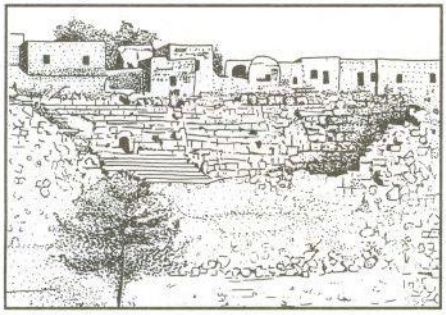
OCCIDENT & ORIENT

Newsletter of the German Protestant Institute of Archaeology in Amman



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The Institute: Where People and Sciences Meet

With 1997 coming to a close, the overall political situation in the Middle East looks rather bleak. The peace talks between Israelis and Palestinians have come to a total standstill and it seems that the present government of Israel is not only unable but also unwilling to continue the peace process started by the late Yitzhak Rabin. This deadlock in the negotiations has, of course, its impact far beyond the political level, and it effects the total atmosphere of relations between the communities in this region. So the hardening attitude of the Israeli government and the growing frustration within the Palestinian people may lead to further violence and might destroy all the trust and hope which were built up after the Oslo agreement and the peace treaty between Jordan and Israel. Nevertheless, we all hope that despite all the anger and frustration, peace and mutual understanding between all parties to this long-running conflict will finally be achieved, and each one of us should try to contribute to this for the benefit of all of us who live and work in the Middle East.

This year also seems to be a crucial one for the institute. The growing financial difficulties the Evangelische Kirche in Deutschland (EKD) is facing are seriously threatening the future of the institute, as the EKD decided not to provide the institute with a budget for 1999. The consequence would be the closure of the institute in 1999. However, the support of H. R. H. Crown Prince Hassan bin Talal, H. R. H. Prince Ra'ad, the German Embassy in Amman, the German Foreign Office in Bonn, and many other German and Jordanian institutions, colleagues and friends will hopefully help to reverse that decision and allow the institute to continue the work it has so successfully done over the past years, with1997 being its busiest year ever.

This year two archaeological excavations were conducted at Umm Qais (Gadara) with the support of the institute. In spring the team of Dr. Ute Wagner-Lux and Karel Vriezen did work on the Church Terrace; in summer Prof. Hoffmann and his team continued their research at a number of spots in Umm Qais, e.g., on the temple terrace, where, besides the late Hellenistic temple, a high place was identified and excavated. In early summer the institute carried out an excavation at Ba'ja, an early Neolithic site in the northern Petra region. The difficult accessibility of the site within the mountains north of Petra, the summer heat, challenging logistics, and other extreme working conditions made this excavation a real adventure. The excavation was conducted in collaboration with the German Institute of Archaeology - Orient Section, Berlin (DAI) and ex oriente e. V., a research association based at the Seminar für Vorderasiatische Altertumskunde, Freie Universität Berlin. The excavation was immediately followed by a five-day conference on the topic of "Central Settlements in Neolithic Jordan," which was organized by the Amman institute and ex oriente e.V. - Berlin at the Mövenpick Hotel in Wadi Musa, from 21-25 July.

In addition to their archaeological research, members of the institute offered a number of excursions and lectures, mostly organized by the Friends of Archaeology in Amman. One trip was guided to Ba'ja to visit

(continued on page 14)

Ba'ja--Early Neolithic Settlers in the Petra Mountains

By: Hans-Dieter Bienert, German Protestant Institute of Archaeology, Amman-office (DEI) and Hans Georg Gebel, Free University of Berlin (Germany)

The scenery is spectacular: situated in the mountains north of Petra, partly on a plateau, partly on a steep slope, and bordered by two canyons, Ba'ja is one of the oldest settlements of Jordan. Discovered in summer 1983 by the team of Manfred Lindner from the "Naturhistorische Gesellschaft Nürnberg", Germany, a first investigation of the site was undertaken the following year by H. G. Gebel, who opened up three soundings. It became clear that Lindner's team had found an early Neolithic settlement, dating into the second half of the 7th millennium B. C., the so-called late Pre-Pottery Neolithic B period (LPPNB). The site itself is located approximately 11 km linear distance north of Wadi Musa (a first report on surface investigations was published in Occident & Orient vol. 2, no. 1, 1997, pp. 13-14).

The first large scale archaeological excavations were conducted this summer. They were carried out by the German Protestant Institute of Archaeology - Amman Office (DEI) in collaboration with the German Institute of Archaeology - Orient Section, Berlin (DAI) and ex oriente e. V., a research association, based at the Seminar für Vorderasiatische Altertumskunde, Freie Universität Berlin. Grants have been provided by the German Protestant Institute (DEI), the Deutsche Forschungs-gemeinschaft (DFG), the German Institute of Archaeology - Orient Section, Berlin (DAI) and ex oriente e. V. The Department of Antiquities in Amman and the Petra Regional Council (PRC) gave all support necessary. We would like to thank all of these organizations for their contributions.

Before the actual work on the site could start, a base camp at Beidha Housing had to be established and the way through the Siq al-Ba'ja had to be made easily accessible. Therefore three houses from families at Beidha Housing were rented and two ladders were installed at the two major rock blockings in the siq. Still, was physically very demanding to reach the site in the summer heat. To supply the team every day about 130 litres of water and food had to be carried to the site from the entrance of the siq.

The archaeological investigations started on June 16th and lasted until July 20th. During the first week the surveyors started mapping the site topography and prepared a grid system. Ten squares, each measuring 5 x 5 m, were outlined for excavation. They extended over part of the plateau-like area and the adjacent steep western slope. Our work concentrated on the exposure of the architectural remains, some of which were already visible on the surface. Further on, two test units (TU 1 and TU 2) were established. TU 1 was set up to investigate in detail the thick sterile layers below the Neolithic occupation, and TU 2 was situated in the wadi which borders the site to the north and contains ashy garbage deposits. Apart from the archaeological excavations, a site and vicinity survey was undertaken by team members to detect traces of further human occupation.

According to the site survey and the surface distribution of the LPPNB artifacts, the site itself covered an area of approximately 12,000 sq. m. The most densely populated area seems to have been on the highest parts of the site, while the area close to the

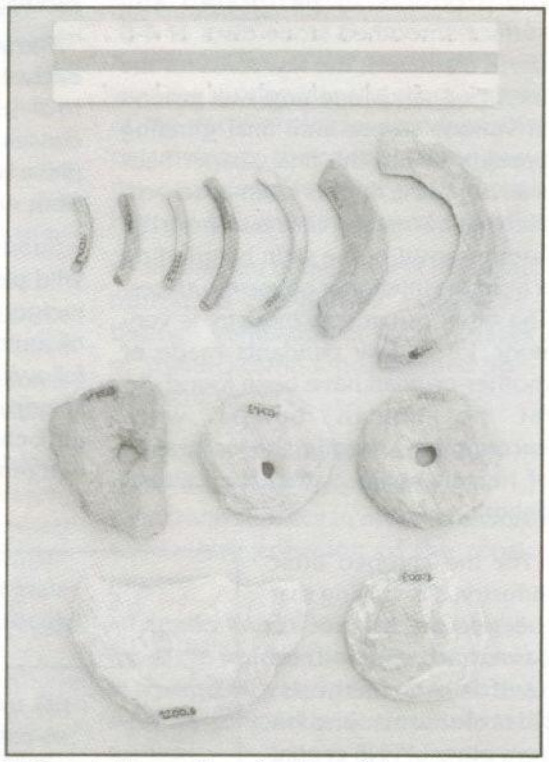
The dramatic setting of Ba'ja, in the midst of mountains north of Petra.

siq seems almost not to have been populated at all, as it did not reveal any remains of house walls, most probably due to the steepness of that part of the site and its proximity to the siq. Some of the wall alignments detected seem to be of later periods, most likely the Roman or Nabataean period.

In most parts of the excavation well-preserved architectural remains could be detected. Walls were built double-faced, and formed rectangular or polygonal rooms. The groundplan resembles that of LPPNB architecture known from a number of other contemporary sites, characterised by very small rooms, sometimes just measuring 1 x 1 m, or even less (e.g. Basta, 'Ain Jamman, Sifiya). However, there is also evidence for large rooms or courtyards in the northern squares of the excavation area. It is not yet clear whether these rooms had been properly roofed. The blocking of some doorways indicates a functional change in the groundplan. Floor levels have not been reached in some rooms. Where a floor could be found it was made of cobbles or lime plaster. The design of these floors seems rather rough. An interesting architectural feature is a long wall running from NNW to SSE in Squares C1 and C11, which was obviously too weak as it was stabilized by two succeeding reinforcements. First, a second wall was built adjacent to the western base of the long wall. Afterwards both of those walls had to be further stabilized by two buttresses, partly built over the first reinforcement wall. Connections between the rooms existed through passages built into the groundplan via wall-openings and via roof-tops. The specific function of each room and courtyard is, in most cases, not detectable.

However, within the excavated area three major activity zones have been identified by the team: In the eastern fringe of the excavated area almost all rooms bore remains of ovens associated with ashy layers, often rich in animal bones. In the space largely covered by the northeastern part of square C11, food processing activities had taken place as evidenced by large numbers of grinding slabs and manos. One grinding slab was found in its original position, set into a circular stone alignment. In the same area and nearby vicinity a high concentration of stone discs was found, together with partially formed products, indicating a manufacturing area for sandstone rings.

The site itself was obviously a centre for the production of sandstone rings on an industrial scale. The abundant tabular raw material is available locally. The production stages, represented by their semi-, unfinished and broken elements of the chaine operatoire, are attested as follows: After selection of the tabular material it was flaked bifacially into a disk shape, varying in diameter from 5 to 16 cm (average: 8-9 cm). From this disc an inner disk was removed. Work traces indicated



Different stages of production of stone bracelets excavated at Ba'ja.

A doorway that was blocked in the Neolithic period in a Ba'ja building.

a concentric carving and possibly low-pressure chiseling process from both sides, until a raw ring was produced. While the inner discs may have been transformed into other artifact types (by-products of perforated and surface-smoothed stone discs of 4-5 cm in diameter), the raw torus for the intended sandstone ring was ground in various stages until final grinding brought it into the final shape. Back staining of the rings is often observed. Bicolour decoration can result from the later removal of the stain by grinding it from the interior or obverse surfaces. The other ornaments industry is very poor. Just a few pendants made of mother-of-pearl have been found. So far no human burials were encountered, despite the occurence of human bones within the cultural debris.

For the chipped lithic industry, it is striking that the site seems not to have had specialized naviform workshops. This element, known from other LPPNB central settlements, is missing, but a non-naviform bidirectional blade technology exists, as shown by cores with detachments from all around the (round) platform. Both the ground stone and the chipped lithic industries are well represented and do reflect the spectra of types known from other LPPNB sites. However, a peculiar aspect can already be mentioned: although the stone vessels and abundant grinding tools are attested as classes, the variety of sub-classes, by means of types, seems to be less developed when compared with e. g. Basta and 'Ain Jammam. The flint and ground stone industries of Ba'ja reflect the tool kits of a self-reliant regional center rather than that of a center involved in large-scale surplus production and exchange, allowing a distinction between a "manufacturing" and "industrial" mode in lithic production.

The worked bone industry is almost exclusively represented by tools and tool fragments belonging to the classes of piercers and spatulae. One piece is an incised tubular bone blank from which bone beads were cut off.

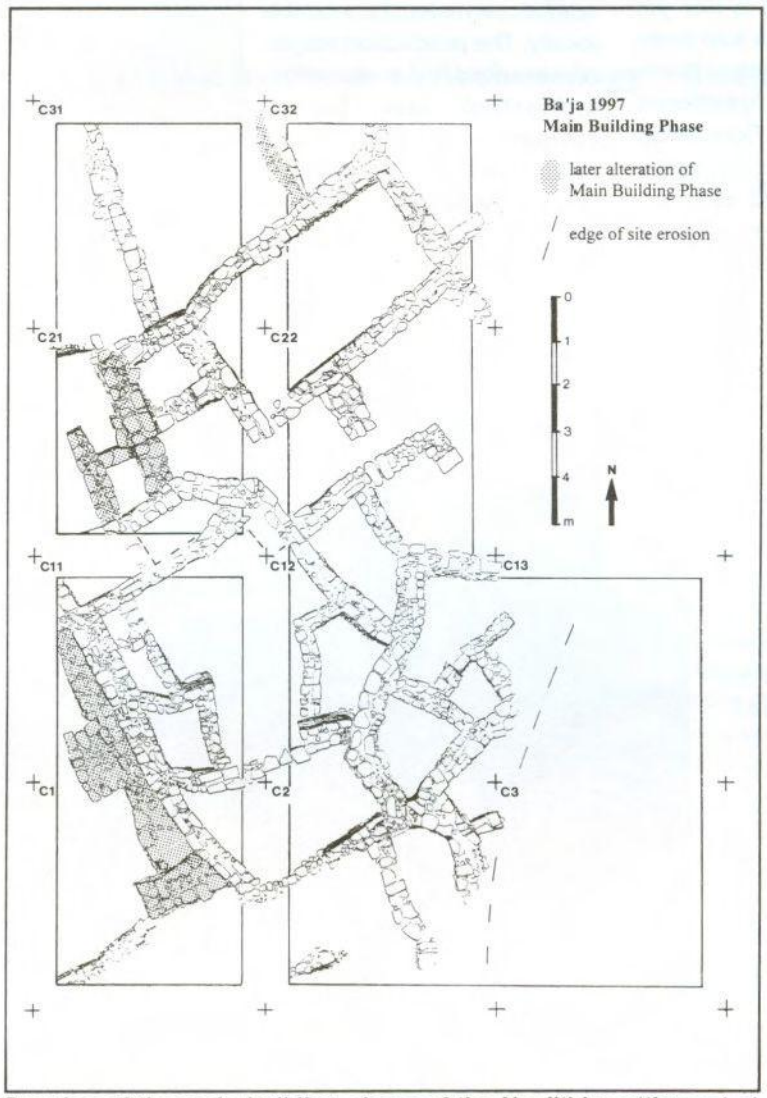
Subsistence relied on emmer wheat, wild pistachio and the exploitation of juniper and pistachio wood; the diet of animal protein made use of the following species: wild goat, domestic sheep/goat, gazelle, wild boar, aurochs, African wild ass, hare, hedgehog, hyrax, and various birds.

Further work will be necessary to analyse the findings in detail. Nevertheless, many questions will still be unanswered. We do not know why the early Neolithic people chose such a remote place. Maybe further excavations will help to find the answer. Until then, we can just speculate, as we do so often in archaeology.

Acknowledgements

Archaeological excavations at Ba'ja demand more than at any other site: a long and difficult approach to the site, including climbing, snakes, scorpions, no shade, carrying all necessary equipment, many days without a shower, and directors who did not always make your life easy. But everything can be overcome with a splendid team of enthusiastic people with lots of patience and never ending good spirit--just the team we had. Therefore we would like to express our deep gratitude to the whole team--you all have been great: Bernd Müller-Neuhof, Christian Hartl-Reiter, Ute Koprivc, Tobias Krämer, Jan Timm, Abd al-Nasser Hussein al-Hindawi, Christiane Meckseper, Benjamin Jeffs, Sandra Schatz-Härle, Johannes Meier, Julia Littmann, Philipp Rassmann, Salaheddin al-Abbasi, Annalisa Alvrus, Ulrika Anna Andersson, Anna Jessica Andersson, Brian Conn, Reinder Neef, Patrick Kloiber, Stephan Fengler, Nina Höffgen, Muhammad Fadel Khatatbeh, Lena Gebel, Sonja Striegl, Bo Dahl Hermansen and Ghattas Savej.

We would also like to thank those German companies that donated equipment. ■



Drawing of the main building phase of the Neolithic settlement at Ba'ja.

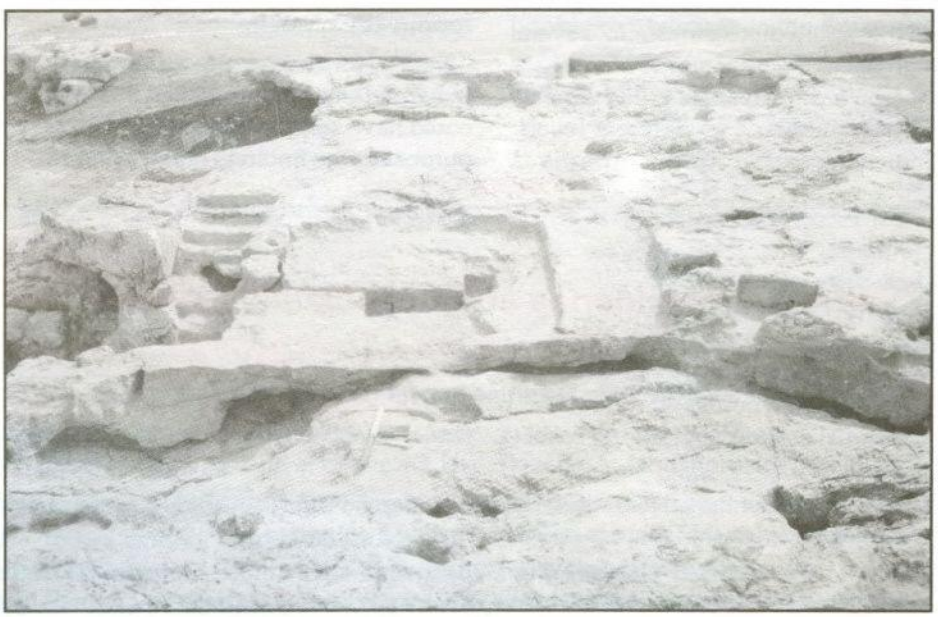
Churches, Temples, High Places...and a City Wall -- the 1997 Season at Umm Qais

By: Adolf Hoffmann, Technical University of Cottbus (Germany) and Nadine Riedl, German Protestant Institute of Archaeology, Amman-office (DEI)

The 1997 excavation at Gadara/ Umm Qais was conducted by the German Archaeological Institute (DAI) Berlin in collaboration with the Technical University Cottbus. Work was continued in different areas to clarify the results of former excavations.

Trikonchos area

In the so-called trikonchos area the connection of this structure with the adjoining architecture to the north and west has been investigated as well as the chronological relation of all structures in the area. The main result is the evidence for a three-aisled basilica whose southeastern side was attached to the trikonchos. The trikonchos itself which had been transformed into a mausoleum, belongs to a much earlier monumental building, probably dating back to the Flavian period (2nd half of the first century AD).



The High Place recently discovered at Umm Qais.

Hellenistic city wall

Just a few metres southwards a square corner tower of the Hellenistic city wall has been studied. Next to the North Theatre the team identified the remains of another square tower which gives more evidence of the course of the Hellenistic city wall. Probably the wall continues from here to the northwest while another tower is assumed to be below the modern resthouse building. Between the square towers which were built at the corners of the Hellenistic city wall, more pentagonal towers -- like the two preserved ones at the southern city wall -- can be assumed. In fact, there is evidence for a pentagonal tower at the eastern side and two at the northern and western sides of the city wall as well. Inside the walls the city gates next to each pentagonal tower were connected by streets, an urban layout which is clearly reflected in the plan of the late Ottoman settlement.

Temple and temple temenos

In the temple area northeast of the acropolis, excavation continued at the southern end of the presumed via sacra where a propylon was assumed. The structures discovered here originate from three different periods. Well-cut Hellenistic limestone blocks belong to a portico and a gateway which widened to a monumental vestibule. An apparently simpler structure was erected in the Flavian period: instead of a portico and an elaborate gate building there was only a series of simple, but rather spacious, rooms. While limestone had been used for the lower parts, the upper walls consist of well dressed basalt blocks, set accurately in a header and stretcher technique.

After a second, perhaps complete, demolition of still unknown date a third structure was built, but very little remained of it. Refill from a robbing trench points to a destruction in Byzantine times.

At the eastern edge of the temenos two parallel walls have been excavated which seem to have been unfinished for a long period. The space between them had been filled to a certain height with earth and rubble. After a long time during which the exposed walls had weathered badly, the space between the walls

was covered with barrel vaults.

High place

Some distance to the north of the temenos the bedrock rises up to approximately four metres above the level of the temple terrace. A rocky spur with a flat surface shows not only natural clefts but also several circular and semicircular basins close to the edge of the spur. Furthermore some square and circular "cups" are cut into the bedrock. Somewhat below, on a small terrace, a rectangular shallow basin which opens to the slope of the bedrock is connected by a natural cleft with a deep round basin.

A whole system of terraces is to be found a few metres to the northwest of the spur; quite similar to several highplaces in and around Petra, a rock plateau has been shaped into a series of four flat spaces on different levels. The uppermost one contains a rectangular basin, close to a hollow with very rough walls and bottom into which there could well have been placed a square block or stele. On one of the lower terraces there is an L-shaped basin connected with a small channel. But the most interesting feature is a staircase cut into bedrock at the northeastern corner of the lowest terrace, leading down to a pit. This is connected with a once underground natural cave, the northern part of which has collapsed. In a second cave which communicated with the first one by two natural holes (now blocked), two fragments of a big limestone altar were found.

Probably in the Byzantine period the pit was transformed into a closed oval room with a rough mosaic floor.

Except for the nearby quarry there is hardly any evidence that the area could have served industrial or similar purposes. The findings rather point to a function comparable to high places in the Nabataean world. Next to the Hellenistic temple, this could well have been an ancient sacred place.

The excavation was headed by Prof. Dr.-Ing. Adolf Hoffmann. The team consisted of Dr. Helmut Becker (geophysisist), Oliver Bertram (architect), Claudia Bührig (architect), Thorsten Bunk (architect), Christian Hartl-Reiter (surveyor), Hinz-Holger Hirth (excavation engineer), Dr. Gerhard Jöhrens (archaeologist), Dr. Michaela Konrad (archaeologist), Hubert Liebel (architect), Elke Posselt (archaeologist), Nadine Riedl (archaeologist), Isabelle Ruben (archaeologist), Dr. Günther Schauerte (archaeologist), Jochen v. Sichart (architect), Wolfgang Thiel (archaeologist), Roland Wieczorek (photographer). Representative of the Department of Antiquities: Nasser Khasauneh.■

Excavations and Survey in Umm Qais/Gadara, Spring 1997

By: Ute Wagner-Lux, Basel (Switzerland), Karel Vriezen, Utrecht (Netherlands), Nicole Mulder, Leiden (Netherlands), Robert Guinée, Bergen op Zoom (Netherlands)

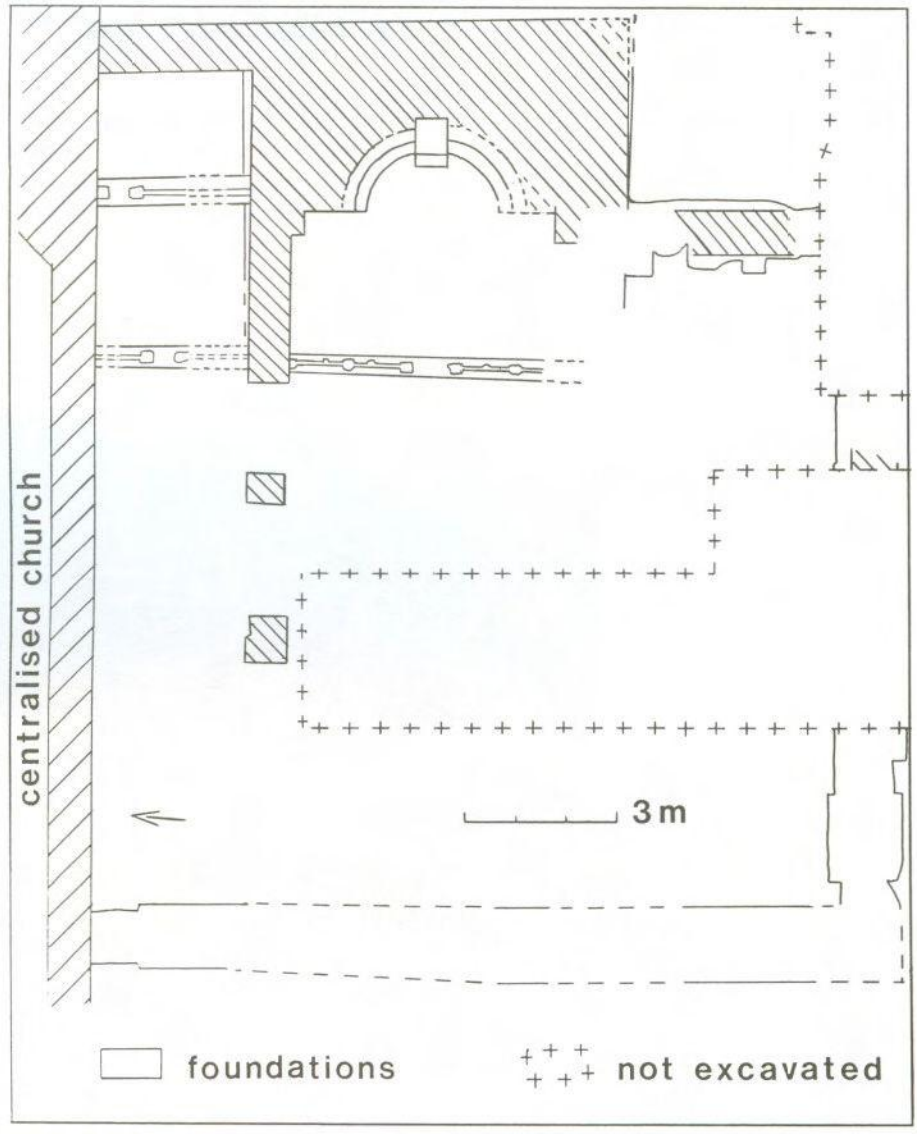
After a break of several years, the archaeological investigations on the terrace situated at the foot of the west slope of the Acropolis hill at Umm Qais were resumed. The campaign lasted from 3 May till 4 June, and was sponsored by the German Protestant Institute of Archaeology in Amman (DEI) and the Theological Faculty of the Universiteit Utrecht, Netherlands.

Earlier excavations on the terrace were carried out in 1976-1979 and 1992. During these campaigns the ruins of a square centralised church with an octagonally planned church hall and a narthex attached to its west side had been exposed, together with a columned courtyard (atrium) on its north side and parts of a second church, a basilica, built against the south wall of the centralised church. An architectural survey of the terrace and the adjacent urban area was undertaken in 1992 and 1993.

The excavation

Of the basilica already mentioned, in 1992 only the northern half was uncovered, i. e. the northern aisle and the nave up to the centre line. From the remains of two chancel thresholds across the width of the aisle, it then became clear that the eastern part of the aisle had once been barred by chancel screens. In the eastern part of the nave, the sanctuary with a synthronos and a kathedra was situated, separated from the western part by a chancel threshold.

This year, the southern half of the basilica was excavated, exposing the total width of the building (inside ca. 15 m). The southern aisle appeared to be shorter than the rest of the building, its east wall being set ca. 3.70 m west of the east wall of the two other aisles. In the southern part of the sanctuary a grave was discovered inserted into the floor (length: 1.74 m; width: 0.58 m; depth: 0.67 m). The line of the basilica's western wall, which -- like parts of the southern wall -- is totally destroyed by recent building activities, may be deduced from the line of its foundations, made of reused basalt slabs of the Roman building phase. The basilica's length is ca. 17.30 m.



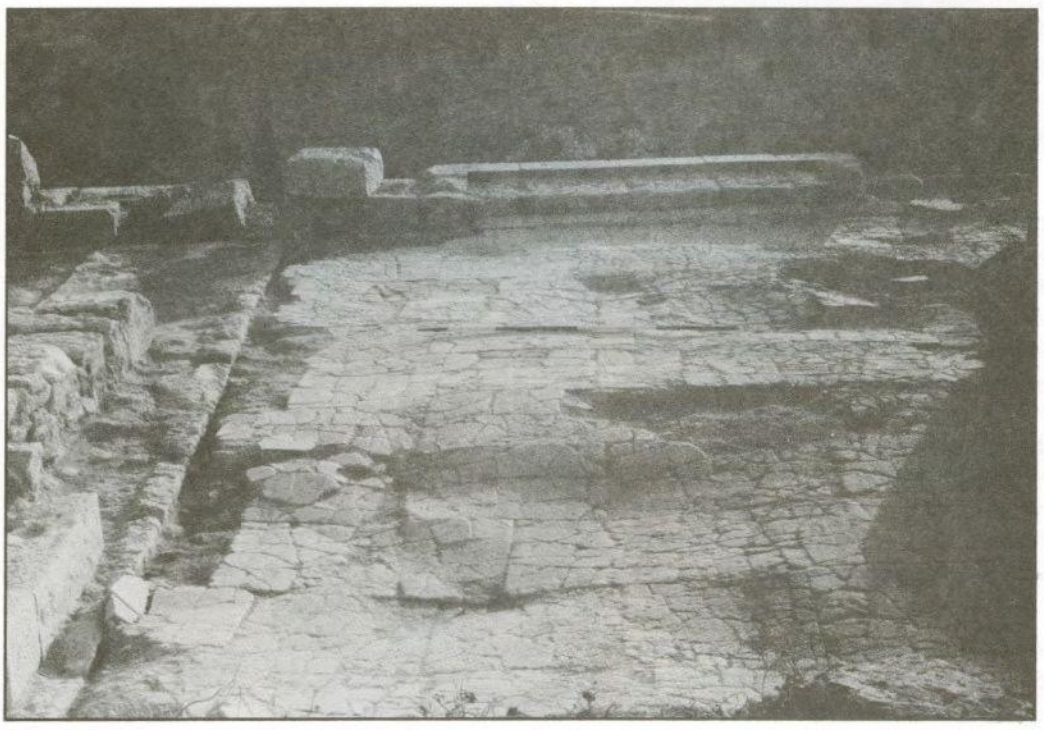
Plan of the basilica.

The excavation area was extended southwards and almost reached the north wall of the Roman West Theatre, exposing the southern end of the terrace. This enables one to survey the development of the terrace and its buildings during their successive construction phases. The construction of the terrace is tentatively dated to the end of the 1st century or into the 2nd century A. D., when the platform was paved with large limestone slabs. In the Byzantine period, in the first half of the 6th century, right in the centre of the terrace a centralised church (ca. 23 x 23 m) with a narthex to its west side was erected, together with a columned courtyard on its northern side and probably a similar one on its southern side. Later, in the early Umayyad Period (7th century) a three aisled basilica was built against the south wall of the centralised church. In the 8th century the two churches apparently were abandoned, and shortly afterwards they were destroyed by an earthquake, probably in 749 -- the same one that caused so much damage in other nearby cities, like Pella of the Decapolis.

The sanctuary of the basilica (looking north).

The archaeological-architectural survey

Besides the excavations, an architectural survey of the terrace and the surrounding area was made as a continuation of the project carried out in 1992 and 1993. The newly uncovered remains were incorporated into the documentation; and, additional investigations and measurements were undertaken at the monumental entrance on the north side of the terrace, at the substructions (the vaulted rooms) on its west side, and in the West Theatre. The buildings and separate architectural parts (for the Byzantine period, mainly spolia) were measured, drawn, photographed and described in detail. Special attention was paid to the building materials used. Comparative studies were made with similar building complexes, architecture and construction techniques in Roman-Byzantine cities, like Gerasa, Abila, Capitolias, Scythopolis and Umm el-Jimal. ■



The south-west part of the terrace platform with its Roman pavement (looking west).

The Babylon Symposium, Held by the Department of Antiquities and Heritage in Baghdad, 23 - 25 September 1997

By: Donny George Youkhanna, Department of Antiquities and Heritage in Baghdad (Iraq) and Michael Müller-Karpe, Römisch-Germanisches Zentralmuseum Mainz (Germany)

On the occasion of the Ninth Babylon International Festival an archaeological symposium was held by the Department of Antiquities and Heritage in Baghdad from 23 through 25 September 1997, attended by some forty scholars from Austria, Belgium, Britain, Germany, Italy, Canada, Switzerland and the USA, and an equal number of colleagues from Iraq.

The symposium focused on the topic 'The Ziggurats of Mesopotamia -- The Problematic of the Ziggurats of Babylon and Borsipa: The present Situation and the Future', to which the following papers contributed: "The Ziggurats in the Light of Cuneiform Texts" (Bahija Kh. Ismail); "The Ziggurats of Northern Mesopotamia" (D. Oates); "The Geometrical Base for the Ziggurats of the First and Second Millennia B. C." (Fauzi Rashid); "The Babylonian Influence on the Ziggurat of Choga Zanbil" (M. Roaf); "The Myth of the Woman on the Ziggurat of Babylon" (Abdulilla Fadhil); "Das Esangil als Weltachse" (S. Maul); "Urnammu, der Planer der babylonischen Zikkurratform" (M. van Ess); "The Shrines on the Ziggurat on Babylon" (W. Allinger); "The Ziggurat of Babylon: New Evidence from the Cuneiform Tablets" (A. R. George).

A summary of recent research in cuneiform and archaeological studies provided the following papers: "Texts for Tukulti-Ninurta II" (Ali Yasin); "New Cuneiform Letters" (Khalid al-Adhami); "Cuneiform Texts from Tikrit" (Bahija Kh. Ismail); "The Hymn of the Babylonian King Lipit-Ishtar" (Nawala al-Mutawally); "Cuneiform Texts from the Site of Shishin" (Ahmed Kamil); "A Mathematical Text from the Iraq Museum" (Khalid Salem); "Mandain Incantation Bowls from the Region of Babylon" (Firial Zahroon); "The Influence of Babylon on the Aramaic Language in Iraq" (Amir Harraq); "The Akkadians in Tell Brak" (J. Oates); "Glass Inlay Plaques from Nimrud" (J. Curtis); "A New Look upon the Religious Beliefs in Babylonia" (Amer Sulaiman); "Hellenistic Terracotta from Babylon" (Mariam Imran); "Two Fly Emblems from Ur" (Muna Hasan); "Zur Rekonstruktion einer akkadischen Königsstatue" (E. Klengel-Brandt); "Neue Einsichten in die Arbeit von W. Bachmann in KTN 1913/1914" (R. Dittmann); "Mitani-Glyptik in der Ägäis" (B. Salje); "A Rare Dirhem from the Time of Harun al-Rashid" (Muhab al-Bakri); "A Babylonian Rock Relief with Cuneiform Inscriptions of King Nabonidus in Southern Jordan" (Fauzi Zayadine) and "Gates of Hatra" (Wathiq al-Salehi).

Of special interest were reports on recent excavations in Iraq, which took place despite the present difficult circumstances: "The Italian Expedition at Hatra During Spring 1997" (R. Venco); "Excavations in Tell Rashad" (Riadh al-Doori); "Excavations in Tell Harmal 1997" (P. Miglus); "Excavations at Borsipa 1993-1996" (W. Allinger); "Excavations at Tell Nimil" (Barhan Shakir) and "Excavations at Eskri Mosul, Teams I, II and III" (Burhan Shakir, Salem Yunis and Kadhim Muhammad).

The application of computer technology, especially internet, was the focus of three papers: "Internet Applications in Archaeology, Philology and Publishing at the Oriental Institute Chicago" (McG. Gibson); "Potentials and Requirements For a Multi Lingual Museum Inventory Data Base" (M. Müller-Karpe) and "Archaeology and Internet" (Muayad S. Damerji).

Finally an overview of the achievements of the Universities of Babylon, Al-Qadesiya and Mosul was given by Yahya al-Rawi (Babylon), Nail Hannoon (Al-Qadesiya) and Ali Yasin (Mosul). The three days of lectures ended with a discussion of a new "Code of Ethics" by Muayad S. Damerji.

After the conference the participants were invited to a tour to Ashur, where recent excavations of the Iraqi Antiquities Department, between the Sin-Shamash Temple and the expedition house, were presented; and to Tell Nimil, a recently discovered new site on the right bank of the Tigris, some 30 km downstream from Ashur, at the foot of Jebel Hamrin. The excavations, presently conducted by the Department of Antiquities and Heritage, headed by Burhan Shakir, have revealed an extensive round building of a type previously excavated at Tells Gubba, Razuk, Sulaima and Shok al-Zaghir. The dating of this building to the early 3rd millennium is attested by EB I pottery of scarlet ware as well as Ninive V type. ■

Highly Successful Symposium on Jordanian Neolithic Settlements Held in Petra - Wadi Musa

By: Gary O. Rollefson, 'Ain Ghazal Research Institute (AGRI), Ober-Ramstadt (Germany)

A symposium entitled "Central Settlements in Neolithic Jordan" was hosted by the German Protestant Institute for Archaeology - Amman office and ex oriente e.V. - Berlin at the Mövenpick Hotel in Wadi Musa from 21-25 July. The meeting was held under the patronage of H.R.H. Prince Ra'ad bin Zeid and was attended by approximately 35 people, including Jordanian and international archaeologists and affiliated specialists who have contributed to the investigation of Jordanian Neolithic settlements. Other guests included the German ambassador H. E. Peter Mende and his wife; Dr. Ghazi Bisheh, Director-General of the Department of Antiquities of Jordan; Dr. Kamal Mahadin, Director-General of the Petra Regional Council; Prof. Dr. Ricardo Eichmann, Director of the German Archaeological Institute - Orient Department in Berlin; and H. E. Peder Mortensen, Cultural Attaché of the Royal Danish Embassy in Damascus.

The symposium was also made possible through the support of the German Embassy Amman, the Petra Mövenpick Hotel, the Petra Regional Council, Petra Moon Tourism Services and Mu'tah University. The organizers owe special thanks to all of them for their invaluable help and support.

The focus of the meeting was the astounding and sudden development of enormous Neolithic settlements in Jordan during the latter half of the 7th millennium B.C. Sites such as 'Ain Ghazal and Wadi Shu'eib in northern Jordan, Sifiya in the Wadi Mujib, and Basta and 'Ain Jammam in southern Jordan ranged from 10 to 15 hectares in size, with population densities that had not been witnessed before and that would not be equalled again until thousands of years later. The equally dramatic decline of these population centers about 6,000 B.C. was also addressed. The special case of Ba'ja, a small but evidently defensively located Neolithic settlement just north of Beidha and Petra, received considerable attention.

The framework for the presentations and discussions was outlined by the symposium organizers, Dr. Hans-Dieter Bienert and Hans Georg K.

Participants in the Jordanian Neolithic symposium are photographed outside their hotel in Wadi Musa.

Gebel and by Dr. Gary Rollefson. Gebel's theme was "Central Settlements: Central to What?", followed by Rollefson's provocative suggestion that the large settlements were "Tribal Territorial Centres". Bienert concluded the introduction with his views on the crucial changes in "Social and Political Organization". Finally, Prof. Dr. Hans Nissen's paper (Free University of Berlin) cautioned against the use of terms such as "proto-urbanism" to describe the emergence of the large Neolithic towns in Jordan.

There followed a series of 16 papers by prehistorians that described major changes witnessed in the archaeological record, as well as theoretical treatments to explain why the 500-year phenomenon blossomed so quickly and then collapsed so utterly. These presentations were divided into topical areas that included:

1. Spatial Organization (Dr. Hamzeh Mahasneh, Sifiya; Dr. Mohammed Najjar, Ghuwair; Nazeh Fino, 'Ain Jammam; and Prof. Dr. Zeidan Kafafi, 'Ain Ghazal);

2. Social Organization (Dr. Gary Rollefson; Dr. Hans-Dieter Bienert; Bo Dahl Hermansen; Dr. Ian Kuijt; and Dr. Leslie Quintero);

3. Human Ecology (Prof. Dr. Michael Schultz; Dr. Margit Berner; Dr. Tyede Schmidt-Schultz; Dr. Alan Simmons; Dr. Cornelia Becker; Hans Georg K. Gebel; Dr. Reinder Neef; Dr. Phil Wilke, Leslie Quintero; and Dr. Giles Gaines).

After each session there were lively discussions about views and hypotheses of developments.

The symposium closed with a special session entitled "The Post-Excavation Fate: Brainstorming on Restoration Procedures", which focused on what should and could be done to preserve archaeological sites and develop them as touristic and educational resources. The session was chaired by Mr. Suleiman Farajat, and discussants included Dr. Hans-Dieter Bienert (DEI-Amman), Ms. May Shaer (CARCIP), Hans Georg K. Gebel (Free University, Berlin), Dr. Alison McQuitty (British Institute - Amman), Dr. Hamdan Taha (Palestine Department of Archaeology); Prof. Ricardo Eichmann (German Archaeological Institute, Orient Department - Berlin), and Dr. Gary Rollefson ('Ain Ghazal Research Institute).

Finally, the symposium organizers led the members of the symposium on field trips to inspect at first hand the settings and situations of sites that included Basta, Beidha, Ba'ja, 'Ain Jammam, Sifiya, Wadi Shu'eib and 'Ain Ghazal. A farewell reception was hosted at the GPIA in Amman. The symposium organizers would like to acknowledge their gratitude to Wendy Botham of the Petra Moon Tourism Agency in Wadi Musa for making the arrangements for hotel accommodations and the special Bedouin zarb meal in Petra. ■

GPI director Hans-Dieter Bienert addresses the opening session of the symposium. Seated at the front table are HRH Prince Ra'ad bin Zeid, flanked to his right by Dr Ghazi Bisheh and to his left by Dr Kamal Mahadin.

The Plaster Figures of Khirbet es-Samra

By: Abdalla J. Nabulsi, Hamburg University, (Germany)

In the 1996 campaign, systematic excavation of the ancient Byzantine cemetery in Khirbet es-Samra was resumed in order to complete digging in site B, which had started in 1995. The cemetery is located to the east of the ancient settlement, within the boundaries of the modern village. It was pillaged twice since the beginning of this century, so that only a few intact burials remained. Site B covers an area of 35x30 m, and was divided into 5x5 m squares. Tombs were located after clearing down 50 cm from the topsoil. A total of 130 tombs were excavated. According to the homogeneous ceramic oil lamp fragments found, the site is datable to the 7th century A.D. (late Byzantine-early Umayyad). The burials were laid out in rows in a general west-east direction. First analysis revealed that more than 65% of the tombs involve child burials, thus suggesting that site B represents part of a child cemetery.

The main objective of the excavation is to obtain all possible human skeletal remains for anthropological analysis; yet, diverse tomb offerings were salvaged during the last excavation in site B, including iron, bronze, stone, glass, plaster, ceramic and gold objects. Painted plaster figurines (gypsum) of variable shape, form and size were the most interesting objects obtained from the cemetery in Khirbet es-Samra. They were restricted to non-adult burials and included figurines of geometric form (half spherical, rounded or oval disks, star shaped, and quadratic) or painted figures of abstract "female" or animal motifs. Though most of the plaster objects were broken and incomplete (one with traces of a painted hunting scene) we were able to restore a few that are presented in this report.

Object S.4008 (Figure 1) represents an abstract female wearing a long dress. This black painted, 12-cm-long figurine was found in situ in tomb 99, placed in the right hand of a 12-15-year-old female child. At least two

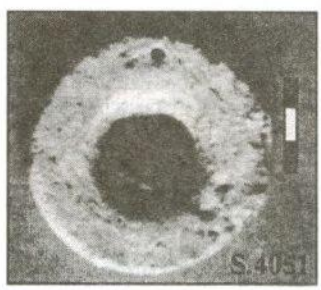


Fig.2

Fig.1

Fig.4

Fig.3

The plaster figurines excavated in 1996 in Site B at Khirbet es-Samra (photos by A. J. Nabulsi, restoration by H.-G. Bunger).

more identical but less intact figurines were found in other child burials. This type is believed to have served as dolls. In the same burial (T.99) a rounded framed mirror, 7 cm in diameter, was also found (Figure 2). Brashler (1995) reported a similar finding in the ancient Um el-Jimal cemetery (6th century AD). The fragments of object S.4009 were found in tomb 128 filling (Figure 3). The slightly eroded, 22.5-cm-long figurine represents a female wearing an elaborate dress. The two arms were stretched above the head, encircling a rounded mirror ca. 15mm in diameter. The two circular spaces between the arms and neck were probably filled with small mirrors. The painted S.4012 figurine, 13.5 cm long, was found in tomb 126. It represents a woman "dancer" wearing a long transparent dress (Jallabiya!) revealing detailed body contours (Figure 4). This figurine is incomplete and probably missing an attached mirror above the head, as in the S.4009 figurine.

Female plaster figurines are suggested to have a long regional history. Besides the one reported by Smith (1969) in Pella, we were able to trace similar objects dated to the 5th century B.C. in Greece (Amiet et al. 1994). Yet, the quantity and diversity of such findings in the limited area of Khirbet es-Samra's cemetery appears to be particular. Furthermore, these objects are datable to a period ca. 150 years later than suggested for similar previous findings in Jordan (Smith 1969, Bashler 1995). We hope in the near future, and after the completion of restoration works, to provide a detailed study covering the wide range of plaster figurines obtained from this site.

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(continued from page 1)
the excavations of the institute. The institute also works in close cooperation with the Royal Institute for Inter-Faith Studies, as it regards inter-religious dialogue as an important part of its work.

The fruitful and excellent cooperation with the German Speaking Congregation in Amman continues - thanks to the enthusiasm of Reverend Claudia Schreiber; we hope to deepen the relations between these German institutions by offering joint activities, and we have already started by organizing lectures for the German-speaking community. Furthermore, the congregation organized women's training for self-assertiveness, led by Dr. Josi Salem-Pickartz, a well-known psychologist in Jordan, which was held at the Amman institute.

The cooperation with the Department of Antiquities, the Ministry of Tourism, Jordanian universities and the other foreign archaeological missions is excellent and helps us in many ways to conduct our work successfully. The library of the institute is growing and is used by many scholars and students. For a considerable financial donation towards the library and the Newsletter we would like to thank Ms Brigitta Meier (Amman) and Mrs Mechthild Meier (Frankfurt/Main, Germany).

We are sure that our work, our many activities, and of course the help and support of all our friends will finally convince our Church Council to continue funding the institute, so that we will not have to bid farewell in 1999. ■

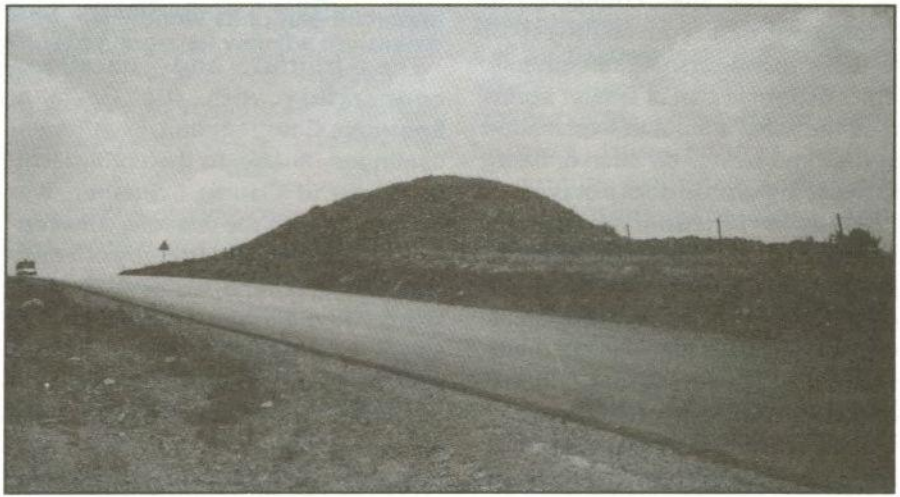
Some Iron Age sites in the vicinity of Tell Johifiyeh : a general survey

By: Dr. Roland Lamprichs, University of Freiburg (Germany)

Our knowledge of the Iron Age (c. 1200-586 BC) in the northern parts of modern Jordan is still very scanty. Reliable written sources are not available and very few relevant excavations have taken place until now. Only new archaeological investigations like the one planned in and around Tell Johifiyeh, a site situated some 7.5 km southwest of Irbid, could fill this gap in information.

The work done in the area in 1996 (Newsletter Vol. 1, No. 2) was focused on Tell Johifiyeh itself, its surface structures and surface finds. The main point of interest in 1997, therefore, was focused on the archaeological sites surrounding Tell Johifiyeh. These sites, forming a semi-circular settlement pattern, are Tell Beit Yafa, Tell esh-Sheqaq, Zaharet Soq'ah, Tell Kufr Yuba and Qasr el-Ghul.

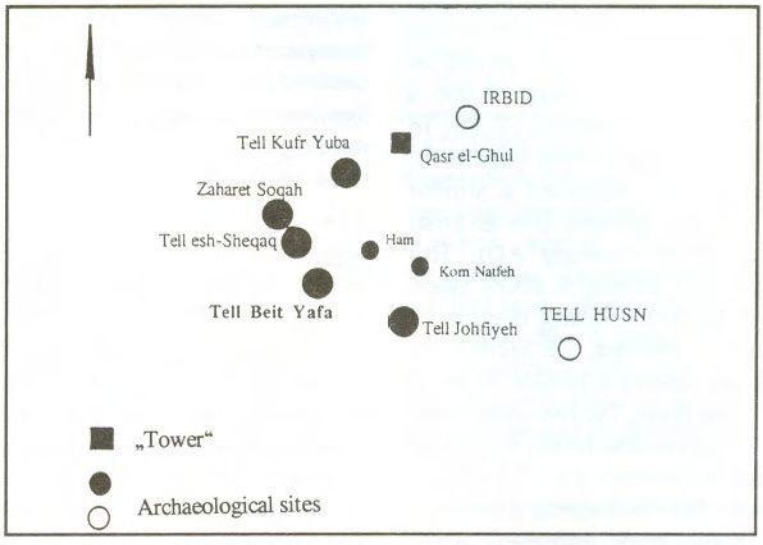
A closer look at these sites in 1997 showed that most of them have some features in common concerning their outward (and inward ?) appearance. Other than Qasr el-Ghul, they are generally built on top of a rise and located in a cultivable region, with the result that modern cultivators plough and plant up the edges of the site, and frequently even over the site. Most of them are of the same size (approximately), shape and date. With a few exceptions their general state of preservation is qu'te good. Due to their positions on top of a rise most of the sites are in sight of each other.



Tell Beit Yafa (looking south).

Surface structures and surface finds indicate that most of the sites may contain some kind of "fortified building" founded and used mainly during the Iron Age (most probably Iron Age II). Only a few potsherds indicate further occupation phases. Due to the fact that none of these sites has been excavated, their exact date and function, however, are still unknown.

Contrary to popular suggestions offered by Nelson Glueck in the late forties and early fifties of this century, an interpretation of the sites as part of an early communication (watchtower) or fortification system (fort) is not supported by my investigations carried out this summer. Although some of the visited sites may have a fortification element, this was certainly not the only function of the buildings. Generally, it seems that the military quality of the sites was mainly defensive, i.e. shelters for the population that lived in the immediate surroundings, rather than a central effort against outside threats. The distribution of the sites mainly follows natural limits, and no apparent line or border could be recognized. Also, the sites are not scattered in any "military order" and there is no evidence of weapons on the surface of any of the sites. The semi-circular settlement pattern mentioned above may, therefore, be explained by topographical reasons and by a culturally motivated division of cultivable land. A mainly domestic purpose of the sites connected to farming (agricultural facilities) or dwelling activities (small settlements; center of a small clan or family) seems to be the most adequate explanation for the time being. Of course, being domestic in purpose does not prevent a defensive function in times of emergency. Due to the lack of appropriate data, the line between private and public, or defensive and offensive, is not always clear. More information concerning the political, social and economic organization of the sites and the region is desired in this context. Only further archaeological investigations, like the excavation planned in Tell Johifiyeh, and a systematic survey of the region including sites like Tell Beit Yafa, Tell esh-Shoqaq, Zaharet Soq'ah and Tell Kufr Yuba, could fill this gap in information.



Archaeological sites in the vicinity of Tell Johifiyeh.

The investigations in and around Tell Johfiyeh are planned as a cooperative effort between Dr. Ziad al-Sa'ad from Yarmouk University (Irbid/Jordan) and Dr. Roland Lamprichs from Freiburg University (Germany). After postponing the excavation for one year the first season in Tell Johifiyeh will start in 1998, provided that sufficent funds are available.

Acknowledgements

I would like to express my gratitude to the Alexander von Humboldt-Stiftung for its material and non-material support. Logistical help during my stay in Jordan (July - September 1997) was given to me by Prof. Dr. Zeidan Kafafi, Institute of Archaeology and Anthropology, Yarmouk University, Irbid, and Dr. H.-D. Bienert, German Protestant Institute of Archaeology in Amman. Thank you to all of them!. ■

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Development of an Analytical Tool to Compare Water Sector Strategies

By: Alexander Manakos, Darmstadt (Germany)

Water resources in Jordan are rare by nature, and scarcity is increasing yearly mainly due to population growth and pollution of existing resources. Besides the decreasing availability of water, the problematic situation of the water sector in Jordan is characterized by an ongoing degradation of water quality. The resulting deficit between water demand and supply is growing considerably, and this fact leads to an urgent and increasing allocation problem, as the three main water users -- agriculture, industry and municipalities -- are competing more and more for the same water resources.

Since autumn 1993, the GTZ has been assisting the Ministry of Water and Irrigation via the Water Sector Planning Support Project. The main objective of the project is the design of the second National Water Master Plan, which will provide the framework and strategic plans to secure the water supply (in quality and quantity) to various users in Jordan from now until 2035. One component of the National Water Master Plan is the presentation of various strategic alternatives for future water sector development.

As the water sector is a key sector strongly impacting on the overall development of the country, water sector strategies are to be seen mainly from two points of view: (1) They should contain a maximum contribution to the solution of problems in the water sector itself; (2) They have to be seen as a major factor influencing the socio-economic development of the country.

It is hardly possible to evaluate such strategies in an objective way. A possible tool for comparative analysis is the multi-criteria analysis. First, the goals of water sector strategies and the overall development goals have to be structured into a hierarchy, due to their linkages and effects. Second, criteria have to be developed that can be used to measure the contributions of alternative strategies to achieve these goals. Examples for such criteria are the employment effect per cubic meter of water allocated for a certain use type or its effect on the growth of Gross Domestic Product due to its allocation. Because of the hierarchic structure of such a scheme of criteria, it is possible to weight the different criteria and to evaluate how far the elements of a strategy in total contribute to the socio-economic development of the country. During the last three months such a tool was developed under the guidance of the above criteria.

Such multi-criteria analysis can be a helpful tool for decision-makers to judge possible future water sector strategies for Jordan. However, it has to be kept in mind that such a scheme can only be a guiding principle and a general framework for individual strategic decisions. ■

1997 Excavations at 'Ain Soda in Azraq, eastern Jordan

By: G. Rollefson, L. Quintero, P. Wilke, D. Schnurrenberger, R. Low and R. Watson (U.S.A.)

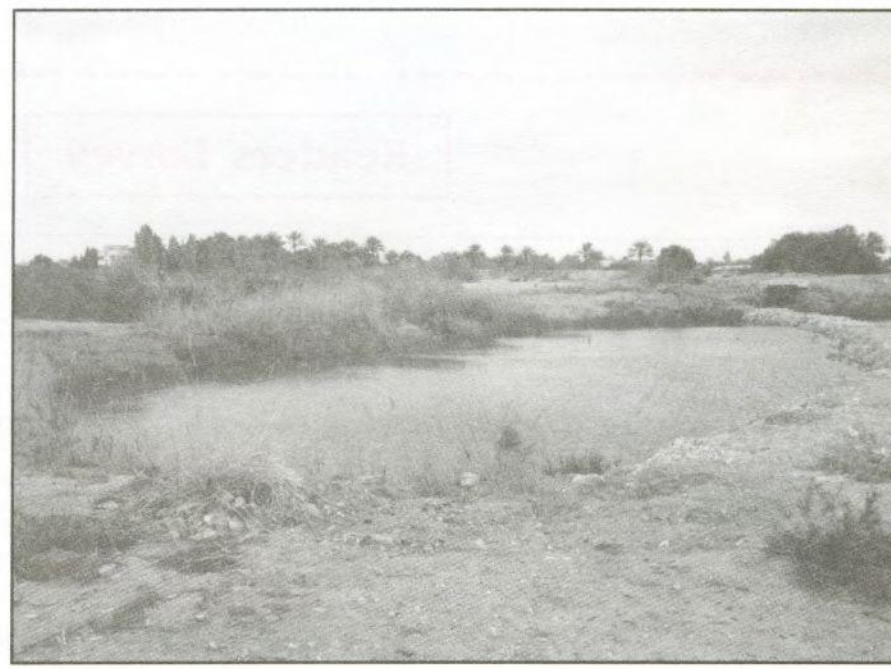
Six weeks of archaeological excavations were undertaken at 'Ain Soda, a pool located in Azraq Shishan (South Azraq) in the desert of eastern Jordan. In the form of an archaeological field school for San Juan College (Farmington, New Mexico, USA), 12 students and seven staff members investigated the sediments at the edge of a large pool originally created by a spring fed by an underground aquifer, bringing water from as far away as Jebel Druze in southern Syria and Zarqa in western Jordan.

Altogether, approximately 60 m^2 were sampled in four excavation trenches along the northern, southern and western edges of the 'Ain Soda pool. In addition, attention was focused on the investigation of an extensive and massive wall that surrounded the pool and extended well beyond the limits of the present distribution of standing water.

It remains uncertain when the wall, reputedly "Roman" in origin, was first constructed. More than a meter wide, the rubble-filled structure was faced on both sides with trimmed basalt facing stones, with buttresses of rubble-filled basalt triangles and semicircles on the interior and exterior surfaces. Excavations at the western limits of the wall revealed a section that included a sluice-gate that could be opened and closed to regulate the water level in the pool as well as to distribute water (presumably) to irrigated gardens. Pottery and other artifacts show that the wall was in use during the Byzantine and early Islamic (Umayyad) periods, although the date of construction of the facility remains undetermined.

In the other excavation trenches the time depth was much greater. In one trench (the "Elephant Trench"), two teeth of an elephant (probably Elephas planifrons) were found nearly at water level, in association with late Levantine Mousterian Levallois points (ca. 40,000-60,000 years ago), and many more tooth fragments were found as well. Above these finds was a succession of marshy deposits, including peat formations with well-preserved reed and cattail plants, that could be dated to the early Upper Paleolithic and to the middle Epipaleolithic periods; one surface that included a chip bone deposit is puzzling, since the material appears to cut through a later Epipaleolithic(?) peat layer, but the presence of more than 10 rhinoceros teeth and some Late Acheulian handaxes and cleavers makes the situation very complicated. There is no reason that camels could not have roamed the area a quarter-million years ago, but the stratigraphic evidence remains somewhat obscure in this case.

In the "West Bank Trench" three rhinoceros molars were found in Late Acheulian or early Levantine Mousterian deposits in a deflated sand dune. Although the area immediately around these teeth was chronologically unclear, other parts of the trench showed a clear succession of the earlier Late Acheulian tools (with handaxes and cleavers) separated from the early part of the Levantine Mousterian, which is characterized by a high degree of the use of the Levallois technique for tool manufacture, especially the production of long and heavy Levallois points. This trench provided evidence that the 'Ain Soda area was visited often during the long period that spanned the transition from the Late Acheulian (ca. 250,000-150,000 years) to the early Levantine Mousterian (ca. 150,000-60,000 years ago).



'Ain Soda pool at Azraq.

The "Greater Southwest Trench" provided information that overlapped the circumstances in the "South Shore" and "West Bank" trenches. Here the deposits reached greater depths and reflected deeper pool deposits in earlier times. Of very crucial importance was the discovery of a complete lower jaw bone of an equid (Equus hemionus?) and an almost complete skeleton of an enormous animal (Rhinoceros sp ?). In direct association with the latter skeleton were some 30 large Levallois points, datable to the early Levantine Mousterian period. These tools may have been used to kill the animal, but certainly they were also used to cut the skin and meat.

The visits to the 'Ain Soda area by ancient hunters mirrors the situation discovered at several other sites in the vicinity, including Lion's Spring and C-Spring, both south of 'Ain Soda. Whether the Azraq Basin was covered by a large Pleistocene lake remains debatable: several smaller lakes may have developed and disappeared at different times in the area. But the work at 'Ain Soda has significantly augmented the scope of the available data, and future work will help to improve our understanding of the ecology and human use of the region through the last quarter-million years.

The research at 'Ain Soda was funded by the students of San Juan College and several of the staff members. Additional support was provided by ACOR, the German Protestant Institute for Archaeology, and the Department of Antiquities of Jordan. ■

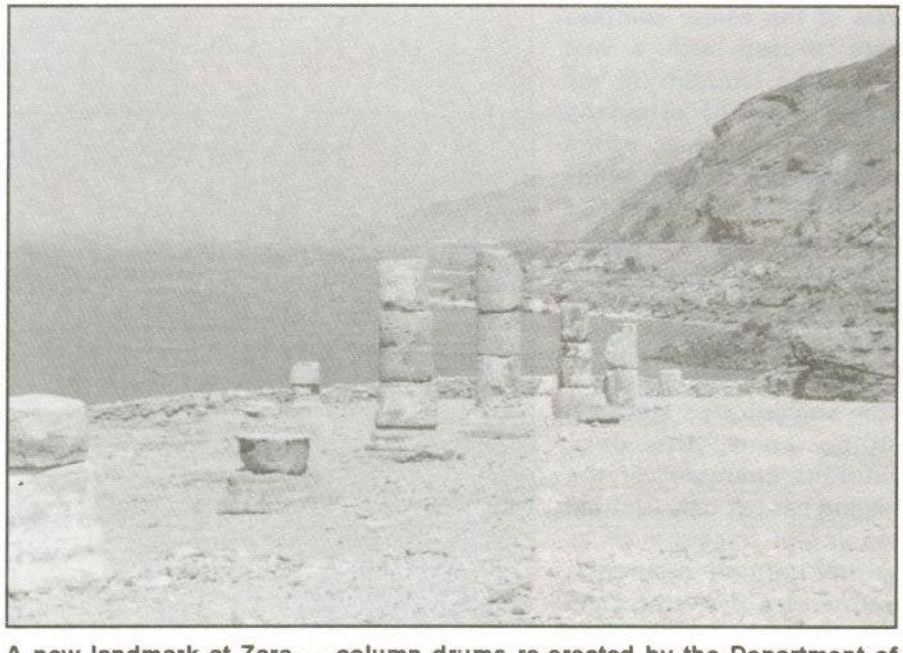
Kallirrhoë ('Uyûn ez-Zâra) Once Again: The 3rd Campaign

By: Stefan Wimmer, University of Munich (Germany)

The oasis-like site of 'Uyûn ez-Zâra lies along the Dead Sea shore, some 1100 m below the Hasmonean and Herodian mountaintop fortress of Machaerus (Mukâwer/el-Mishnaqa). In antiquity the renowned spa was known as "the good/beautiful waters," in Greek: Kallirrhoë. Some forty perennial thermal springs over an area of some two km^2. provide for abundant, lush vegetation, and substantiate the plural designation 'Uyûn as against the commonly used name "Ayn ez-Zâra (for a scientific spring water analysis see Böser/Rieger 1996).

Exploration results, mainly by the Deutsches Evangelisches Institut für Altertumswissenschaft des Heiligen Landes in 1985, 1986 and 1989, were presented in the preceding issue of Occident & Orient (June 1997) by Christa Clamer. All three seasons were headed by August Strobel, then director of the Institute in Jerusalem, who entrusted Clamer in the first and second seasons, and the author in the third, with the archaeological supervision. It was indeed Professor Strobel who realized the significance and true nature of the Herodian palace-like complex in area II (building A and B), long before meticulous analyses of the excavation campaigns only recently arrived at the very same results. Clamer's recent publication of the first and second seasons, incorporating to a degree some later results, fully corroborates his identification of the major building as a luxurious villa built by King Herod the Great (Clamer 1997).

Publication of the third campaign is now forthcoming by Strobel and the



A new landmark at Zara — column drums re-erected by the Department of Antiquities at the harbour site.

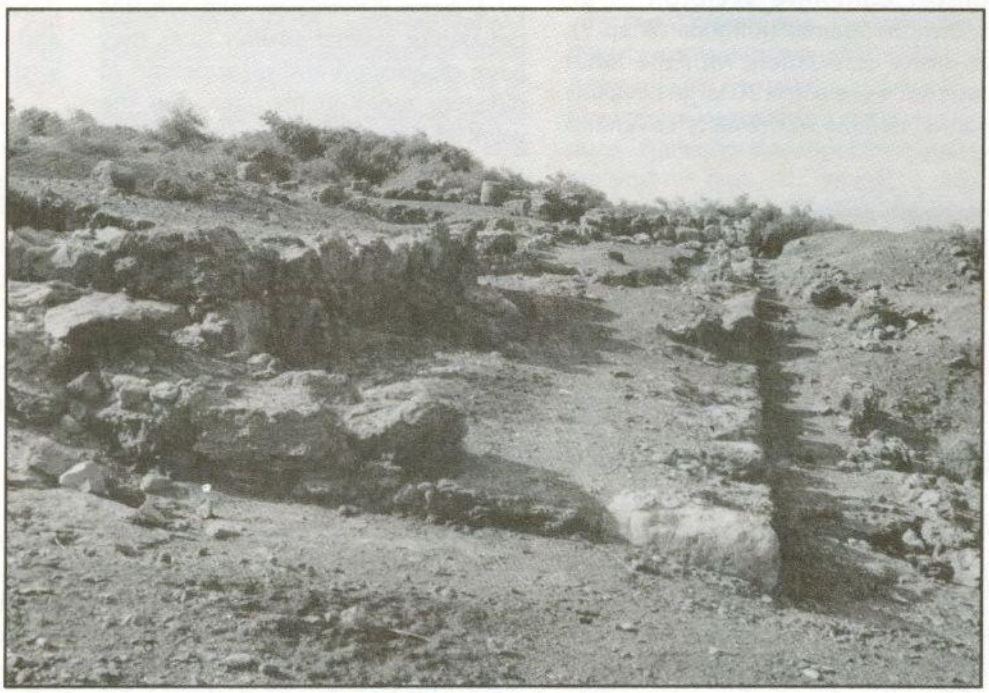
author, et al., after the author was able to study the material at the Institute in Amman (special thanks go to ACOR for their hospitality!).

The latest occupation at the site (stratum I) dates to Early Byzantine times (4th and 5th century AD), when, to a rather limited extent, earlier structures were re-erected, while other units deviated in part from the older foundations. Earlier building materials, including column drums, were amply re-used as spolia. The site was then abandoned and the decaying structures at some later point flattened by an earthquake. Interestingly we found no evidence for any later activity, such as could be related to the well known vignettes on the 6th century Madaba map, suggesting perhaps that those depictions might have to be related to earlier sources.

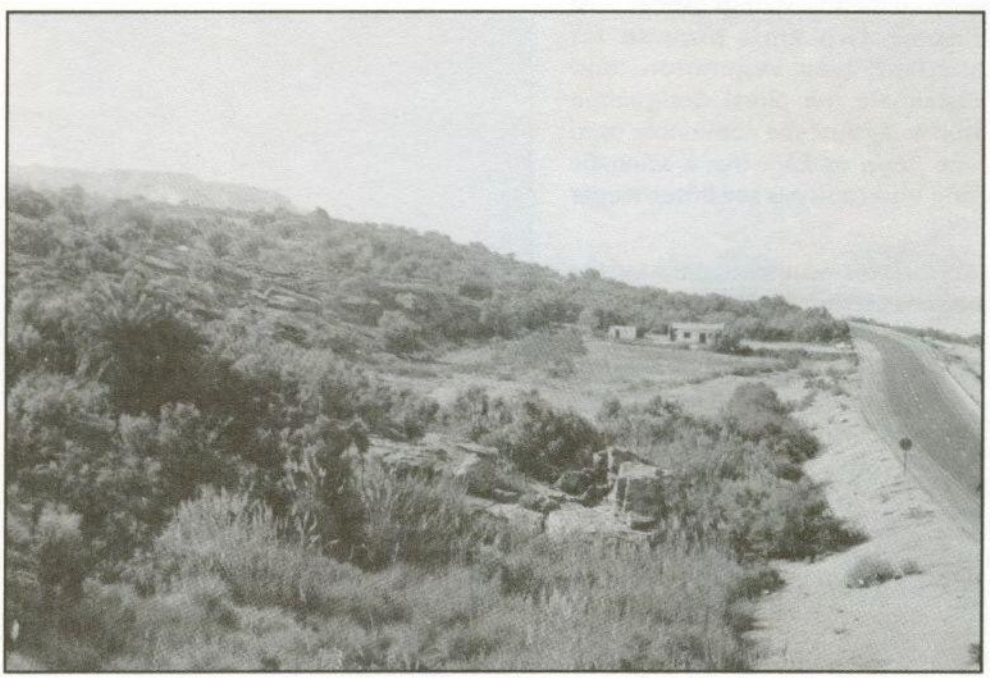
Prior to the Byzantine occupation the site was left uninhabited for as long as two and a half centuries. The main activity took place during the Herodian and Early Roman period, from which three strata can be discerned. While in the late 1st century AD only limited units of the earlier complex were re-used, after a vast destruction (stratum II), the edifice (area II) originally extended over 80 m, with a possible extension even further to area III. It consisted of two main units, building A and B, interconnected by an outside wall to the east and a walled terrace to the sea side, with a garden in between.

The sophisticated structural outline apart, the once luxurious character of the building has left only faint but meaningful traces, such as various column elements, small remains of pavement and mosaics, and wall and ceiling stucco fragments which classify the site amongst other Hasmonean/Herodian constructions like Machaerus, Jericho, Herodeion, Massada and Jerusalem. Building A was dominated by a peristyle courtyard, surrounded on three sides by Ionian style colonnades, similar to the columns at Machaerus, but of much larger dimensions. The courtyard was paved with large rectangular flagstones, again similar to Machaerus. The building's most prominent feature was a pool of ca. 10 x 3 x 3.5 m, with stairs, fed with hot water from a thermal spring via a small external secondary pool.

The construction shows minor secondary modifications, which are difficult to date exactly (stratum III),



Wall remains of building B in the foreground (looking south).



General view of Zâra; the buildings of area II are on the rocky terrace to the left.

and which must be attributed to the reign of Herod the Great (stratum IV). Archaeologically we do have some, but not very conclusive, clues to earlier, Hasmonean activity.

The ceramic spectrum relates Herodian/Early Roman Kallirrhoë, not surprisingly, with sites like Jericho and Qumran. Of major importance is a large amount of so-called cream-ware in definitely Early Roman context, and significant quantities of Herodian stone vessels.

Most commendably, the western, sea-side wall of building A has been partially reconstructed and consolidated by the Department of Antiquities (under the direction of Sa'ad Hadidi, inspector of the es-Salt district, whom I should like to thank for his kind support during my stay), so that the structure is now easily visible from the modern highway along the shore. On the other side of the highway, near the harbour site, a row of columns has been erected, providing a prominent landmark to the site for everyone passing on the Dead Sea road as well as the thousands of weekend visitors to the hot springs of Kallirrhoë.

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C. CLAMER et al., Fouilles archéologiques 'Uyûn ez-Zâra / Callirrhoë, IFAPO BAH 147. Beyrouth 1997. ■

Structural Adjustment and its Effects on the Private Sector in Jordan

By: Anja Wünsch

During the end of the eighties Jordan faced a deep economic crisis and the government was compelled to start negotiating with the World Bank and the International Monetary Fund (IMF) for economic support from the international community. As a result Jordan launched the implementation of a Structural Adjustment Program (SAP) whose main task is to remove distortions in the market (caused by, for example, subsidies, protective tariffs and state monopolies), and to improve the role of the private sector in the economy and promote demand and supply forces. In return the World Bank and the IMF facilitated debt reschedulings and forgiveness as well as new loans from creditors to the kingdom.

The first program was introduced in 1989 but had to be interrupted during the Second Gulf War. The massive inflow of capital brought into the country by the 300,000 returnees from the Gulf and Saudi Arabia during and after this war could not compensate for the negative impacts of the crisis, like the lost of traditional markets for Jordanian products in the Gulf, Saudi Arabia and Iraq, the cut-off of financial aid from oil-exporting Arab countries and western nations, and the new infrastructural challenge for the government in order to cope with the sudden increase in the population.

Besides, most of the new capital was spent on construction and consumption, which led to a fast but also brief boom in these sectors without sustainable growth and development of resources and also to land speculation and inflation. This situation, together with the remaining distorted economic structures, constituted the main reasons for the implementation of a second SAP for the period 1992-1998.

Regarding macroeconomic data and performance, Jordan is a model for World Bank and IMF reform programs, which is attested in public praise by the two organisations and also in facilitated technical and financial aid for Jordan from international donors. Indicators like the reduction of inflation, indebtedness and the trade deficit, as well as the rise in currency reserves and the stable exchange rate of the Jordanian Dinar, seem to reflect a successful reform program.

At the same time the Jordanian people complain about the sharp rise in the cost of living without an equal rise in their wages, which leads to the hard situation of many Jordanians having to work two jobs in order to maintain their living standard. Despite the contradiction of the two phenomena, both are results of the transition process of the Jordanian economy and maybe even of society. Nevertheless, the World Bank and the IMF had to admit that the trickle-down effect of reform gains cannot be realized in the expected time frame, because this requires perfect economic, political, and social preconditions. Therefore both institutions now explore and support more intensive social measures which are reflected in Jordan in the recently introduced plans to establish a Social Safety Net. The question remains of why the project of a complete security net started in the sixth year of the SAP, despite longer time frames in other reform countries. We will never know if earlier implementation of the Social

Safety Net and a broader information campaign would have elicited greater acceptance of the entire reform process.

The implementation of SAPs has been discussed, with all its contradictions, possibilities, and challenges, in many publications and surveys, and it constitutes only the general frame for the underlying study. It leads to another interesting field of research -- the impacts of the program on the private sector, and its role in the restructuring of the economy and redefining the tasks of the state and the private sector; the latter is pushed into the leading position for all market transactions and thus, in some ways, for the entire society. The point is, is the private sector willing and able to play this main role -- despite many voices which blame the state for too much interference in the economy over many years (which is true to a certain extent, but one should not forget that the very same private sector benefited a lot from these measures and steps taken by the government)?

The reform program also stresses the importance of strengthening all export-promotion efforts. Thus, in its first part the study surveys industrial development under the SAP, especially in the private sector, because this segment of the economy seems to have the most potential for exports. Recent data also prove this assumption in the form of increased exports of industrial products as well as of investments.

Of course, Jordanian industry is not homogeneous -- there are a few big companies (most of their government shares are going to be sold within the privatization process of the SAP) and many small and medium size companies. Interviews among the latter show that they feel certain improvements due to new laws and regulations, but they still face difficulties linked to implementation, exceptions and a slow change in red tape procedures. Thus they still look forward to a clear, transparent system which would lead to a better investment climate. Beside these problems, for these companies a main reason for their moderate investment is the unstable political context of the region and its direct impact on the Jordanian economy -- especially the Palestinian self ruled areas and the closure of the Iraqi market. Interesting is the fact that for most of the interviewees the planned entry into GATT/WTO and the EU Partnership Agreement play just a minor role in their past, present and future decisions (except some pharmaceutical companies that produce without Intellectual Property Rights). Regarding this, it seems that many companies lack information but also the initiative to know more about their possibilities and challenges under the agreements.

Several Jordanian officials say there is much potential among these small and medium scale entities, but more awareness is needed. Missing are strategic medium and long term planning, on the one hand, and effective cooperation in lobbies and pressure groups to enforce common interests, on the other.

The second part of the study will probe into developments among the bigger companies of the country, for comparison, and final conclusions about the effects and effectiveness of the SAP in the Jordanian economy will require further research. ■

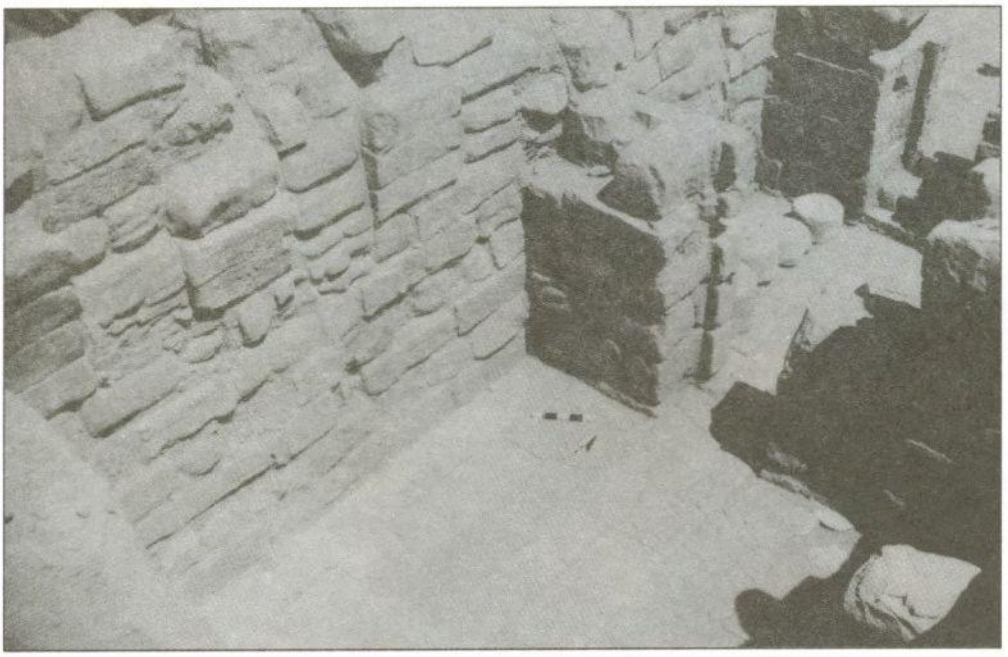
The Roman Street Project in Petra

By : Zbigniew T. Fiema, American Center of Oriental Research (Amman)

This project of the American Center of Oriental Research was conducted in Petra in late spring 1997, with the author in charge of the fieldwork. The project was developed to enhance the touristic attraction of Petra and to address its urbanistic history, by exposing a part of the civic center. Three rooms located at the eastern end of the Colonnaded Street and along its southern side were excavated. These rooms are situated directly to the west of the stairway which leads up to the Upper Market. Two more rooms were excavated to the east of the stairway. Judging from their location, all rooms were commercial establishments, such as shops or taverns. The second phase of the project will include the anastylosis of the exposed entities. The following interpretation of the site in terms of spatial and temporal changes is tentative, and most likely to be modified through future studies. But the continuity of occupation in the area is now firmly attested for the period between the 1st century B.C. through the 6th-7th century A.D.

The first major activity at the site resulted in the construction of three rooms west of the later stairway, probably in the first half of the 1st century A.D., or later. In the following phase, the stairway was constructed, presumably accompanied by a monumental arch in front of it. The A.D. 114 inscription which seemingly belonged to that arch had been previously found in the area. It appears that the original rooms were enlarged through the construction of a new facade wall farther north. The fieldwork results favor the opinion that the stairway is contemporary in construction with the stylobate and the colonnade, the expanded shops, and the extant pavement of the street. The pottery relevant for the dating of these elements does not date beyond the beginning of the 2nd century A.D. This development could relate to the last decades of Nabataean independence, but the Trajanic, or generally post-annexation, period is preferred.

The predominance of storage jars, amphorae and unused cooking pots among the recovered ceramics supports the commercial function of the rooms. The find of 186 coins in the eastern rooms may somehow relate to the specific operations conducted there. The majority of coins is dated to the 4th century A.D., but the 5th century types are also present. Many were minted before A.D. 363, but the impact of the earthquake of that year on this area cannot be fully defined at this point of time. Possible damage must have been repaired, as the collapse of the arches inside the rooms had certainly occurred later. Flood-control installations in the valley, as well as the stability of the hillsides, might also have been affected. The construction of the so-called "Byzantine shops" on the sidewalk, often encroaching upon the street itself, as well as the blockings of the doorways of the original shops, may relate to both the earthquake damage and to the increased threat of flooding. The gradual abandonment of the shops progressed in a linear pattern, from east to west. The eastern rooms were abandoned in the 5th century, but the latest ceramics found in the westernmost room date to the 6th-7th century A.D. The last to be abandoned were the northern spaces of the rooms, as the southern arches in the rooms appear to have collapsed first. The occupation in this area of the street would have continued also during the 7th century. ■



View within one of the excavated structures along the Roman road in Petra.

The Upper Temple of the Sanctuary of Zeus, Gerasa (Jarash)

By: Jean-Pierre Braun, IFAPO (Amman)

Apart from articles on the lower sanctuary area by J. Seigne, the final study of which will be published by IFAPO, there exists no actual study of the Upper Temple of Zeus and its precinct, except for some unpublished works by H. Kalayan and R.M. Lemaire, who worked, respectively, on restorations in the 1970's and in the 1980's on a feasibility study of restoration. Save for some brief mention in publications on Gerasa, concerning the sanctuary as a whole and some broader aspects of urban development, there have been no further studies of the tumbled and standing remains of the Temple complex.

In continuation of the French Archaeological Institute's work on the Sanctuary of Zeus at Jarash, IFAPO's present team, led by Jean-Pierre Braun, has begun architectural investigation and comprehensive research of the Upper Temple complex. The extensive architectural study in the field is accompanied by necessary explorative excavations in order to meet a number of preliminary objectives:

- to provide a complete study on the architecture of the temple itself and the architectural planning of the temple complex in its setting

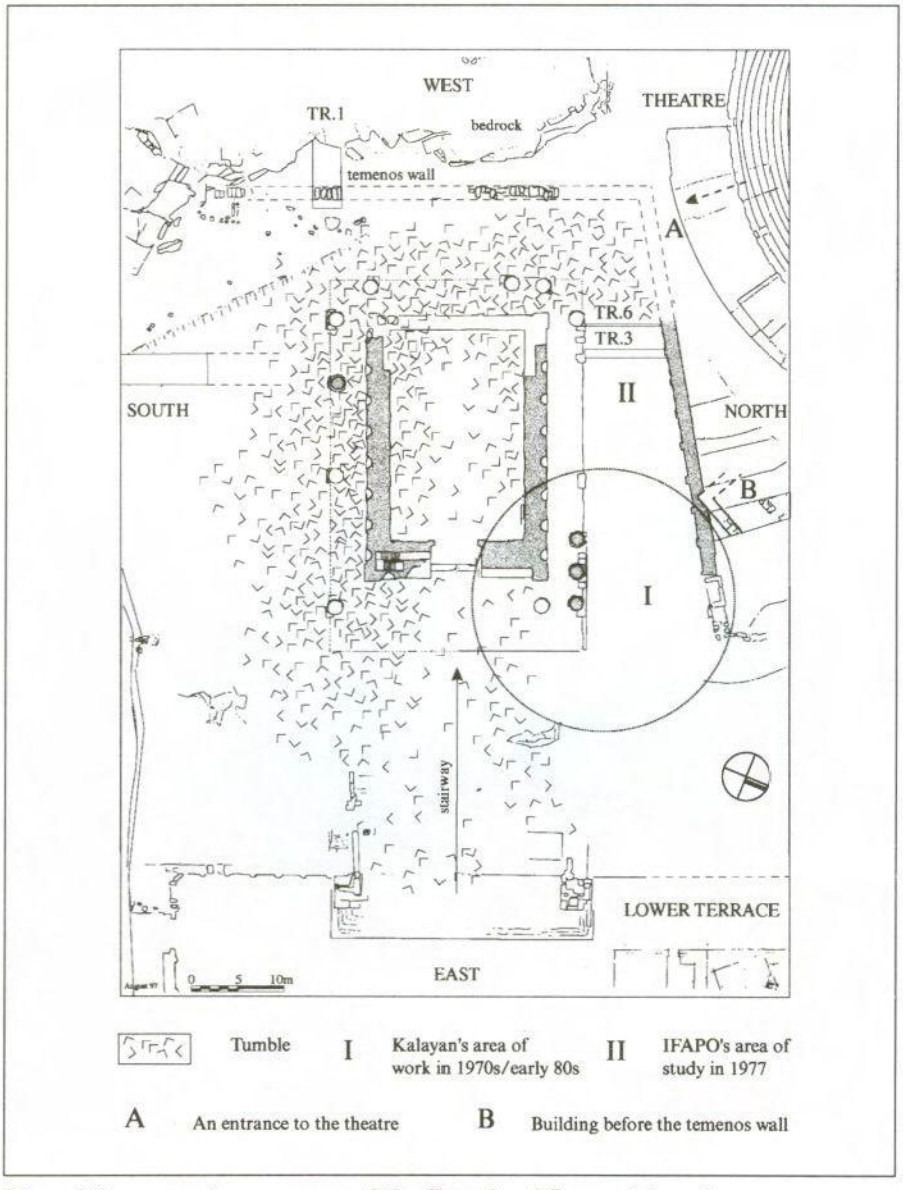
- to establish the chronology of construction of the whole complex and the subsequent occupation of the site

- to study the evidence of the destruction process(es). The aim is to establish a "historio-graph" of physical disintegration of the building as can be recognized on the ground and through excavation

- to plan a programme of appropriate restorations and site presentation.

We began by investigating whether the temple and its precinct, including the temenos wall, were conceived, planned and executed as one building programme, that is to say within the second half of the second century AD, the known date (dedication on the pediment) of the temple itself. The first season of excavations has provided affirmative evidence: Trench 1 on the western side of the temple revealed a section of the outer side of the temenos wall, which can be dated to the second century AD by the latest pottery and glass finds associated with the construction of the wall.

Some irregular features of the ground plan of the temple complex,



Plan of the upper terrace area of the Temple of Zeus at Jarash.

like the obtuse angle at the north-west corner of the temenos wall, can now be explained. To allow for the optimal placement of the Temple and to build it in the largest possible size, it had to be sited in such a way as to make most use of the confined space in which the whole complex had to fit. That is why the builders stretched the wall as far out as possible to the point permissibly nearest the theatre (A). One would usually expect a temenos wall to be parallel to all sides of the temple; in this case, however, the space for the terrace of the temple on the north side would have been too narrow, not leaving enough room between the temenos wall and the overpowering façade of the peristyle. Instead, the builder(s) swung down to point B in the north where it 'squeezed' against the corner of an already existing building there. The result is a 'geometric' adaptation on the ground, a compromise fitting the terrain of the temple and not the result of two separate phases of construction for the upper complex.

The excavations and examination of building blocks on the ground have prompted an examination of the finished state of the temple complex in the second century AD. There is emerging conflicting evidence which raises some doubts over the generally accepted assumption that the temple complex was completely finished.

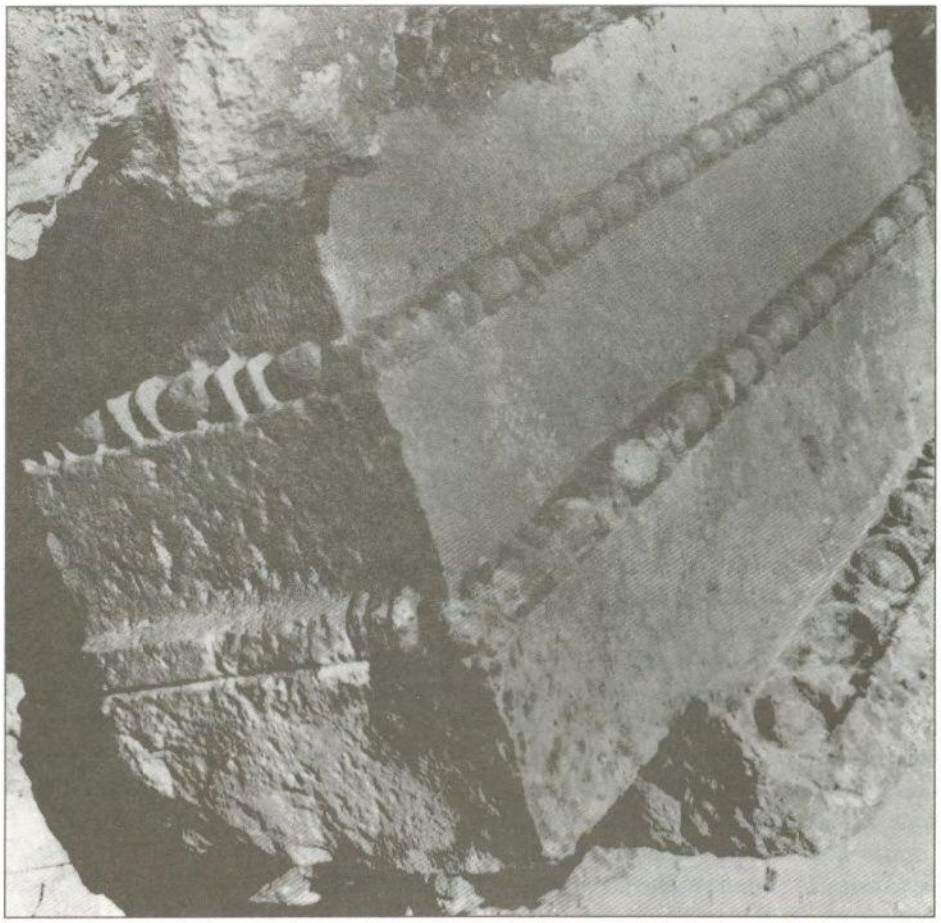
First, the sculpting of decorative ornaments begun on some blocks found on the ground was left incomplete.

Second, excavations in June-July 1997 have revealed that the northern side of the courtyard has never been paved or levelled (nor was the southern side, as the current season of excavations has just brought to light). This in itself may not have been so unusual for Gerasa, where a number of Roman buildings still show the outcropping bedrock within their confines (e.g. the Hadrianic Arch, the hippodrome). At the site of the upper temple, the bedrock had been cut to make room for the foundation of the podium and the temenos wall, the latter's course below the bottom moulding of the podium and the bottom of the temenos pilasters being exactly level. The bedrock between the podium and the temenos wall is 20 to 30 cm higher than the desired level necessary for a pavement of the court. In order to install a pavement, or even if there was to be no pavement, the outcropping bedrock of the court would have had to be levelled at the right height to make the moulding of the podium and of the temenos pilasters visible.

These two factors alone--the unfinished blocks and non-executed programme of the court construction (in the northern and southern half)--are hard to explain by reasons other than that the temple project was never carried out to the very end.

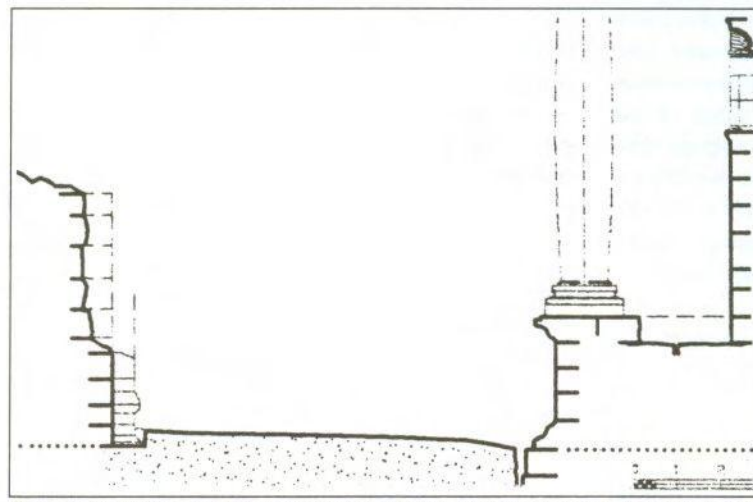
In addition, while the blocks for the series of the lion-frieze have been skilfully sculpted in relief and finished in every detail (before they were put in place) , there are others, like poorly executed blocks for the cornice, which were evidently done in a great hurry.

This leads to the question of why particular types of architectural blocks seem to be totally missing, like coffers for the peristyle, if there were any, and why there have not yet been found any upper blocks which could have been the coping of the outer cella wall. In the same vein one may ask about the supposedly bronze capitals of the pilasters of the cella. It may not be entirely impossible but it would seem strange if certain types of architectural blocks were totally missing on account of removal without leaving the smallest trace. Nor is it easy to explain why some types of building blocks dominate to a too large extent other kinds. This imbalance can hardly be the result of selective robbing or exploitation, as after a collapse only the blocks lying



Incomplete sculpting of decorative ornamentation on a block found in the temple area.

on top would have been taken and not all of the same type could have been scattered just on the surface. In addition we have to keep in mind that the Upper Temple of Zeus was a difficult site for quarrying: an uneven and steep approach on the west side, a deep and abrupt difference in level of bedrock on the east and south sides, and a large impediment with the South Theatre on the north side -- more a dangerous tumble of heavy stones than a quarry (this may be why restorers, before H. Kalayan, worked anywhere else but on the Upper Temple). That the site has been used as a working/ stone cutters site for a short while in antiquity (after the late sixth or early seventh century) is evidenced by a column drum buried in the tumble which had been used as a core for cutting off fine stone slabs, but only a fourth of the drum's volume capacity had been used up.



The area between the podium and the temenos wall, showing the unpaved state of the bedrock.

In order to obtain a clearer picture of the tumbled remains, we have begun a 3-D system of recording in situ each block of the tumble to create models which will help us understand how the tumble occurred and in which order the blocks fell. This method of recording is especially expedient considering the preliminary calculation which showed that ca 70% of the blocks of the temple are still on the site. This calculation does not concern the adyton, which is totally ruined.

Understanding the process of collapse can help us evaluate the actual degree of achievement of the construction programme of the temple complex. The manner of destruction(s) seems to be more complex than meets the eye and cannot be explained simply by having been brought about by one big earthquake. For instance, after careful excavation, a section of the tumble in the north-west area of the temenos and on the south-west has shown that there were at least three major phases of collapse of the temple. In only a small section of the terrain, i.e. the confined area of excavation, we found in the level of the first big tumble and mixed with blocks of the outer cella wall, blocks of the peristyle, architrave and frieze.

This could mean either that not all building elements, including the upper part of the cella wall and, a fortiori, the roof, were in place or that they were destroyed before the first collapse took place, most probably in the later sixth century AD, according to pottery sherds found among this tumble. Interestingly, there was a thick layer of densely packed and fragmented roof tiles just below the first tumble. They must have been put there or gotten there before the event of the first collapse--if it was indeed the first collapse and not the second, were one to interpret the broken tiles as evidence of an earlier destruction. In that case, the tiles could have come from the temple, which would mean that the building had been at least partially roofed.

The observation that the upper temple complex of the Sanctuary of Zeus may in fact never have been finished is not such an odd notion, when one considers other major public buildings in Gerasa which were built during more or less the same time but whose construction was abandoned in varying degrees of unfinished stages.

If not finished it seems nonetheless clear that the Upper Temple of the Zeus sanctuary was more advanced in construction than, for example, the Temple of Artemis; but what is not yet clear is how much more advanced towards completion the Upper Temple may have been. At any rate, the first results and observations permit a renewed evaluation of what has been said or written in previous studies about the Upper Temple, and in which it has been posited that the temple was completed in the years between AD 161 and 166, and that the upper temenos wall had been built before.

To sum up the first preliminary results after just one season, it now seems probable that the Upper Temple was never completely finished (at least not in all detail), the upper temenos wall was part of the original building programme of the second century upper temple complex, and the temple was destroyed or dismantled over two or more phases of violent collapse.

The members of the 1997 international team of the IFAPO project are: architects - J-P.Braun (F), P. Lenhardt (F), E. Léna (F); archaeologists - L. Pontin (GB), L. Tholbecq (B); registrar - G. Humbert (F); ceramicist/small finds analyst - I. Kehrberg (AUS); draftsperson - E. Obeidat (HKJ); volunteers/students - S.Benghiat (GB), X. Cottineau (F), J.M. Kafafi (HKJ), S. De Maussion (F), I.M. Rashid (IQ), M. Schlitz (AUS), P. Unterlechner (A), S. Vetter (F); volunteer architect - R. Keilani (HKJ); consultants - C. Augé (F, numismatics), J-C. Bessac (F, quarry specialist), F. Carré (F, geomorphology), P-L. Gatier (F, epigraphy). ■

Re-Evaluation of Tell es-Sultan (Jericho)

By: Hamdan Taha, Palestinian Department of Antiquities, Ramallah (Palestine)

The restoration and preservation of Tell es-Sultan

Before the transfer of authority to the Palestinian side, there was no formal body for the management of archaeological sites in Palestine, and sites remained as they were before 1967. Therefore, a high priority was given to excavated sites which had been left abandoned without much protection, such as Tell es-Sultan.

The archaeological site of Tell es-Sultan (located in the lower part of the Jordan Valley) is a prime archaeological site in the Near East, and has a special importance in the history of archaeological research in Palestine. It is identified with ancient Jericho, rises to a height of 21 meters above the surrounding area and covers an area of about one acre (6.5 hectares).

The ancient cemeteries of the town lay to the north and northwest of this site. Along its eastern flank, a modern road cut into the archaeological deposits, dividing the spring east of the road from the rest of the site located west of the road. Almost nothing has been preserved outside the Neolithic tower, and fragments of the EB wall and MB revetment wall.

In spite of its significance and the number of visitors it receives, Tell es-Sultan is not well preserved and must be disappointing to the average visitor, especially due to the lack of properly designed routes.

History of Archaeological excavations

The surface of the site is dotted with trenches and pits representing the results of a whole series of archaeological investigations carried out over the last 130 years. The first sounding was made by Charles Warren in 1868, when he dug a number of shafts into the mound. But, the first large scale excavation was conducted by an Austro-German expedition in 1907-1909 under the direction of E. Sellin and C. Watzinger. The expedition uncovered the face of a considerable part of the EB town wall, and traced the wall line on the north end, and a great trench was cut across the center.

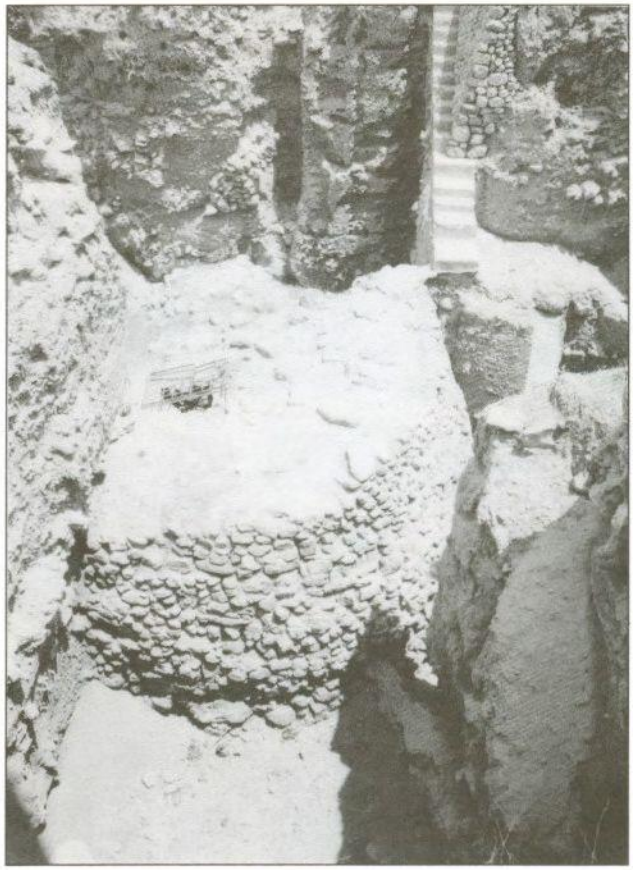
The second major excavation was organized by J. Garstang in 1930-1936, and was preoccupied with the biblical narratives. The dating of the successive Bronze Age fortification proved to be wrong, but his major discovery was the Neolithic accumulation bene-ath the Bronze Age levels.

The third major excavation was carried out between 1952-58 under the direction of K. Kenyon. She dug in three major trenches, I, II, and III, where she reached bedrock in different places, and fixed the occupational history of the site from the Natufian level to the Iron Age. The vertical strategy used by this scholar produced a good knowledge of the stratigraphic sequence of the site, but left few remains to be seen in the horizontal level.

The fourth major campaign was carried out by a joint Palestinian-Italian expedition in 1997 under the directorship of Dr. H. Taha and Prof P. Mathiae.

Objectives of the Project

The project for the Re-evaluation of Tell es-Sultan has been developed in cooperation with different international institutes, especially the University of La Spianza in Roma. The scope of the first phase is to carry out an archaeological assessment of the site in order to determine the present state of the archaeological remains. Moreover, the scope of the first phase is to determine priorities for



The Neolithic tower at Jericho.

archaeological research in the future, as well as carrying out a site conservation assessment to determine the present state of preservation of the site and to develop a plan for its future conservation. This will provide the necessary information to develop a management plan, and to enhance tourism with minimal damage to the site.

The main aim of the management plan is to give a better understanding of the site and to mitigate damage currently caused by human and natural forces.

The development plan

It includes the following elements:

-Archaeological survey and topographic map of the site.

-Clearance of the trenches and leveling of the dump.

-Consolidation of earthen section to prevent further deterioration.

-Conservation of the Neolithic tower and the EB and MB walls.

-Pathways and signing system.

-Lighting system.

-Proper fencing.

-Interpretation of the site.

Results of the first season:

The first season of work was undertaken within the framework of the Palestinian-Italian archaeological expedition at Tell es-Sultan, conducted by the Palestinian Department of Antiquities and the University of La Spianza in Rome, and co-directed by Dr. H. Taha and Prof. P. Mathiae. The field direction was by N. Marchetti, L. Nigro, and I. Sarie, with N. Khaleel as paleobotanist and O. Hamdan as architect. The expedition of the first season carried out between April 4 and May 6, 1997 has managed to complete a good part of the planned activities.

The main objectives of this development project are: I) Consolidation, II) Excavations.

I- Consolidation:

This includes restoration, general removal of the old dumps from the site, including leveling in trench I, regularization of eroded balks, and removal of dump at the southernmost limit of trench II and refilling the trench from the top of the outer stone wall to the stone foundation of the EB mudbrick wall on the southwestern corner of the tell, in front of the MB revetment wall. The conservation work was done by using the traditional sun-dried mudbrick to cover the hole at the base of the EB wall.

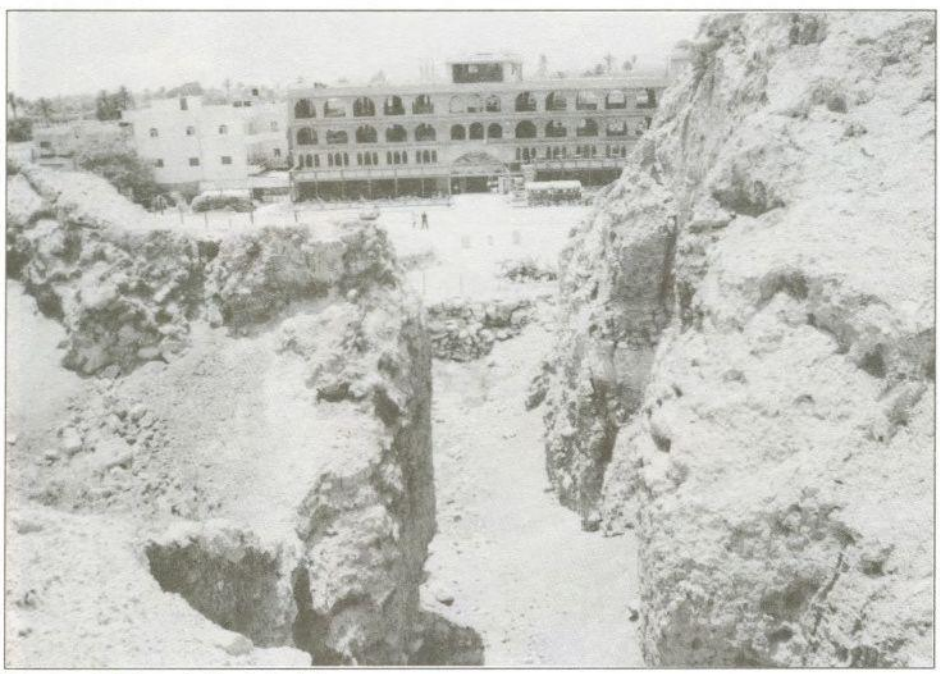
The EB Age city wall, severely eroded, has been protected by means of a series of small trenches and drains. In area C, a general cleaning of the tower area and trimming of trench I has been carried out, clarifying the internal structure of the MB Age glacis and the mudbrick wall on its top. Restoration of the EB wall in the northern trench was done with mudbrick, prepared in a special workshop in Jericho, using traditional methods of making mudbrick with earth and straw.

A series of restorations has been carried out in several parts of the site. In area A, a new path has been made from the site entrance to the southern flank to trench III, for showing the massive stone wall and Building A1. At the same time trench II has been partially trimmed in order to appreciate its stratification through the Early and Middle Bronze Ages. In area B a complete restoration of the Early Bronze Age city wall has been achieved with chemical consolidation of the mudbricks, as well as complete removal of the dump from the previous excavations, envisaging new tourist circulation in the area.

II- Archaeological Excavations:

A small scale excavation was conducted in three areas (A, B, and C), with the aim of investigating the plan of the EB town and the chronology of the EB II-III (2850-2300 B.C.) city walls, and clarifying the internal structure and chronology of the MB Age (1950-1550 B.C.) fortification system and the massive stone revetment wall at the base. The main focus was on the urban structure and fortification system of the EB Age and MB Age cities.

The joint project is regarded as the core of a long-term international project for the safe guarding of archaeological sites in Jericho, with potential participation by UNESCO and Yale University. ■



Kenyon's Trench III at Jericho.

The Royal Institute for Inter-Faith Studies: Working for Peace and Understanding

By: Kamal Salibi, Amman (Jordan)

Among the centers and institutions of its kind in the world, the Royal Institute for Inter-Faith Studies (RIIFS) in Amman, with its Academic and Dialogue Programs, has come to enjoy an especially prominent standing. During the three years that it has been in operation, it has succeeded in placing Jordan in the forefront of countries concerned with the promotion of inter-faith understanding, regionally and internationally. Through its Dialogue Program, which is run independently of the Academic Program, it became a founding member of a number of regional and international inter-faith organizations, not the least among them the Middle East Consortium of Research Institutes (MECRI). The originality of the operation of this RIIFS Program is best epitomized by the two-day symposium it organized in February 1997 on the subject of The Fear of Peace — the first diagnosis of this pathological socio-political phenomenon, and the first time it was given a name.

Like other inter-faith dialogue programs, that of RIIFS provides a platform — perhaps the only fully credible regional one — for the free and candid discussion of inter-faith differences, problems and conflicts, and of what lies behind them. The RIIFS activity, however, is not limited to the promotion of useful, bona fide dialogue. Through its equally active Academic Program, the Institute serves first and foremost as a centre for research and publication, in English and Arabic, on subjects directly or indirectly related to inter-faith relations. It is on this score that RIIFS stands today as a leader in the field, regionally and internationally.

Established by the initiative of H. R. H. Crown Prince El Hassan bin Talal of Jordan in July 1994, RIIFS inaugurated its publishing activity by bringing out the book of His Royal Highness, Christianity in the Arab World, in English and Arabic editions (other editions of this book are due to appear in 1998-1999 in German, Hebrew, Italian and Spanish translation, with a translation into Dutch also being considered). Other RIIFS publications in English are Christianity in the Sudan, Overview and Bibliography, by John Gay Yoh (1997), and The Fatimid Armenians, by Seta Dadoyan, which was published for RIIFS by E. J. Brill; other commissioned books and monographs are under preparation. RIIFS publishes a periodical bulletin, Inter-Faith Quarterly, which it plans to develop shortly into a refereed journal.

Two major reference works produced by the RIIFS English language research team, edited by its Director, Professor Kamal Salibi of the American University of Beirut, in association with Yusuf K. Khoury, are The Missionary Herald: Reports from Ottoman Syria, 1819-1870 (1996), and The Missionary Herald: Reports from Northern Iraq, 1833-1870 (1997). Meanwhile, the RIIFS Arabic language research team has produced Jesus and Mary in the Koran and in Koranic Exegesis (1996), with another book, The Christians in the Koran and in Koranic Exegesis, currently in press, and A Bibliographic Dictionary of Christian Arabs in Islamic Times under preparation. Among the commissioned monographs published by RIIFS in Arabic are a study of social life in Jersualem under Fatimid and Crusader rule, a biography of Butrus al-Bustani as a Christian pioneer of the nineteenth century Arabic re-naissance, and a book on the Syrian Orthodox church, commonly known as the Jacobite church, in history and today. The RIIFS Arabic language research team produces a quarterly bulletin in Arabic called al-Nashrah.

The first conference organized by RIIFS, held in August 1995 with international participation, was on the subject Christian Perceptions of Islam/ Muslim Perceptions of Christianity: The Historical Record. The proceedings of this conference were published in Birmingham, England, in two successive issues of the journal Islam and Muslim-Christian Relations. The second conference, held in August 1997, with international participation, was on Muslim Arab Civilization: The Non-Muslim Dimensions; the proceedings are to be published within a year by an American academic publisher. Planned for

October 1998 is a third conference on Religion and Community: Crosscultural Patterns of Coexistence and Conflict in Contemporary Society. This conference, which will deal with the question on the universal rather than the regional level, will be attended by leading anthropologists from different countries, and is being organized in association with Professor Gerald Obermeyer of the Department of Anthropology at Boston University. In September 1997, a conversazione was organized and held by RIIFS, openly broaching the subject of The Christian Arab Today in the Arab world, and among concerned Arab participants, for the first time.

It is the conviction of RIIFS that inter-faith dialogue cannot be truly meaningful as an exercise between representatives of the different faiths unless backed by the sort of knowledge that can only be produced by academic research and learned give-and-take among specialists and scholars. This explains the concentration it places on its Academic Program, as distinct from its Dialogue Program, which is no less important. ■

CARCIP: The fine tuning of a repair mortar for the monuments of Petra

By Helge H. Fischer (Project Director/CARCIP)

After extensive trials comprising field tests, laboratory investigation and rock analysis, the Conservation and Restoration Centre in Petra (CARCIP) has successfully adjusted the properties of a silica sol repair mortar to the properties of the Petra sandstones. The mortar is now being applied in the restoration of monument 825. This is the first time a state of the art repair mortar, compatible with the properties of the Petra sandstones, has been used in a world heritage site, making the use of cement-based mortars with their adverse side effects obsolete.

Sandstone is a rather fragile building material whose damaged surface cannot be easily repaired. In Europe until the end of the 19th century the common practice was to replace damaged stones by new ones, preferably of a more durable nature. This is still common practice on many of the sandstone cathedrals found throughout Europe (for obvious reasons, such methods may not be applied to the rock carved tombs of Petra, as these are practically monoliths). At the turn of the century, however, new materials became available and were put into use in the reconstruction or repair of damaged surfaces of natural stone. The materials thus used were primarily cement-based mortars, and, since the middle of this century, resin-based mortars or a combination of both.

The effects of the introduction of these materials on sandstones turned out to be disastrous. They constitute one of the major causes of damage where they have been applied to ancient monuments, and are responsible for the loss of valuable pieces of art such as wall paintings or frescos. The major reason for this catastrophe is in the soluble alkalines present in Portland cement, leading to the formation of salts, and that such cements are physically and chemically incompatible with sandstones. Just to cite one example of this incompatibility: it is known that any solid material expands upon heating. The so-called caloric expansion values that are a measure of such expansion properties may differ considerably from sandstone to Portland cement-based materials. The result: tension at the contacts between such materials, leading finally to detachment. Or, if administered in cracks, the strength and expansion of such cements may lead to rupture and break-up of the host sandstone, thus causing damage instead of fixing the problem.

In modern restoration, i.e. a restoration based on scientific analysis, and this applies in general, such disasters fortunately are by and large a thing of the past. This shift towards a scientific approach and structured procedures is — as the examples cited above imply — something learned the hard way.

But old habits die hard, and new approaches are difficult to implement, in spite of all evidence of past failures. There are several reasons for this, and in order to avoid such malpractices it might be worthwhile to look into the matter. First of all, general knowledge of and appreciation for the newly established conservation sciences is not yet widespread and often has not even been registered by those in charge of restoration campaigns. Secondly, the application of elaborate procedures and practices based on scientific investigation and evidence is time consuming and costly. And thirdly, "restorers" for a long time have been delivering results that were aesthetically pleasing, earning them a reputation that later proved hard to question, particularly if the adverse effects only show up after decades.

CARCIP is in the process of implementing and institutionalizing such modern, scientifically-based restoration techniques and procedures in Jordan. The fine tuning of the silica sol repair mortar is just one example, and its development or adjustment to the situation in Petra shows in an exemplary way what modern

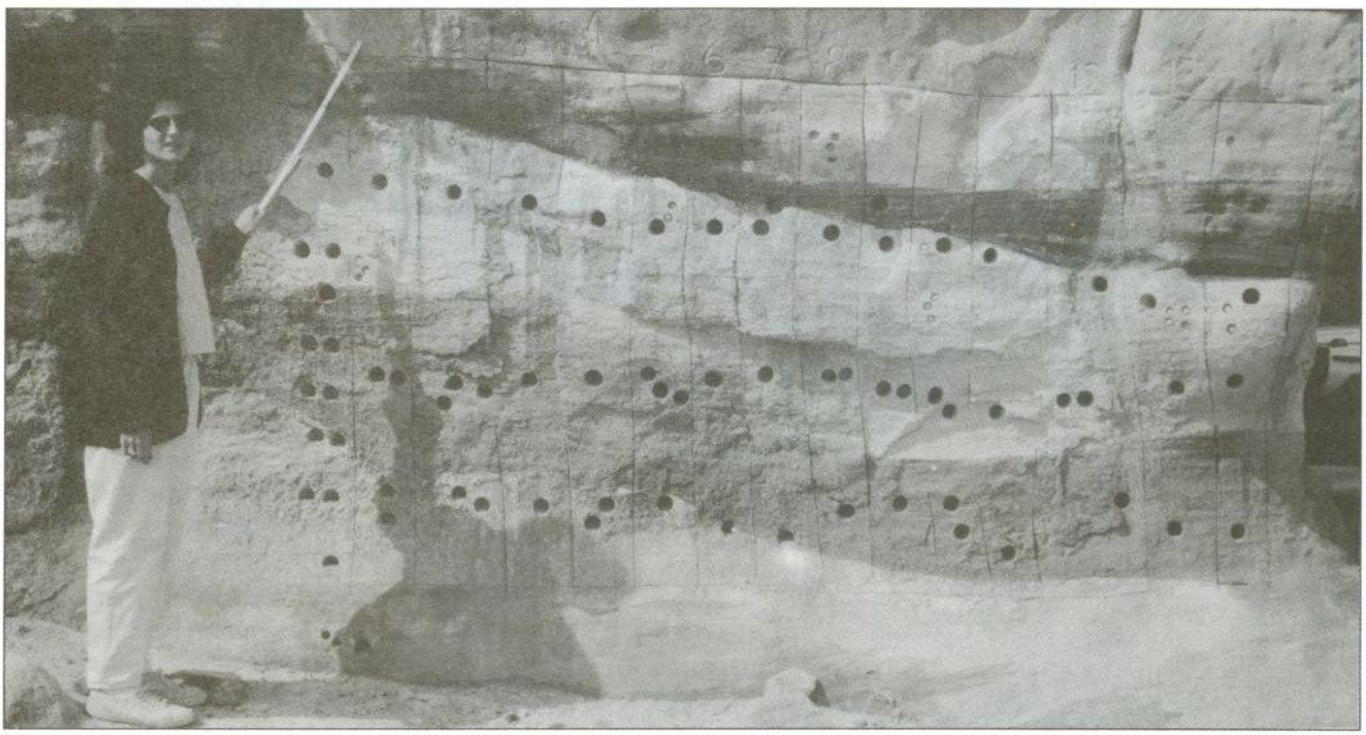
restoration entails.

Though silica sol mortars have been known and applied in restoration for a number of years, such mortars are not ready made products available on the market that you just mix according to a standard formula and then put to use. This is one of the lessons learned from the past: every situation is different. The application of mortars on any historical monument thus always poses a new set of challenges, to which the mortar has to be adapted. The key issue here is compatibility, and, as we will see, this can be extremely demanding and difficult to achieve. There is no way around this, unless you want to take risks with unpredictable results.

Compatibility means adjusting the properties of the mortar to be applied for repair to the various properties inherent to the sandstone. This, in turn, first requires a thorough analysis of the sandstone itself, which requires a set of procedures that are now standard in modern restoration, and have been for the first time implemented for the adaptation of a mortar for repair use in Petra sandstones.

Due to the accompanying build-up of appropriate testing facilities, the purchase and installation of the required tools and equipment, and the training component involved — ensuring that the tests can be executed by Jordanian personnel — the whole procedure took almost two years (of course, this was not the only procedure implemented, and a number of other procedures and facilities have been established parallel to the rock-testing facilities) and comprised essentially the following:

- dry extraction of core samples from sandstone (it has to be dry, because core drilling with water would dissolve the salts contained in the sandstones that also need to be characterized)
- determination of the sandstone properties, such as porosity, strength, water vapor diffusion resistance, water absorption, caloric expansion, mineralogical composition, and grain size distribution, the latter two through microscopic investigation
- mixing of a trial repair mortar (an elaborate procedure in itself) based on the parameters obtained from the sandstone data and experience generated by the use of such repair mortars
- preparation of test cubes from the trial mortar
- determination of the trial mortar properties for the same parameters as the sandstone
- comparison of the sandstone data with the mortar data and modification of the recipe in order to adjust the parameters to the ones obtained from the sandstone (this procedure may have to be repeated several times!)
- adjustment of the color of the repair mortar to the natural sandstone, through generation of various mixes of monochrome sands crushed from sandstones
- testing of various consolidants in the required pre-treatment of sandstone surfaces in order to ensure satisfactory adhesion of the repair mortar
- application of the adjusted repair mortar to various pre-treated surfaces in a particularly designed open air test field for long-term observation and testing
- determination of adhesion properties through visual inspection, macroscopic and microscopic



The repair mortar test field in an ancient Nabatean quarry in Petra

investigation of the interface from core samples drilled through the repair mortar into the sandstone, and in situ measurement of pull of strength values

- modification of pre-treatment and mortar application techniques until optimal results are obtained

The tests and trials were finalized earlier this year and the resulting fine tuned mortar applied to the first monument under restoration by the project. Additional tests have been carried out after application of the repair mortar to the monument and from this the final product obtained. This specially designed repair mortar will later be produced in large quantities in the final restoration of monument 825, requiring a different set of mixing machines, which have already been acquired and put into operation. The problem here is to generate an absolutely homogeneous repair mortar that cannot be achieved with standard mixing equipment.

As mentioned earlier, replacement of the sandstone in the tombs of Petra is not an option, as these are monoliths. The development of the repair mortar as described — with a wide range of properties matching the properties of the natural sandstones, for the first time based on knowledge available to us — allows us to reconstruct damaged surfaces where needed without inflicting future damage.

Admittedly, the procedure is costly and cumbersome. The alternative, however, is — but cannot be — to use cheaper materials or to make short cuts that will later inflict damage rather than achieve any repairs. The only alternative to the use and application of modern restoration principles and techniques, for all practical purposes, is rather to do nothing at all. ■

German Institute of Archaeology (DAI) Research Activities in the Near East

By: Ricardo Eichmann, German Institute of Archaeology - Berlin (Germany)

The establishment of the Orient Department with its head office located immediately next to the central administration of the German Institute of Archaeology in Berlin was part of the recent restructuring of this organization. The department, which started work in the beginning of 1996, supervises the institute's archaeological research in Southwest Asia, in the region south of Turkey and west of Iran. In Turkey the institute is represented by a separate department (Istanbul) and in Iran by a regional office (Teheran) which is subordinate to the Eurasia Department.

The Orient Department has branch offices in Syria, Iraq and Yemen, which emerged from a department founded in Baghdad in 1955, and two sections in Sanaa (1978) and Damascus (1980).

In Yemen, excavations are taking place in and around Marib, the site of the ancient capital city of the Sabaean kingdom. Work has focused on ancient irrigation installations, a number of spectacular graves within a temple necropolis, and a sanctuary dedicated to the moon god Almaqah of Bar'an, whose six propylon pilasters have become one of the national emblems of Yemen. Further projects are being carried out in a region north of Aden, where excavations at the site of Sabir, an urban settlement from the second millennium B.C., have produced evidence of cultural contact between this region and areas in Africa, such as Ethiopia and Sudan.

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The projects in Syria are intended to advance research on ancient urban centers and military installations from the Roman, Byzantine and Islamic periods. This includes work on temples, churches, castles and representative domestic architecture. Among the investigated sites are Qanawat (Hauran), Resafa and Late Ottoman Damascus. Research within the field of ancient oriental archaeology is being carried out at Tell Bazi (Middle Euphrates), where, just below a fort, extensive areas of a large lower city dating to the 14th to 12th centuries B. C. have been cleared.

The branch office in Baghdad is currently unoccupied. Studies on Iraq are temporarily being performed at the desk in Berlin while hopes persist for a change soon in the situation in that country. Mutual visits have served to maintain contacts on a scientific level and to prepare future excavations, as in the case for Uruk-Warka where German archaeologists have excavated in 40 different campaigns since 1912. A substantial number of final reports on the excavations have appeared in the last decade and more are expected in the years to come.

The Orient Department, therefore, does not only seek to meet regional research requirements, but moreover ones that go beyond modern national borders. Current projects, consequently, do not only comprise

countries with branch offices, but also neighbouring states. Such projects are

planned in the branch offices or in Berlin. Another policy is to work in close co-operation with institutions of the host countries. The international consciousness emanating from such co-operation reduces culturally biased modes of inquiry. In this connection, the Orient Department has started new projects in Lebanon, with excavations beginning in the ancient city of Baalbek, which will also be the location of an archaeological exhibition in 1998. More projects also are being planned in Jordan, where the German Institute of Archaeology can look back at several years of active involvement through collaboration with the German Protestant Institute (DEI) in the excavations at Umm Qais, and more recently in assisting the 1997 excavation campaign at Ba'ja, a late PPNB site near Petra, with a research commission. A further project is also planned for January 1998 in association with the University of Jordan (Amman) in the area north of Aqaba, for which preparations are underway.

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JARASH CATHEDRAL PROJECT 1997

By: Carola Jaeggi, University of Basel (Switzerland) and Hans-Rudolf Meier (Swiss Federal Institute of Technology, Zürich (Switzerland)

The fourth campaign of our project concerning the christianisation of the site of the so-called Cathedral of Gerasa/Jarash and its construction history took place in September/ October 1997. Carrying on our excavations of last year (see Newsletter of the German Protestant Institute of Archaeology in Amman, Vol. 1, 1996, p. 8) the outlines of the Roman temple which preceded the church have now been clarified. At the east end, just under the chord of the church apse, three steps of the original staircase ascending from the Cardo to the temple were discovered.

Obviously, in the 3rd century the area was no longer used as a sacred space. An oven found near the foundation of the temple shows that at this time potters and bronze-casters had installed themselves in the presumed Temenos. At least in the late 4th century they had to leave the place for the Christians, who built a huge church. With this act they revitalized this central urban lot, just beneath the Artemis temple and the Nymphaeum, with a monumental public building. The church-builders used the foundations of the temple well: the stylobate was built on the foundations of the Cella-podium, the side-walls on those of the Temenos walls or a colonnade.

During the next two centuries problems — maybe connected with an earthquake — caused two collapses of the eastern part of the church, where the foundations were set on the temple-staircase. One of these collapses destroyed the wall mosaics. The church was restored each time, with some changes to the chancel screen. Our investigation of the walls during the measuring of a new ground plan shows some later changes and many interesting details, which now have to be analyzed.

Literature:

B. BRENK, C. JAEGGI, H. R. MEIER, Neue Forschungen zur Kathedrale von Gerasa. Probleme der Chronologie und der Vorgängerbauten. In: Zeitschrift des Deutschen Palästinavereins 112/2, 1996, 139-155.

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Karstification, Ancient Water Structures and Human Imprints Northwest of Irbid City

By: Elias Salameh, University of Jordan, Amman (Jordan) and Mohammad Ali Okla Al Farajat, University of Jordan, Amman (Jordan)

In the northwestern area of Irbid city which extends to the slopes overlooking the Jordan Valley and the Yarmouk River, karstification of outcropping rock units forms prevalent topographic features such as sinkholes, caves, caverns and deep incised water courses. These features are mainly developed in the Chalky Marl Limestone Unit, designated as B4-Al Rijam of Early Tertiary age.

Some of these karst features seem to have been used by former inhabitants of the area for storage of water or food, or as shelters. Human imprints in newly discovered caves in the vicinity of Agraba, Khoraibeh and Um Irsheid include carvings on cave walls, colourings, clearings of narrow paths, and others.

One of the authors, Mohammad Al Farajat from the University of Jordan, prepared his Masters thesis on these karstification phenomena in the area, from the points of view of spatial distribution, nature and size, geology, hydrochemistry, speleology and the role of karstification in enhancing water percolation and pollutant transport into the groundwater bodies and spring water.

The field and laboratory studies and analyses, including interpretation of aerial photographs and landsat images, revealed some clues about the extent of the karstification and its distribution. It seems that the karstification extends as far as 15 km west and north of Irbid, to the slopes of the Yarmouk River and the Jordan Valley.

Underground karst channels and cavities are extensive and interconnected, and have lengths of a few hundred metres, perhaps kilometres. In some areas the karstholes are filled and covered by thick soils, but nevertheless they serve as recharge sites for the groundwater.

Villages, settlements and single houses use the karstholes and cavities to dispose of their liquid and solid wastes. Pollutants are negatively affecting the groundwater resources of the area. The groundwater (spring water) in the area is already polluted and some major springs cannot be used any more as a safe source of drinking water.

Former studies, especially those of the German Protestant Institute of Archaeology in Amman (DEI) on Umm Qais (Gadara) and Irbid caves, showed that these karstification phenomena are of utmost archaeological importance for the water supply of Gadara and Irbid, in addition to their shelter and defence functions.

It seems that it is worth continuing the studies on the Karstification of the area and including the human imprints in that research. It is also of great importance to end up with some relevant recommendations concerning the deteriorating water quality of the area. Mohammad Al Farajat plans now to continue these studies, preparing a Ph. D. thesis. ■

Karstification of rock units northwest of Irbid.

Fellows in Residence and Associated fellows (June 1997 - November 1997)

Team members of the Ba'ja Neolithic Project (see article on page 2).

- Dr. Ute Wagner-Lux, Basel (Switzerland) and Dr. Karel Vriezen, University of Utrecht (Netherlands), University of Leiden (Netherlands), Archaeological Excavations in Umm Qais (Church and Church Terrace).
- Helmut Burkard, National Music Conservatory, Noor al-Hussein Foundation/Deutscher Musikrat (Germany), Courses for Music Teachers of Basic Music Education.
- Anja Wünsch, University of Leipzig, Oriental Institute (Germany), Effects and Effectiveness of the Structural Adjustment Programme (SAP) in the Jordanian Economy, a project supported by the Volkswagen Stiftung (Germany).
- Prof. Dr. Adolf Hoffmann and his excavation team, University of Cottbus/German Archaeological Institute Berlin (Germany), Archaeological Excavations in Umm Qais.
- Dr. Roland Lamprichs, University of Freiburg (Germany), Preparing for an Archaeological Excavation at Tell Johifiyeh.
- Jan Weitz, University of Mannheim (Germany), GTZ-Watershed Management Project - GIS-Group
- Prof. Dr. Beat Brenk, Dr. Carola Jäggi, University of Basel, and Dr. Hans-Rudolf Meier, Federal Institute of Technology Zürich (ETH) (Switzerland), Jerash Cathedral Project.
- Lorenza Schlotmann, Dipl. Ing. Agr., University of Hohenheim (Germany), GTZ-Watershed Management Project - Gender and Participation.
- Marleine Boueiz, Hamburg (Germany), short term consultant for the Agricultural Policy Impact Monitoring (APIM) Project, Ministry of Agriculture, Amman/GTZ.
- Prof. Dr. Andreas Hauptmann, Deutsches Bergbau-Museum Bochum (Germany) and Stephan Kölschbach, Technical University Aachen (Germany), Preparations for simulations of early Bronze Age smelting processes at Wadi Feinan.
- Elisabeth Joos, University of Tübingen (Germany), volunteer for the German Speaking Congregation in Amman

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