.
deposit abundant in organics. Zones 5 and 8 seem to indicate burning of the organic mats. Zones 9 and 10 and indicate signs of pedoturbation (soil formation). Two AMS radiocarbon dates taken in 1997 from stratum IV, which roughly correspond to zones 7 and 8 of section AS-1, provided ages of $13,200+/-95$ and $13,850+/-85$ (calibrated 15,372 and $16,132 \mathrm{BP}$, respectively).

## Unit IV (Zones 10 to 19)

This unit comprises a series of carbonated silt deposits alternated with organic horizons. The bottom of the deposit (zone 10) is an organic horizon of a paleosol apparently developed above water. The rest of the zones seem to have accumulated as alternating deposits of carbonate and thin black mats. Some of the soils and mats in the carbonated deposit form lenses sloping to the west.

The OSL date obtained from zone 12 produced an age of $1490 \mathrm{BP}(517 \mathrm{AD})$. This relatively recent age suggests that most of the top white deposits (Unit IV) were laid behind the Roman-to-Early Islamic dam. Unlike the nearby 'Ayn Qasiyya pool, the 'Ayn as-Sawda pool is located inside the perimeter of the wall that demarcates the Roman-Islamic pool. This explains why the top deposits of 'Ayn Qaṣiyya are remarkably different from those of 'Ayn as-Sawda. According to Richter et al. (2007), the corresponding topmost sediments at 'Ayn Qaṣiyya consist of
a sandy soil containing carbonate concretions (Unit IV) and coarse material corresponding to flowing water (Unit V).

## OSL Dating Methods

The three OSL samples collected from section AS-1 were processed at the Radiation Dosimetry Laboratory at Oklahoma State University. OSL sample 1 was intended to date the carbonated silt material, or Unit IV (Figs. 1 and 2). OSL samples 2 and 3 had the purpose of bracketing the occupations with Middle Paleolithic material (Unit III), as well as providing the minimum age for the lacustrine green clay deposits (Fig. 2).

The OSL samples were obtained using a 20 cm long plumb pipe hammered into the deposit. The tube was pulled out by removing sediments around it and carefully protecting it from the light. For this purpose the samples were obtained at night or under a dark plastic cover. Additional samples for dosimetry measurements and water content were obtained from the sampled layer and the layers above and below.

Measurements were obtained using a Ris $\varnothing$ TL/OSL-DA-15 reader, Risø National Laboratory, with a bialkali PM tube (Thorn EMI 9635 QB) and Hoya U-340 filters (290-370 nm). The built-in ${ }^{90} \mathrm{Sr} /{ }^{90} \mathrm{Y}$ beta source gives a dose rate of $102.8 \mathrm{mGy} / \mathrm{s}$. Optical stimulation was carried out with blue LEDs ( 470 nm ), deliver-

4. (A) Lithic material from Test Pit AS-2, depth 5-10cm (B) Material from Test Pit AS-2, depth $10-20 \mathrm{~cm}$.
ing $31 \mathrm{~mW} / \mathrm{cm}^{2}$ to the sample. The heating rate used was $5^{\circ} \mathrm{C} / \mathrm{s}$.

The following measurement procedure was for all samples

1. Give dose $\mathrm{D}_{\mathrm{i}}$
2. Preheat at determined temperature for 10 s to remove unstable signals
3. Stimulate with blue LEDs for 100 s at $125^{\circ} \mathrm{C}$, measure OSL signal L
4. Give test dose, $15-20 \%$ of expected dose
5. Preheat at determined temperature for 10 s to remove unstable signals
6. Stimulate with blue LEDs for 100 s at $125^{\circ} \mathrm{C}$, measure OSL signal $\mathrm{T}_{\mathrm{i}}$
7. Return to 1

The ages for the samples are calculated by dividing the dose by the dose-rate. The results
are listed in Table 1.

## Pollen and Phytoliths

Eighteen samples for pollen and phytolith analyses were collected from section AS-1 (Fig. 2) and three samples from the ash layers in test pit AS-2 (Fig. 3). The study is supported by collections of pollen and phytoliths from all the vegetation types in Jordan filed at the Applied Geoarchaeology and Paleoecology Lab at Oklahoma State University. The study of phytoliths included collection of soil and specimen samples in a vast area inside and outside the wetland

At this point only two of the eighteen samples have been processed for pollen and phytoliths. A sample from zone 4, Unit II, which is a layer containing Middle Paleolithic artifacts and

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Table 1: OSL dates from section AS-1

| Sample | Dose <br> $(\mathrm{Gy})$ | Dose rate <br> $(\mathrm{Gy} / \mathrm{ka})$ | Age <br> $(\mathrm{ka})$ |
| :---: | :---: | :---: | :---: |
| AS-1-middle of zone 13 | $1.21 \pm 0.19$ | $0.812 \pm 0.034$ | $1.49 \pm 0.24$ |
| AS-1-top of zone 4 | $78.7 \pm 4.1$ | $2.70 \pm 0.14$ | $29.1 \pm 2.2$ |
| AS-3-bottom of zone 2 | $>255 \pm 57$ | $2.137 \pm 0.077$ | $>93$ |

Equivalent dose, dose rate and resulting age for the samples. Reference point for the ages is the year 2007 AD.
bone, contained an assemblage of pollen types typical of grasses, chenopods, Asteracaeae, and Rhamnaceae shrubs. Although desert taxa such as Chenopodiaceae and Artemisia are present in this sample, their numbers are considerably lower than those recorded in modern samples. Aquatics such as Typha sp. (cattail) are present but in very small amounts. Grass phytoliths are not abundant, but more numerous than in regional modern contexts. The strong presence of undetermined shrub phytoliths suggests the presence of woody plants.

A sample from the organic mat deposit (zone 8, Unit III) produced a large number of grass pollen (approximately $85 \%$ of the sample). Typha, Juncus, Cyperaceae and other aquatic taxa were also common, as well as typical Saharo-Arabian desert Chenopodiaceae. Grass phytolith assemblages in this deposit show large amounts of bulliforms, which are abundant in aquatic grasses. The assemblages also contained a large number of plateau saddles typical of Phragmites australis and Arundo donax, both of which grow in the wetland reserve today.

Processing, counting, and proper statistic interpretation of all 18 samples for pollen and phytoliths will provide more information on the vegetation types associated with the natural and cultural deposits of section AS-2. It is expected that phytoliths will provide information on grass types (cool versus warm season grasses) as well as aspects related to fire and herbivory effects on the landscape.

## Interpretation of Finds

The sedimentary sequence excavated in the 2007 season at 'Ayn as-Sawda exposes the geomorphological history of the site during the past 100 ka , although events are separated by long
depositional gaps. The bottom of the sequence has a deposit of green clay in which fragments of rock increase towards the top. The minimum age of 93ka places the top of the clay deposit within MIS 5c (Fig. 5). In the regional context of the al-Azraq Basin, green clay deposits have been reported in C-Spring, 'Ayn al-Asad, and various sites in Wādī al-'Unqiyya in northern Azraq (Rollefson 1983; Besançon et al. 1989) as well as in the nearby 'Ayn Qaṣiyya (Richter et al. 2007). Its broad presence in the Pleistocene deposits and its association with Middle Paleolithic material are suggestive of a 'plenipluvial' period (Besançon et al. 1989).

At this point we assume that the green lacustrine clay may be associated with the extraordinarily wet period of the interglacial, or MIS 5e, as suggested by data from other localities in the Jordanian and Arabian deserts (Sanlaville 2002). The sequence may have continued into MIS 5c, which is known to have been also wet, as some evidence in the Levant suggests (Fig. 5).

Zones 1 to 3 represent a full lake that gradually dries out. The green clay with gravel (zone 2) indicates a lake with low influx of rock fragments delivered by the wadis emptying into the lake. However, most of the rocks are flint from the nearby outcrop exposed inside the pool. Therefore, it is possible that the flint source might be the nearby outcrop, either by means of erosion or deliberate mining. Zone 3 marks the total exposure of the lakebed and a relatively rich environment for hominid/human occupations.

Unit II (zones 3 and 4) represents the total drying of a lake and its further occupation by groups using Levallois lithic technology and later by groups using lithic technologies typical of the Upper Paleolithic. OSL dates bracket this

5. Tentative correlation with Marine Istope Stages (MIS) and regional paleoenvironmental events.
cultural layer between 29.1 ka and 93 ka , which are consistent with the Middle and Upper Paleolithic material of P. Wilke's stratum IX and the equivalent deposit in test pit AS-2. Throughout this period there is no evidence of lacustrine transgressions, suggesting long dry conditions.

The organic wetland deposit of Epipaleolithic age (Unit III) is interpreted as a wetland similar to the modern reed area inside the al-Azraq Wetland Reserve. The wet conditions of the deglaciation (roughly between 18,000 to 13,000 years BP ) may have been the cause for the formation and persistence of this organically rich wetland. A similar deposit with similar lithic assemblages was reported for the nearby 'Ayn Qaṣiyya, also located inside the Azraq Wetland Reserve (Richter et al. 2007). Ash layers embedded in the Epipaleolithic wetland deposit suggest episodic burning of the wetland vegetation (zones 5 and 8 ).

The top layers of unit IV correspond to a highly carbonated silt deposit with layers of organic mats containing macroscopic remains
of Typha sp. (cattail) and Arundo donax (reed grass) leaves, suggesting the presence of aquatic vegetation. Because of its location inside the Roman wall and the late date, this deposit may be associated with the construction of the water installation built during the Roman period.

## Significance of this Study for the Middle Paleolithic

Geoarchaeological interpretation of sections AS-1 and test pit AS-2 and their ${ }^{14} \mathrm{C}$ and OSL age assays provide an overview of sequences of deposition and occupation for the latest part of the Middle Paleolithic. The green clay deposit under this occupation seems to correlate with a plenipluvial originally proposed by Besançon et al. (1989). Although the plenipluvial can be placed in MIS 5 e to 5 c , absolute dates are needed to determine the exact chronological extent of the lacustrine transgressions that may have resulted from high moisture levels. The importance of this clay in al-Azraq is that in several localities it has been associated with Middle Paleolithic ma-
terial (Hours 1989; Besançon et al. 1989)
Data from other regions of the greater SyroArabian Desert point to high lake level stands during the 5e (Abed et al. 2000), which can also be confirmed by paleopedological data from south Jordan (Henry 1997) and the Western Highlands (Cordova et al. 2005, 2007). At a broader scale these periods are also represented by depressions in the $\delta^{18} \mathrm{O}$ curve obtained from speleothems of caves in the limestone highlands west of the Jordan river and sequences of sapropel formation in the Eastern Mediterranean (Kallel et al. 2000; Bar-Matthews et al. 2003) (Fig. 5).

The depositional gap associated with the Middle Paleolithic-Upper Paleolithic transition coincides with cold MIS 4 and 2, and with the relatively warmer MIS 3. Data from paleosols in the Madaba Plateau show a gap in soil horizon development during MIS 4 and 2 (Fig. 5). This gap may be a lack of sediment deposition or an erosional phase that resulted from predominantly dry conditions. Therefore, it is possible that two cold stages of the glacial period (MIS 4 and $2)$ were generally dry.

The importance of this study lies in the possibilities of reconstructing paleoclimates during the last interglacial and the early glacial periods, which coincide with the late Levallois phases, particularly the ones associated with Tabun-C and Tabun-B types.

## Conclusions and Recommendations

The stratigraphic analysis of natural and cultural sediments at AS-1 and the new set of OSL dates complement the information obtained by P. Wilke in square AS97 E187N196 in 1997. The paleoecological information obtained through pollen and phytoliths will be useful for placing the faunas associated with these deposits in their ecological context.

The most important aspects of this sequence lie in the nature of sediment deposition and paleoclimates during the last interglacial (MIS 5e) and the early glacial (MIS 5d-5a) as being relatively wetter in contrast with the drier middle glacial (MIS 4), interstadial MIS 3 and late glacial MIS 2. Another important aspect of the deposits in 'Ayn as-Sawda lies in the importance of the organic mat developed during the early and middle Epipaleolithic, which suggests wet conditions.

The paleotopography of each layer needs to
be reconstructed to better understand the horizontal variation of geomorphic processes. This can be attained by linking similar deposits inside the different areas of the 'Ayn as-Sawda and 'Ayn Qaṣiyya. A 3-D model of the layers will allow understanding processes of erosion, deposition, and post-depositional processes that affect the material, as well the landscape of each occupation.

Test Pit AS-2 showed that some of the lithic accumulations at the bottom of the pool were not completely affected by bulldozing. Therefore, a larger excavation to recover these remains should be carried out before it is altered by new development projects.

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# DAYR ‘ALLĀ REGIONAL PROJECT: SETTLING THE STEPPE THIRD CAMPAIGN 2006 

F. Hourani, E. Kaptijn, L. Petit, O. al-Ghul and G. van der Kooij

## Introduction

The Dayr 'Allā Regional Project Settling the Steppe is an interdisciplinary research program targeted on the study of patterns of settlement and land use in the southern part of the Middle Jordan Valley during the Bronze and Iron Ages. The project is directed by Gerrit van der Kooij (Leiden University, the Netherlands) and Omar al-Ghul (Yarmouk University, Jordan). Its main objective is to place the detailed results from 45 years of excavations at Tall Dayr 'Allā (Franken 1969, 1992; Van der Kooij 1989, 2001) within a broader regional perspective. These excavations have shown relatively short periods of occupation alternating with equally short periods of abandonment during the Iron Age II period. This apparent instability in settlement is the central focus of our research. Emphasis is placed on four main questions: How does this mode of occupation compare to other sites from the same period in the region and how do these compare to sites from the periods before and after the Iron Age II period? Why did people choose to live in this part of the valley with such an apparent dry climate? What were the landscapes and climatic conditions existing during the different periods? How did the inhabitants of the region around Dayr 'Allā use and manage to maintain soil and water resources?

The third and last campaign of the Settling the Steppe project took place from September 11th until November 2nd, 2006. Fieldwork proceeded in three separate but cooperating components. The geoarchaeological part of the project was carried out by Fuad Hourani and included among other things the investigation of wadi cuts and small soundings. An archaeological surface survey conducted by Eva Kaptijn examined the archaeological remains in the land-
scape. Small-scale excavations were undertaken by Lucas Petit at two talls, i.e. Tall al-‘Adliyya and Tall 'Ammata. Scopes, directions and methods of each one of these subprojects have been described in the project's first and second preliminary reports (Kaptijn et al. 2005; Petit et al. 2006). This paper focuses on the work progress achieved during the 2006 field campaign and associated results.

Geoarchaeological Investigations (Fuad Hourani)

In addition to the geoarchaeological investigations and their related paleogeographical results here described, a summary description on five newly discovered sites during these investigations will be given at the end of this section.

As reported in our previous preliminary reports (Kaptijn et al. 2005; Petit et al. 2006), geoarchaeological investigations aimed primarily at analysing the paleogeographical development of the study region since the Late Chalcolithic Period. Two geomorphologic features are prominent in the region and were of big influence on human settling activity and on settlements' remains: the Zarqā' River system and the widely spread Ruwayḥa alluvial fan to its north (Fig. 1). Therefore investigations have focussed primarily on these two systems since the first season of the project. Two additional areas were also investigated during this third campaign: the flat land around Tall al-Mazār and the strip of Qaṭar hills located between the Zarqā' channel and the Zur, to the south of Tall Umm Ḥammād.

## Area of Tall al-Mazār

In order to assess the sequence of events involved in the development of the landscape around Tall al-Mazār and the type of deposits


1. General location of the study region and some of its geomorphic features.
on which the site was built, a five meters deep sounding was dug in the cultivated fields north of the site. The sounding revealed a succession of multiple episodes of cut-and-fill (Fig. 2). The first of these episodes, five meters below the modern walking surface, corresponds to a channel cut. The channel appears to have truncated a soil horizon that had developed on the Lisan deposits during an older phase and to have mixed it with a kind of red silty deposits. Although it was not fully exposed within the 1 m wide trench base, this channel was very likely cut-down through another brown soil developed on top of the first. Interestingly this layer and the underlain reworked one contain fragments of fired mud bricks and pottery sherds. Most of them are dated to the Iron Age I/II; but some are from the Late Bronze period. The ceramics indicate that the episode of down-cutting occurred during or, more probably, after the Iron Age occupation on Tall al-Mazār.

At least four other similar episodes were identified in the sequence (Fig. 2). The second, third and fourth episodes, located respectively at about $4.2 \mathrm{~m}, 3.2 \mathrm{~m}$ and 2.3 m below the present surface, occurred during or after the Persian/ Hellenistic period. The last episode, at 1.8 m below the surface, seems to have taken place during or after the Roman/Byzantine Era. The Early

Islamic remains appear only within the uppermost meter of the deposits. After each erosional/ depositional phase some soil structure could develop, indicating more or less prolonged lulls.

The sedimentary sequence studied near Tall al-Mazār thus suggests multiple modifications in the landscape near the site after the Iron Age occupation and before the Early Islamic Period. Although the full implications of these results are not yet known, the acknowledged development suggests stream discharges stronger and especially more abundant than today.

## Wādī al-Ghawr

The east-west running Wādī al-Ghawr located north of Dayr 'Allā has been deviated in the 1960s by the Jordan Valley Authority. A straight line canal was then cut down into the deposits of the alluvial fan of Ruwayha, while retaining in its middle part the original channel of the wadi. The sides of this canal as well as those of the preserved original wadi channel were extensively studied in 2006 in order to check the stratigraphic sequence of the alluvial fan of Ruwayha and the extension of its geomorphologic influence over the region. The uncovered geomorphologic sequence appeared to be very complicated, showing different phases of cutting/ re-cutting and refilling. However, some differences in type

2. Soil and sedimentary sequence observed in the sounding near Tall al-Mazār and sequence of the associated pottery sherds.
and date of the geomorphologic events could be observed between the eastern, the middle and the western parts of the canal and channel.

In the east, from the crossroad near the modern village of Ruwayha down to the point where the artificial canal joins the original wadi channel, the sequence was composed of two main groups of deposits: laminated Lisan marls, associated with some fairly consolidated sandbanks, followed by a brown orangish sand and a clayey-silty sand layer. The latter appeared in many places associated with imposing channel gravels. Pottery sherds show that most, if not all, deposits overlying the Late Pleistocene marls and sands are post-Roman in age.

In the middle part of the canal, corresponding to the original wadi channel, the sequence showed a massive dark green to dark grey and moderately hard clay deposit at the base. In the section this deposit extends deeply under the channel bed: we observed it down to a depth of 80 cm . Only one Iron Age sherd was collected from the lower levels and some Roman/Byzantine ones were found in the upper 30 cm . Around one hundred meters to the east of the main valley road a concentration of big pieces of sugar pots of the Islamic period can be seen above the clayey deposits (cf. infra). Deposits on top of these dark clays are mostly washed and reworked sediments deriving from the slightly sloping wadi banks.

In the flat land area located at about 200 m to the north of this middle part of Wādī al-Ghawr and at the point where in 2005 the survey team found on the surface a concentration of pottery
sherds from the Late Chalcolithic period (Petit et al. 2006), a probe trench was opened in order to understand the geomorphologic context of this concentration and to study the sequence of the Ruwayḥa alluvial fan in this area. Here, a stone wall and two pits (cf. infra) associated with pottery sherds from the Late Chalcolithic was found buried under ca. $1,10 \mathrm{~m}$ of natural deposits. These archaeological features appear to be set upon freshly deposited sand and layers of small gravels. Deposits covering these features are composed of light brown orangish silty clay, with massive to columnar soil structure and plenty of calcitic nodules.

The western area of Wādi al-Ghawr, from the main road down past Tall Abū Sarbūṭ and further down into the Qatar, was studied in its middle part around another concentration of pottery sherds from the Chalcolithic period observed in the section. On the surface next to this section some other concentration of Early Bronze Age sherds was found in 2005 (Petit et al. 2006). The lowest part of the wadi cut shows here welldeveloped dark-brown to yellowish clayey soil, with columnar to grumular structure and plenty of carbonate nodules. This layer is 110 cm thick and is expected to continue down the modern wadi bed. It was overlaid by a 20 cm thick wash layer with some small but unsorted angular stones and many fragments of pottery and burnt bones. The pottery is entirely Chalcolithic; some sherds are probably from the early phases of this period. The pieces are relatively large; some of them were not worn off by long transportation. On top of this layer another clayey soil, of 50 cm
thick, with dark red-brown colour, carbonate nodules and Chalcolithic sherds was seen. The red brown component observed in theses deposits more likely derives from far the upstream, where subsist the red Mediterranean soils, than from the Ruwayḥa alluvial fan, principally supplied by the escarpments with their sandstones and yalowish/orangish Mediterranean soils. It may suggest thus a coalition in this area of flows from both Wādī az-Zarqā’ and the Ruwayḥa fan (See also below, the section concerning Wādì az-Zarqā̄). The youngest component observed in this sequence was an 80 cm thick package of brown to light-brown fine sandy silt, with a poor soil structure.

Three preliminary conclusions and points of attention can be drawn from these observations. Firstly, the geomorphologic events associated with the Chalcolithic structures and pottery concentrations discovered a little north and northeast of Tall Dayr 'Allā indicate the onset of at least two main phases of extensive surface flows and alluvial fan activities during the Late Chalcolithic. Soil development and the extensive formation of carbonate nodules after each depositional phase suggest alternation of periods of landscape stability under humid conditions and regular streaming.

Secondly, together with the evidence collected near Tall al-Mazār, deposits in the study region, especially in the flat land areas, are highly variable not only from a mineralogical point of view, but also chronologically. On the surface sediments may appear homogeneous in colour and texture, but in their chronology, they may vary within a same small field. This is not only the effect of modern agriculture nor only caused by winds, it is mainly the influence of the escarpments with their torrential flooding, sometimes channelled, sometimes overflowed. This brings us to the issue of to what extend the number and size of the visible sites correspond to their reality in the past. Some sites may have been naturally swept away and some others reduced in size. Furthermore, pottery sherds scattered on the surface could have been subjected to transportation by channel/sheet flows or by soil reworking processes.

The third point of attention concerns the massive clay deposits distinctly present in the middle part of the Wādì al-Ghawr channel. Their mass,
their consistence and their colour strongly suggest attributing them to a massive water body that could have occupied this part of the wadi for a relatively long period. It may be a natural or partly artificial reservoir.

## Wādī az-Zarqā

A first preliminary assessment of the paleogeographical development of the Wādī azZarqā̀ was presented in the second preliminary report (Petit et al. 2006). It reveals two main alluvial terraces, which are called middle and younger terrace for the time being. A third older terrace, identified during a previous study in some small wadi systems elsewhere in the Jordan Valley (Hourani 2002), was not recognized in this area. The middle and younger terraces were investigated in detail during the current field season at four distinct parts along the western cut of the Zarqā': near Tall al-Hammah, near the village Abū Nu'aym and Tall Zakārí, near Tall Umm Hammād and a little north of Tall Dāmiyah. Among the areas investigated during this season, it is only in the two last areas that the younger terrace appears clearly.

In the sections of an 80 cm deep pipeline trench dug by the Jordan Valley Authority in the eastern slope between the site of Tall al-Hammah and the Zarqā' channel, the middle terrace appears to be inset in the surrounding Late Pleistocene deposits. It overlies unconformably the laminated green Lisan deposits, which in turn overlap densely packed Pleistocene gravel conglomerates. Near the top of the slope deposits of the middle terrace appear located above the Lisan deposits and are characterized by a 60 cm thick layer of medium size gravel and lenses of gravel. Both the gravel and the laminated Lisan deposits are obliquely cut by a massive layer of red-brown clayey silt, that may overflow the banks of the wadi in this area. This layer was later eroded and covered again by material washed down from the site and from the non-cemented conglomerates. Numerous reworked Late Chalcolithic pottery sherds were collected from the red deposits, thus giving a minimum age limit for the last over-bank flooding in this area. Further down on the slope, yellowish-brown sandy silt and grey-brown clay, each some 50 to 60 cm thick, were observed below the red alluviums. Close to the Zarqā' channel, a more recent clay-
ey and sandy silt material cuts the red deposits and the underlain layers. This sequence reflects a similar development that was observed in a previous study of the area west of the village of Dibab. It shows the existence of a major erosion phase immediately before the onset of the middle terrace and another event on the top associated to the red brown deposits. This latter can be dated to the Late Chalcolithic/Early Bronze Age period.

More information about these events was collected near the village Abū Nu‘aym and under the Iron Age site of Tall Zakārī. The sequence of the middle terrace stands here between 20 and 25 metres above the Zarqā' channel bed. The base of the sequence is characterized by a 1 m thick layer of small to medium sized, angular poorly sorted gravel in a coherent dark sandy clay matrix. These deposits, containing numerous Late Neolithic pottery sherds, partly covered the laminated Lisan marls, and partly a $0.2-0.6 \mathrm{~m}$ thick package of massive yellow sand, with a sharp cut. This same cut was reported by Mabry (1992) at Qaṭar Zakārī, a little north of the section described here. He did also discover some Late Neolithic (Yarmukian) flint tools. A massive yellowish-brown clayey soil with columnar structure and abundant carbonate nodules covered the angular stone layer. The surface of this soil horizon appears in the section near Abū Nu'aym and at Tall Zakārī cut by pits and a stone silo (Fig. 3), all containing Chalcolithic pottery sherds. This soil and the associated Chalcolithic structures were covered again, on both sections, by a $c a .2 \mathrm{~m}$ thick, clayey soil of reddish brown colour, also with a columnar structure and secondary carbonate nodules. The quantity of these nodules decreases, however, gradually as the sequence is built up. The base of the deposits is naturally cut by a series of large, but relatively shallow, depressions filled with a dark clayey matrix, angular gravels and Chalcolithic pottery sherds. The upper part of this soil contains large pieces of Early Bronze Age pottery, besides Late Chalcolithic sherds and some others of an uncommon ware.

The section near Tall Umm Hammād shows a similar development, especially the event of the red clayey soil in the upper part. This soil, upon which the site of Umm Ḥammād was built, revealed, similar to the situation seen at Tall

3. Section studied near Ab $\bar{u}$ Nu'aym showing a stone silo dug into yellow clayey soil.

Zakārī and Abū Nu‘aym, pottery sherds from the Chalcolithic Period and Early Bronze Age. The yellowish clayey soil that appears at Tall Zakārī and Abū Nu‘aym and was associated with Chalcolithic structures is not as clear in the section at Umm Hammād. Here successive layers of clays and sandy-silty clays of dark red, dark green or yellow colours characterize the deposits underneath the red clayey soil. Some of them are composed of thin laminated beds. It reflects slow deposition under very humid conditions and even water stagnation. It shows similar environmental conditions as were detected at Tall Zakārī and Abū Nu'aym in association with the yellowish soil, but the former were more subject to direct influence of streaming.

Further south of Tall Umm Hammād, on the top of the Qatar hills that overlook the Iron Age site of Tall Dāmiyah from the north, and where a new Late Chalcolithic/ Early Bronze-I site was discovered (see below), a section in the buried soil under this site was cut and studied. The mas-
sive yellowish and red brown clays observed in the sections studied further north are lacking here. The buried soil appears to be mainly developed on top of the Late Pleistocene Lisan marls. Its dark colour, fine columnar structure and, most of all, the presence of calcitic nodules reflect, nevertheless, a paleoenvironmental ambiance similar to the humid one associated with the yellowish and red brown soils observed a little to the north, in the regions of Umm Hammād and Abū Nu'aym/Zakārī. This would indicate that the Zarqā' channel at this point, indeed very close to the Jordan river, was more entrenched than further north and that floods are confined here to the major bed without being able to reach its banks.

Thus the sequence of the middle terrace shows firstly the occurrence of torrential inundations during or sometime after the Late Neolithic that incised the banks of the wadi and generated a deep reworking of the surrounding soils and sediments. The succeeding accumulation of the yellowish brown clayey silt and the development of a soil with abundant calcitic nodules demonstrate subsequent regularization of the stream discharges and the development of a high water table. The most prominent event to be noticed here is the widespread deposition of the red clayey silt at the end of the Chalcolithic and the beginning of the Early Bronze Age, indicating the formation of wide floodplains with over-bank flows during this period. This situation can be compared with the results obtained at the flat land a little north and north-east of Tall Dayr 'Allā, among the middle and western parts of Wādī al-Ghawr (see above). Here, a contemporaneous alluvial fan activity had demolished one or probably two Chalcolithic settlements and covered them with new deposits, upon which the survey team found concentrations of Early Bronze Age material.

On top of the red soil at Tall Zakārī and just under the Iron Age remains, a 40 cm naturally deposited stone layer was seen containing both rounded gravels and angular stones. The same layer can also be observed on top of the red deposits at the Zarqa' cut more to the south. It indicates the onset of an erosive episode, with incisions of the Zarqā' banks, somewhere after the Early Bronze Age and before the Iron Age. The absence of any over-bank deposits after this
erosion phase indicates that the Zarqā' channel was deeply incised during the Iron Age and afterwards. This is also demonstrated by the location of the Iron Age Tall Dāmiyah in the actual floodplain of both the Jordan and Zarqā' rivers. However, successive erosions since that period continued to entrench the channel bed to a greater depth. The main conclusion to be drawn from this (these) post-Early Bronze Age incision(s) is that naturally supplied soils' moister was highly deficient in the over-bank areas during at least the Iron Age and onward.

The geomorphologic events associated with the younger terrace were mainly studied during the second field season in the region around Tall Dāmiyah (Petit et al. 2006). Similar deposits were observed in 2006 in the region of Umm Hammād, at around 15 m down below the site. The results indicate a major depositional phase within the main bed of the Zarqā’. During the 2005 field season it was suggested that this depositional phase post-date the Iron Age site of Tall Dāmiyah (Petit et al. 2006). To this depositional phase might also be associated, at least partially, the episodes of channels' cut-and-fill studied near Tall al-Mazār (cf. supra), where the pottery sequence collected from the probe trench allowed to date them roughly between the Persian/Hellenistic era and the end of the Roman-Byzantine period. However, several organic samples were collected from the terrace deposits present to the north of Tall Damieh and those located near Tall Umm Hammād in order to date this depositional phase, hopefully, more accurately.

## Sites Newly Discovered

In addition to the above-mentioned results about landscape development in the study region, geoarchaeological investigations during mainly this field season have allowed identifying five new archaeological sites, referred to in the preceding paragraphs. Cultural remains associated with these sites suggest a preliminary assignment of one of them to the Natufian period, three to the (Late) Chalcolithic and one to the Late Chalcolithic/ Early Bronze Age transition. Data collected from all five sites are currently being processed and will be published subsequently.

The Natufian settlement $\left(32^{\circ} 07,50 \mathrm{~N}\right.$,
$35^{\circ} 34^{\prime} 05 \mathrm{E}$ ) was discovered in a bulldozer cut in the Qatar hills, near the small village of Zaqøm, at about 3 km south of Tall Umm Hammād. Stratigraphically the site presents an interesting and original position, since it is embedded within the laminated Lake Lisan deposits. According to the archaeological material, mainly flints, collected on the slopes of the surroundings Qatar hills, the site may cover an area of 1500 to 2000 square meters. Cultural deposits observed in the cut are $0.60-0.80 \mathrm{~m}$ thick, varying in colour and texture between brown-reddish fine sand and soft light grey to dark brown material. The whole package is ashy and mixed with plenty of charcoal lenses. No built structure was found in the 8 m wide bulldozer cut. Portions of at least two occupational (ashy) surfaces were however clearly discernable. The site appears to be heavily affected, on the one hand by slow water movement, and on the other hand by seismic activities. The latter manifest themselves in the section by a number of cracks with vertical and oblique shifting in both the cultural and the Lisan marl deposits. Cultural remains collected from this site comprises a number of lunates and bladelet microlithis as well as tubular marine shell beads. A used stone and two antler branches were also found in the section. Two charcoal samples for radiocarbon dating as well as three undisturbed soil samples were collected in order to better understand the environmental context of the site as well as its position in relation to the Lake Lisan terminal history, on the one hand, and the chronology and regional distribution of the Natufian culture, on the other hand.

One of the newly discovered Late Chalcolithic sites was found buried under 1.10 m thickness of natural deposits in the flat land area a little north of Dayr 'Allā, at $32^{\circ} 12$ ' 11 north and $35^{\circ} 37^{\prime} 23$ east. The survey team had found a dense surface scatter of Chalcolithic sherds during a previous season (Field 27; see the previous reports), but occupation layers of the site were discovered in a probe trench opened in order to study the depositional sequence of the Ruwayha alluvial fan in this area (see above, the Wädì al-Ghawr paragraph). Cultural deposits visible in the sounding are 1.6 to 1.8 m thickness. At the base they comprise one ashy pit with charcoal lenses and another one containing a concentration of pottery sherds and a two courses
stone wall on its top. Pottery sherds and flints collected from the sounding are typical of the Late Chalcolithic (Ghassulian) culture found elsewhere in the Jordan Valley such as at Abū Hāmid and Ghassūl. Post occupational geomorphologic events in this area do not allow a clear knowledge of the size of the site.

The second Chalcolithic site discovered is at the north western cut of Wādī az-Zarqā' near the village of $\mathrm{Abu} \mathrm{Nu} u^{\prime} \mathrm{aym}$, at $32^{\circ} 10^{\prime} 04$ north and $35^{\circ} 36^{\prime} 11$ east (see the Wādī az-Zarqā ${ }^{\prime}$ paragraph, above). Cultural remains appearing in the section include a stone silo (Fig. 3) and at least two partially preserved pits cut into a 0.80 m thick layer of massive yellowish alluvial clays. The pottery collected from these features is rather general Chalcolithic. Likewise, the settlement here also clearly appears to be truncated by - and buried under - another bed of alluvial deposits (more information on the nature, chronology and environmental significance of these deposits is presented above). On top of this alluvium the Roman-Byzantine and Islamic remains of Tall Abū Nu'aym ADDIN ENRfu (Glueck 1951; Ibrahim et al. 1988) are accumulated.

The third (Late) Chalcolithic site was found under the Iron Age occupation of Tall Zakārì ( $32^{\circ} 09^{\prime} 43 \mathrm{~N}, 35^{\circ} 36^{\prime} 08 \mathrm{E}$ ) at about 700 meters south of Abū Nu'aym, on the same Zarqā' cut. This site could be the extension of the one seen at Abū Nu'aym since it is relatively close to it and both are found exactly in the same stratigraphic context. The site is represented here by a series of three oval pits cut into an earlier alluvial clays. One of these pits was studied in detail. In its largest and deepest points it measures respectively $1.10 \mathrm{~m} \times 1.05 \mathrm{~m}$. Deposits inside it consist of a mixture of ashy material mixed with some small stones, few pottery sherds and with some yellowish clayey silt, identical to the one of the alluvial substratum. The mouth of the pit is covered by some small to medium size stones, upon which large pieces of pottery were found that apparently belong to a single pot. This pottery as well as that collected from inside the pit is similar to the pottery found at $\mathrm{Abu} \mathrm{Nu}^{\prime} \mathrm{aym}$.

The transitional Late Chalcolithic/ Early Bronze Age site was discovered on the Qatar hills near the point where the Zarqā' channel joins the Jordan River, at $32^{\circ} 06^{\prime} 54$ north and
$35^{\circ} 33^{\prime} 30$ east. The site is extremely eroded and divided by multiple gullies. No structures or architectural features were observed on the surface or in the gullies' cuts. The cultural remains found are large pieces of ceramic and flint tools scattered on the surface along with stones of small to medium size, which cannot have been deposited here naturally according to the geological context of the area. These remains are scattered over an area of 1.7 to 2 hectares in size. Nevertheless the size of the site may have been of greater extent during the period of its occupation, taking into account the deep erosion of this area. The pottery collected on the surface of the site includes material dating to a very early phase of the Early Bronze Age, according to our colleague in the Settling the Steppe Project, Eva Kaptijn.

This site is of special interest not only because its remains offer additional information to understand the transition of the Late Chalcolithic to Early Bronze Age period in the Jordan Valley, but also by providing some key elements for a better understanding of the development of landscapes and climate of this region during the mid-Holocene (see above).

## The Regional Surface Survey (Eva Kaptijn)

During this third and last survey season of the Settling the Steppe-project, apart from a few smaller investigations, three distinct regions have been examined and will be discussed here separately (Fig. 4). The survey team was formed by Ms. Jitske Blom, Ms. Ingrid Heijen, Ms. Eva Kaptijn, Mr. Jeroen Rensen, Ms. Jacqueline Ruland, Ms. Marjolein Verschuur, Mr. Thomas Wolter and assisted by DoA representatives Mr. Ali Alowaisi and Mr. Ziyad Ghnaimat. Survey methodology and design have been described in the preliminary report of the 2004 season ADDIN ENRfu (Kaptijn et al. 2005). Survey work started this season east of Tall Dayr 'Allā. Parts of this area had already been surveyed during the 2004 season and had revealed among others a large Late Chalcolithic concentration north of Tall Qa‘dān North (field 27) and a concentration of Mamluk sugar pot sherds just east of Dayr 'Allā (field 31) ADDIN ENRfu (Kaptijn et al. 2005: 93).

One of the reasons to return to this area was to check for possible remains of Tall Hammah West. Tall Hammah West has been first identi-

4. General overview of the fields surveyed during the 2004/2005/2006 seasons.
fied by the East Jordan Valley Survey (EJVS) in 1976, which dated the material to Early Byzantine and Mamluk/Ayyubid periods, besides one Early Bronze Age sherd and some possible Early Bronze IV remains ADDIN ENRfu (Ibrahim et al. 1988: 190). Both Glueck, surveying the region in the 1940's, and Kirkbride, who conducted a small survey within the scope of the Dayr 'Allā excavations in 1960 and 1961, did not mention this tall. However, both investigated the Byzantine cemetery located immediately south-west of the tall, but apparently did not recognize the tall as such ADDIN ENRfu (Franken 1960: 392; Glueck 1951:312). The tall is nevertheless indicated as a small rise of 3 to 4 m on a 1:10.000 map from 1965 ADDIN ENRfu (anonymous 1965). In 2004 the tall was not visible anymore. The survey passed just west of the supposed location, but only a limited amount of sherds was discovered. Moreover, these were not typically Byzantine sherds, but as the collection was small it was decided to return in 2006
and collect more datable pottery. Unfortunately, the 2006 survey was not very successful in collecting pottery either. Plots were laid out over the exact location of the former tall and the area was randomly surveyed for feature sherds. Only a small number of sherds was discovered. Again typical Byzantine sherds are largely missing. Most sherds are of a light grey, yellow or buff ware and mainly take the form of handles, body sherds with wavy comb decoration, while only a few ribbed body sherds and rims are present. Dating is problematic as the assemblage is a mix of different periods including the Roman, Islamic and possibly the Hellenistic and Byzantine periods. Four fragments of Mamluk sugar bowls and a few (sub-) modern sherds were found.

The small number of sherds and the absence of the once discovered Byzantine pottery shows that Tall Hammah West was removed in its entirety and has not been levelled and spread out over the surrounding soil. Reasoning from the lack of typical Byzantine pottery it is possible to think that only the earliest layer of the tall left some ceramic traces. One would however expect the tall to have left a halo of sherds outside its limits. These sherds would represent the
pottery as it was distributed on the surface of the tall. As the halo area was surveyed in 2004 and showed the same pottery as the 2006 collection it might be that the entire tall should be dated to the Late Roman and the start of the Early Byzantine period. The small size of the collection, however, makes that a large question mark must be added to this conclusion.

The hypothesis that the tall was completely removed has been corroborated by an eyewitness. Amin Kan'an, an inhabitant of the neighbouring village of Dibab and the oldest living technician of the Dayr 'Allā excavations, informed us that the tall was removed by bulldozers about 10 to 15 years ago and had indeed been called Tall Hammah West.

A site that is undoubtedly of Byzantine age has been discovered only one kilometre west of Tall H.ammah West. This site has not been reported by Glueck or the EJVS and does not appear in JADIS. Franken, however, mentioned that a large Byzantine settlement is located east of Tall Abū Ghurdān, but no further information was given ADDIN ENRfu (Franken 1960: 392). It seems certain that Franken was referring to the same concentration of remains (Fig. 5). Large

5. Area east of Dayr 'Allā: 1) Tall Dayr 'Allā; 2) Byzantine concentration; 3) Mamluk concentration; 4) Tall Abū Ghurdān; 5) Tall Qa'dān South; 6) Tall Qa‘dān North; 7) Chalcolithic concentration; 8) Tall Hammah West; 9) Ruwayḥa; 10) Tall Hammah
quantities of pottery have been discovered, with a mean of $c a .350$ sherds per plot at the densest part of the concentration. ${ }^{1}$ Pottery included casseroles and lids, cooking jars, storage jars, etc. A few pieces of imported Red Slip Wares have been found, mainly Phocean Red Slip Ware ( $n=13$ ), but also six pieces of African Red Slip Ware and one Cypriot Red Slip Ware sherd (Fig. 6). Taken together these date between 325 and 625 AD , while most centre between 500 and 625AD. ${ }^{2}$ Other finds included a few slabs of polished marble, fragments of glass bottles and cups, and small mosaic stones. Although the finds have not been completely processed a date in the Byzantine period seems certain, though there might be a continuation into the early Umayyad period. The pottery shows many paral-
lels to the concentration south of Tall 'Ammata surveyed in 2005 ADDIN ENRfu (Petit et al. 2006).

A modern farm villa is located on top of a little rise just next to the concentration. ${ }^{3}$ The men that worked the land surrounding it had discovered several column bases, drums, and capitals together with grinding stones and other hewn stones and had used them as terrace decoration. These columns together with the marble slabs, the relatively large amount of glass fragments and the imported tableware show this concentration should be not interpreted as a simple workman's house but probably as belonging to wealthier occupants. Its exact function, for example as a rural villa, can, however, only be ascertained through more detailed analysis of the finds.

6. Red slip wares, rim sherds.

1. A plot is an area of 50 m long and 1 m wide in which surveyors collected all artefacts they came across.
2.E.g. 5x PRSW form 3 F ( $500-550 \mathrm{AD}$ ), and 3 x PRSW form 10A (575-625 AD). Thanks must be expressed to Philip Bes (Icrates project, Catholic University of Leuven) for
preliminarily dating these imported table wares.
2. Most likely it is built on the centre of the concentration, but as it was impossible to survey this area and the road immediately to its south we were not able to ascertain this.

Immediately north of this Byzantine concentration large numbers of Mamluk sugar pots were found (Fig. 5). The western edge of this concentration was already touched upon in the 2004 survey. As very little domestic pottery was present within this assemblage it was decided to return to this concentration, survey the remaining area and ascertain whether this site was a sugar mill or a production site for sugar bowls and whether there was a domestic component present as well. Again very little domestic pottery was discovered. This time apart from sugar pots several vitrified lumps of clay were found. This points to a pottery production site. Furthermore, a slightly elevated area was visible consisting of ashy material on the edge of the site where it slopes down to the Wādi al-Ghawr. This ashy soil can be interpreted as an indication for pottery production, but it can also be taken as a by-product of sugar production as the sugar pulp is heated by fires to extract the sugar. An additional feature pointing to the use as a sugar mill is the location of the site. It is placed alongside the Wādi al-Ghawr on a small natural ridge. On the 1:10.000 map of 1965 a canal is visible running more or less along the top of this little rise. At the location of the sugar pot concentration the canal makes a $90^{\circ}$ turn and runs into the Wādī al-Ghawr. This canal might have powered the watermill that was used to grind the sugar cane. The fact that the canal runs over the top of this small ridge shows that it is manmade; a natural wadi would choose the lowest areas. The sharp turn at the sugar pot concentration suggests a connection between the two features, because had it been an agricultural irrigation channel it would have continued to water the eastern fields of this ridge as well. This canal is of course of recent age, but as was argued elsewhere there are several indications that the ethnohistorical irrigation system is of great age and can be dated back to at least the Mamluk Era ADDIN ENRfu (Kaptijn in press; Petit et al. 2006). The location of the site with a channel bringing water, a difference in altitude to power a waterwheel and the Wādì al-Ghawr as natural drainage seem ideal for a sugar mill. Until a millstone has been found it is impossible to be certain, but it is known from early Ottoman tax records dating between 1525 and 1597 AD that the village of Dayr 'Allā had indeed a mill in
the period following the Mamluk Age ADDIN ENRfu (Hütteroth and Abdulfattah 1977: 168). It therefore seems reasonable to conclude that the concentration probably represents a Mamluk sugar mill possibly in combination with some production of sugar pottery.

Further investigations in the area east of Dayr 'Allā included the resurveying of Tall Ruwayḥa. During the 1960 excavations of Tall Dayr 'Allā a villager came to show the archaeologists several large flint blades he had found near the village of Ruwayḥa ADDIN ENRfu (Franken 1960: 293). When Kirkbride investigated this area she discovered sherds that were interpreted as representing a large Chalcolithic/ Early Bronze Age village situated at the foot of the mountains three kilometres east of Dayr 'Allā ADDIN ENRfu (Homes-Fredericq and Franken 1984: 71). In 1976 the EJVS visited the tall and also dated it to the Late Chalcolithic/ Early Bronze Age ADDIN ENRfu (Ibrahim et al. 1988: 190). The last archaeologist to survey the tall was Helms during the excavations of Tall Umm Hammād. Helms describes Ruwayḥa as a 'small, now virtually destroyed, settlement' ADDIN ENRfu (Helms 1992: 95). Only a small part of the tall remained, the rest seemed to have been ploughed away leaving only sparse remains on the surface. On its western side the tall was cut through by a modern track showing an occupation depth of about one meter ADDIN ENRfu (Helms 1992: 96). Helms dated the pottery to the Early Bronze Ia and a smaller part to the Early Bronze Ib period, concluding that it was a small open village ADDIN ENRfu (Helms 1992: 97). It was decided to revisit the tall to ascertain whether it still existed and if so, whether it was threatened by agricultural or building activities. The situation we encountered was almost exactly as described by Helms. A small part of the tall was still present although some shallow holes had been dug and a few child's graves were visible. The road cutting through the tall was still a dirt track showing occupational layers in its section. Although finds on the tall itself were indeed sparse the survey examined all accessible areas surrounding the tall attesting much pottery, some flint tools and a stone mace head (Fig. 7). In line with Helms' conclusion the pottery was preliminarily dated to the Early Bronze Ia and Ib periods.

In the area west of Ruwayha two small Early

7. Mace-head from Ruwayha.

Bronze Age pottery concentrations have been found. Both do not extend over more than 30 m and contained only a few feature sherds. Although the number of finds was very limited, both concentrations had pottery dating to the Early Bronze I and Early Bronze II/III periods. The small size of the concentrations points the interpretation into the direction of an isolated activity like a single house or some sort of small storage area. What is remarkable, however, is the continuity that both show as being used during episodes in at least two sub-periods of the Early Bronze Age.

After most of the accessible areas east of Dayr 'Allā were surveyed it was decided to investigate an area along the lower course of the Wādī al-Ghawr. This year's and last year's surveys have revealed several concentrations of pottery from different periods along the Wādi al-Ghawr, e.g. the Mamluk and Byzantine occupations described above and the Early Bronze Age concentration discovered in the 2005 season ADDIN ENRfu (Petit et al. 2006). The question therefore was whether the same amount of occupation was present in the area where the Wādī al-Ghawr crosses from the Ghawr into the Qatar hills. Further downstream the amount and quality of water carried by the Wādī al-Ghawr might have been less and no use can have been made from small seasonal wadis coming from the foothills. Nevertheless good drainage was of great importance to counteract salinization and a deep gorge has been worn away in the Qatar
pointing to prolonged water transport and erosion. An additional reason to survey this area was to attempt locating Tall Abū Nijrah reported by Glueck as being a low hill on the western edge of the Ghawr overlooking the Qaṭar and containing some Late Bronze and much Iron Age I and II pottery ADDIN ENRfu (Glueck 1951: 312). The EJVS also visited the site and reported to have found some sherds from the Early Bronze Age and early modern period, while most sherds dated to the Late Bronze Age ADDIN ENRfu (Ibrahim et al. 1988: 190). However, in 2004 Lucas Petit was unable to locate the tall during an explorative tall survey within the scope of the Settling the Steppe-project.

The valley plain on the edge of the Qatar, along the southern bank of the Wādì al-Ghawr, was investigated until west of the village of Khirbat Abū Nijrah (see the northern part of area 2 on Fig. 4). The amount of artefacts discovered in these fields was very low. Ribbed body sherds from the Roman, Byzantine and Islamic periods, that are discovered in low numbers in all parts of the research area, were found together with the occasional Early Bronze Age sherd but no concentrations of any period were discovered. Furthermore, even after randomly searching the Qatar hills and the courtyards of the village, no sign was found of Tall Abū Nijrah, although Glueck's description, his mark on the aerial photograph and the name of the village show that its location must have been close by or even crossed.

To further investigate artefact density on the western edge of the valley plain another area bordering on the Qaṭar hills was surveyed, namely further to the south in the area east of the village of Țiwāl (Fig. 4). This southern area also shows quite heavy occupation towards the east (see below). The same low amount of sherds was discovered in this area allowing a conclusion that at least in these two areas the eastern part was more heavily occupied than the western edge of the plain bordering on the Qatar. This might be explained by the closer proximity of the river Zarqā' and better quality agricultural soils created by overflowing of the Zarqā' during the Late Chalcolithic and Early Bronze Age times (see the geomorphologic section, above).

A part of the eastern area near the village of Ṭiwāl was already surveyed in 2004. West of the
location where Glueck and the EJVS placed Tall Rikābī a concentration of seemingly Chalcolithic or Early Bronze pottery was discovered in 2004. The number of diagnostic feature sherds was however insufficient to come to a clear date for the concentration. In 2006 the survey therefore returned to this site and focussed on collecting datable pottery. The date of the site is now firmly established as Early Bronze I. The densest part of the concentration is found on a very shallow rise next to the road leading to the village of TTiwāl (Fig. 8). Immediately west of this Early Bronze site a dense concentration of Mamluk sugar pottery was discovered. The concentrations overlap, but their centres seem to have been located next to each other. Further to the north-west, but still south of the road an elongated concentration of pottery provisionally dated to the Roman and Byzantine periods was
discovered together with a few Iron Age sherds. The pottery, however, still has to undergo detailed analysis to date it more precisely and conclusively. On the south-western edge of this concentration an area with some Late Bronze Age and Iron Age sherds was discovered, but only in low quantities and without constituting a clear concentration. These three concentrations, all partially overlapping but with different centres, cluster around the supposed location of Tall Rikābī.

Glueck was the first to survey Tall Rikābi. He described it as a small insignificant mound with several modern houses on top. The collected pottery has been dated to the Roman, Byzantine, and Medieval periods and he notes that some Early Bronze and some Iron Age I-II sherds have been found ADDIN ENRfu (Glueck 1951: 314). The location has been marked on an aerial

8. Fields around the village of Țiwāl: 1) Tall Rikābī; 2) Tall Bashīr; 3) Tall Abū Nu‘aym; 4) Tall Zakārī.
photograph. The EJVS also visited Tall Rikābī and gathered a few Early Bronze Age sherds, one possible Middle Bronze Age sherd, possibly some Iron Age sherds and one Byzantine sherd. The dominant period in their collection is, however, the Ayyubid/Mamluk Era ADDIN ENRfu (Ibrahim et al. 1988: 191). On the spot where Glueck has marked Rikābi on the aerial photograph a low rise is indeed visible in the landscape. This rise is, however, very small and is one of a series of small hills flanking the river Zarqā'. Recent bulldozer activity has left a small section in the hill's flanks. This section shows that at least this part of the hill is natural and without occupation layers. The lack of a tall at this location or its immediate vicinity can either be explained by it having been bulldozed away or the mistaken identification of a natural hill as a tall. The former explanation seems highly improbably as the different periods would have been bulldozed into separate directions without any mixing of layers. This leaves the latter explanation as the most likely. It would also account for the difference in dominant periods between Glueck and the EJVS. They probably surveyed slightly different areas.

The last week of the survey season was used to investigate the area surrounding the village of Ṭiwāl near the turn in the Zarqā’ where many talls have been reported. The survey moved from the area of Rikābī, described above, towards the north-west turning around Tall Bashir/Tall 'Asiyah and Tall Abū Nu‘aym towards Tall Zakāri. ${ }^{4}$ Tall Abū Nu‘aym, or Tall Shahwān as it is also called, was dated by both Glueck and the EJVS to the Roman period and virtually all periods after that ADDIN ENRfu (Glueck 1951: 316; Ibrahim et al. 1988: 191). Unsurprisingly, its vicinity revealed many sherds dating to these periods. What was surprising, however, was the presence on the surface of several bones and a few teeth, some of them of definite human origin. These bones were found together with many fragments of pottery and glass and most likely form part of the cemetery of Tall Abū Nu‘aym. In the section eroded away by the Zarqā' three graves consisting of large flat stones with bones underneath
them and in one instance part of a skull were visible beneath the present-day village. As they could not be reached it is unknown from which period these graves stem. Further analysis on the finds should take place to date the tall and its probable cemetery more precisely.

## Iron Age Settlement Site Study in the Middle Jordan Valley (Lucas Petit)

It was made clear in earlier preliminary reports of the project Settling the Steppe, that the occupation history of the Middle Jordan Valley is very complex, with many settling, resettling and abandonment processes (e.g. Kaptijn et al. 2005; Petit et al. 2006). These processes should be understood in order to be able to tell something about social, political and economical activities and entities in the region. To what degree are hamlets, villages and cities depending on each other? Can the inhabitants be considered as dependent on others or were they autonomous? The excavations in 2004 and 2005 at three sites, e.g. Tall al-‘Adliyya, Tall 'Ammata and Tall Dāmiyah have generated important information about different factors that influence occupation processes in the region. The results show the quickly oscillating variety and intensity of use of settlements and the importance of the landscape for the occupants. However in order to base conclusions on solid grounds, more information was needed, especially from the sites of Tall al-'Adliyya and Tall 'Ammata, where previous small scale work was limited to four weeks only.

A small team of archaeologists carried out fieldwork at Tall al-'Adliyya: Ms. Jitske Blom and Dr. Lucas Petit from Leiden University, and Mr. Nabil Qadi and Mr. Mohammed Jamil Ruwashda from Yarmouk University. The team was accompanied by the representative of the Department of Antiquities, Mr. Hussein alJarrah, and the surveyor Mr. Muaffaq Batayneh (Yarmouk University). Excavations took place from the 11th until the 28th of September 2006.

The earliest phase excavated was reached in the most western square IV and consists of a walking surface and a mudbrick wall, deposited

[^53][^54]directly on sterile soil. Some burnt mudbrick debris and fragmentary pottery confirm that a destruction had ended the oldest occupation at Tall al-‘Adliyya, preliminarily dated to the Iron Age IIa/b period. After a gap in occupation people settled again. Taking the thick occupation deposit in account, it seems that this phase had lasted longer than most other occupation periods at the site. Mudbrick walls were still standing about 1.4 m high above the walking surface and demonstrate some rebuilding and restoration activities. Broken, but restorable, pottery was uncovered on one of the surfaces in square IV. A new destruction ended this occupation and the inhabitants moved away. Tall al-‘Adliyya was left unoccupied for a while.

The succeeding package of courtyard and wash layers is almost 1.5 m thick, and still puzzling, while no contemporaneous architectural features were excavated. A study of the main north-south profile (a bulldozer's cut) might give the crucial information about this phase in the nearby future. During the excavation of 2004 this phase was not encountered and also the succeeding occupation period did not have any contemporaneous parallel in the excavation trenches on the northern slope (Kaptijn et al. 2005: 94-95). In the most eastern square a wall and a pavement were found, on top of these courtyard layers. The pottery assemblage on top of the pavements is typical for the Iron Age IIc period. A small wall, visible in the eastern section of square V , and a pit are the scarce remains of later occupation. This situation is in contrast to the extensive Roman/Byzantine and Islamic occupation found during the 2004 season.

Small excavation work was carried out at Tall 'Ammata from the 5th until the 22nd of October 2006. The team included Mr. Jeroen Rensen and Dr. Lucas Petit from the University of Leiden, and from the Yarmouk University: Mr. Nabil Qadi, Mr. Muaffaq Batayneh and Mohammed Jamil Ruwashda. The representative of the Department of Antiquities was Mr. Ashraf al-Khraysheh.

The oldest remains, dated preliminarily to the Late Bronze Age, were discovered on top of
a natural gravel layer in the small sounding V on the eastern slope. A thick layer of red burnt mudbrick and roof fragments on top of smashed pottery shows the sudden conflagration that had ended this last phase of the Late Bronze Age. The oldest layers discovered in soundings IV and III can be dated to the Iron Age II period. The occupation remains and pottery assemblage point to a domestic character. This changed with the construction of a large wall. At the western side of this structure some installations were built with the same orientation. The floors related to these installations show burnt mudbrick rubble, but different from the thick Late Bronze Age destruction layer found in square V. Sounding III and the section made by the bulldozer in the north-eastern corner of the site, revealed the remains of several stone-lined storage pits, that can preliminarily be dated to the end of the Iron Age and beginning of the Hellenistic Period.

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We would like to thank the following institutions and people for their strong support and help: The Department of Antiquities of Jordan, especially the Director General, Dr. Fawwaz alKhraysheh and involved staff-members, as well as Mr. Hussein al-Jarrah, of the Dayr 'Allā office. He also was a DoA representative, as were Mr. Ali Alowaisi, Mr. Ziyad Ghnaimat and Mr. Ashraf al-Khraysheh. We thank Yarmouk University for its support, especially Prof. Dr. Ziad al-Saad, Dean of the Faculty of Archaeology and Anthropology. We are grateful for the support of The Faculty of Archaeology of Leiden University, especially its Dean Prof. Dr. Willem Willems, and The Netherlands Organisation for Scientific Research (NWO), that largely funded the project (project number 360-62-020). Many thanks go to Mr. Ahmed Jude, keeper of the Dayr 'Allā Station for Archaeological Studies, for his essential efforts with other personnel at the Station, as well as to the Yarmouk University driver, and to all the inhabitants of the Dayr 'Allā region, who were so kind to let our team members survey the fields.

## IN MEMORIAM MR. NABIL AL-QADI

When Nabil al-Qadi passed away on December 7th, 2007, a strong sense of loss was felt by us, because of the role he had in our fieldwork, study of pottery and personal life.

Nabil, Abu Sallim, worked as field supervisor and instructor on most of the field seasons of the renewed excavations at Dayr 'Allā, which were done jointly with the Department of Antiquities of Jordan and - since 1980 -with Yarmouk University. He started working with us 30 years ago, in 1978, for the DoA, and continued joining - now for YU - in 1982, '84, '87, '98, 2000 (missing only the seasons of 1994, '96 and 2004). Subsequently he joined for Yarmouk University all three seasons of the Settling the Steppe project in the Dayr 'Allā region (Fig. 9), in 2004, '05 and '06. Right from the beginning he had a remarkably sharp view on soil layers and understanding of stratigraphy, which he combined with careful recording, and with a clear, strict and effective organisation of work in his squares. This rare combination of qualities continued to develop, and it made his field documentation very reliable. It also made him into a good teacher, not only for Yarmouk University students, but also for Dutch students from Leiden University, because his communication in English was excellent.

He liked to work at Dayr 'Allā, especially if he had Jamil Kan'an as his local foreman; they formed an unbeatable team, but Jamil passed away four years before. Nabil was a stable team member, also socially in camp, with his keen eye for those that needed his attention, and great joy when playing chess, especially with Hugo.

Nabil came to Leiden within the exchange programme between Yarmouk University and Leiden University, during 8 months from June 1994 till mid February 1995. There he was trained in the technological approach of pottery with Bram van As and Lou Jacobs, and dealt with the MB II and LB I pottery collection from Tall Dayr 'Allā accordingly. He worked precise, consistent and hard on this and managed to get much of the classifying and descriptive part done. He also very much enjoyed living in Leiden, having rooms with the kind landlady,

9. Nabil al-Qadi in the Dayr Allā Station November 10th 2004.

Mrs Schultheiss in Oegstgeest. Although Nabil had hoped to develop this training into an MA degree - which unfortunately was not possible at that time - he benefited a lot from it, because he now was able to bring in a new approach of pottery study at Yarmouk University. What he did with the MB-LB pottery collection will be combined with additional material and become part of the final report on the MB and LB strata of Tall Dayr 'Allā.

Nabil became for many team members a personal friend, with his quiet and steady character and well pondered authoritative speech. He was proud to tell my children about the many aspects of Jordanian hospitality when my family was invited at his house many years ago. His illness and hospitalisation a few years ago changed him by making him less optimistic, a bit worried, but not complaining. His religious experience clearly was for him a source of strength. In March 2007 he took the effort of showing my wife and myself around in the beautiful Mughāyir and Zayraqūn region - enjoying the region and its archaeology.

This is how he will stay with us, from Leiden, when travelling in Jordan, when working with the MB-LB pottery and when excavating.

Gerrit van der Kooij
Universiteit Leiden
Faculteit der Archeologie

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[^0]:    even found in the early Bronze of Jāwā. In the southern region of the Dead Sea we find human figures in the funeral art of Bāb adh-Dhrā‘. In al-Muțawwaq and in other places the presence of standing stones is relatively common.

[^1]:    3. The two slabs are represented in Figs. 10: 5 and 7 and one of them is photographed in Fig. 11.
    4. A reproduction of a fragment of potter of al-Ghassūl, with a
[^2]:    2. Schematic topographic map of the area.
[^3]:    'Amr, K.
    1987 The Pottery from Petra. A Neutron Activation

[^4]:    3. Apse-like structure with a platform in Sq. 003.
[^5]:    3. Square I7, general view showing walls L9, L6.
[^6]:    Marwan F. Abu-Khalaf
    The Higher Institute of Archeology
    Al-Quds University

[^7]:    1. For the present overview, beside the examination of the published material, I could take advantage of the documents preserved at the Institute of Ancient History of the University of Perugia and in Macerata at «Centro Studi per l'Africa Settentrionale». Here, I would like to thank Prof. Antonino di Vita for having allowed me to make use of those documents.
    2. A mere mention of the Italian work on the site of the Great Temple, probably based on the Department of
[^8]:    3. In Transjordan in particular, the numerically irrelevant presence of western wealthy missions, would not have caused embarrassment for Italian government. Despite various misadventures, the mission in Transjordan was in reality the most fortunate among the Italian adventures in Middle East. On the contrary, the mission in Mesopotamia, planned since 1929, was realized in 1933, with only one excavation campaign which lasted three months at Kakzu, under the direction of Giuseppe Furlani. The mission in Yemen, was no longer successful. It ended with a mere philological mission of Ettore Rossi in 1936. Though strongly wanted by the central government, the mission in Persia had an even
[^9]:    more miserable destiny and despite various scientific projects were presented, it was not funded in that period (Petricioli 1988: 129-152).
    4. An editorial news on Guidi's mission is given on the magazine «Oriente Moderno» in January 1928. The Excavation Permit to excavate the Acropolis of Amman bears the $\mathrm{n}^{\circ} 3$, issued under Trans-Jordan Antiquity Ordinance, signed by George Horsfield, Inspector of Antiquities (for the Director of Antiquities), by Hassan Khalid Aloul, Chief Minister, in confirmation, and by Giacomo Guidi (for the Missiones Scientifiques Italiennnes en Orient) in acceptance; the date is October 18th, 1927.

[^10]:    5. Ceschi's drawings of the lower city's monuments, Theatre, Odeon, Nymphaeum and of the Great Temple and Water Reservoir on the acropolis have been already
[^11]:    6. Of the 80 pot shards brought to Italy in 1930, only 40
[^12]:    7. The building plot was chosen adjacent to the Italian Hospital, built few years earlier by the 'Associazione Nazionale dei Missionari', and the project was realized by the same architect Antonio Balduzzi (Bartoccini 1939). The property of the building, probably for
[^13]:    1. We would like to express our gratitude to the Department of Antiquities of Jordan for permission to exca-
[^14]:    2. Zoomorphic handle type lamps, dated to the Umayyad era, were also recovered in the temple of Artemis and in a residential area by the south decumanus.
[^15]:    3. Similar ceramics were uncovered in a residential area by the south decumanus and in the church of the bishop Marianos (see Gawlikowski and Musa 1986: 137-162).
[^16]:    4. Tombstone KS-1325 with its Greek inscription. The stone was reused as a covering slap in Tomb-358.
[^17]:    * Rome "La Sapienza" University. L. Nigro wrote §§ 1-3, 6, M. Sala wrote § 4, A. Polcaro wrote § 5 .

    1. Rome "La Sapienza" team during the third season included: L. Nigro, Director; M. Sala, Supervisor of Areas F and B South; A. Polcaro, Supervisor of Area B North; E. Gallo, A. Di Michele, V. Tumolo (draughtsperson). The representative of the Department of Antiquities, who gave helpful collaboration on the field to the Expedition, was Inspector Romel Ghrayib.
    2. Lat. $32^{\circ} 05^{\prime}$ N, Long. $36^{\circ} 04^{\prime}$ E; JADIS site n. 2516.011, p. 2.172 (Nigro 2006a: 233-235, fig. 1; Nigro ed. 2006: 9-22, maps 1-6, plan I).
    3. The Author would also like to thank the Italian Embassy in 'Amman, in the persons of H.E. Gianfranco Giorgolo, Ambassador of Italy, and Dr. Emanuele Manzitti for their cooperation, and the Italian Ministry of Foreign Affairs - General Directorate for Cultural Promotion and Cooperation, Office V.
    4. The Expedition wishes to express his deepest thank to Dr. Fawwaz al-Khraysheh, General Director of Department of Antiquities of Jordan, for his invaluable support, as well as to the Academic Authorities of Rome "La Sapienza" University, the Vice-Rector, Prof. Paolo
[^18]:    8. See for instance: Altar 4017 at Tall al-Mutasallim/ Megiddo (Loud 1948: 70, 73-76, figs. 164-165; Sala 2007: 214-219); circular platform i0.1 in the sacred area of Khirbat az-Zayraqūn (Genz 2002: 94-96, fig. 2; Sala 2007: 243-244), and the semicircular platform (locus 13) in Field XII at Bāb adh-Dhrā‘ (Rast and
[^19]:    Schaub 2003: 321-332; Sala 2007: 288).
    9. Nigro 2006a: 243-245; Nigro ed. 2006: 188-190, figs. 4.53-4.54, plan IV; Nigro 2007a: 349-351.
    10. In squares BoII5+BoII6.
    11. In squares BnII4+BoII4+BnII5+BoII5.

[^20]:    17. Most of the dolmen fields in Jordan are in the northeastern area of the Dead Sea Plain, along Wādī Hisbān (200-300 dolmens) and Wādī Judayd ( 250 dolmens), in connection also with the great Chalcolithic necropolis of Adeimeh (Stekelis 1935; Hanbury-Tenison 1986). Towards the north, the other important areas with dolmen fields are al-Murayghāt, south of Mādabā (Piccirillo 2001), the Wādī az-Zarqā’, Wādī al-Yābis (Palumbo 1992; Palumbo et al. 1990: 480), Wādī aṭȚayyiba, Wādī al-‘Arab and Wādī al-Yarmūk, until
[^21]:    the Golan region (Prag 1995: 72-78).
    18. While the southern megalithic necropolises date to the Late Calcolithic Period, the majority of northern dolmen fields, in particular along the Wādī Yarmøk and on the Golan Heights, seem mostly belong to the Early Bronze IV/Middle Bronze I (Zohar 1992). It is noticeable, however, that more recent studies propose a more ancient date (Early Bronze I) for some important megalithic structures of the Golan, like Rujum Hiri (Aveni and Mizrachi 1997).

[^22]:    Abu Dayyah, A.-S. et al.
    1991 Archaeological Survey of Greater Amman, Phase 1: Final Report. ADAJ 35: 361-395.
    Aveni, A. and Mizrachi, Y.
    1997 The Geometry and Astronomy of Rujm el-Hiri, a Megalithic Site in the Southern Levant. Journal of Field Archaeology 25: 475-496.

[^23]:    1. This project, funded by the French Ministry of Foreign Affairs, is part of the French Archaeological Mission in Petra directed by Christian Augé (CNRS-Centre National de la Recherche Scientifique). The 2005 campaign extended from June 16th to July 14th. The Department of Antiquities was represented that season by Mr S. Fayyad. A. Le Bihan (Paris I) and E. Cappelli (Tours), worked as trench supervisors. F. Bourguignon, (Strasbourg) initiated the architectural analysis. M. Perry (East Carolina University) and her team gave us a priceless help by offering their help in mapping the complex. The 2006 campaign was carried out from June 17th to July 20th. S. Martin (Paris I) and M.-J.
[^24]:    Lanthier (Laval), worked as trench supervisors. The 2007 season lasted from June 29th to July 26th. M.-J. Lanthier (Laval), M. al-Hilahi (Lille) and B. Vergnaud (Bordeaux), worked as trench supervisors. E. Cappelli (Tours) helped with the drawings and the recording. Mr M. Salameen represented the Department of Antiquities in 2006 and 2007. Since 2006, S. Delcros (Architect, Paris) is in charge of the architectural recording and analysis. An average of twelve workers was hired during the three seasons.
    2. Nehmé 2002a; Tholbecq and Durand 2005. See also the short reports published in AJA: Nehmé 2002b; Tholbecq 2003, 2006 and 2007.

[^25]:    5. On this part of the complex, see Tholbecq and Durand 2005.
[^26]:    8. On the cistern, Tholbecq and Durand 2005: 303; Gabriel Humbert (IFPO 'Ammān) was in charge of the res-
[^27]:    9. The number of individuals is inferred from the cooking-pot's bases.
[^28]:    14. Several centers have been suggested among which Aqaba and Udruh are plausible candidates (Dolinka 2003: 63-64 and note 123).
    15. It has been suggested that these jugs could have been
[^29]:    appropriate containers for particular goods like garum or date wine (Dolinka 2003: 86) or were particularly adapted to the conservation of cool drinks (MurrayEllis 1940: 20).

[^30]:    fixe Cf. devant le taxon
    22. Willcox 2003.
    23. Ruben 2006.

[^31]:    27. Zohary 2000.
    28. Al-Muheisen 1990.
    29. Mouterde 1966.
    30. Bouchaud 2007.
[^32]:    1. Corresponding author: Council for British Research in the Levant (CBRL), P.O. Box 519, Jubayha, 'Ammān
[^33]:    3. Excavations in Trenches A1 and A2 were supervised by S. Alderson.
    4. This trench was expanded into Area A3 in the 2005 sea-
[^34]:    son, the results of which are discussed below.
    5. Excavations in Trench A3 were supervised by J. Vivona.

[^35]:    6. Excavations in Trench A4 were supervised by M. Makinson.
[^36]:    8. Excavations in Trench B2 were supervised by I.K.
[^37]:    9. Excavations in Trench B3 were supervised by G. Rees.
[^38]:    11. A detailed analysis of the shell is currently being prepared by Aldona Kurzwska for inclusion in the final report. Grateful thanks are extended for her kind as-
[^39]:    12. As these are re-used sherds, presumably originating from a ceramic vessel, they have been included here,
[^40]:    1. Most of all, I have enjoyed the encouragement of my husband, Artemis, my closest collaborator. During the year Eleanor A. Power took on a number of tasks including re-editing the signs while writing her Senior Honors thesis on the Roman-Byzantine Bath Complex. Additionally, I would like to thank Sarah Whitcher Kansa and Eric Kansa for their interest in the Great
[^41]:    Temple Project and for making Open Context available to us.
    Mathew Dickie and my staunchest critic Elizabeth Gebhard came into the field to lend their assistance. Finally I thank the indefatigable Dakhilallah Qublan and his band of merry Bedouin dedicating themselves to the restoration of the Great Temple site.

[^42]:    13. 14. ware 27, locus 4066, sq. 4; 2. ware 21, locus 3072, sq. 3; ware 4.1, locus 15007, sq. 15, slip (5YR 4/4); 4. ware 4, locus 3061, sq. 3; 5. ware 27, locus 4062, sq.4.
[^43]:    ism. Robbyn Gordon and Caroline Riedel worked with Oleson to develop the exhibit concept, and Gordon and Miranda Angus guided the final installations at the museum and Visitor's Centre. Rebecca Foote assisted with preparation of the Visitor's Centre exhibition, which was funded by the Dean of Humanities, University of Victoria, and the Canada Fund in Jordan. A Harris Grant from ASOR funded computer reconstructions of the E125 shrine. As always, the assistance of the Director and staff of ACOR was indispensable.
    Oleson and Reeves co-edited this report based on revised field reports submitted by the other authors. Baker was responsible for the geophysical survey, de Bruijn for the Praetorium and Horreum, Gerber for ceramics, Nikolic for hydraulic probes and Area Q, Reeves for E125 and E128, and Sherwood for Areas N, O, and P.

[^44]:    13. Horreum, plan.
[^45]:    15. Latrine and bins, view.
[^46]:    3. Although Gerber joined the project as ceramicist in 1998, other commitments have kept her from the field.
[^47]:    5.This building was temporarily assigned a Field B Building number (B250), but was later reassigned a Field D Building number (B306).

[^48]:    7. The bioarchaeological team included Margaret Judd, Kara Golya, Sarah Leentjes, Cathie Marcks, Laura
[^49]:    vey since 2005. We are also indebted to the American Schools of Oriental Research Committee on Archaeological Research and Policy for a Harris Grant that made the survey's 2007 field season possible.

[^50]:    9. Such as Qaṣr Bshïr in Jordan and ad-Diyatheh in Syria
[^51]:    37. Curved structures in adjoining squares A53+A54.
[^52]:    1. The authors thank Prof. Beate Salje for her kind help
[^53]:    4. Tall Bashirr and Tall 'Asiyah are reported as two separate talls on more or less the same location. It was reported by Glueck as Tall 'Asiyah but later the name seems to
[^54]:    have changed into Tall Bashïr causing confusion (Glueck 1951). To all likelihood Tall Bashïr and Tall 'Asiyah should be considered as one and the same tall.

