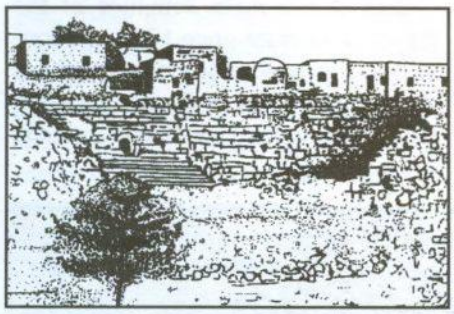
OCCIDENT & ORIENT

Newsletter of the German Protestant Institute of Archaeology in Amman



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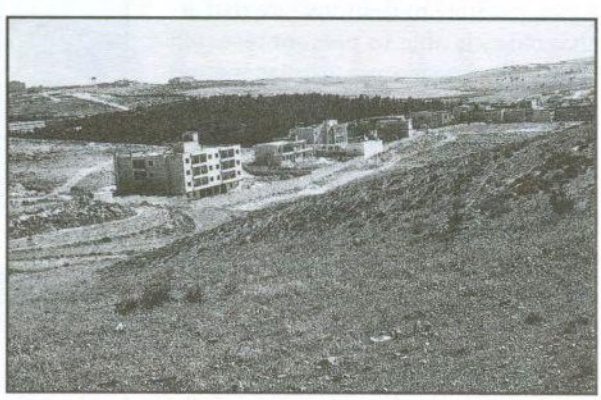
The German Institute Turns 25

It was on November 4, 1975 that the administrative committee of the German Protestant Institute of Archaeology for the Holy Land (DEI) bought land in north Amman, on a hill, opposite the University of Jordan. It was intended, as previously decided in 1974, to built a branch of the Jerusalem Institute in Amman. Due to the war of 1967 and its political implications it became almost impossible for the DEI to continue its work east of the Jordan River. Therefore – due to the courage and efforts of Dr. Ute Wagner-Lux – the German Protestant Institute of Archaeology was founded in Amman. Between 1976 and 1980 the institute's building was built with funds provided by the "Stiftung Volkswagenwerk Hannover, Germany" (Foundation Volkswagenwerk). The official inauguration of the institute followed in April 1982. The Amman institute was headed by Dr. Ute Wagner-Lux until 1982; she was followed by Dr. Axel Knauf (1982-1985), Dr. Thomas Weber (1985-1990), Dr. Susanne Kerner (1990-1995) and Dr. Hans-Dieter Bienert (1996 until now).

Now, 25 years after the purchase of the land, the Amman Institute has established itself as one of the most important scientific institutes in the field of archaeology in Jordan. Since its foundation the institute has always tried to work in close cooperation and in the spirit of mutual understanding and respect with local authorities, universities, and other local and foreign institutions involved in research on the history and archaeology of the Middle East. So, lectures, conferences and exhibitions have often been jointly organized with Jordanian institutions. The Institute also supports the archaeological activities of German universities and institutes carrying out fieldwork in Jordan, e.g., projects conducted by the German Archaeological Institute (Berlin), the Bergbau-Museum Bochum, Tübingen University, Liebieghaus Frankfurt/Main, Free University of Berlin and Cottbus University. There is also close cooperation with other European universities, such as the University of Utrecht (Netherlands), the University of Copenhagen (Denmark) and the University of Basel (Switzerland).

The Institute also has other obligations. Once a year a group of German-speaking theologians receive scholarships from the Evangelical Church of Germany to travel to the "Holy Land" (an area very generously defined here, sometimes even including Egypt, Syria and eastern Turkey) to study the archaeology, topography and history of this area. The logistics of this study-course have changed considerably since the



View towards the German Institute (center of photo) in 1979.

programme began, from sleeping in tents and riding on mule-back to using one of the institute buses, staying in the guest-rooms of the Institute, and having dinner at one of Amman's Arab restaurants. But the main purpose is still to learn as much as possible about the "Holy Land" in a period of two months.

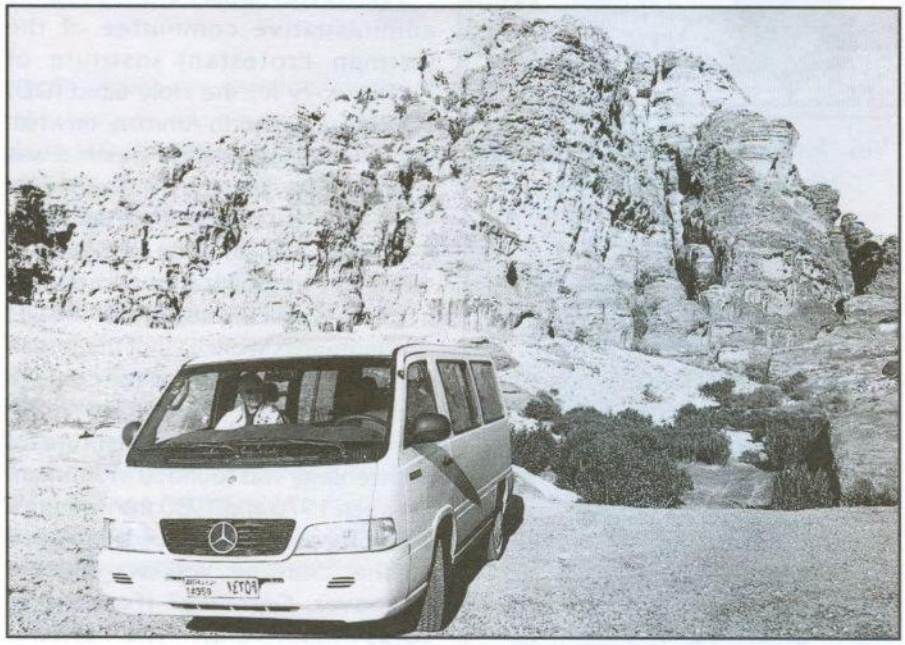
In 1996 and 1997 the Institute organized a number of archaeological meetings. In October 1996 the Institute hosted a meeting of the foreign archaeological missions working in Jordan. In July 1997 the Amman Institute, in cooperation with ex oriente e. V., a private research association based in Berlin (Germany), organized an international symposium on "Central Settlements in Neolithic Jordan". This conference was held at the Petra Mövenpick Hotel under the patronage of H. R. H. Prince Ra'ad Bin Zeid and was very well attended by about 50 international scholars. The proceedings of this conference will be published in 2001.

A second international symposium was organized in 1999 by the German Institute in cooperation with the German Archaeological Institute and Yarmouk University, Irbid. The conference, entitled "Men of Dikes and Canals – The Archaeology of Water in the Middle East", was held in Petra/Wadi Musa, Jordan, from June 15-20. More than 60 scholars participated in this conference: archaeologists as well as scholars whose scientific research is related to water in antiquity and today. Ancient water installations and water-related issues, as well as modern water problems and increasing water conflicts in the Middle East, were the focus of discussions. It was possible to demonstrate that archaeology is able to present research results on ancient water installations and techniques which have an impact on present and/or future water exploitation and distribution techniques.

The Institute also maintains close contacts with a number of non-archaeological institutions, such as the Royal Institute for Inter-Faith Studies, as it regards inter-religious dialogue as an important part of its work. Therefore, it actively participated in the conference "Muslim-Christian Consultation on Religion and Secularism", held in Amman in April 1997. The Institute also enjoys fruitful and excellent cooperation with the German-speaking Congregation of the Lutheran Church of the Reedemer in Amman. Joint activities, such as excursions and lectures, are offered for the German-speaking community.

The Institute edits a number of publications. Between 1990 and 1994, Dr. Susanne Kerner, former director in Amman, in cooperation with the Goethe Institute and Al Kutba Publishers, edited four volumes of "The Near East in Antiquity". Since 1996 Dr. Hans-Dieter Bienert is editing the bi-annual Newsletter "Occident & Orient".

One of the main activities of the Amman Institute since 1975 has consisted of archaeological excavations at the Decapolis city of Gadara (modern Umm Qais) where Ute Wagner-Lux, the



The new mini bus of the Institute, purchased with the support of the Daimler-Chrysler Company (Germany).

Prof. Dr. Kyrieleis (second from left), President of the German Archaeological Institute Berlin (Germany), during his recent visit to Umm Qais.

first director of the Amman Institute, had started work in 1965 by uncovering a late Roman bath complex. Later on Dr. Wagner-Lux worked together with Dr. Karel Vriezen on the Church Terrace, where they uncovered an Octagonal Church and another smaller basilica. Dr. Wagner-Lux also conducted excavations in Madaba in 1966 and 1967. Since 1986, the DEI has worked at Umm Qais in cooperation with the German Archaeological Institute in Berlin (DAI). A number of important discoveries have been made at the ancient site. An underground tunnel system was discovered and investigated, a five-aisled basilica and large parts of the Hellenistic/Roman city wall were uncovered, and a late Hellenistic sanctuary was found and excavated. However, it seems that Gadara still holds more "secrets" which await discovery. Thanks to the financial support of the German government, three Ottoman houses were restored between 1987 and 1988. One – the former Beit Rusan – now hosts the local museum.

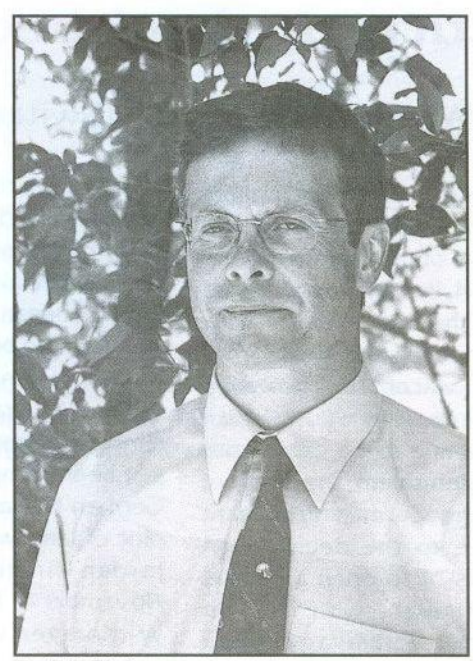
Members of the institute have also conducted research at other sites in Jordan. Prof. Dr. August Strobel and Dr. Christa Clamer excavated at Ain Zara in 1985, 1986 and 1989, which was known in antiquity as "the good/beautiful waters" – in Greek: Kallirhoe. The oasis-like site, which stretches along the eastern shore of the Dead Sea, was visited by study-courses of the DEI in 1961 and 1965. Some forty perennial thermal springs here provide for abundant, lush vegetation. The excavations of the DEI revealed remains of a Herodian palace-like complex, dating to the end of the first century B.C. Thereafter, an Early Byzantine re-settlement lasted from the second half of the fourth century to the end of the fifth century A.D.

In summer 1997 archaeological excavations were carried out on behalf of the DEI at the early Neolithic site of Ba'ja (second half of the 7th millennium B.C.), situated in the mountainous region 10 km north of Petra. Archaeological investigations were continued by the Institute in the same region in October and November 1999. Subsequently, later settlements, called Ba'ja I and III, were researched. This project aims at studying the archaeology of the Ba'ja region and documenting its remains from the earliest time of human occupation up to the Ottoman period. Plans for future fieldwork are already underway.

Alison McQuitty.

Looking back at all those successful activities, we decided to commemorate the 25th anniversary of the Amman Institute. A number of events were organized with the Goethe-Institute Amman, the Department of Antiquities of Jordan, the German Speaking Congregation of Amman, the European Salon and Darat el-Funun (see contribution by D. Vieweger in this issue). The intention of the celebration was to look back at what has been achieved in the past 25 years, and mainly to look forward and to celebrate the good cooperation and the splendid spirit in which we can conduct our projects, jointly with our Jordanian partners and colleagues and the other foreign missions working in Jordan. Therefore, the anniversary was also a good chance to say thank you to our host-country, the Hashemite Kingdom of Jordan and to all friends and colleagues. We are grateful to all of you!

While in 2000 we celebrated the 25th anniversary of our institute, we held a number of other activities and events too, of which just a few shall be mentioned here. In Umm Qais further excavations were conducted by our German colleagues from the German Archaeological Institute in Berlin (Germany). A project to erect explanatory signs at the major monuments is in progress, jointly conducted by the Orient Department of the German Archaeological Institute and the DEI in Amman, and ex-



Dr. Bill Finlayson.

ecuted in cooperation with the Jordanian Department of Antiquities. Archaeological fieldwork undertaken by German teams in the Irbid and Aqaba areas received logistic support from the DEI. In late September we had the honour to welcome the president of the German Archaeological Institute, Prof. Dr. Helmut Kyrieleis, in Umm Qais and Amman. He showed great interest in our work and the achievements of our Jordanian colleagues in the field of archaeology.

However, in 2000 we also had to say good-bye to a good friend and colleague: Ms. Alison McQuitty left Jordan after having spent many years in the country as Assistant Director (1986-1989), Acting Director (1989-1990), and finally Director (1990-1991 and 1994-1999) of the British Institute at Amman for Archaeology and History. Ms. McQuitty received here M.A. in Middle Eastern Studies in 1985 from the School of Oriental and African Studies, University of London (U.K.) and is currently working on her D.Phil. entitled: "Rural Settlement of the Kerak Plateau, Jordan from the Middle Islamic Period (12th/13th Centuries A.D.) – early 20th Century A.D.". She also has considerable experience as a field archaeologist and conducted excavations at Khirbet Faris. Her excellent scholarly input into our archaeological community here in Jordan will be very much missed, as well as her friendly and charming character! Alison, we do hope you will return often to Jordan, your second (or even first?) home!

Alison McQuitty is succeeded by Dr. Bill Finlayson as Director of what is now called the Council for British Research in the Levant (CBRL), which is responsible for CBRL activities throughout the Levant and Cyprus. He has come to Jordan from Edinburgh, where he was the manager of the Centre for Field Archaeology, a professional archaeological unit providing applied research and consultancy services. He has worked in the Near East since 1979, and his 1982 MA dissertation was on the Middle Palaeolithic of the southern Levant and its external relations. Since then he has combined his interests here with research in Scotland. His PhD thesis, "A pragmatic approach to the functional analysis of chipped stone tools", completed at the University of Edinburgh in 1990, illustrates this, combining case study material from Jordan, Cyprus and Scotland. His main research interests lie in early prehistory, particularly the transformations occurring between hunting-gathering and farming societies at the start of the Holocene. He has been working in Wadi Faynan since 1996, conducting survey and trial excavations on Palaeolithic and Pre-Pottery Neolithic sites. We wish Bill much success in all his projects and we are sure that we will continue the good cooperation and friendship as European colleagues working here in the Middle East.■

The Early Years of the German Protestant Institute of Archaeology in Amman

By: Ute Wagner-Lux, Basel (Switzerland)

When the German Protestant Institute of Archaeology re-opened in the Jordanian part of Jerusalem in the autumn of 1964, its work concentrated on sites east of the Jordan: Gadara (now Umm Qais), Madaba and Rihab. After the Israeli-Arab war of 1967, however, when it became clear that work in Jordan could not continue to be carried out from a base in Jerusalem, the Board of Directors of the German Protestant Institute came to the decision on October 25, 1974 to open a parallel institute in Amman, with its own building. The Volkswagenwerk Foundation in Hanover agreed to the division of the original sum intended for the purchase of a building in Jerusalem, and after many negotiations with the Jordanian authorities and the German Embassy the search for a suitable location began. (Because of the political situation, no building was, in fact, ever bought in Jerusalem itself.) After the failure of several attempts – the Institute almost acquired a building that had only just been completed, near the present German Embassy – the purchase of a plot of land west of the University of Jordan finally went through on November 4, 1975. The architect Ernst W. Krueger was commissioned to design the building. Once the foundations had been dug, construction work began in the spring of 1976, but due to the Lebanon crisis progress was slow. In the spring of 1977, nonetheless, it was possible to begin the Gadara excavation season working from this building (only its ground floor was ready for use at the time); the neighbouring British Institute had acted as the base for the 1976 season.

The building was fully operational in 1978; study courses and guided tours were arranged, excavations undertaken on a large scale, lectures given, and visitors accommodated. Special tribute should be paid here to Abu Hassan (Jamil Amira), the excellent Arab driver and interpreter who has been the

Institute's loyal supporter from the first day to the present.

In the winter of 1979/80 heavy rains and snowfall did a considerable amount of damage to the building – the western part of the garden was washed away, along with its wall – and the commission to carry out repairs went to Abu Habib Kort of east Jerusalem, who had distinguished himself in 1970-1974 as supervisor of the restoration of the German Protestant Church of the Redeemer in the Old Town of Jerusalem.

The new building was formally inaugurated on April 22, 1982, in the presence of Dr Marie Luise Zarnitz (representing the Volkswagenwerk Foundation of Hanover), Dr Heinz Joachim Held (chairman of the foreign department of the Protestant Church in Germany), Dr George Krüger-Wittmack (managing director of the Institute), Dr Christian Meyer and Dr Konrad von Rabenau (both members of the Board of Directors), Dr Hermann Munz (the German ambassador), and many representatives of the Jordanian authorities and other institutes.■

In Memory of Ernst Walter Krueger (July 16, 1902 - March 6, 1983)

By: Max Wagner, Basel (Switzerland)

The 25th anniversary of the German Protestant Institute of Archaeology in Amman is inseparable from the memory of the architect Ernst Krueger, who planned and constructed the building and laid out its grounds between 1975 and 1978. Although the original utilization concept has been modified over the following two and a half decades to facilitate the management of the building, and the growth of the library entailed the construction of an adjoining new library wing in 1991/92, it owes its harmonious yet practical design to his great experience and artistic talent.

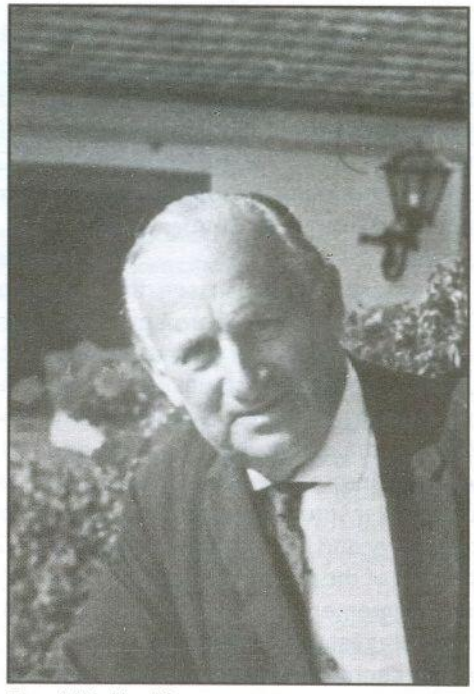
Ernst Krueger was born on July 16, 1902 in Labes in Pomerania, then part of Prussia. He was attending the Humanist Grammar School in Hohensalza, Poznań, before his expulsion by the Poles in 1919; after moving to Hameln on the Weser he earned his secondary school certificate at the grammar school there in 1921. He then trained as an engineer and architect at the Technical Universities of Hanover and Munich, and successfully took his degree. After another four years of advanced technical training with the Prussian State Construction Authority, he passed his Second State Examination with distinction in Berlin in 1930.

From 1931 to 1938 he worked for, among others, the State Buildings Design Department of the Prussian Finance Ministry in Berlin, where he planned and constructed a large number of buildings of all kinds. Even at this time his artistic interests were evident in activities such as the organization of the first Schinkel Exhibition in Berlin in 1931, the restoration of medieval churches, and work on the preservation of historical monuments (in locations including the Schinkel Hall of the Prussian Finance Ministry and the forecourt of the University).

To escape the pressure of political circumstances to which he was increasingly exposed as a high-ranking civil servant, he obtained leave of absence from state service in 1938, and took over the management of the Iraq and Iran branch of Philipp Holzmann AG, which had its offices in Teheran. Here he was again responsible for a series of major buildings, until the British invasion in 1941 brought these activities to an abrupt end; he was interned in Australia for five years. He used this time to learn new skills, including silver and goldsmithing. He was released in 1946, and worked as an architect for twelve years in Melbourne, where in 1954 he passed the examination to qualify as a member of the Royal Australian Institute of Architects.

He returned to Germany in 1958, and worked on a number of Federal German projects abroad for the Federal Construction Authority in Berlin, supervising some of them himself on site (in Washington, New York and Chicago). The management of the authority's entire foreign department was placed in his hands in 1963.

After his retirement in 1965, he continued in private practice as an architect, making his great knowledge



Ernst Walter Krueger.

and experience available primarily to development projects of the Protestant Central Office for Development Aid in Bonn, and to similar Federal German undertakings.

In 1970 the foreign department of the Protestant Church in Germany and the management of the Federal Construction Authority asked him to take on the task of restoring the Church of the Redeemer and its annex buildings in the Old Town of Jerusalem, a commission which led to a stay of many years in the east, where he pursued a host of activities in the evening of his life. From 1970 to 1982 he lived in Jerusalem and Amman as a member of the staff of the Institute. His knowledge of the world and his sympathetic and congenial manner, together with his outstanding command of languages, very quickly gave him access to all the major state, church and private authorities, made him an excellent representative of the Institute in Jerusalem and Amman, and, as time went on, brought him all kinds of enquiries, requests for advice, and a number of architectural commissions.

His interest in archaeology also became increasingly profound, leading on the one hand to research into the history of the Old Town of Jerusalem, in particular the Muristan, and on the other to his extensive and knowledgeable activities as a collector, resulting above all in his collection of ceramics (now in the Institute in Amman). His contribution to the work in Gadara (Umm Qais) in Jordan was invaluable; he was architect to the excavations for five seasons, and displayed his practical and technical talents as well as his scholarship by re-erecting the columns of the Octagonal Church and the adjoining atrium on the structure known as the Terrace (the columns had earlier fallen during an earthquake). His services very soon were also in demand by the Jordanian state authorities, and in 1978 he was appointed to the committee of the Department of Antiquities.

Shortly after his 80th birthday on July 16, 1982, which was celebrated with an impressive ceremony in the Institute garden on the Mount of Olives in Jerusalem (an occasion attended by many members of the Protestant community, other institutes, and the staff of the German Embassy), he moved to his last home in Weil am Rhein, in southern Germany. His unexpected death on March 6, 1983, after a short but severe illness, cut short all his future plans. The personal telegram of condolence sent by Crown Prince Hassan of Jordan shows the high esteem in which he was held everywhere, and the Crown Prince also remembered him movingly on the occasion of the Second Jordanian Archaeological Conference in Amman in the spring of 1983.

Ernst Krueger was buried in Weil on March 9, 1983. Propst Jürgen Wehrmann of Jerusalem conducted the funeral service, and Dr Heinz Joachim Held represented the foreign department of the Protestant Church in Germany.■

Celebrating the Amman Institute - Comments on its 25th Anniversary

"Hardly a day passes without good or bad, mostly ambiguous news about the whole region of the Middle East. In this permanent crisis Jordan, however, has enjoyed stability, which is one of the major reasons for the fascinating growth of the city of Amman in recent decades.

In retrospect we can see that the Evangelical Church in Germany (EKD) made a good decision to establish the German Protestant Institute of Archaeology (DEI) in Amman. During the last 25 years since its foundation it has developed into a respectable and well accepted institution in the field of archaeology and related sciences. Today it is part of the German-Jordanian Cultural Agreement.

The biggest project in this past quarter of a century has been Gadara/Umm Qais where excavation campaigns with excellent scientific results have taken place on a regular basis, together with the German Archaeological Institute (DAI). This is one of the reasons that Gadara/Umm Qais is today one of the major tourist attractions in Jordan.

The Institute has gained further international repute through high-level conferences, successful congresses, and impressive exhibitions, all organized by its directors. In 1998 the Institute was host to the Christian-Muslim-Dialogue between the al-Albeit University and the Evangelical Church in Germany. The latest International Symposium took place in 1999, in co-operation with the German Institute of Archaeology and Yarmouk University, Irbid, under the title: "Men of Dikes and Canals".

In April 1999 I had the opportunity to visit the Institute for the first time as Chairman of the Board of Directors. Thus I gained an insight into the scope, diversity and quality of the work done by the Institute, its Director Hans-Dieter Bienert, and his assistants. To me it has become quite evident that the Institute fulfills, and will do so for a long time to come, important tasks in teaching and research, in biblical archaeology, and in intercultural and interreligious dialogue, and as such in the development of peace and mutual understanding in the region and worldwide. As a church we see this as part of our calling and Christian witness.

I congratulate the Institute on the day of its 25th anniversary with good wishes for a successful future."

--Präses Manfred Kock,
Chairman of the Council of the
EKD, Hannover, Germany

"I visited the institute for the first time in the beginning of the eighties. Since then, I have come to know and treasure it through my numerous visits, through its hospitality and helpfulness, its library, and its competent directors. In its comparatively short history, the institute has gained a good reputation within the scholarly community in Jordan, in the region, and internationally, through its archaeological projects, colloquies and exhibitions, about which the institute's newsletter gives regular information. The numerous activities of the institute make it one of the most significant archaeological institutes in Jordan, despite its modest staff and financial means. The annual training course offers young researchers a personal and basic research encounter with the Near East. On behalf of the German Palestinian Society, I congratulate the German Protestant Institute of Archaeology in Amman on their 25th anniversary and wish much success and continuity to their important work in the near and more distant future. I hope, and am at the same time certain, that the quarter-century-old amicable relationship and cooperation between the institute in Amman and the German Palestinian Society will continue. Both institutes, considering their common and different aims and objectives will strengthen their ties in the future."

--Prof. Dr. Ulrich Hübner, University of Kiel, Germany

"I first visited the Hashemite Kingdom of Jordan 40 years ago, in 1960. At that time I was working on the mosaic map of Madaba, trying to identify the famous ancient spa of Kallirhoe (Ayn az-Zara). I was a member of several archaeological summer-courses of the Jerusalem Institute, and in 1963 was its leader. There was no German Institute in Amman at that time. We had to go every day from Jerusalem to the east side of Jordan, and if necessary, we stayed in the small Continental Hotel not far from the Hussayni Mosque in the city centre. Naturally, it was possible to work under such circumstances, but it was difficult, although the Department of Antiquities led by Dr. Awni Dajani took all measures to be helpful to us. When the German Institute was founded and opened in 1975, a new age – a sort of archaeological paradise – began for scholars like me. Fruitful archaeological work in a country needs a base or headquarters, a library, and a place where weary archaeologists might lay their heads. All that was available as of 1975 to an ever increasing degree. Thanks go to those who rendered outstanding services to it, above all to the Volkwagenwerk Foundation. I wish the Institute a bountiful future, and equally I hope the responsible committees of the German Protestant Churches will increase their understanding of the usefulness of this work and of such an Institute."

--Prof. Dr. Dr. Herbert Donner, University of Kiel, Germany

"The 25th anniversary of the German Protestant Institute of Archaeology in Amman, celebrated this year, gives me an opportunity to express my personal gratitude to everyone concerned with the founding, funding, and running of the institute. I would like to mention in particular Abu Hassan and the present director, Hans-Dieter Bienert, who, besides other people and things, contributed a great deal to the fact that the institute became "a home away from home" for me during several visits in the past 15 years. My special thanks are also due to many colleagues, and especially to the Jordanian people and institutions who supported me and my work. I also wish to thank "Paul", the institute's cat, who was a permanent companion over the last years during my breaks in the beautiful garden of the institute. His slight modification of a statement that describes the much praised and often misunderstood academic freedom, from "you may work more than is demanded of you" into "you may *eat* more than is demanded of you", still attracts me in some way!

The German Protestant Institute of Archaeology in Amman is one of the most important and active scholarly institutions in the whole region. This is due thanks to both the scientific achievements of the institute and the personal style of its staff. Recognizing that personal encounters are always the best basis for successful cooperation across borders, the institute offers an opportunity to increase understanding and improve personal communication between scientists of different fields and countries. During the main excavation and research seasons (i.e., academic holidays in Jordan, Europe, and the USA) the institute (or some may say: its kitchen or garden) becomes one of the most important academic meeting points in the country. Its hospitality and good reputation within the scientific community, as well as the library, have

Dr. Ute Wagner-Lux and Ernst Walter Krueger at Umm Qais (photo: D. Glade).

attracted international researchers of different scientific disciplines. An interesting exchange of ideas was always guaranteed during my numerous stays. Thank you!

The institute fulfils an outstanding need, particularly in view of the globalization of social, political, cultural, and academic processes which *must (!)* be continued in the future despite a shortage in funding at the moment. All the best for the future and at least another 25 successful years!"

--Dr. Roland Lamprichs, Dresden, Germany

"During the 25 years of its existence the German Protestant Institute in Amman has built up a fine reputation among scientists and scholars who research and work in the Near East. Whether archaeologists, theologians, historians, arabists, or engineers of the GTZ – every profession is welcome here and finds excellent living and working conditions. The astonishing good stock of books in the library, the ever possible exchange of ideas between academics of different subject areas, and the prudent, helpful management of the institute have greatly influenced its reputation, which has become a landmark in Jordan and has gained the respect of foreign institutes. Since it was founded by Dr. Ute Wagner-Lux the institute has become an indispensable institution in German-speaking scholarship and the exploration of the Holy Land.

As a frequent visitor to the institute, during my regional studies as well as during excavations in Jordan, I received much support and varied logistical help. Therefore I would like to thank Dr. Hans-Dieter Bienert, his assistant Bernd Müller-Neuhof, the secretary Nadia Shugair, and the indispensable factotum Abu Hassan for their untiring commitment!

German Protestant theology will hopefully receive a lot of ideas from and through this institute in the future. In Jordan, with its constantly developing society, the institute opens the door to a unique research scene where archaeological and regional questions will surely keep generations of researchers busy."

--Dieter Vieweger, Biblical Archaeological Institute, Wuppertal, Germany

"I have been to Jordan almost every other year since 1963. I quickly found out that Dalman and the tradition of his work lived on efficiently in Amman. During my visits and expeditions, I had the pleasure to meet the Directors Prof. E.A. Knauf, Dr. Thomas Weber and now Dr. Hans-Dieter Bienert. The contacts were always a pleasure. It was a great advantage to have a place to go to and find refuge in the rapidly growing oriental capital. When the EKD threatened to close the Institute, I addressed the relevant authority and declared that the Institute had a lot more to offer than housing wandering archaeologists. Was it not a traditional bulwark in a vast diaspora and a meeting place for scientists from many countries and continents? And did it not help my own undertakings, surveys, and excavations when I worked, together with the directors? Congratulations to the people who maintained the Institute and improved its work manyfold in the last 25 years! May it remain in Amman many years to come: ad multos annos!"

--Dr. Dr. Manfred Lindner, Nürnberg, Germany

"Amman was a welcomed continuation of what I began in Damascus: A five-year term of duty at the GPI (1985-1990) enabled me to resume fieldwork in southern Syria and northern Jordan. It was my aim to built up the institute's scholarly and logistical infrastructure by installing a suitable library. Due to the friendship and cooperation with Dr. Herwig Bartels, the then German Ambassador to Jordan, and Ammar Khammash, architect and artist, it was possible to preserve part of the Ottoman village at Umm Qais by restoring two of its complexes, which have served as a dig house and a local museum. Archaeological activities at Gadara on behalf of various German institutions reached a peak during the late 80s and the 90s: Teams from the German Archaeological Institute Berlin, headed by Adolf Hoffmann, and the Sculpture Galleries of Frankfurt, directed by Peter Cornelius Bol, each joined the excavation of the GPI with their own projects. Gadara then achieved the scholarly attention it deserved. All this would not have been possible without the active and enthusiastic support of my Jordanian friends Lutfi, Abu Hassan, Mouna, Fawzi, Muawiyah, Ghazi, Khairiye, Rami, and many others.

The GPI has always been an important base for a number of excavation teams, for many visitors and for the German Protestant community in Amman as well. We should be aware that culture and science are important exports for

Mr. Kock and his delegation during a visit to the Baptism site in 1999.

our country, and the existence of an institute such as the GPI is highly appreciated in Jordanian society."

--Dr. Thomas Weber, University of Mainz, Germany

"In the course of my study trip the German Protestant Institute for Archaeology proved a highly valuable resource for deepening my knowledge about Jordanian history in terms of its archaeology. As a historian of the middle ages, I was mainly interested in the period from the fourth to thirteenth centuries, within the ever-changing and many-faceted history of the country. The talks I had at the institute, especially with my colleague Professor Vriezen, were able to lend precision to my questions which I then pursued in situ when I visited the sites. At important places, such as Gadara but also elsewhere, my eyes were opened to the great achievements of the German Protestant Institute during the last quarter of a century."

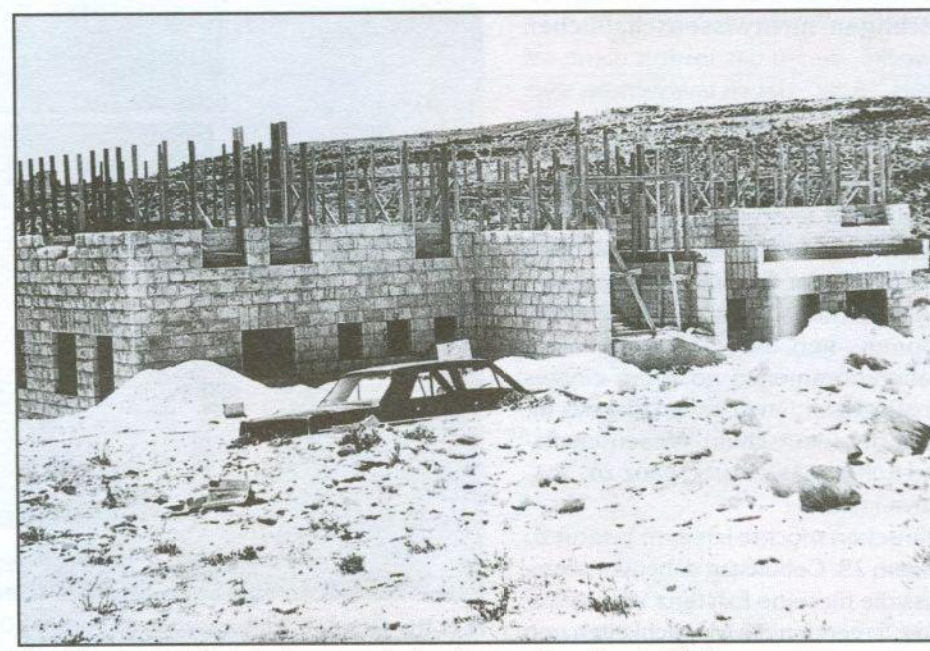
--Prof. Dr. Alfred Haverkamp, University of Trier, Germany

"The German Archaeological Institute (DAI) and the German Protestant Institute (DEI), as everyone very well knows, have been collaborating for many years in the excavation of Umm Qais, ancient Gadara of the Decapolis. Over the years fruitful scientific cooperation took place in that city, where many scholars and students from different disciplines and countries could meet and widen their personal and professional horizons. Both institutions intensified their joint efforts since the creation of the Orient Department in 1996, when the DAI started new research projects in the north and south of Jordan, in the Mafraq and Aqaba districts. The DEI offered logistical support and a platform for new scientific exchanges in many fields, thus stimulating the DAI's archaeological work considerably. The DEI also became a starting point for the many scientific expeditions which members of the DAI led to neighbouring countries, such as Iraq, Yemen, and Oman. Thus, the DEI contributed implicitly to the supranational perspective that Near Eastern archaeologists normally have with regard to their profession. Explicitly, this was pursued in several conferences the DEI organized, partly with the DAI, such as the conference on Water in Near Eastern Archaeology entitled "Men of Dikes and Canals", held in June 1999 in Petra in cooperation with Yarmouk University in Irbid and under the auspices of H. E. Prince Ra'ad bin Zeid. The DAI is deeply indepted to the DEI and its staff for their support of our scientific projects in Jordan and also for the many excursions which Dr. H.-D. Bienert organized for us, in order to better understand, among others, the archaeological potential of the country. Apart from successful research which many people take for granted, the collaboration led to many firm friendships which cannot be regarded as a routine matter. May the German Protestant Institute have a long and prosperous future!"

--Prof. Dr. Ricardo Eichmann, Dr. Margarete van Ess and Dr. Jutta Häser, German Archaeological Institute - Orient - Department, Berlin (Germany)

"I have been privileged to be a guest of the GPIA in Amman as participant of the "Lehrkurs" of the German Protestant Church last year. There, I did not only meet and like to get to know Dr. Bienert and his friendly and efficient staff, but also enjoyed a place to study the vast range of the archaeology of the ancient Near East and a place to communicate with scholars and students of a variety of disciplines: From the cultures of the preceramic ages, to the roots of the Old Testament and its neighbouring religious and social contexts, up to the roots of Christianity and Islam or current issues and problems of geology, water supplies or politics – the GPIA is an 'embassy' of its own. The GPIA and its director are always helpful and eager to help their guests to establish contact with the right people and to get to the right places.

I especially like to remember our trips to Umm Qais and Petra, to Jerash, Madaba, to the Baptism site with Dr. Waheeb, and our visit to His Excellency, the German Ambassador to the Hashemite Kingdom of Jordan. The well stocked library and the wonderful garden provide adequate means for studies or for just a relaxing chat over *qahwa* or *shai* or even evening receptions for



The German Institute in Amman during its construction in 1976.

distinguished guests. The GPIA certainly knows how to celebrate and needs to be celebrated!

Therefore, I very much hope that this unique institution will find its necessary financial support for its future existence. One simply does not want to miss it in Jordan and in the Near East at large – Alle guten Wünsche and as-salaamu 'alaikum!"

--Dr. Markus Müller, Friedrich-Alexander-University, Erlangen-Nürnberg (Germany)

"vivat - crescat - floreat – Nachdem ich seit meiner Teilnahme am Lehrkurs mehr als einmal die Gelegenheit und das Vergnügen hatte, als Gast im Institut zu weilen, muss ich gestehen, dass ich bislang nur ganz wenige wissenschaftliche Institute erlebt habe, die in ähnlicher, nachgerade liebenswürdig-informeller Weise so verschiedenen Zwecken zu dienen vermögen wie das Deutsche Evangelische Institut für Altertumswissenschaften in Amman.

Neben den an erster Stelle stehenden wissenschaftlichen Aufgaben, zuerst und vor allem der vom Institut geleisteten archäologischen Forschung, seinen Ausgrabungen mit all ihren im Laufe der Jahre zutage gebrachten Ergebnissen und Konferenzen, zu denen es aus verschiedenen Anlässen eingeladen hat, zu nennen sind da die nicht weniger wichtigen nichtwissenschaftlichen Zwecke, denen das Institut dient, sei es als "Hotel", das oft unerwartete, stets aber ebenso angenehme wie anregende Begegnungen mit Kolleginnen und Kollegen aus vielen Ländern und Disziplinen ermöglicht, sei es als kulturelle Vermittlerin oder auch als "neutraler Ort", der Gespräche ermöglicht, die andernorts nicht geführt werden können; von den über die bisher wahrgenommenen noch um einiges hinausgehenden Chancen, die das Institut der (deutschen) Wissenschafts- und Kulturpolitik bietet, ganz zu schweigen.

Wünschen möchte ich dem Institut zu seinem 25. Geburtstag daher vor allem, dass die für seine Existenz Verantwortung Tragenden die Möglichkeiten und Chancen, die es bietet, erkennen und ihm die Förderung zuteil werden lassen, die es braucht, um sie nutzen zu können."

--Prof. Dr. Stefan Schreiner, Tübingen University (Germany)

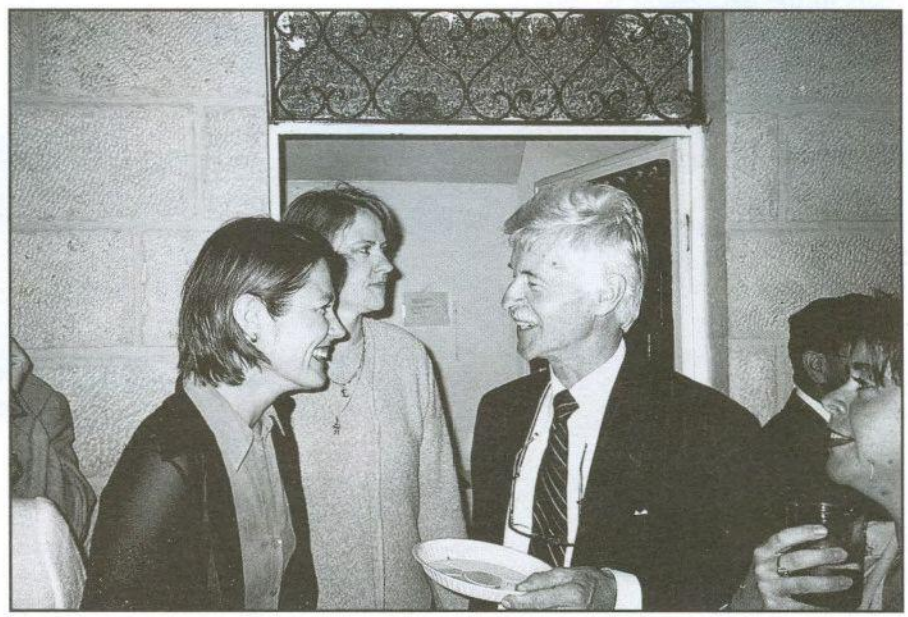
"The foundation of the German Protestant Institute in Amman coincided with the commencement of Sydney University work in Jordan, both in 1975. Over the course of the last 25 years Australian archaeologists have enjoyed the comradeship and benefited from the professionalism of German teams working out of the Institute. The German work at Umm Qais has mirrored Sydney's at Pella. Both teams have had to grapple with the complexities of excavating a Greco-Roman city metamorphising into a major Christian bishopric. Communication between teams has been close over the course of the last 20 years, and staff from both expeditions have worked together to our mutual benefit. Another close relationship grew up with German excavations in the marginal zones east of Amman at Chalcolithic Abu Snesleh in the 90s, which coincided with renewed Sydney University work at Teleilat Ghassul. Again, cross fertilisation has been close and to the benefit of both teams.

The GPIA has been the linchpin of all German research in Jordan for the last 25 years. This much is obvious. But it has also greatly facilitated the research of many other archaeological expeditions, both through infrastructural and equipment support, and through the good graces of a sequence of energetic directors, by providing a relaxed venue for scholarly communication between teams often working at opposite ends of the country, who would otherwise never meet in the field. Communication in the field is often far more valuable and cost-efficient than subsequently by post. Australian fieldwork at Pella and Teleilat Ghassul has benefited greatly from our ongoing links with the GPIA. We look forward to continuing the relationship in the future, and congratulate the GPIA on 25 years of achievement."

--Dr. Stephen Bourke, Dept. of Archaeology, University of Sydney, Sydney (Australia)

"A two-fold message comes from Tel Aviv to the German Protestant Institute of Archaeology in Amman (DEI) on the occasion of its 25th birthday.

The first one is dictated by the current circumstances. In spite of all the unrest, violence and setbacks which are shaking the Middle East again these

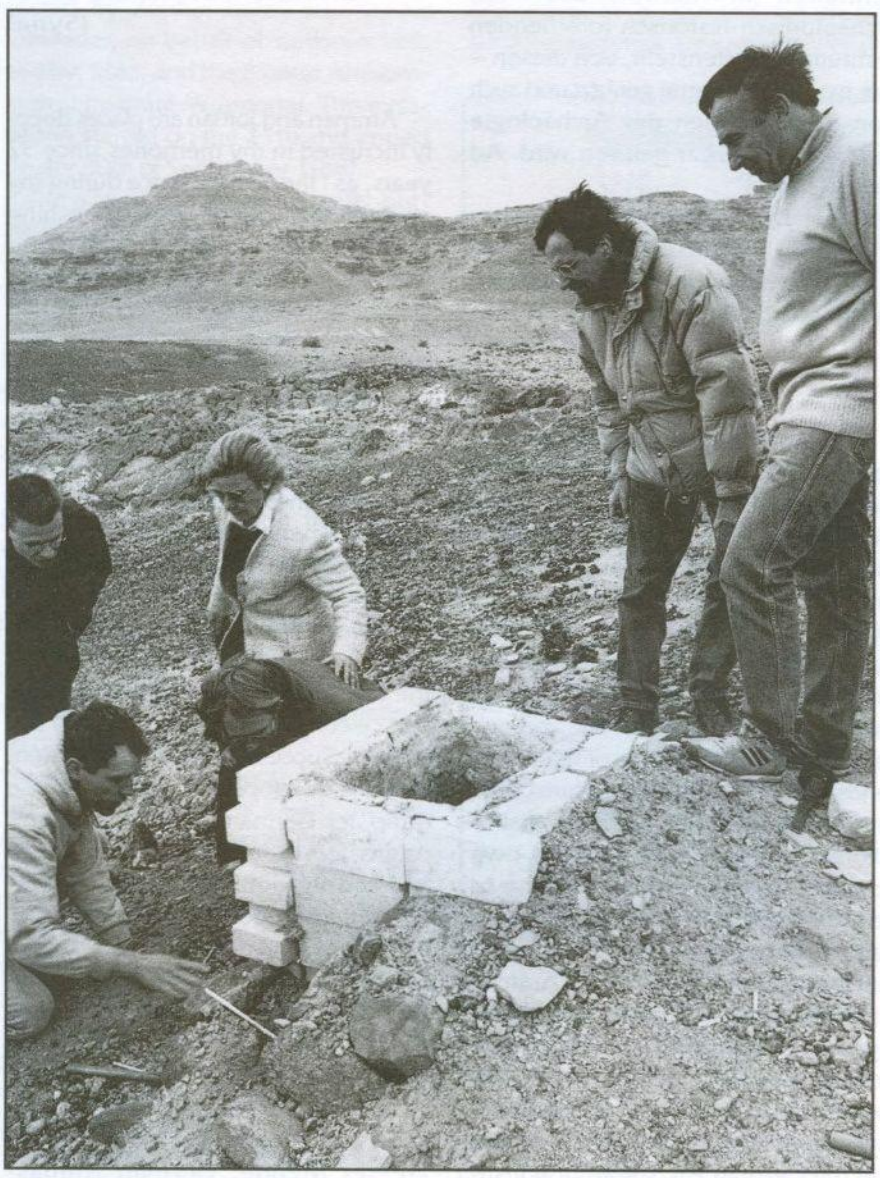


H.E. the German Ambassador to Jordan, Dr. Martin Schneller, talking with Mrs. Ohnemüller, former reverend of the German– Speaking Congregation in Amman, during a reception at the German Institute.

days, scientists should continue to act as bridge-builders, contributing to the revival of the peace-process and to a peaceful neighbourhood.

The rich archaeological heritage ranging from Neolithic to Nabataean ages, from Jewish, Hellenistic, Roman and Byzantine times right up to the Islamic and Ottoman periods, is a common heritage shared by almost all the neighbouring countries of the region, and also a challenge for joint scientific ventures. Who is better prepared to act and serve as a neutral platform, organizing scientific partnering events and initiating joint research work, than an Insitute such as the DEI? I know about the problems which are confronting regional projects, including Arab, Israeli and other scientists, e.g., from Germany. It is not a scientific "kindergarden". I have no illusions about the difficulties. But experience is showing: With a high degree of dedication and motivation, in particular by the participating and coordinating German scientists, successful joint research is possible.

The DFG (Deutsche Forschungsgemein schaft) so far has been the major German actor promoting joint research activities since 1995 in the Middle East region in the area of ecology, plant science, agriculture, water research, toxicology, social sciences and other fields.



Former German Ambassador to Jordan Mr. Peter Mende (right) visiting archaeological fieldwork in Wadi Faynan, conducted by the Bochum Mining Museum.

Why not add archaeology as an additional area? There are other funding possibilities, such as US-AID, and the 5th EU Framework Programme for Research and Development with its subprogramme on International Cooperation (INCO). According to a recent study submitted to the Israel Academy of Science and Humanities more than 200 regional scientific projects involving Arab and Israeli scientists found financial support. We, therefore, should not give up the idea that scientists can contribute and play the role of pioneers on the long road to peace in the Middle East.

The second message is a personal one. Two times I had the opportunity to enjoy the hospitality of the DEI, in particular of its Director Dr. Hans-Dieter Bienert, including excursions to the ancient city of Umm Qais (the largest and most continuous German archaeological project in Jordan); a visit to Petra and to the various ongoing activities in this area, such as the stone preservation project and the Nabataean water system; and to the unexcavated refuge of Sela. The geographical range of the DEI's research activities, however, is much broader. Its international reputation is well reflected in its Newsletter "Occident and Orient". Even as a non-archaeologist, I was caught by the Institute's dynamic and pioneering atmosphere. According to archaeologists most of the excavations and related research work in Jordan is still to be done – a challenge for the DEI as well as for those responsible for its prosperous future."

--Dr. Henning Eikenberg, Science Counsellor, German Embassy, Tel Aviv (Israel)

"Men of Dikes and Canals was the title of an international conference held in Petra/Wadi Musa in summer 1999, which was organized by the DEI-Amman and the Orient Department of the German Archaeological Institute (Berlin, Germany). I was very happy for the chance to participate in this splendid scientific event. It was an excellent experience to discuss various aspects of water resources management, hydrotechnical methods, and other as-

pects of water with colleagues from different disciplines in various countries. It is not common for archaeologists to deal with subjects like hydraulic engineering, although this subject played a dominant role in the history of all countries with arid climatic conditions. The DEI-Amman initiated and organized this congress, whose great success resulted from the excellent scientific contributions and also from the warm and friendly atmosphere. This must be emphasized in a period when the Near East is threatened by war. For every participant it became obvious that the former and the present directors of the Institute play an important role in Amman as heads of a scientific institution, but also as a kind of cultural ambassador from Germany to Jordan.

The 25th anniversary of the Institute is a wonderful opportunity to thank the DEI again for outstanding hospitality and to express the wish for the continuation of its excellent work in future."

--Prof. Dr. Henning Fahlbusch, University of Applied Sciencies, Lübeck (Germany)

"Der XVIII. Internationale Limeskongreß (Congress of Roman Frontier Studies) in Amman bot den Teilnehmern der Römisch-Germanischen Kommission des Deutschen Archäologischen Instituts, Frankfurt/Main, die Möglichkeit, im Deutschen Evangelischen Institut zu wohnen, vor allem aber auch dank vieler Gespräche mit Herrn Bienert, Herrn Müller-Neuhof und auch mit dem früheren Leiter, Herrn Weber, viele Einblicke in die Arbeit dieses Instituts zu gewinnen. Beeindruckt hat uns der die gesamte Kulturgeschichte Jordaniens umfassende Ansatz, der von den Steinzeiten bis hin zur Gegenwart reicht: Wenn sich auch die wissenschaftlichen Arbeiten vorwiegend der Prähistorie und dem Altertum widmen, so wird mit den Ausgrabungen speziell in Umm Qais und der Herrichtung der Ruinen für die ständig wachsende Zahl von Besuchern aus dem In- und Ausland öffentliche Kulturarbeit für die Gegenwart und die Zukunft geleistet. All' dies geschieht in enger Kooperation mit anderen Institutionen, deren Know How bemerkenswerterweise auch dazu eingesetzt wird, die mancherorts verlassenen Häuser des 19. und 20. Jahrhunderts für ethnographische Studien zu dokumentieren. Ein derart breiter thematischer und methodischer Rahmen ist ungewöhnlich und beispielhaft. Als Kernstück sind in die Aufgaben und Leistungen des Instituts eingebettet die Entdeckung der Basilika von Gadara und die außerordentlichen Grabanlagen mit ihrem Bezug zu biblischen Texten. Glücklich schließlich ist die Idee der informativen Zeitschrift "Orient & Occident". Das Deutsche Evangelische Institut Amman begründete damit ein Forum der schnellen Information, das allen archäologisch-historisch forschenden Institutionen offensteht, von diesen – wie man sieht – gerne genutzt und auch von den Freunden der Archäologie Jordaniens dankbar gelesen wird. Ad multas annos!"

--Prof. Dr. Siegmar von Schnurbein, Römisch-Germanische Kommission des Deutschen Archäologischen Instituts, Frankfurt (Germany)

"It is our great pleasure to congratulate the German Protestant Institute of Archaeology in Amman on the occasion of its 25th anniversary. Since its foundation the Institute has enjoyed an international scholarly reputation that was the result of its archaeological activity in Jordan. This reputation has been first of all built on the execution and maintenance of numerous archaeological field works, the range of which extends from the early high culture of the ancient Near East to the later Arabo-Islamic period. It is not only its own scholarly achievements that deserve to be appreciated. Its endeavor for international cooperation made the Protestant Institute of Archaeology in Amman an estimable location and a lively meeting place for many colleagues who come from all over the world to work in Jordan. Thanks to the close and long-standing cooperation between this Institute and the German Archaeological Institute, in addition to the active support of colleagues from the Jordanian Department of Antiquities, it was possible to initiate projects such as that of ancient Gadara (Umm Qais). These projects have enriched the profile of archaeological explorations in the Near East. In accordance with Near Eastern traditions the Institute in Amman is distinguished by its great hospitality. In the name of the German Archaeological Institute of Damascus, I would like to express my cordial thanks to the current and former staff of the Institute for their professional assistance and personal help.

May even greater success and prosperity be granted to the Institute in the future."

--Prof. Dr. Klaus Stefan Freyberger, German Archaeological Institute - Damascus Office (Syria)

"Amman and Jordan are places deeply incrusted in my memories since 32 years, as I lived there twice during my professional career. This flourishing country is host to many a national and international institution fostering fruitful cultural development and cooperation. Among them are long-standing partners, while some discovered the Hashemite Kingdom only recently.

Germany and the Germans are proud to be present as partners of Jordan at least since the middle of the sixties especially when the country had to deal with the negative consequences of a war and the loss of territories west of the River Jordan. A kind of "late offspring" of our interests in this part of the biblical land, but a very successful one celebrates its 25th anniversary this month. Successive, very competent directors developed its profile as a "base camp" for German archaeological campaigns, as a centre for scientific research and cooperation, and as a highly respected institution east of the River.

As German Ambassador to Jordan I highly appreciated this very active presence, sometimes under difficult financial circumstances. And I am optimistic about its future as one of the pillars of bilateral cultural relations between Germany and Jordan."

--Peter Mende, German Ambassador to Jordan 1996-1999 (Berlin/Bonn, Germany)

"Germans occasionally pose the question as to whether the Institute in Amman is needed. Certainly, the question can only be heard among people who know nothing about the Institute's work and output. For almost 20 years the German Protestant Instiute (Deutsches Evangelisches Institute) made it possible for young scientists from East Germany (GDR) to take part in courses (Lehrkurs). Thereby they got the opportunity to become acquainted with the land of the bible and its archaeological remains. In 1985 I had the chance to participate in one of these courses. Until today I still benefit from my first study trip in the Near East and my passing through Jordan, Syria and Egypt. The Institute, emerging from the political crisis in the Near East, linked East and West; still divided German scientists in Europe were united here long before the "Fall der Mauer" in Berlin. For this reason the Institute made it its business to build a bridge of communication. In view of global economic and political trends, it is easily forgotten that the region constitutes the context for global cultural and intellectual history. One of the most important scholarly tasks is getting to know foreign countries at first hand. Common research concerning culture and religion is a basic foundation for understanding. In view of the Institute's personnel and financial resources, it has done amazing things. It is my constant hope that the Institute will continue to accomplish these tasks in the future, as well."

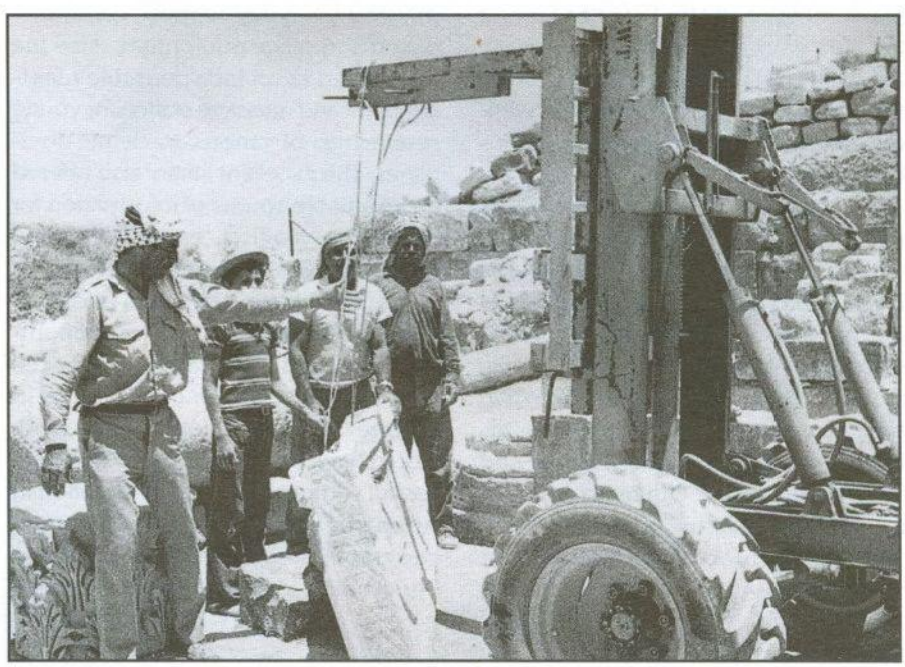
--Prof. Dr. Ernst-Joachim Waschke, Martin-Luther-University, Halle-Wittenberg (Germany)

"Wir hatten das Glück, im Februar dieses Jahres sieben Tage lang Gast sein zu dürfen im German Protestant Institute of Archaeology in Amman. Es bedeutete Hilfe in jeder Hinsicht, die Zeit, Wege und Geld sparen ließ. Es bedeutete kenntnisreiche Information, die so unentbehrlich ist für jeden Wissenschaftler, der zum erstenmal in das Königreich kommt. Es bedeutete eine einschlägige Bibliothek zur Vorbereitung bzw. zum Nacharbeiten, ein ruhiges Bett: welch ein Vorteil für den Wissenschaftler, der die bemessene Zeit am Ort optimal nutzen muß. Wir danken dem derzeitigen Leiter dieser Einrichtung, Herrn Dr. H.-D.Bienert, für geduldige, selbstlose Betreuung in Amman, aber auch in Petra, Buseira, es-Sela, Irbid und Umm Qais.

Heute, 25 Jahre nach der Gründung dieses Instituts, kann man mit Fug und Recht sagen: Es war eine Sternstunde, als großzügige und weitsichtige Förderer beschlossen, neben dem GPIA auf dem Ölberg auch Forschern während ihres Besuchs des Ostjordanlands eine 'Heimstatt' vor Ort anzubieten. Im Laufe eines Vierteljahrhunderts hat sie sich zu einem Zentrum entwickelt, das man in vielfacher Hinsicht nicht mehr missen möchte.

Wir denken dabei nicht nur an seine überaus erfolgreichen Grabungsaktivitäten, die teilweise gar verknüpft wurden mit der Restaurierung wertvoller Gebäude und der Gründung eines kleinen Lokalmuseums. Wir denken auch an Forschungen, die durchaus Probleme der Gegenwart, allen voran das immer bedrohlich werdende Problem der Wasserversorgung, in die Überlegungen miteinbezogen. – Wir denken auch an die stets wachsende Fachbibliothek, heute schon die zweitbeste des Landes, die allen Forschern offen steht und eine gute Basis für deren Arbeit liefert und zudem zu einem Treffpunkt der internationalen Fachwelt geworden ist. Von den ausgezeichneten Beziehungen aller Mitarbeiter und insbesondere des Leiters des Instituts, Herrn Dr. Bienert, zu den jordanischen Kollegen in Amman und im ganzen Land haben wir uns wiederholt überzeugen dürfen. – Wir denken an den Lehrkurs und die einmalige Möglichkeit, die das Institut in Amman damit Jahr für Jahr jungen Theologen bietet, auch im Ostjordanland die Landeskenntnisse zu erwerben, die sie später für eine überzeugende Tätigkeit im Beruf brauchen. – Wir denken schließlich an die von Herrn Bienert im Namen des Instituts herausgegebene, zweimal im Jahr erscheinende Zeitschrift Occident&Orient, Newsletter of the German Protestant Institute for Archaeology in Amman, mit vorbildlichen Berichten zu den neuesten internationalen archäologischen Aktivitäten im Lande.

Die zeitweilige Nachricht, dieses Institut sei von einer möglichen Schließung bedroht, hatte in der Fachwelt Entsetzen ausgelöst. Seine Schließung wäre – davon sind wir überzeugt – einer Katastrophe nicht nur für die deutsche archäologische Forschung, sondern auch für die deutsche



Restoration work at Umm Qais, directed by Dr. Ute Wagner-Lux, Ernst Walter Krueger, and the Department of Antiquities of Jordan.

Kulturarbeit im Nahen Osten gleichgekommen. Heute scheint die Gefahr zum Glück eher gebannt!? Nochmals: Wir danken dem Institut und seinen Mitarbeitern, allen voran Herrn Dr. H.-D. Bienert, für ihr ganz ungewöhnliches Engagement und wünschen dem GPIA in Amman das Beste – ad multos annos."

--Prof. Dr. Gustav A. Gamer und Ingrid Gamer-Wallert, Tübingen University, Tübingen (Germany)

"I am happy to salute the 25th anniversary of the German Protestant Institute of Archaeology in Amman, Jordan. For many years, while digging at Basta and Abu Snesleh and surveying the Wadi Qattar, the institute was not only a station for our research, it was also home to me. I remember the beautiful building and garden, but most of all the stimulating encounters I had with my colleagues. While the research facilities and the library supplied us with the necessary facilities, the excellent contacts of the institute's various directors never failed to provide access to the foreign institutes or the Department of Antiquities. Without this network of academic and personal contacts successful research abroad is impossible.

I warmly remember many directors of the GPIA, but please allow me to thank most of all Ute Wagner-Lux for her life's work and her initiative, which led to the establishment of the GPIA. What would a visit to Amman be without a cup of tea with her in the GPIA's kitchen?

In recent years, when the institute was threatened by budget cuts, the current director and friend Hans-Dieter Bienert, did a lot to save this oasis of German research and academic contacts in Jordan. We will probably know only in years to come how much German archaeology in Jordan owes to him, his team, and the many colleagues and friends who did everything to maintain the GPIA for all of us.

German archaeology in the Near East has long been reputed for its quality international research in close connection with a world community of colleagues. For all of us the GPIA is an important partner and address in Jordan and in the Near East."

--Dr. Gunnar Lehmann, Ben-Gurion-University, Beer Sheva (Israel)

"The university of Erlangen's geographical research activities in Jordan and the co-operation with the DEI in Amman are long-standing traditions. In the recent years the successful collaboration has become even more intensive. In particular in November 1997, when we began to run a research project in the framework of FORAREA, an interdisciplinary research network founded and supported by the Bavarian Ministry of Academia, Culture, Science and Arts, in which we study international business co-operations in Jordan. At the heart of the research is the 'people side of things' – those men and women who were involved in setting up co-operation in certain business sectors and Jordanian regions, and made sure that such co-operation can operate successfully for the benefit of all.

For the extensive studies, several stays were necessary in Jordan, while the DEI provided accommodation, practical everyday support, communication and office equipment. Also the DEI served as an indispensable meeting point and message station for young researchers of various academic disciplines. The excellent library also offered an invaluable source of information for non-archaeologists, especially as we began. For years Dr. Hans-Dieter Bienert equipped the library with Jordanian books and studies on current economic, social and geographical aspects, which are troublesome to acquire in Europe. With no doubt, our work would have been significantly less successful without this unique institution in Amman. For this reason, the Erlangen geographers would like to take the opportunity to show our appreciation for the current anniversary and for the constant hospitality and support of the DEI colleagues in Amman. We hope that the DEI can continue to work for many more years – ideally without concerns about money."

--Prof. Dr. Horst Kopp and Christian Riedel, University of Erlangen-Nürnberg (Germany)

"25 Jahre sind gewiß eine lange Zeit. Danach ist durchaus der Zeitpunkt erreicht, ein wenig innezuhalten und zurückzublicken. Wenn es nun gilt, 25 Jahre des Bestehens des DEI-Amman zu würdigen, so wird jeder, der irgendwann und irgendwie mit dem Institut zu tun hatte, einen anderen Grund haben, der Arbeit des Instituts zu gedenken. Dabei kann es durchaus zutreffen, daß eine kurze Inanspruchnahme des Instituts nachhaltigere Wirkungen hatte, als vielleicht ein längerer Aufenthalt. Niemand wird dabei das Institut als eine Art Hotel betrachtet haben – so luxeriös waren die Aufenthalte sicher in keinem Fall. Vielmehr stand hier ein Ort zur Verfügung, der neben bescheidener Unterkunft stets ein Hort der Wissenschaft war. Dazu trug eine kleine, aber feine und fachlich gut ausgerichtete Bibliothek bei. Dazu gehörten aber unverzichtbar auch die Gelegenheiten zu Fachgesprächen mit den anderen Gästen, die wiederum ihre eingenen wissenschaftlichen Fragestellungen und ebenso profitieren konnten.

Unverzichtbar war das DEI-Amman auch als Türöffner zu mancher historischen Stätte – besonders dann, wenn es galt, Zugang zu Plätzen wissenschaftlichen Interesse zu finden. Ich selbst hätte im Rahmen meiner Tunnelforschungen nie Einblick in die großartigen unterirdischen Bauten von Khirbet ez-Zeraqon oder Gadara gefunden, wenn das DEI-Amman nicht hilfreich eingesprungen wäre. Damit wären meinem Forschungsprojekt "Planung und trassierung im antiken Tunnelbau" zwei wichtige Objekte vorenthalten

geblieben und – mehr noch – eine für das Gesamtproblem wichtige Fragestellung wäre nie beantwortet worden.

Im Rahmen dieser Forschungen was das DEI-Amman als Außenposten der Archäologie anzusehen, dessen Dienste unverzichtbar waren. Dieser Problematik wird man sich bei oberflächlicher Betrachtung kaum bewußt , weil die Mitarbeiter des Instituts – ohne großes Aufheben davon zu machen – vor Ort hilfreich bereitgestanden haben. Wie sehr unverzichtbar dieser Vorortposten war, wäre erst dann besonders deutlich geworden, wenn es das Institut nicht gegeben hätte. Ein solches Inszenario ist schlicht unvorstellbar! 25 Jahre sind gewiß ein lange Zeit – wenngleich auch kein Alter, um aufzuhören!"

--Dr. Klaus Grewe, Rheinisches Landesmuseum, Bonn (Germany)

"As I was the reverend of the German-speaking Congregation of Amman for two years (1998-2000) I was lucky to have a very special relationship with the Protestant Institute: There – amidst the hectic city of Amman – an oasis of calmness and peace could be found, the green life in the garden could be enjoyed. For me personally, it was a meeting point with many interesting people and I gained a lot by the talks I had there. But beyond that, it is also my experience as the reverend which leads me to express my gratitude to the whole staff of the Institute who were all very supportive of the congregation. Special thanks to Nadia, the secretary, and Mr Abu Hassan, both helpful in any respect. Nadine Riedl, Bernd Müller-Neuhof, and Dr. Hans-Dieter Bienert gave lectures and shared with us their archaeological knowledge and research; Dr. Bienert even guided several tours, organized for members of the congregation. With lectures and meetings of the congregation being held in the inspiring atmosphere of the Institute, it was more than a scientific institution, and also a house open for all Germans living in Amman – those married to Jordanians, those working in different German institutions, and visitors. I am convinced they all share my good wishes for a fruitful and prosperous future of the Institute."

--Sabine Ohnemüller, Berlin (Germany)

"In den letzten Jahren war ich mehrmals in Jordanien. Dabei war ich regelmäßig auch Gast im DEI. Besonders schätze ich die offene und gastfreundliche Atmosphäre dort. Man fühlt sich schnell zu Hause. Die Gespräche mit den jeweiligen Bewohnern immer sehr interessant. Das DEI ist eine gute Möglichkeit, dass verschiedene Menschen miteinander ins Gespräch kommen. Da ist die Studentin, die in einem Jahr arabisch lernen will. Da ist der Archäologiestudent, der an einer Grabungskampagne mitmacht. Es ist auch außerordentlich begrüßenswert, dass das Institut sehr gute Beziehungen zur deutschsprachigen evangelischen Kirchengemeinde pflegt. Regelmäßig finden Gemeindeveranstaltungen im Institut statt. Da entstehen interessante Begegnungen und Gespräche. Menschen kommen wieder mit der Kirche in Berührung, die zu Hause kaum Kontakt zu ihren Gemeinden hatten. Oft sind das nach langer Zeit wieder Berührungen mit Kirche und Glaube. Das ist eine ungeheure Chance. Eine Brücke zum Land stellen auch die Frauen dar, die mit Jordaniern verheiratet sind. Sie sind eine Brücke zwischen den Kulturen – mit allen Chancen und Problemen. Christ sein in Jordanien bedeutet als eine Minderheit zu leben. Man ist stolz auf seine christliche Identität. Konfessionelle Abgrenzungen treten dabei völlig in den Hintergrund. Das kann auch uns Impulse für die Ökumene geben. Es bleibt zu wünschen, dass das Institut erhalten bleibt und weiter eine Brücke zwischen der Wissenschaft und den Menschen bietet. Ich wünsche mir, dass hier weiter ein Dialog zwischen den Christen, zwischen den Religionen und natürlich zwischen den Menschen im Orient und Okzident lebendig bleibt."

--Bernd Mayer, Pfarrer in Nagold-Hochdorf und Mitglied des Arbeitskreises Orthodoxe Kirchen der württembergischen Landeskirche, Hochdorf (Germany).■

Archaeology of Jordan: From Irbid to Germany

By: Zeidan Kafafi, Yarmouk University, Irbid (Jordan)

Jordan consists of the eastern side of the Jordan River and is a part of the Ancient Near East. It was located in the center of ancient civilizations and played an important role in writing the history of the surrounding areas. Jordan has always been considered as part of the Holy Land, and the recent discovery of the Baptism Site in Wadi Kharrar in the Jordan Valley affirms this fact.

Starting in the Middle Ages, German travelers, explorers, and excavators were interested in understanding this land. In modern times German scholars have given it more importance, and joint projects with Jordanian institutions have been started at several archaeological sites all over the country. To organize German archaeological activities in the Holy Land, The German Protestant Institute for Archaeology in the Holy Land was founded in Jerusalem in 1900, and a branch of it was opened in 1978 in Amman.

The German Protestant Institute in Amman has helped develop the classical site of Umm Qais (Gadara) in northern Jordan by conducting excavations, installing a local museum, and restoring houses of the Ottoman period. The director of the Institute is working hand in hand with the Department of Antiquities of Jordan and faculty members of Jordanian universities.

During the last fifteen years Yarmouk University (Jordan) in cooperation with Tübingen University, Free University of Berlin, the German Archaeological Institute (DAI) Berlin, Kirchliche Hochschule Wuppertal, and the German Protestant Institute of Archaeology in Amman conducted several archaeological projects, such as excavations, surveys, exhibitions, conferences, and workshops. These include Khirbet ez-Zeiraqoun, Basta, Khanasri, and Sal excavations and surveys. These projects have resulted in joint publications, workshops, and exchange visits by technicians and students.

Many German scholars have conducted research in the archaeological city of Petra and its vicinity. Some other projects were undertaken either as joint projects with Jordanian institutions or only by German scholars.

One of the priorities in German technical development assistance to the Hashemite Kingdom of Jordan is the strengthening and upgrading of local institutions, an effort that is also often referred to as "institution building". Within this framework, GTZ is currently assisting the Jordanian Government in establishing a much needed stone conservation and restoration center in Petra through a project that is know as the Petra Stone Preservation Project and also as the "Jordanian-German Project for the Establishment of a Conservation and Restoration Center in Petra (CARCIP)". The prime goal of this project is to establish a center for Petra - to be entirely operated by Jordanian specialists and staff - that will be able independently to plan, execute, and supervise conservation and restoration work on the Petra monuments. Faculty members and technicians such as Talal Akasheh and Mo'awiya Ibrahim, then at Yarmouk University, were the first to be involved in this project and were followed by Ziad Al-Saad.

In terms of human resources, through DAAD scholarships many Jordanian archaeologists were able to pursue their PhD studies in archaeology and related fields at German universities. Many of them have graduated and are teaching at Jordanian universities, while others are still working for their degrees. They are distributed among Jordan University, Yarmouk University, Mutah University, and al-Albeit University. However, most of them are to be found at Yarmouk. In

(continued on page 33)

Prof. Zeidan Kafafi with the German excavation team at the Late Neolithic site of esh-Shallaf.

Jordan Archaeology, From Irbid to Germany

(continued from page 16)
addition, several technicians from Yarmouk University have been sent to be trained in the field of conservation and preservation.

The Alexander von Humboldt-Foundation gave scholarships to Jordanian and German archaeologists, which is very visible in the joint work done by Zeidan Kafafi and Roland Lamprichs.

One of the main landmarks of Yarmouk University is the Museum of Jordanian Heritage. This museum was built as a joint venture between Yarmouk University and Linden Museum/ Stuttgart. During the mid-1990s the German Cultural Attache (Ms. Ingrid Liedgens) presented a stipend to the university to build a dome for the museum courtyard. This addition to the building came after technicians complained that the winter rain and summer heat damaged the exhibited material.

The libraries of Jordanian archaeological institutions are full of publications donated to them by German organizations. I remember that the Deutsche Forschungsgemeinschaft used to present the Institute of Archaeology and Anthropology library with a large number of German publications in the field of archaeology, anthropology, and epigraphy. This enriched the library and today facilitates the work of students and scholars.

To sum up, traffic between Irbid and Germany is very active, as Jordanian scholars are going to several German institutions for research training or study. Meanwhile, German scholars and students are coming to Jordan to excavate, survey, and gain experience in Jordanian archaeology. As always, traffic starts a little bit slowly, but now it is moving very quickly because the road has been paved by good people like Hans-Dieter Bienert and many other Jordanian and German scholars. ■

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"Men of Dikes and Canals"

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The following is the second and final part of the symposium abstracts (the first part was published in Occident & Orient, vol. 4, nos. 1 & 2, December 1999).

Madaba and its Water Systems

Pierre Bikai
Amman

Madaba developed in a semi-arid area with no water resources in the vicinity. However, settlers at the site created catchments in a variety of forms and the city prospered for millennia by relying on rainwater. This paper illustrates the variety of systems used.

Water Management as Seen in Byzantine Architecture of Transjordan with Respect to the Excavated Monuments in the City of Gadara-Umm Qais.

Mohammad Al-Daire
Mainz

It was shown by earlier environmental studies that the first three centuries AD witnessed an abundance of rainwater in the East Mediterranean area. This abundance was said to have ended in the first half of the fourth century AD and to have continued till the end of the sixth century. It was claimed that cessation of building activities and secondary settlement in marginal regions of the Levant correspond with increased aridity in the early Byzantine period.

This paper discusses the fact that in spite of a possible lack of water, the area in this period flourished. This is demonstrated by building activities and also by the use of water resources, indicated by new installations in that period.

The choice of Gadara as a case study results from the fact that new representative buildings had been constructed, such as the fourth century AD baths and a huge five-aisled basilica with a water reservoir north of it. New ideas about the purpose of this water basin will be presented. The collected water in this circular structure might have served liturgical purposes or just daily use.

The archaeological excavation shows that the earlier aqueducts of the city were still in use at least till the middle of the fifth century AD. That means that the surrounding springs provided the water supply that was transported through aqueducts. After this time (mid-fifth century AD) the economy of the city was still expanding, so more representative buildings like the Octagonal Church were constructed in the early sixth century AD. In this period of time (from the fourth to seventh centuries AD) the city may have witnessed some environmental fluctuations. This can be attested by the reduction of the size of the Byzantine bath of the city. The water capacity of its containers was reduced from about

70 to about 40m³, but it was still huge. Even the bath itself was functioning till the end of the Umayyad period. The use of natural resources to generate hot water is indicated by the towers on the south wall of the building, where the water was heated by sunlight.

The architectural program of building the basilicas during this period also included collecting rainwater in cisterns within their walls such as in their open courtyards (Atrium), which allowed storing a quantity of water to be used when necessary.

The purpose of this paper is to shed light on a period that was formerly used as an example of the decline of architectural and settlement patterns related to environmental factors.

Remains of Water Harvesting and Storage Techniques in the Northern Jordanian Badiyah

Daifallah Obeidat
Mafraq

Aal Al-Bayt University in Mafraq has large, comprehensive research and field survey projects in the north Jordanian Badiyah. The main goal of this effort is to document as much as possible the natural and cultural features and archaeological remains of this region before these treasures are destroyed by modern development.

The first two seasons of field research are completed. During these two seasons we surveyed the western parts of the northern Jordanian Badiyah, east of the Mafraq-Jaber highway and between the Mafraq-Ruwayshid highway in the south and the Syrian/ Jordanian border in the north.

The results of this survey showed that this area was populated through different archaeological periods, extending from the Palaeolithic until modern times. In addition, an intensive population presence during the Roman, Byzantine and Islamic (Umayyad and Ottoman) periods could be traced all over this area.

Water is the vital need for any sizeable settlement in this area. It is supplied today either from pumped groundwater or from a distance (from the Azraq Oasis) by pipe or water truck. In antiquity, the solution was to collect and trap annual rainfall. The archaeological remains of reservoirs, cisterns, and waterholes are to be found all over the surveyed area. Remains of lines of low stone walls, which could be traces of ancient terraces, canals, and land boundaries, also are still to be seen all over the area.

The objective of this paper is to identify these elements in the research area and to examine them in the context of population size and farming.

The Umayyad Hydraulic Systems on the Citadel of Amman: Collection, Storage, Distribution, Use and Sewage

Ignacio Arce
Amman

The following summary is a review of the quite sophisticated hydraulic systems on Amman's Citadel during the Umayyad period, including their use, the building techniques, the reuse of previous structures, and other aspects.

Collection: Antecedents. Roman Byzantine infrastructures. General conditions: Absence of springs or watertable supplies on the Citadel. Rainfall origin water: underground channels, aerial ducts (clay pipes or "atanores"). (The "niches" in the walls to drive down the rainwater from the roofs, etc.).

Storage: Subterranean cisterns. Open cisterns ("Birka"). Storage of other products (oil, wine, etc.).

Sewage and reuse: Latrines, sewage conducts, overflow channels (in cisterns, birka, etc), decantation basins.

Services, and water uses: Collective and private structures; private and collective use of service.

The bath: The access to the bath: collective and palatine use.

The elements: Access court, Apodyterium, Cold room (al Ghurfa al-Barida), Warm room (al-Ghurfa al-Dafi'a), Hot room (al-Ghurfa al-Sakhina), Furnace (Al-Furun), Alcoba (resting room).

Other communal services.

Building techniques:

Excavated devices and structures vs. built structures. Channels and pipes. Mortars and renders. Other coating and impervious materials (bitumen, marbles, etc).

Reuse and interventions after the Umayyad period: The reuse of cisterns. The transformation of the staircases of the Vestibule into a cistern.

The restoration and reuse of the structures.

Human Impact on the Water Problem: The Case of Jordan

Nasim F. Barham
Amman

Jordan belongs to that group of countries with "absolute water scarcity", i.e., the water barrier indicator is less than 500 CM per capita, and the use-to-resources ratio of 41% in Jordan exceeds the limit of 25-30 % that is usually applied as the limit of the "area of stress in water management".

The most frequently undertaken or proposed solutions concentrate on supply management activities, which require expanding the water supply. The main ideas to develop and manage new water resources include construction of dams, reuse of treated wastewater, desalination of seawater, and even water imports. In this paper, cultural and political aspects are considered to explain the background of the current problem. This approach could pave the way to find solutions to this most pressing national issue or, at least, to mitigate it. It sheds light on ways to cope with the rapidly escalating water demand.

Behavior of water-consumers causes losses of more than 40% of the municipal water through so-called "unaccounted-for" water. During the years 1994-1998, unaccounted-for water reached between 53. 8% and 56.6 % of supplied water. This rate reached its maximum in Mafraq governorate, at 79 %.

Some of the issues to be explained and interpreted include uncontrolled urbanization and mismanagement of water resources, especially groundwater, which suffers severe damage.

The efforts to store more rainwater in cisterns and dams and to protect the collected water from evaporation are

inefficient. The mean rainfall amount is 8.5 billion CM and water harvesting is estimated at 11 MCM for the year 2000.

The capacity of Jordanian dams, built on the side wadis of the Jordan Valley, amounts to 120 MCM. Most of these dams are protected neither from evaporation nor from pollution. It was declared in 1999 that the water of the King Talal Dam, the largest in Jordan (90 MCM), is not usable for irrigation. The rate of salinity exceeded 2200 PPM.

There are 2240 wells in Jordan, of which 1654 are privately owned, most of which are not controlled or have broken meters; 596 wells are unlicensed, and all of them have no meters. These practices have triggered a chain of adverse consequences, such as increased water and soil salinity, decreased land productivity, and depopulation in some areas.

The case of Jafr is a typical example of the behavior of the state and local tribes. Sixty-two wells registered at the Water Authority violate the law. Forty-five percent of the wells belong to one tribe. The pumped water exceeds the safe yield capacity by 225%.

Azraq basin is another example of a catastrophic development. The safe yield is limited to 24 MCM. In 1997, about 54 MCM were exploited, which means an overpumping of 225 %. The number of groundwater wells was 484 (another 209 wells are closed) and 76.6% of them were illegal (unlicensed). The oasis of Azraq, with its attractiveness for internal and foreign tourism, has been totally damaged. Young people have already begun to emigrate from the area.

In 1997, treated wastewater totalled about 61.000 MCM, which is only 25% of municipal water and 10% of irrigation water. The treated wastewater in Samra plant, the largest in Jordan, which flows to King Talal Dam, is repolluted by the wastewater of Gaza refugee camp near Jarash.

These are some of the issues of man-made water problems which must be addressed. Besides looking for new resources, better management of the existing resources is urgently needed. The awareness of the entire society of the water problem must be considered as the first priority.

The Sa'ad al-Kafara: The Oldest High Dam in the World

Henning Fahlbusch
Lübeck

The Sadd al-Kafara, the oldest high dam in the world, was constructed as an earth-fill dam with a cover of limestone slabs on its upstream and downstream faces in ancient Egypt during the Old Kingdom, probably about 2500 BC. Its position is in the Wadi Garawi, about 40 km south-east of Cairo, halfway between the Nile River and an alabaster quarry in the upper wadi.

The investigation of the remains of this structure revealed the mode of construction. Sand and gravel for the core were taken from the wadi bed and the surrounding terraces, and the limestone ashlars for the cover from quarries in the upstream and downstream banks. The material was transported over ramps. The results of the research indicated that the very strong dam was never finished, but was most probably destroyed shortly before completion.

The purpose of the dam is still controversial. It is assumed that the dam was constructed as a flood protection measure. However, the object to be protected is not known. Here the hypothesis is made that water stored behind the dam was used for wetting a track made of muddy sediments from the Nile River. Friction was reduced when in the Old Kingdom widely used alabaster ashlars were dragged on a sled from the quarry in the upper Wadi Garawi to the Nile River.

Ancient Water Installations and Dams in the al-Fayyum Oasis/ Egypt

Horst Jaritz
Cairo

Since its beginning, agriculture in Egypt has depended on artificial irrigation, generated by its only source of water, the Nile River. Material remains of man's effort to manage the potential of available water for irrigation are found all over the country. This is particularly valid for the oasis of al-Fayyum, where ancient dikes, dams, sluices, and other water installations still exist, witnessing to one of the greatest hydrological projects in antiquity, the legendary Lake Moeris. This reservoir remained in use from the Middle Kingdom (1906 BC) until its demise in 1886 AD. During the period of the Nile flood the artificial lake was filled with about 200 million

Conference participants being informed on new excavations in the Petra Siq.

cm of water that was used for irrigation purposes during the period of low water. Its superficies and remains were recorded and evaluated in 1988 by a multidisciplinary group of hydraulic engineers, surveyors and architects.

Wasser im Kult – Kult im Wasser: Zur religiösen Bedeutung des Wassers in Altägypten und in Vorderasien

Katja Lembke
Damascus-Malki

Welche große Bedeutung dem Wasser in ariden Gegenden zukommt, ist nicht nur an ausgetüftelten Dammprojekten und Anlagen zur Wasserspeicherung zu erkennen, sondern auch an seiner Wertschätzung im Kult. In Ägypten wie in Vorderasien lassen sich dabei zwei Verwendungsarten unterscheiden, nämlich die aktionsgebundene und die fortdauernde Ausschüttung. Erstere ist in Ägypten etwa bei dem täglichen Ritual anzutreffen, bei dem die Waschung der Kultstatue im Mittelpunkt steht. Daß Wasser Leben bedeutet, zeigen außerdem Darstellungen von Libationen, bei denen Wasserlinien mit dem Anch- (d. h. Lebens-)Zeichen verbunden werden. Zu den stehenden Gewässern andererseits gehören in Ägypten die Heiligen Seen, die in zahlreichen Tempeln seit dem Mittleren Reich anzutreffen sind. Sie waren in erster Linie Reservoire für Libations- und Reinigungswasser sowie Stätten der Priesterreinigung, sind aber darüber hinaus auch häufig in Kultabläufe integriert. Eine Sonderrolle kommt dem Osireion Sethos' I. in Abydos zu, eine monumentale Grabstätte des mit Osiris identifizierten Königs. Dieser Bezirk ist durch einen Kanal als künstliche Insel gebildet. Ähnlichen Charakter hat das phönizische Herkles-Melqar-Heiligtum in Amrit; Portiken umgeben ein Wasserbecken, in dessen Mitte sich ein Kultbildschrein erhebt. Kultische Wasserbecken sind weiter im Hauran anzutreffen (sog. Birken) und literarisch in Hierapolis (heute Membij in Nordsyrien) belegt. Auch in Vorderasien sind Wasser und Kult also unmittelbar miteinander verbunden.

Assyrian Hydraulic Engineering, Tunneling in Assyria and Technological Transfer

Ariel M. Bagg
Tübingen

The hydraulic engineering projects in ancient Assyria (north Iraq) are documented from the fourteenth to the seventh century BC. Not only archaeological evidence, but also valuable iconographical and written sources allow us to follow the achievements of the Assyrian engineers, especially in the field of agricultural hydraulic engineering. Although the importance of irrigation in ancient Mesopotamia has been stressed over and over again, up to now the Assyrian irrigation works were rarely the subject of discussion, nor were systematically studied by Assyriologists or historians of ancient technology.

The most impressive enterprises were carried out by the Neo-Assyrian kings Ashurnasirpal II and Sennacherib, to provide their new capital cities with water, to irrigate luxurious gardens, as usually assumed, but mainly for agricultural purposes. The intake works of three main canals conducting water to Kalhu (modern Nimrud), Nineveh, and Arbail (modern Erbil) are asociated with tunnels constructed in a particular Assyrian way, which I discuss in my paper.

From Ashurnasirpal II on, who washed his weapons in the Mediterranean, almost every Assyrian king campaigned to the West. In the Levant the Assyrians were particularly active, and there they gained their bad reputation, as evidenced by their tendentious treatment in the Bible. A well known feature of this region are the water tunnels, and I will analyse a possible transfer of technological knowledge in the light of a fragmentary and enigmatic cuneiform text.

The Great Dam of Ma'rib as a Part of the Hydraulic Culture of Southern Arabia

Ueli Brunner
Pfäffikon

The Great Dam of Ma'rib is the most famous construction in Yemen's history. The enormous extension of this earthen dam of 620 m in length, a height of about 20 m and a width of more than 100 m at its base, as well as the two monumental stone structures at both ends, give it a top rating in the Islamic world. At a first glimpse the dam seems to have functioned as a storage basin. A closer look reveals its real purpose. The Great Dam had to raise the *sayl* (river) onto the level of the fields. The distribution of the water was an immediate load of the *sayl* that was laid down behind the dam. The safety of the dam was guaranteed by a huge over-spill, which leveled the amount of water entering the canal network. Altogether an oasis of 9,600 ha could be irrigated.

If we look at the irrigation system of Ma'rib from the point of view of its function, we see that it is similar to the flood irrigation in most of the bigger wadis of Southern Arabia. The only difference in the case of Ma'rib was that the dam that closed the wadi was replaced by a diversion dam which caught only a part of the *sayl*. The canal network and the means of water distribution to the fields were almost identical.

A totally different system was in use in the central highlands, where precipitation was almost sufficient for rain-fed agriculture. Here rainwater was collected on a cleaned stony surface and conducted by small walls along the hillsides to fertile fields. This kind of rainwater harvesting is similar to the Nabataean irrigation system in the Negev. Did these methods of irrigation evolve independently from each other?

Five thousand years of irrigation have shaped the landscape of Southern Arabia in a specific manner. The anthropogenic sediments in the valleys, the terraced fields on the mountain slopes and the cleaned hillsides in the central highlands, with their stripes of small walls, are all remains of this long history of adaptation of Man to the special conditions of Southern Arabia.

Agricultural Water-Management on the Oman Peninsula

Jutta Häser
Berlin

Climatic conditions on the Oman Peninsula have made agricultural activity possible only with ghayl, falaj

or well irrigation systems. Even the earliest cultivation at the beginning of the third millennium Bed on irrigation, since at that time aridification had already set in. By c. 1000 BC aridity had reached the state which has continued until today.

Although diverse finds and contexts from the third millennium BC provide evidence of well and ghayl irrigation, no detailed conclusions can be made as yet about their actual function.

Proof of field irrigation from the second millennium is absent, although some finds of date stones and the carious condition of the teeth of the population could be an indication of date cultivation.

The falaj irrigation system was introduced during the first millennium BC; recent finds indicate an earlier date than assumed until now, that is in the first half of the first millennium BC. If this is confirmed by further finds, the theory on the introduction of the falaj system in Oman by the Achaemenians in the mid-first millennium BC must be reviewed.

Since then the falaj has become the characteristic water-management system in Oman today. Despite the recent employment of water pumps and other new techniques, the state endeavors to preserve the long proven falaj system and to make it more attractive for use.

The Function of Roman Cisterns and Water Basins in the Hauran

Klaus-Stefan Freyberger
Damascus

After the decline of the Hellenistic Kingdom in the late first century BC many tribes settled down in the Near East. The leaders of these families were local rulers or kings who intensively cultivated their lands and promoted the settlement of extensive regions in the Levant. The rapid increase of the settled population and the urban development of city centers in the Roman period required a sufficient water supply. During the provincial period many water canals, water basins, cisterns, and wells were constructed in the Hauran and in many other regions in the Near East. In rural regions like the Jabal al-'Arab there are many ancient water installations which are used by the inhabitants until today. The quantity and the good preservation of these buildings allow some remarks about their use in antiquity.

The different cisterns and water basins of profane use fulfilled certain functions in the public life of the cities and villages. According to this idea, these constructions were public installations whose use was regulated by rules. The water basin called a Birka in the sanctuaries, which had a ritual function, belongs to the second group. It is very probable that these belonged to sacred buildings and could be used only by the staff of the temples. The third group consists of many private cisterns and pools in ancient dwellings.

Zur Wasserversorgung von Resafa, Syrien

Stephan Westphalen
Damaskus

Resafa, eine antike Tagesreise südlich des Euphrats in der syrischen Steppe gelegen, verfügte neben salzhaltigem Brauchwasser aus tiefgebohrten Brunnen von Natur aus nur über geringe Ressourcen an Trinkwasser, die von Regenfällen im Winter und Frühjahr gespeist wurden. Die Versorgung mit Trinkwasser wurde zu einem Problem, als sich der christliche Wallfahrtsort im 5. und 6. Jahrhundert n. Chr. von einem Militärlager zu einer wohlhabenden Stadt entwickelte, in der die zunehmende Bevölkerung neben den nur zeitweise angereisten Pilgern ein Mehrfaches an Wasser benötigte. Die Oberflächen von Dächern und Plätzen reichten nicht aus, um genügend Wasser zu sammeln und in Zisternen zu leiten. In Resafa verfiel man für die Wasserversorgung auf ein im Prinzip einfaches, in der technischen Ausführung aber aufwendiges System. Man legte im Südwesten an der tiefsten Stelle der Stadt große unterirdische Zisternen an, deren Gewölbe heute noch nahezu vollständig erhalten sind und deren Format an hauptstädtische Wasserbehälter in Konstantinopel erinnert. Raffinierterweise wurde das Wasser für diese enormen Volumen nicht innerhalb der Stadt, sondern vor den Mauern in den weiten Flächen der Steppe aufgefangen. Vor allem wurde ein nahegelegenes Wadi ausgenutzt, um Wasser durch Erdwälle zu stauen, über einen Kanal durch die Stadtmauer zu leiten und auf die einzelnen Zisternen zu verteilen. Das System hat wahrscheinlich nur funktioniert, wenn sturzflutartige Regenfälle im Frühjahr die Zisternen in kürzester Zeit füllten. Schätzungsweise konnten die Zisternen den Jahresvorrat für etwa 6000 Menschen fassen.

Water in the Old Testament

Dieter Vieweger
Wuppertal

Water is the most important element for life. Through all the changing things in life, all the changing scenes history brings, water is one that remains the same: today, no less than in times past, water is the most important element for life. Small wonder, then, that water plays an important role, directly or indirectly, in nearly all the books of the Old Testament.

All thirst. All people. "All creatures that on earth do dwell." And in Palestine access to water determines in which areas people can live and, quite simply, in which they cannot. Access to water divides the country into permanent and non-permanent settlements. Along the coastal plains, especially, and the Jezreel and Jordan valleys, permanent societies and cities could be easily established, but in the hill areas, small rural villages and non-permanent pastoral societies were much more common.

In the Iron Age, when the years were good and enough rain fell, people were able to manage the water problem. But if for one or more years there was not enough rain, in some regions or over the whole land, all people, the Ammonites, Moabites, Edomites, Philistines, Israelites, and others, all faced a major crisis. As a consequence, all of them were especially careful to have good connections to their gods, who were able to bless their land with sufficient rain, and, they were careful to ensure that their material culture had reliable means of water supply, storage, and use.

In my paper I stress both these, so to speak, channels to water, the human and the divine, because both belonged

together in Old Testament times. And for both tributaries of this two-fold approach I want to highlight some of the rich variety of source material. These are texts dealing, on the one hand, with major water problems and crises, and, on the other, with problems that occur in everyday life. I will also cite archaeological evidence, such as wells, dams, cisterns, or channels. All these provide evidence of the design, use, purpose, and social context of ancient water use in Old Testament times.

1. Water is the gift of God; 2. Natural conditions; 3. Human activities to take care for a secure water supply; 3.1. Springs and wells; 3.2. Irrigation culture; 3.3. The degradation of the water supply and the wider environment

Meaning of Water in the New Testament

Sabine Schmiedel
Amman

Water is essential for human life and survival. But beyond that, in all religions, cults, and civilizations, water has an additional and spiritual meaning. Water is used to cleanse hands and the face, and at the same time, it is the main factor used in purification rites and corresponding religious thinking. This applies also for the time of the New Testament and its cultural context.

Explaining these ideas, reference is made to Jewish ideas of purification and Christian concepts of baptism. Furthermore, developing into the sphere of transcendence, "water" is used when discussing God and Jesus Christ.

Aspects of the Significance of Water in Muslim Traditions: A Bird's Eye View

Julia Dröber
Leipzig

The purpose of this paper is to give insight into different aspects of the significance of water in Muslim traditions – be it in the scriptures, in the philosophical or mystical works of Muslim scholars, or in the orthodox or rather traditional rites.

Water in the scriptures – i.e. in the Holy Qur'an and the Sunna – is mainly mentioned in connection with the creation of the earth, during which God created everything out of water, and He is the one who is still giving life to everything by sending down rain. Besides that life-generating, blessing character of water, a second feature is mentioned in the scriptures, which is that of the destroying and threatening power contained in the huge masses of water of an ocean or a flood. However, water is not only connected to life in this world. We find very detailed descriptions about the abundance of water in the other world, in Paradise.

Muslim religious rites concerning purification rituals deserve special mention when discussing water. Although not all kinds of purification rituals are achieved through water, it nevertheless plays an important role in several ablution rites.

Consideration should also be given to the meaning of "holy" water which is found in wells or other sources, next to holy places such as tombs of "saints", and which very often is said to be extraordinarily blessful. One prominent example of this kind of powerful water is the Zamzam water in Mecca.

The last aspect to mention here should be the role of water in mystic, especially Sufi, poetry, in which poets like Maulana Jallaluddin Rumi find ways to describe God and the relation to Him through the different forms of water.

The Rehabilitation of the Al-Hasa Oasis in Saudi Arabia

Henning Fahlbusch
Lübeck

The Al-Hasa oasis in the eastern province of Saudi Arabia has an area of irrigable land of up to 20,000 ha. However, due to excess irrigation and insufficient drainage the soil became saline and the cultivable area decreased to 8,000 ha only in the middle of this century. Additionally, the yield of the crops was reduced by nearly 50%. Furthermore, due to steady northerly winds, dunes moved into the oasis, covering the cultivable land.

Under these circumstances the Saudi Government decided to analyze the situation and to rehabilitate the oasis by a completely new planned irrigation and drainage system and a sand stabilization project.

The water of several artesian wells was tapped and channeled into a system of concrete canals to the fields. Water of low-lying wells was lifted by means of three pumping stations, in order to apply gravity irrigation even to fields at higher elevations. The length of the new concrete canals amounts in total to more than 1,500 km. In this system quite a number of inverted siphons, gauges, and distribution weirs had to be installed.

Parallel to the irrigation system a new drainage system of open ditches was dug in order to control the ground-water level. The length of the drainage canals amounts to more than 1,300 km. The drainage water is led to two evaporation lakes in the desert.

The project was successfully implemented from 1967 to 1971. The result was that the irrigated area could be increased again to about 12,000 - 14,000 ha, with good yields. The movement of the dunes was stopped. The situation of the oasis became stable.

The project is looked upon today as one of the best irrigation projects under arid conditions.

Water Shortage in the Middle East: A Source of Cooperation

Yasser Adwan, Hans-Dieter Bienert, and Brigitta Meier
Amman, Frankfurt

The increasing water demand in the Middle East, caused by a rapidly growing population, is leading to water shortages in the countries of this region. The annual growth in demand for water in Jordan is estimated at a rate of about 25 MCM/year.

It is an established fact, recognized by the scientific community, that any time consumption far exceeds production, a crisis is at hand. This crisis can be called a water crisis. Two aspects of this crisis appear at the national level – in this case Jordan – or at a regional level, including Jordan and other countries such as Israel, the Palestine National Authority (PNA), Syria, Egypt, Lebanon, Turkey, and Iraq.

Another face of the same coin is th4 t the end of the Würm glacial period only. Two main theories concern the origin of the Dead Sea Basin.■

'Ain ez-Zara Thermal Springs: The Strange Paths of Herod's Spa Waters

By: Peter Udluft, University of Würzburg (Germany)

Introduction

The Dead Sea area around the thermal springs was inhabited since prehistoric times. This is indicated by implement sites surrounding these springs (Ziegert et al. 1984). Furthermore the thermal springs were referred to several times in the Bible (Genesis 36,24; Ant. 17,6). Herod the Great sought a cure for rheumatism in these hot waters. In Roman-Byzantine times they were called *Therma Kallirrhoes* (beautiful thermal waters). The chemical composition shows a water of the type "sweet to light salty".

General setting

The studied cross section cuts Jordan some 50 km south-west of Amman. The area represents a part of the eastern slopes to the Dead Sea, with mountains going up to about 1000 m ASL, with the Dead Sea level at 400 bsl. The eastern part of the cross section lies some 100 km east in the desert, at 500 m asl in the area of Azraq. The rocks along that line consist of an interrupted sequence of sedimentary rocks ranging in age from Cambrian to Upper Cretaceous and lower Tertiary. The lower part, with a total thickness of 650 m, consists mainly of consolidated to semi-consolidated sandstones. The age of these sandstone sequences are Middle Cambrian to Lower Cretaceous, with some interruptions. Not exposed but included in the numeric model are the precambrian series overlying the basement. The upper part, with a total thickness of about 700 m, consists of limestones, marls and dolomites of Upper Cretaceous age.

The hot springs are the issue of the east-west flow of deeper groundwater that originates in the area between the western hills and the Azraq-Sirhan depression. The points of outflow are mostly located along the crossings of the rift parallel with E-W trending faults. Numerous fractures run in the same direction as the main faults. Along these two fault systems sometimes basalt flows occured (Zerqa Ma'in). All the springs discharge at elevations below sea level, their temperatures reaching 63 °C. The area of outflow of the hot springs is marked by deposits of clacium carbonates, the so called travertines.

Travertine

Travertine deposited along faults and joints is present all over the spring area. The most striking of these deposits is a filling, 20-30 cm in thickness, trending ± N-S, and extending for hundreds of meters. Because of its higher resistance to weathering relative to the surrounding weakly cemented sandstones, this fracture filling forms a natural wall.

We can distinguish two types of hot water travertines: Old and recent precipitated travertines. The older travertines are thicker and darker in color than the recent ones. On aerial photographs old travertines look very similar to basalts and are often mixed up with them. These hot water travertine deposits along faults and joints are present in several niveaus, mostly striking ± N-S and extending for hundreds of meters. The drop in temperature, the loss of CO2 gas, the increase in pH-value, and the decrease in the ionic strength of the water favor the precipitation of aragonite.

It is assumed that older travertines were precipitated at higher levels and higher silica content than recent ones. Analogous to the SiO2-geothermometry this means higher water temperatures, and hence also higher Ca and HCO3 contents, higher Ca2 and Lower to Middle Cambrian dolomitic sandstones. The largest deposit covers an area of about 125,000 m^2, with a thickness up to 20 m. The total volume of travertine in the area is assumed to be about 10 MCM, which is equivalent to 15 to 20 million tons. The recent hot spring deposits are yellowish white and relatively soft.

The relatively high Mn content of 0.65 mg/l and the low HS-content of only 0,04 mg/l could be smelted all around the springs. A few meters away from the spring along the water path, the pH-value increases to 6.9, and the free CO2 decreases to 100 mg/l. The water here is oversaturated and carbonates should precipitate. At the end of the water way, before the water reaches the Dead Sea; the temperature drops to 30°C and the pH-value increases to 8.05. The free CO2 content is now in equilibrium with the atmosphere.

Under these conditions 2.5 meg/l of Ca and HCO3 must precipitate from the water to achieve equilibrium. This means that 125 mg/l CaCO3 should precipitate. But in the area where calc-sinter precipitates, the water loses only 5 to 10 mg/l CaCO3 (0.1 - 0.2 meg/l). This fact shows that the larger part of CaCO3 precipitates on the way to the Dead Sea or even in the Dead Sea itself (whitening).

Isotopes

The isotope composition of the thermal springs indicates that the water is formed from a mixture of highly evaporated water (dominant part) and recently infiltrating meteoric waters. The

average tritium content of 0.27 ± 0.07 T.U. indicates that the water is not recent or that it contains only small portions of recent water.

The average δD and δ18O contents collected from the thermal springs showed isotope concentration with an δ18O enrichment which is higher than that of D. According to the groundwater model developed by Salameh and Udluft (1984) the isotopic behavior could be interpreted by mixing of highly evaporated water with minor amounts of recent meteoric water, where the old water has an age of thousands of years. Most of the old water may originate from the Azraq area, some 100 km east of the thermal springs area.

The water flowing towards the east partly infiltrates through the Upper Cretaceous Units of the sandstone aquifers; the rest of the groundwater in the Upper Cretaceous Units continues flowing southeastwards to the Sirhan depression, where further infiltration to the sandstone aquifers occurs.

Geothermal gradient

A slightly elevated geothermal gradient of 3.9 °C/100 m was calculated from SiO2-geothermometry from the present conditions of the thermal spring area (Salameh and Khudeir 1983). The slightly elevated gradient can be attributed to the effect of cooling of buried basaltic bodies. Since that time, the basaltic bodies have been gradually cooling down.

In the sandstone aquifers, the water flows to the west where it is discharged at elevations below sea level along the slopes bordering the Dead Sea. There, the water in the sandstone aquifers is thermal, due to deep percolation and possibly due to the presence of cooling igneous rocks. Its content of dissolved solids (1.5 to 3 g/l) is increased due to evaporation processes recharging between Madaba and the Azraq area.

Flowmodel

The measurable thermal spring discharge along the western slopes bordering the Dead Sea has been determined as 2.5 m^3/s. The evaporation through the surface of the sandstones exposed on the rift valley can be calculated with help of the groundwater model of 1.5 m^3/s, while the spring water of B2/A7 springs ('Ayn Musa et al.) should be about 1 m^3/s.

The hydrogeological cross section model was constructed on the basis of ASM4 (Kinzelbach and Rausch1994). It includes in x-direction 48 and in y-direction 20 cells; the cell distances are to 2500 m respectively 100 m. The cross section has a width of 1500 m. The heads in Azraq are fixed continuously at 500 m and at the side of the hot springs at -200 m. The outflow of the B2/A7 aquifer in the west is at the cell 5/4 with 10 l/s fixed, whereas the evaporation extracts from the Kurnub-sandstone at the cells 3/7 to 2/10 at least 5 l/s per cell. The hot springs discharge 38 l/s as a fixed head.

The model needs a recharge rate of 68 l/s or 0.45 $l/s*km^2$ to have proper results (see Udluft 1996). How far the Azraq-Sirhan Depression is involved in the groundwater flow to the west cannot be answered by the model.

The numeric cross-section model shows that the time needed for a drop of water to penetrate the units vertically is 1200 years for the two upper aquitards and 1500 years for the lower one. The time needed to flow horizontally through the sandstone aquifers until the water discharges at the springs on the western Dead Sea slopes is 4000 years, so the maximum age of water discharging at the springs is roughly 7000 years.

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Umm Saysaban: Preliminary Report on an Early Bronze Age Settlement at the Perimeter of Ancient Petra (Jordan)

By: Manfred Lindner, Naturhistorische Gesellschaft, Nürnberg (Germany)

Defensible Location

The first trekking group from France visited the site on the second day of the survey of Umm Saysaban. Teams of the Naturhistorische Gesellschaft (NHG) Nürnberg (Germany) have explored the area to the north of the Jabal ed-Deir massif since the eighties. Perched on a small plateau rising out of the abyss of Wadi Mirwan and backed by a natural rock formation, a multitude of more or less standing stones had revealed the former existence of a small village-like settlement (Fig. 1). Ample surface ceramics of Early Bronze Age pottery, beside a scatter of Nabataean-Roman ware, promised to date the place. A few soundings where a house might have been lived in c. 5000 years ago confirmed the date.

Rectangular Structures

With the permission of the Department of Antiquities and the help of its local representatives, as well as the assistance of Dakhilallah Qublan and his crew of Bdul Bedouins from Petra-Umm Saihun, another survey was planned for 1998. The vicinity including Wadi Mirwan and the accesses to the plateau was explored and a map was produced by Ulrich Hübner and Ingrid Künne. It showed about 15 structures (houses or rooms of houses), all of them rectangular and recognizable by their partly still standing wall slabs (Fig. 2). Not exactly standing but unmistakable, a wall with a postern in it had once closed the plateau to the north-east, where defense was of vital interest to the inhabitants.

A 4.80 x 4.00 m structure (I) was chosen for a sounding in 1998. The rectangle revealed such a compact assortment of pithoi that with the permission of the Department the whole room was excavated to a depth of 0.70 m. Stor-

Fig. 1. Plateau of Umm Saysaban seen from the pathway coming from the Deir plateau.

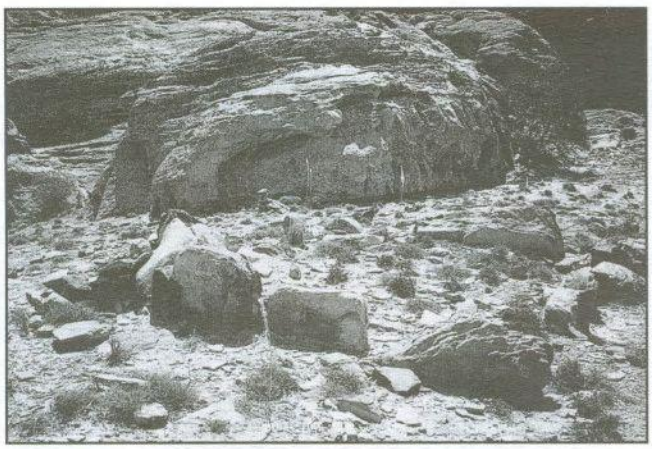

Fig. 2. Excavation site with standing wall slabs.

Fig. 3. Storage jar in Structure I.

age vessels with diameters of up to 0.50 m and a handmill 0.80 m length resting on a box-like setting of 0.80 x 0.80 m indicate use of the structure as a kitchen-store room (Fig. 3). Only one flint implement with a fine cutting edge was found. Conserved walls of thick slabs above benches and a door opening with a socket were reminiscent of the Arad-house as it was excavated by R.Amiran. There the walls consisted of ashlars; here Ordovician sandstone blocks were cut into slabs and positioned around the benches and the sunken floor.

"China among the Earthenware"

In a second campaign in 1999 an adjoining structure (II) of about the same size was sounded. As before, a broad room was mostly filled with storage jars. In both structures all the vessels were cracked, but seemed completely preserved, and they might eventually be restored. There was an interesting difference. In Structure II beside the vessels were unearthed about 10 implements of flint and quartzite, among them, e.g., a knife of the latter material. The "China among the earthenware" was the lower third of a painted and burnished juglet with a graphited lattice pattern on the bottom exterior. There were ledge handles, loop handles, and lug handles. Rope decoration descending from a loop handle matches a similar arrangement on an Arad vessel (Fig. 4).

One would like to call the two structures together a house consisting of two broadrooms (Fig. 5). But the number of large storage vessels makes it difficult to imagine people living and sleeping in such accommodations. Fortunately the site offers further possibilities for answering that question. In the course of future explorations, more structures of the same type and date but of different significance are to be expected. On the way from Umm Saysaban to Beidha, similar house foundations were noted in 1997. They are not yet included in the existing map.

Of Interest to Tourists

The settlement of Umm Saysaban is preliminarily to be dated to the Early Bronze Age, probably to EB II. It was a small rural community of agriculturists profiting from a defensible location. Looking at their stocks, or rather their storage vessels, they did not live on the edge of poverty. There was, it is true, little or no fertile land on the plateau to maintain even a marginal existence, and we do not know precisely where they got their drinking water from; but agriculture is possible at the foot of the plateau. In fact, fields are being cultivated there by Bedouins from Petra-Umm Saihun.

Situated on a difficult but passable track from the ed-Deir plateau to Beidha, the excavated and consolidated structures are of interest to people coming to Petra. A younger generation of tourists is already being allowed and encouraged to hike through the outskirts of the ancient town, on condition that they are accompanied by a licensed guide and keep to certain tracks and pathways (Fig. 6).

Acknowledgements

The NHG teams are indebted to the Directors-General of the Department of Antiquities for allowing the surveys since 1983, and their regional representatives, Mr. Suleiman Farajat and Mr. Hani Fallahat, in this case. Members of the survey teams besides the author were Prof. Dr. U. Hübner (co-director), Elisabeth Gunsam (architect), Ingrid Künne (botanist), Antonie Schmid and Elisabeth Schreyer (sounding supervisor). Thanks are due to Dakhilallah Qublan from Petra-Umm Saihun and his family who have worked with the NHG for many years. ■

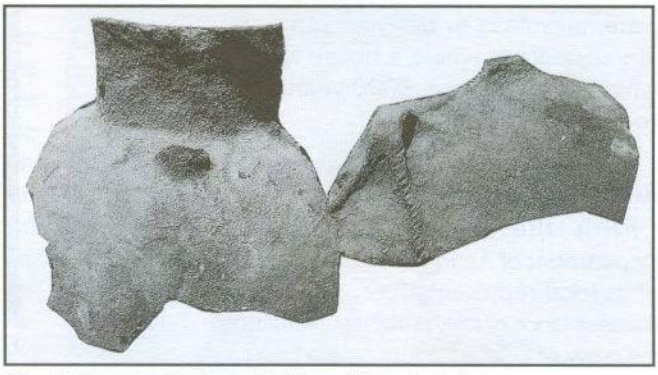

Fig. 4. Two jar fragments from Structure II.

Fig. 5. Structures I and II after excavation.

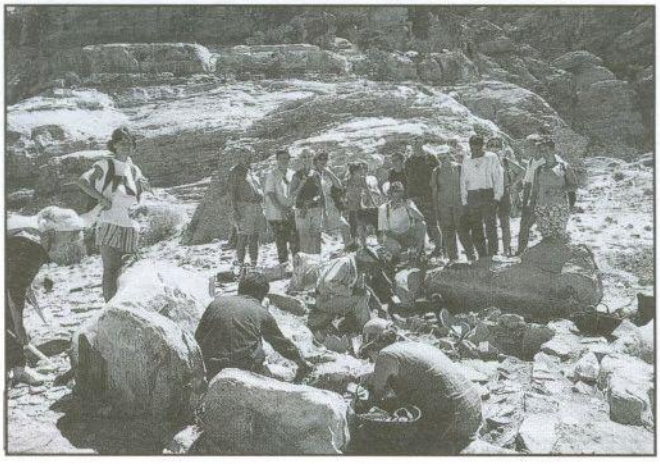

Fig. 6. First visitors at the excavation site.

Swiss Excavations at Petra 1996-1999: The Nabataean Mansion on Ez-Zantur IV (Petra)

By: Bernhard Kolb, University of Basel (Switzerland)

On behalf of the Swiss-Liechtenstein Foundation for Archaeological Research Abroad (SLFA), since 1988 Basel University has been investigating Nabataean private architecture on the terraces to the north and south of ez-Zantur – a rocky crest in the south above the Colonnaded Street. In 1996 we started excavating the structures on the oblong terrace EZ IV immediately south of ez-Zantur, a site which had been surveyed by M. Lindner and John P. Zeitler on behalf of the Naturhistorische Gesellschaft Nürnberg in the early 1990s. During the past four excavation campaigns, most of the southern and central rooms of an extraordinary Nabataean mansion were exposed, which most probably extended across the whole terrace (Figs. 1-2).

The sherds of painted Nabataean pottery from the mortar beddings of the opus-sectile pavements in rooms 1, 10 and 17 all belong to the same decorative phase and define a terminus post quem of 20 AD for the construction of the building. Small finds of the 4th century AD were found on the floors of most rooms, sealed under deposits of fragmented decorative stucco from the walls. On the basis of the coins, the end of occupation of the site and the building's final destruction can be set during the earthquake of 363 AD.

The entire narrow southern spur of the rocky terrace is built up by the three representational rooms 6, 7 and 17. To the north these rooms are connected to the "spine" of the mansion, i.e., the axially constructed courtyards 19, 15 and 28. It seems reasonable to assume that the main entrance is to be expected on the yet unexcavated northern side of the terrace. In order to reach the reception rooms at the southern limit of the building, visitors had to cross the different courtyards, the last of them adorned with distyloi in antis on its northern and southern side. The intercolumniations of the distylos between courtyard 19 and exedra 7 were closed off by doors, as the marks left by doors scraping on the pavement indicate. Before the visitor was given access to the reception rooms, he was confronted with this imposing façade-like scenery. Exedra 7 is flanked to the east and west by the two stately rooms 6 and 17. Room 6 is connected to exedra 7 by an open passageway and two lateral doors, while room 17 has only a single access, which relates to the axially opposed passageway leading to room 6. The floors in rooms 6 and 7 are paved with sandstone flags, while the floor of room 17 was originally decorated with a sumptuous opus-sectile pavement of imported marble and alabaster. Quantities of fragmented painted and gilt half- and quarter-columns, cornices and pediments indicate that the stately rooms were decorated with an elaborate system of polychrome stuccoed architecture.

There are only a few examples in the region comparable to the characteristic three-room group 6, 7 and 17, which consists of a central exedra and two

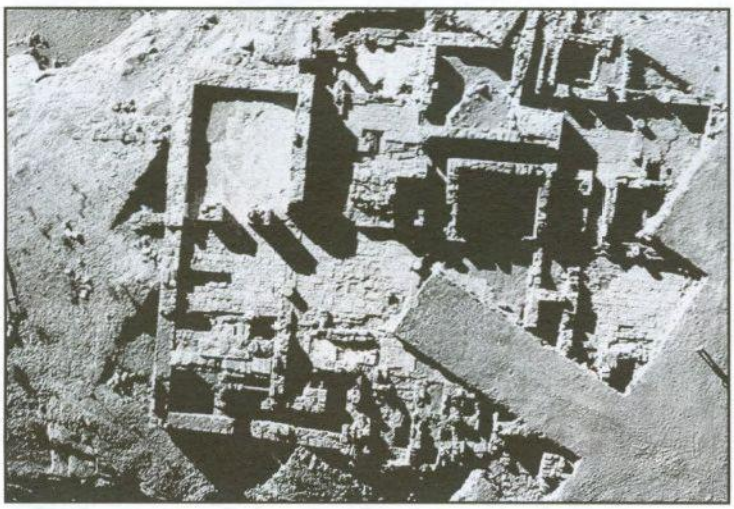

Fig. 1. Aerial view of ez-Zantur area with the site EZ IV.

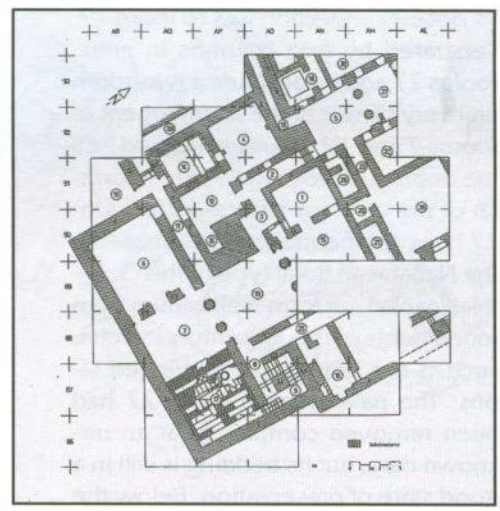

Fig. 2. EZ IV: Schematic plan of Nabataean mansion after the 1999 season.

flanking reception/banqueting halls. Symmetrical suites of three rooms were a basic element of Macedonian palace architecture from the late 4th century BC onwards, echoed in the three-room suite of the Late Hellenistic Palazzo delle Colonne in Ptolemais/Cyrenaica and in the early Herodian core of the Western Palace at Masada, dating from the 4th decade BC. The Palazzo delle Colonne plays a key role as a geographical and chronological link between the Macedonian architecture of the 4th century BC and Near Eastern palatial architecture of the 1st century BC/AD. Although there are still only a few examples to refer to, it is assumed that the three-room suite had its firm place in the Ptolemaic architecture, and that the Herodian palaces, as well as the mansion on EZ IV, reflected Ptolemaic models.

The square staircase 9 to the north of room 17 connected the basement below room 17 to the ground floor and the first floor level. Quantities of black and white mosaic fragments found in the debris of rooms 6, 7 and 17 imply that the first floor was also lavishly furbished. Clearly set off from the "official" part of the mansion are the private and servants' rooms to the east and west of the central courtyards. The square courtyard 5 was the focal point of the western wing. Its western wall originally had three door openings leading to rooms 18 and 30, two doors on its south side leading to corridors 2 and 13, and three on its eastern side leading to rooms 26, 23 and 22 – but its closest connection was to room 27. Separated by two columns in antis, rooms 27 and 5 constitute a two-room unit very similar to the arrangement of rooms 7 and 19 – but smaller and less the doors. The beautifully carved capital of the western pilaster from room 27 is worth mentioning. It represents the Nabataean floral type of the Corinthian capital – a form well known from monuments of the 1st century in Petra, such as the Temple of the Winged Lions. The pavement in room 27 had been removed completely at an unknown date, but its bedding is still in a good state of preservation. Below the floor of room 27 a beautifully preserved cistern is cut into the bedrock. Four intact arches of ca. 60-65 cm width span the cistern, which has a minimal depth of 3.5 m. Astonishingly there is no indication for an inlet to the cistern. A spill-over channel starts underneath the eastern stylobate and subsequently runs southward through rooms 2, 12, 11, and 10. A surprising find was stuck between the cistern's arches 1 and 2 (fig. 3): a complete vessel, probably used to draw water – dating to the later part of the 1st or the early decades of the 2nd century – fell into the cistern and was carried up to the arches when the cistern was filled.

At the western limit of corridor 11 a door gives access to room 14, which measures 5.10 m by 3.4 m. The exposure of room 14 with its hypocaust and the neighboring praefurnium 29 was quite a surprise. The suspended floor of neatly set hexagonal tiles framed by rectangular flags rests on regularly set pilae of rectangular or round tiles. The floor was heated by the circulation of hot gases, produced by the furnace in room 29. In order to maintain the circulation of hot gases three pipes of square tubuli or box tiles were embedded in the northern wall to create the necessary draft. The box tiles were fastened into the wall with mortar and afterwards covered with a coat of mortar and stucco. Huge amounts of the frag-

Fig. 3. EZ IV: Jar stuck between arches in cistern below room 27.

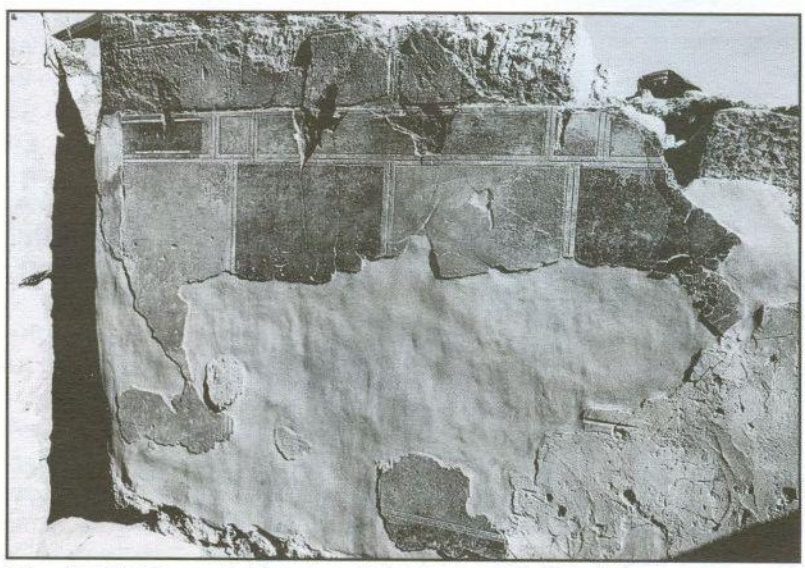

Fig. 4. EZ IV: Room 3. Masonry Style decoration of wall C.

mented polychrome decoration from the walls and the vaulted ceiling of room 14 were exposed.

For the time being it remains unclear if we are dealing with an isolated hot room of a small private bath or with a heatable room for the cold winter months, a feature quite common in the Northern Provinces of the Roman Empire.

The floor heating installation of room 14 belongs to a second construction phase of the building. The thresholds of the blocked-up doors in the eastern and northern walls evidence an original floor on a ca. 70 cm higher level. The second construction phase of room 14 remains conjectural, at least for the time being.

The rooms of the eastern side were altered heavily during the last phase of occupation. A number of minor installations, constructed from re-used column drums and ashlar as well as a taboun, are discernable. For the time being it is impossible to reconstruct the original layout of the rooms.

The use of decorative stucco and wall paintings in temples, tomb façades, and residential buildings in Petra is well attested. The fragmented decoration carried out in the so-called Masonry Style on EZ IV is important, because it is dated with a terminus post of 20 AD. On walls A and C (corridors 2 and 3) large surfaces of stuccoed Masonry-Style wall decoration are preserved (fig. 4). On wall C the following scheme of decoration can be reconstructed: Above a shallow, black plinth, of ca. 35 cm in height, there are panels or orthostates of ca. 70 x 140 cm, separated by incised lines. The orthostates are alternately colored in red and yellow and have white drafts, which are also separated by incisions. The string course above, ca. 20 cm high, displays the same color scheme and is followed by the remains of two lower courses of isodomic masonry A very similar decoration remains in the staircase of the so-called Baths, directly to the south of Petra's Temenos Gate. There are close parallels in the system of decoration, and also in the color scheme employed. As to dating, it seems reasonable to suggest that the two, almost identical, decorations are contemporary. The staircase decoration has recently been dated stylistically to the turn of the 2nd-1st century BC. The striking gap of more than 100 years between the suggested dates demonstrates clearly how difficult it is to date Masonry-Style decorations in general, and in Nabataea's metropolis Petra with its many undated monuments in particular. The obvious persistence of the Masonry Style was certainly not a purely Petraean phenomenon. The remains of decoration found in the Herodian palaces, as well as the residential houses of the so-called Herodian Quarter in Jerusalem, make clear that in the Near East this type of decoration enjoyed a life span above the average. A similar anachronistic tendency in Nabataean interior decoration is found on EZ IV in conjunction with the architectural paintings in room 1.

The rather small room 1 measuring 5 x 4 m was originally decorated on all four walls with illusionistic architectural paintings. The murals on walls A and C remain in very good condition (fig. 5). On wall C the paintings are in situ along a length of ca. 2.9 m, while those on the adjacent wall A are preserved along of ca. 1.8 m. The a secco paintings depict architectural façades on a closed background of yellowish alabaster imitation. From the broadly arranged façade on wall C a central pavilion with a segmental pediment flanked by two pavilions seem to project towards the viewer. The front columns of the pavilions reproduce red marble imitation on a white background, contrasting the rear blue-gray columns and the crowning dark-brown Corinthian capitals. Above the capitals there is a red marbled epistyle, headed by a red-brown frieze, dentils on a white background and the red-marbled geison and sima. The side pavilions are decorated by disc-shaped acroteria with gorgoneia. The pavilions backdrop shows a conspicuous variety of polychrome geometrical patterns which are plainly borrowed from the repertoire of opus-sectile and mosaic motifs. The façades are framed by broad pilasters at the sides and spanned by a narrow blue-green epistyle. Both pilasters are divided into squares which are painted with two-dimensional motifs. They show red diamonds on a white background and vice versa, and a sequence of quadrilobes of four diagonally placed peltae and discs respectively. Above the painted zone of approximately 1.5 m height follows a system of stuccoed architecture in the Masonry Style: The pilaster motif – painted in the main zone – is repeated in stucco in the upper zone.

In the course of the 1st century BC, illusionistic representation of architectural façades became the main characteristic of the Roman so-called 2nd Pompeian Style. The murals on EZ IV are closely related to the late 2nd Pompeian Style of the Augustan period, but there are notable differences: In contrast to the Roman models, the paintings in room 1 are restricted to the lower section of the wall and the typical Roman "wall-piercing" perspective,

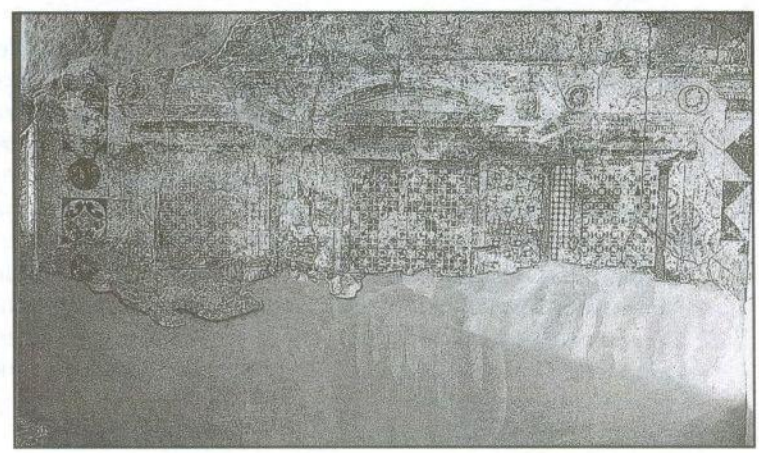

Fig. 5. EZ IV: Room 1. Architectural paintings on wall C.

achieved by vistas through open aediculae and over screen-walls, is completely absent. Another feature unknown in Roman architectural wall-painting are the carpet-like opus sectile-motives on the façade's backdrop.

In conclusion, it can be said that, on the one hand, the architecture of the mansion on EZ IV relates to a certain degree to Macedonia-inspired Ptolemaïc models. On the other hand, a clearly Roman component is present in the hypocaust in room 14 and the illusionistic wall-painting of room 1. The details of the murals referred to, revealed, however, that their Roman forerunners were freely interpreted. The limitation of the painted zone to the lower half of the wall, in combination with a system of decoration in the Masonry Style, gives the paintings in room 1 a new and un-Roman valence. Especially striking are the anachronistic tendencies one is confronted with on EZ IV, the use of the Hellenistic Masonry Style, and the adaptation of Augustan architectural painting in the 1st century AD.

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Brown University 1999 Excavations at the Petra Great Temple

By: Martha Sharp Joukowsky, Brown University, Providence (U.S.A.)

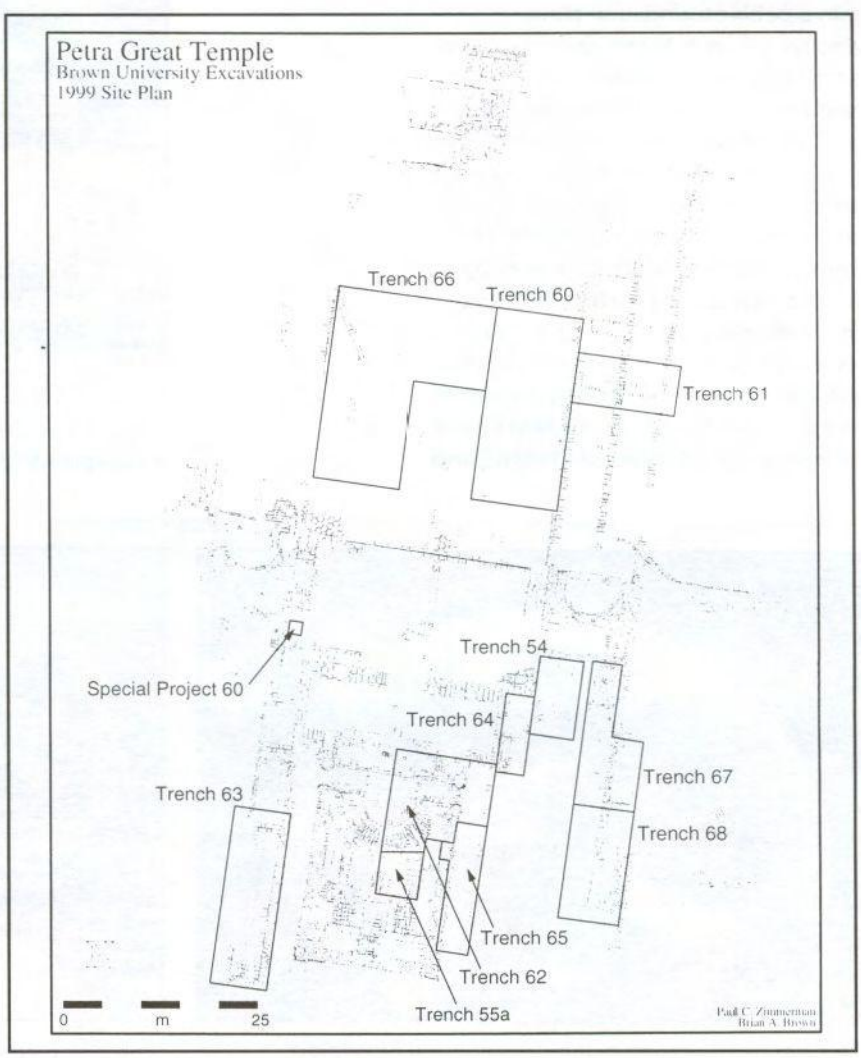
Under the auspices of the Jordanian Department of Antiquities, the seventh season by Brown University archaeologists took place at the Petra Great Temple from June 5 to August 6, 1999. Sami Al-Nawfleh very ably served as our Jordanian Department of Antiquities Representative.

Consolidation of exposed architecture had been undertaken throughout the 1998-1999 year and included the preservation of the frescos in the Temple West Corridor by Ueli Bellwald. Although the architectural remains are remarkably well-preserved, annual consolidation measures have been put in place by the re-erection of the Temple West Corridor doorway, and six columns in the Lower Temenos – the northernmost stands to an approximate height of seven meters, including the elephant-headed capital.

Although the 1999 excavations concentrated on the Great Temple, the Lower Temenos was completely cleared of overburden, exposing the Hexagonal Pavement and defining the East Triple Colonnade. Not only did we find another bust of a Fortuna pilaster, but we also recovered the first complete elephant head from an elephant-headed capital in the west Lower Temenos where it had collapsed in antiquity. Added to this were several more elephant parts, bringing the total number of sculpted elephant elements to 200 fragments.

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

On the Temple East, the inner East Vaulted Chamber of the Great Temple was cleared and a branch of the Subterranean Canalization System was revealed. This system was analyzed in detail and its path continued into this vaulted room from the Central Arch excavated in 1998. Of greatest significance, however, was the continued and completed excavation of the Theater which now has completely exposed this eloquent structure in its entirety. Revealed here were the stairways, the lower six courses of seats and the stage building (*scaenae frons*) which has been found to survive in better condition in the east than that of the earlier excavated theater west.



Plan of 1999 trenches excavated (Paul C. Zimmerman and Brian A. Brown).

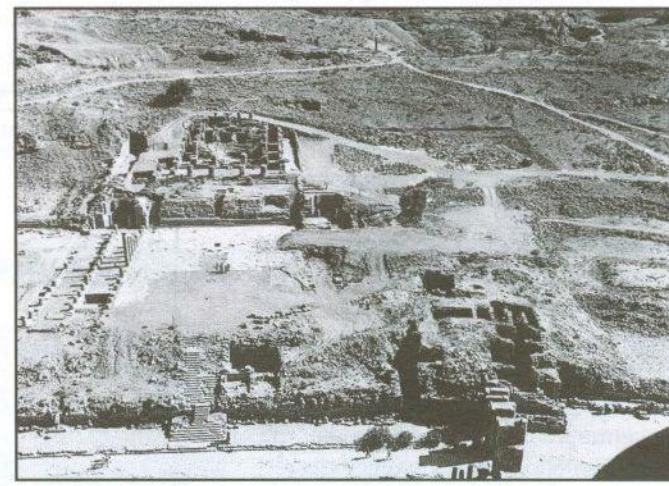
This *Theatron* truly is the most extraordinary structural component of the Great Temple. Recorded here were hundreds of fragments of superbly carved architectural sculpture fallen in the building's collapse.

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

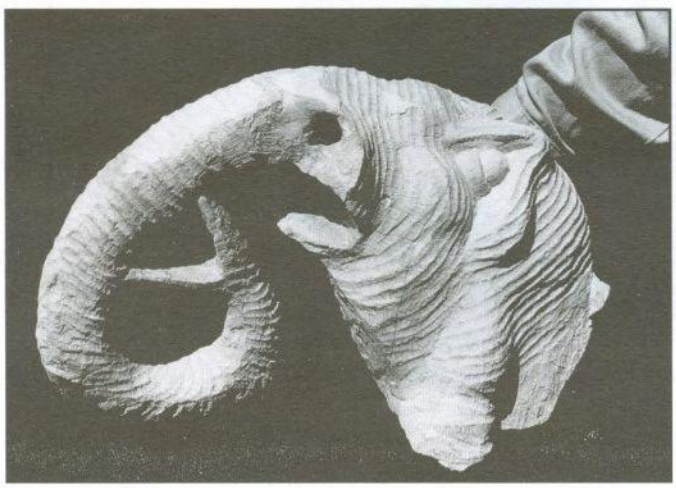
The most striking excavations of the Temple East revealed the Subterranean Canalization System to the north set into a pebble foundation platform, and also lying further to the east was a large section of bedrock which in antiquity had been quarried by the Nabataeans and paved with limestone pavers. This impressive plaza (5-by-25 meters) served as a lavish platform for the monumental East Perimeter Wall of the Temple Precinct, which connects in the north to the arched 'cistern' excavated in 1998 and to an as yet unexcavated area in the south. Measuring more than 10 rows of ashlars in width by 34 meters in excavated length, its eastern face is comprised of 14 courses in height, and the depth of deposit at its highest point is 10 meters. Set into the wall is a half-excavated doorway, which in antiquity stood to a 3.39-meter height. Covered for 2000 years, its simple entablature and interior variegated sandstone ceiling remain in pristine condition and exhibit Nabataean workmanship at its best.

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

Other than the complete elephant head and the inset pilaster of Fortuna, an additional relief pilaster perhaps of an Amazon was recovered as well as numbers of painted stucco fragments, several with gold leaf still adhering to their surfaces. Also unearthed were fragments of several figurines, a crude Deity block representing the frontal female figure shown in a temple, as well as large amounts of Nabataean pottery



The Great Temple at the end of the 1999 season of excavations (photo: A. A. W. Joukowsky).

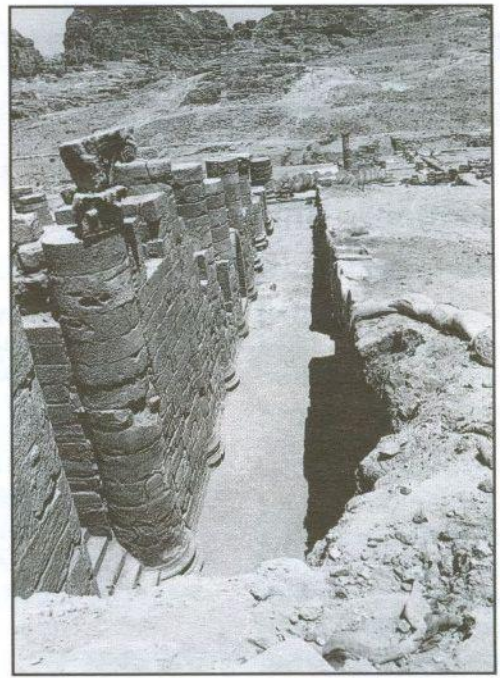


The elephant-headed capital (photo: Ueli Bellwald).

The completed excavation of the Theatron (photo: A. A. W. Joukowsky).

that have been dated by specialist Daniel Keller from the early 1st century BCE to the early 2nd century CE. Small artifacts included 34 coins, several lamps, glass, a bone cosmetic spoon, and a needle.

This was an extraordinary season, and I have to deeply thank my stalwart seven-member veteran archaeological team, our faithful Bedouin and Wadi Musa workforce, and most particularly the Department of Antiquities and Petra Regional Council for their support and loan of heavy equipment. Without the able expertise of all of these components, this season would have fallen far short of our expectations. The Great Temple excavations give us pause to re-evaluate and reinterpret what is known about the urban design of Nabataean Petra. ■



The East Corridor after excavation, 1999 (photo: A. A. W. Joukowsky).

An Almost Unknown Mountain at Petra: Jabal el-Barra

By: Ulrich Hübner, University of Kiel (Germany)

Jabal el-Barra is not altogether unknown at Petra, but was rarely visited from an archaeological point of view. The formidable massif to the south-west of Umm el-Biyara accompanies the weary traveler on the way from Jabal Harun on the western side and a talkative Bedouin will tell him where a child fell into a well on the mountainside and died.

During the 1999 survey of Manfred Lindner (Naturhistorische Gesellschaft Nürnberg, Germany) and Ulrich Hübner (University of Kiel, Germany) Jabal el-Barra (or Jabal el-Quray) was climbed by the author from the south through a narrow and steep ravine beginning to the north of the Bedouin cemetery. The craggy upper part of the mountain is dissected into gullies and gorges and sports several tops. In the confusing area not all places are accessible. In this respect Jabal el-Barra stands in contrast with Umm el-Biyara and its clear and level plateau. Jabal el-Barra would provide a splendid panoramic view in all directions, if it were only possible to find a good look-out post (Fig. 1). In the center of the massif the foundation of a 2 x 2 m house is reminiscent of people who once lived here (Fig. 2). The sherds scatter is exclusively Nabataean-Roman, and flint chips are probably Neolithic. As far as they were surveyed, all wadis, ravines, and gorges are terraced with differently preserved walls.

Jabal el-Barra had two functions in antiquity. It served as a retreat and hide-out in the prehistory periods for the people of eth-Thughra, and again for inhabitants of the Petra region in the Nabataean-Roman period. The second function was hydrological/hydraulic: the massif served as a catchment area. Run-off water of winter rains was and is being collected at its flanks and foothills, especially in the south-east and east, and conducted to cisterns, e.g., the "well" the Bedouin talk about. ■

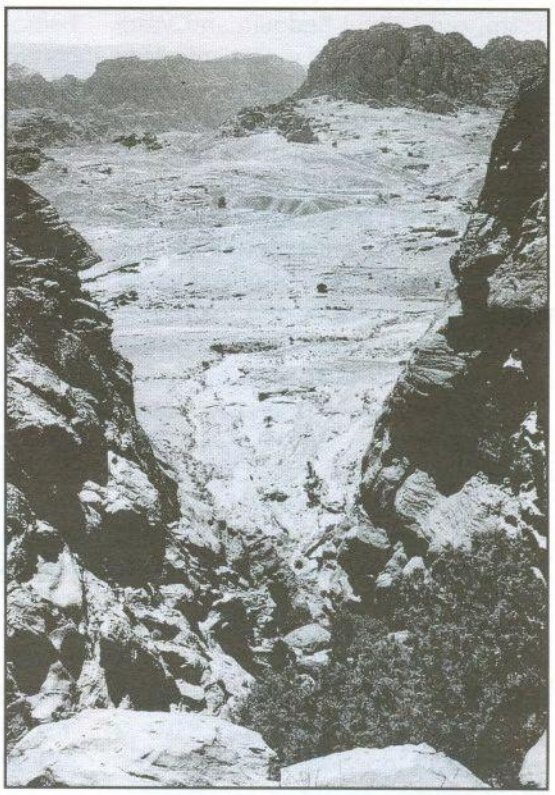


Fig. 1

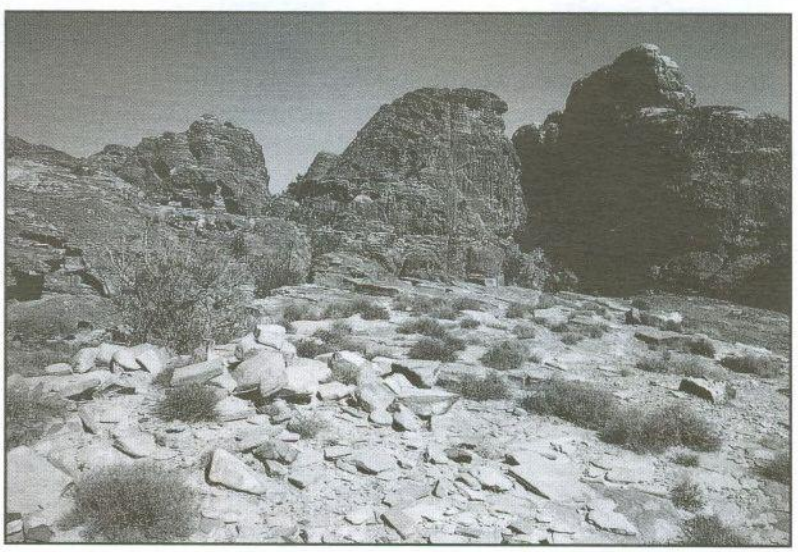


Fig. 2

The First Season of the Syrian-Italian-German Excavations at Tall Mishrife/ Qatna (Syria) in 1999

By: Ammar Abdul-Rahman, Direction General des Antiquites et des Musees, Damascus (Syria), Marta Luciani, Daniele Morandi Bonacoss, University of Udine (Italy), Mirko Novak and Peter Pfälzner, University of Tübingen (Germany)

In August 1999 the Directorate General of Antiquities and Museums of Syria, the University of Udine, and the University of Tübingen signed an agreement for co-operating on a joint archaeological project at the site of Tell Mishrife, which is identified with the important Old and Middle Syrian city of Qatna. The project is co-directed by M. Al-Maqdissi, D. Morandi Bonacossi, and P. Pfälzner. All authors of this contribution share scientific responsibility.

Previous archaeological work on Tell Mishrife was carried out by the French archaeologist Count Robert du Mesnil du Buisson from 1924 to 1929 and by a Syrian Expedition under the supervision of Michel Al-Maqdissi from 1994 to 1998. Du Mesnil du Buisson opened seven large excavation areas in different

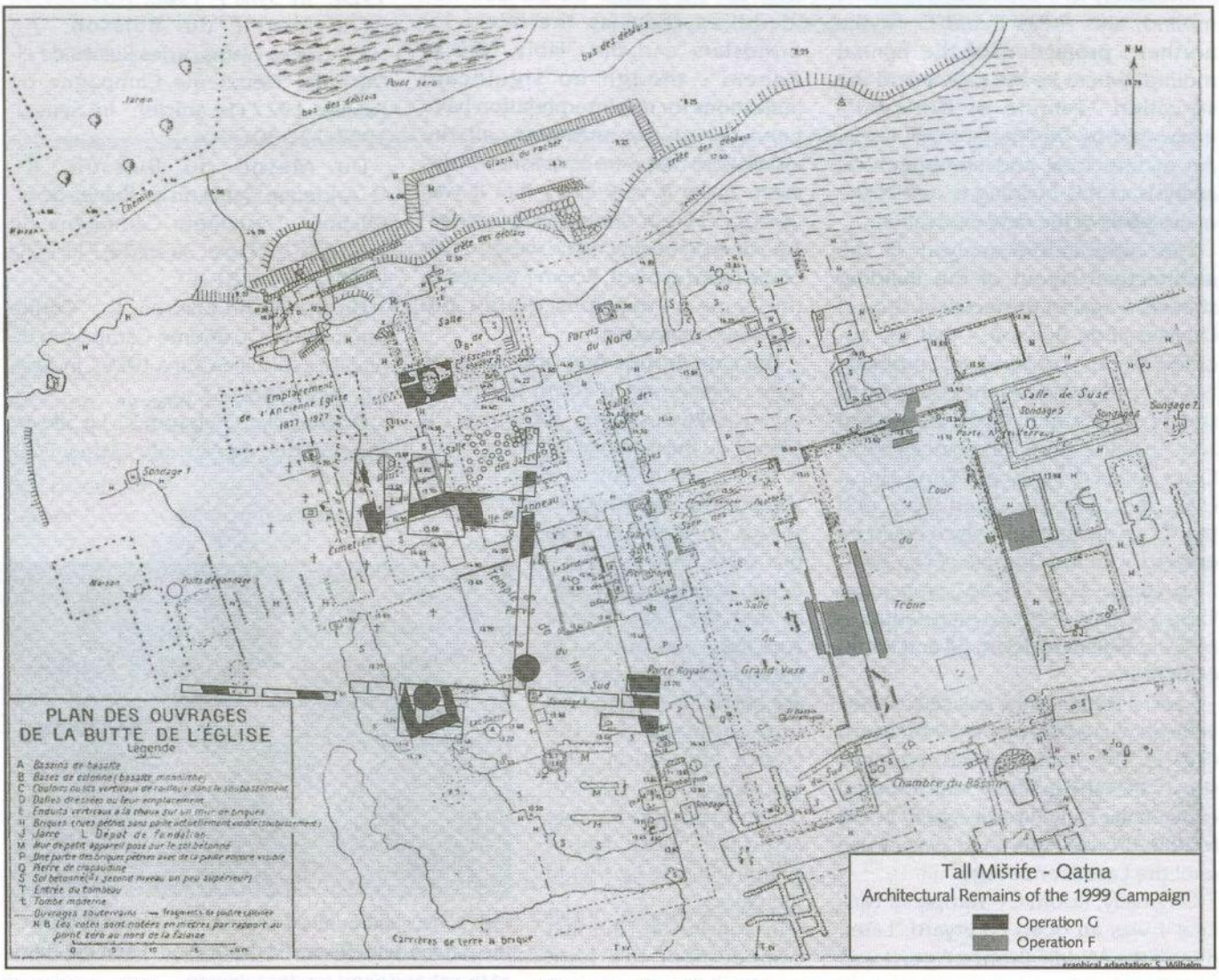


Fig.1. Plan of the palace complex at Qatna, with the rediscovered walls and rooms.

parts of the settlement. The most extensive excavation took place on the "Butte de l'Église", where a large architectural complex covering a surface of almost one hectare was exposed.

Despite all previous archaeological activities, the resulting picture of the site in the different periods of its existence is fragmentary. Therefore, the long-term aim of the present co-operation project is to achieve a comprehensive understanding of the urban layout, functioning, and progressive development of the site in different periods, within the wider context of its territorial and historical setting. Thus, four excavation areas have been selected for archaeological investigation on the basis of their specific topography: Area D on the summit of the central mound, Area E on an outcrop immediately to the north of the central mound, and Areas F and G on the northern projection of the central mound, where lie the palace and the so-called "Temple of Nin-Egal", excavated by Du Mesnil du Buisson. An architectural and stratigraphical analysis of this building is one of the major goals of the new excavation.

The comparative analysis of the architectural layout of the building stresses – against the reconstruction of Du Mesnil du Buisson – that the so-called "Temple of Nin-Egal" probably has to be identified as the courtyard of the large palace with an added administrative wing. It is comparable to Court 106 of the palace of Zimri-Lim at Mari. The "Salle du Grand Vase" and the "Cour du Throne", which could be entered from the "Temple of Nin-Egal" through the "Porte Royale", were more likely a sequence of two representative halls equivalent to Room 64 and Room 65 at Mari.

Several rooms of the palace complex were excavated during the 1999 season (Fig. 1). The stratigraphical sequence shows that the building was founded either in the Early Bronze Age IV or the Middle Bronze Age I and was in use until the Late Bronze Age.

Originally, Room C ("Temple of Nin-Egal") was an open courtyard. Later, during the Middle Bronze Age, it was transformed into a huge column hall. Du Mesnil du Buisson had discovered four column bases made of basalt stone. In the 1999 campaign two of the 2.5m-deep foundation pits were excavated. They were filled with pebbles and stabilised by big stones erected at their edges. This enormous foundation system hints that the columns had to carry a heavy weight, probably a roof and a secondary storey. The so-called "Lac sacré" – a tub that Du Mesnil du Buisson investigated in the centre of the court – may have served as a kind of uncovered "impluvium". A column hall of this dimension of pre-Hellenistic date had not been discovered in Syria or Mesopotamia until now.

In Room F north of Room C, the so-called "Haut-Lieu", several channels and a hole investigated by the French expedition were re-discovered in 1999 (Fig. 2). Du Mesnil du Buisson had identified them as the inlets for orthostats and the "Holy Tree of Ashera", though no significant indications for this interpretation have been found. Nevertheless, all the installations that were established in this room make it very likely that it was used for cultic or ceremonial purposes. As a deep sounding in the western part of the room proved, Room F existed in the same dimensions during the previous occupation.

The Late Bronze Age occupation is only represented in Room G, the so-called "Salle des Jarres". Obviously Du Mesnil du Buisson had left a large part of the ceramic inventory of this room in situ after the end of his excavations. The sherds of several storage pits were uncovered in a trench. It seems quite likely that the Late Bronze Age floor was present in extended areas of the palace but had been removed unrecognised by the French excavation. This would explain why Middle and Late Bronze Age arteifacts were found seemingly side by side in the palace.

In conclusion, the first campaign of the joint project has proved very successful, if with different perspectives of view. Common excavation and documentation methodologies and the sharing of scientific know-how allowed us to achieve homogeneous and comparable results.

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Fig. 2. The excavation area in the western part of the palace, with Room F ("Haut-Lieu") and the ruins of the abandoned modern village.

Celebrating the 25th Anniversary of the German Protestant Institute of Archaeology in Amman

By: Dieter Vieweger and Jens Eichner, Kirchliche Hochschule Wuppertal (Germany)

The German Potestant Institute of Archaeology in Amman celebrated its 25th anniversary from October 31 to November 12, 2000. The programme for these celebrations reflects the impressive German tradition of conducting archaeological research in the Hashemite Kingdom of Jordan, which started in Umm Qais (Gadara) in 1964. The events also reflect the high standard of scientific research which has been undertaken in archaeology and also in other fields related to cultural research. The German Institute – founded in 1975 (Fig. 1) – is today a well-known center of Jordanian-German and Jordanian-European co-operation in the cultural field. Its archaeological, exegetical, historical and religious work, its high level of German cultural representation, and its multi-sectoral co-operation with other research institutes are the reasons why scholars from different organizations on the occasion of its 25th anniversary participated in an international colloquium entitled "Ancient Trade and Trade Routes – Forging New Links for Archaeological Research". This symposium as well as three lectures have been organized by the German Institute in cooperation with the Goethe-Institut in Amman.

The celebrations opened on October 31, 2000 with a lecture held by the director of the German Institute, Dr. Hans-Dieter Bienert, entitled "From Jerusalem to Amman: History and Activities of the German Protestant Institute of Archaeology". One of the highlights of the well organized celebrations was the European Salon Keynote-Lecture by Prof. Dr. Hans Jörg Nissen (Free University of Berlin, Germany) on November 4, 2000. The renowned scholar spoke about "The Emergence of the Concept of the City in the Ancient Near East". Darat el-Fanun provided the marvelous setting and a congenial atmosphere for this event.

H.E. the German Ambassador Dr. Martin Schneller and Mrs. Schneller invited the participants of the Symposium to their residence that evening, which provided an excellent opportunity for discussions on German-Jordanian cultural affairs.

A special Church service the next day of the German-speaking congregation, celebrated by Propst Karl-Heinz Ronecker (Jerusalem) at the church of the ELCJ in Umm as-Summaq, reflects the strong connections of the German Protestant Institute in Amman with the German parish in Jordan, as well as the institute's ability, to combine archaeological and historical with exegetical research.

The lectures of the international symposium "Ancient Trade and Trade Routes: Forging New Links for Archaeological Research" were given on November 6, 2000, at the Goethe Institute Amman (Fig. 2). The number of lectures reflects the importance of this event. A large number of scholars – far more than expected – participated in the symposium, which aimed at inspiring new research on ancient trade and trade routes in the Middle East. Furthermore, it highlighted the need for intensive transboundary cooperation in a region where some of the oldest long-distance trade routes are located and where activities can be traced back to the early Neolithic period, some 10,000 years ago.

After a welcome by Dr. Bienert and Dr. Ule, the welcome address by H.E. Akel Biltaji, Minister of Tourism and Antiquities of Jordan – who also generously invited all participants for

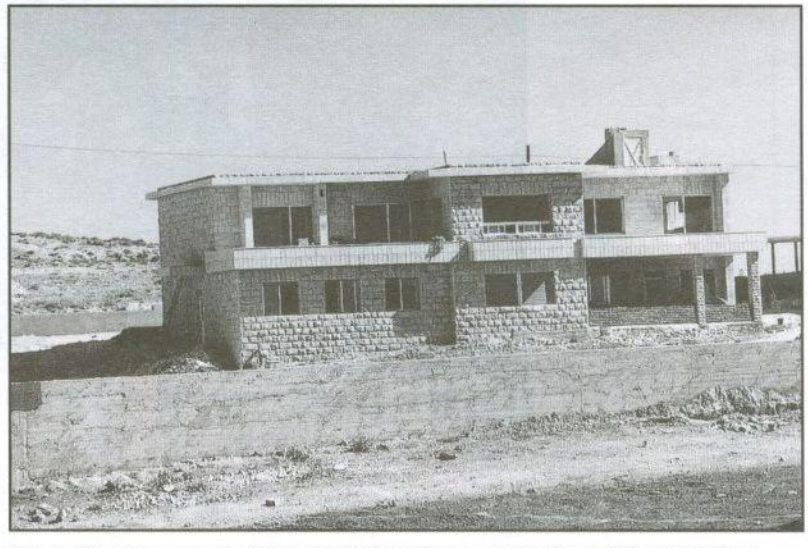

Fig. 1. The Amman Institute in 1979, after completion of the building.

lunch – opened the long list of lectures, each followed by a discussion:

* Dr. Bill Finlayson (Council for British Research in the Levant, Amman, Jordan): Trade and Exchange: Long-Distance Networks in the Early Neolithic Period of the Middle East

* Prof. Dr. Dr. Dieter Vieweger (Kirchliche Hochschule Wuppertal, Germany): Some Aspects on the Origin of the Tell Yahudiye Ware in Cyprus

* Dr. Roland Lamprichs (Dresden, Germany): Tell Johfiyeh and Neighbouring Sites. Part of an Iron-Age Trade, Defense or Communication Network?

* Dr. Karel Vriezen (University of Utrecht, Netherlands): Roads and Trade in Old Testament Times; Observations on Textual and Archaeological Evidence

* Prof. Dr. Hans Jörg Nissen (Free University of Berlin, Germany): Trade and Trade routes between Ancient Mesopotamia and the Indus Region

* Dr. Fawzi Zayyadine (Department of Antiquities of Jordan, Amman) and Dr. Sabba Farès-Drappeau (IFAPO-Amman, Jordan): The Ancient Site of Al-Kharaza – Is it Linked to the Caravan Road?

* Prof. Dr. Ricardo Eichmann (German Archaeological Institute - Berlin, Germany): Music and Migration

* Dr. Jacques Seigne (Institut de Recherche sur l'Architecture Antique, Tours, France): Roman Roads: For Whom and for What? The examples of Gerasa

* Prof. Dr. Klaus Stefan Freyberger (German Archaeological Institute - Damascus, Syria): Trade and Trade Routes During the Roman Period in the Middle East

* Mr. Ueli Bellwald (Amman, Jordan): Trade and Urbanism: The Siq and other Streets in Petra

* Dr. Ina Kehrberg (IFAPO-Amman, Jordan): Pottery Trade

* Mr. Daniel Keller (University of Basel, Switzerland): Glass Finds from Petra and Their Evidence for Trade

* Dr. Ghazi Bisheh (Department of Antiquities of Jordan, Amman): Omayyad Official Routes Across the Jordanian Steppe

Mr. Rami Khouri (Al Kutba, Amman, Jordan) with his evening lecture "Jacob's Bible, Esau's Bible: Reconsidering the Significance of the Biblical Land of Transjordan", and Dr. Roland Lamprichs (Dresden, Germany) on "Iron Age Sites in Northern Jordan: A Closer Look" brought the interesting celebrations of the 25th anniversary of the German Institute to a successful close.

Many thanks to the organizers – especially to Dr. Bienert and to Dr. Ule – and best wishes for the coming 25 years of successful research work at the German Protestant Institute.■

Fig. 2. Participants in the international symposium "Ancient Trade and Trade Routes".

Ba'ja Regional Project Report on the First Field Season, 1999

By: Katrin Bastert, Dresden (Germany), Hans-Dieter Bienert, German Protestant Institute of Archaeology in Amman (Jordan), Roland Lamprichs, Dresden (Germany) and Dieter Vieweger, Kirchliche Hochschule Wuppertal (Germany)

Introduction

Under the joint directorship of Hans-Dieter Bienert (DEI-Amman), Roland Lamprichs (Dresden, Germany) and Dieter Vieweger (Kirchliche Hochschule Wuppertal, Germany), the German Protestant Institute of Archaeology in Amman (DEI) conducted archaeological fieldwork in the Ba'ja region, an area approximately 10 km north of the ancient Nabataean city of Petra (Fig. 1). The project was carried out in cooperation and with the support of the Department of Antiquities of Jordan (DoA), the Petra Regional Planning Council (PRPC) and the Kirchliche Hochschule Wuppertal (Germany) (Fig. 2). Generous financial support was received from the Fritz Thyssen Foundation (Cologne, Germany) and the DEI-Headquarters (Hannover, Germany).

The project aimed at studying the archaeology of the Ba'ja region and documenting its remains from the earliest time of human occupation up to the Ottoman period. Previous research carried out by different scholars was incorporated in the research strategy of the project.

On the northern slope of the wadi of Ba'ja, close to the entrance of the siq of Ba'ja, M. Lindner identified the ruins of a village which he called Ba'ja. I Pottery collected by Lindner (Naturhistorische Gesellschaft, Nürnberg, Germany) in 1983 and 1984 pointed to a Nabataean and late Islamic (Ayyubid-Ottoman) occupation. These results were confirmed in 1998 when another site survey was undertaken by Roland Lamprichs (Dresden) and Hans-Dieter Bienert (DEI-Amman). Furthermore, pottery of the Late Roman/Byzantine periods and some scattered Iron Age sherds were recorded. As part of the recent Ba'ja Project an archaeological excavation was undertaken by Dieter Vieweger (Kirchliche Hochschule Wuppertal) on the site of Ba'ja I.

Ba'ja III - An Iron Age II Mountain Stronghold

Within the framework of the same project Bienert and Lamprichs conducted a survey on the summit of Ba'ja III, which is characterized by small plateaus, steep and narrow canyons, and occasionally dense vegetation. A detailed documentation of the difficult ascent route, as well as of all visible installations on the summit, was undertaken with the help and support of local bedouins. In the gorge leading to the summit three rock-cut cisterns were documented (Fig. 3). They resemble three other cisterns located within the settlement area on the summit. All cisterns show remains of

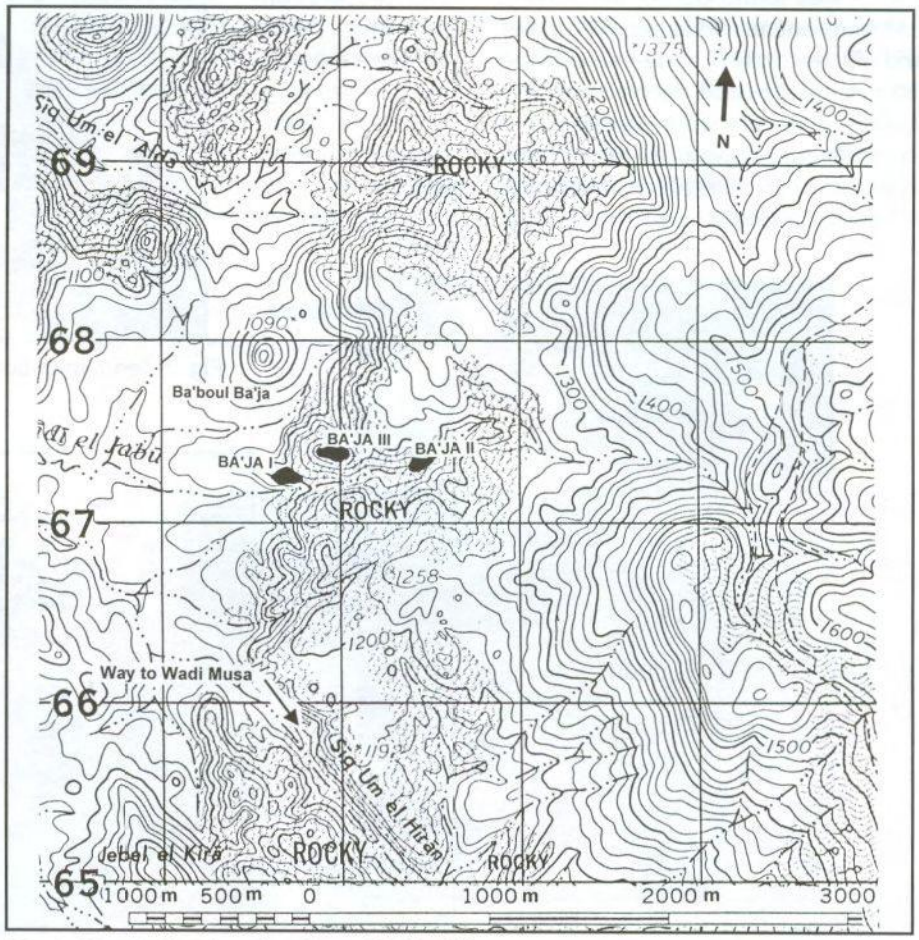

Fig. 1. Map indicating the sites of Ba'ja I-III.

ancient plastering. The "main entrance" to the summit, which is characterized by deeply fissured rocks, was blocked by a wall, of which remains were found (Fig. 4). Within the settlement area a number of terrace walls (Fig. 5) were found and documented. Using the topography of the plateau and several man-made installations (e.g., "house" plans, wall remains, cisterns and fireplaces) situated within the ancient settlement area of Ba'ja III, the site was subdivided into 35 survey units situated in areas A-F (Fig. 6). While survey units S1 to S 32 are on the plateau proper of Ba'ja III, units S 33-S 35 are situated below this area on a slope north-east of the ancient settlement area. At several places installations were documented that might have been used as small water collecting basins or functioned in association with other liquids, such as olive oil or wine. In particular, two small circular rock-cut installations in survey unit S18 can be indentified as olive- or wine-presses (Fig. 7).

A total of 423 diagnostic pottery sherds was found during the survey: 231 body-sherds, 48 bases, 74 handles and 70 decorated body-sherds. The ratio of handles and decorated body-sherds to rims is approximately 1:3 each. Their proportion of 17.94% (handles) or 16.55% (decorated body-sherds) in the pottery total is quite high, and gives a first clue to the uses dominating the pottery assemblage. A significant part of the collected pottery is heavily weathered and moss-covered. Diagnostics are found in almost all areas of the plateau. Despite previous assumptions, almost a fifth of the pottery assemblage from Ba'ja III is decorated, with painted stripes and rill- or impressed patterns.

A correlation of areas A-F, defined by installations and the topographic situation of the plateau, with the given distribution of pottery shows clearly that almost two-thirds (66.43%) of all sherds were collected in areas A and C, situated on the south- and west-north-west parts of the site. The typological spectrum recorded in Ba'ja III is restricted mainly to the following (vessel) forms: (large) storage-jars, (cooking) pots, jars/jugs, and deep and shallow bowls. As a quantitative analysis shows, several variations of "pots" are predominant within the assemblage. Probably food preparation (cooking pot), storage (storage jars), and handling of liquids (jars/jugs) were among the most important activities carried out within the mountain stronghold of Ba'ja III.

A first analysis of the Ba'ja III material showed that the pottery assemblage is very homogenous and most probably represents a single period of occupation. No intra-site pottery development and no sub-phases within the material could be observed. The typological spectrum of the pottery assemblage largely fits the complex of so called "Edomite pottery", well known from southern Jordan. No Iron Age I pottery could be distinguished with any certainty. Strong parallels regarding geographical setting and pottery assemblage with sites like Umm el-Biyara, es-Sadeh and Jebel Qseir suggest most probably a Late Iron Age date (7th - 6th century B.C.) for the site of Ba'ja III.

Fig. 2. Team members of the Ba'ja Project.

Fig. 3. One of the cisterns in the settlement area of Ba'ja III.

Fig. 4. Wall, blocking the entrance to Ba'ja III.

Ba'ja I - A Late Islamic Settlement

The excavations in 1999 aimed at defining the stratigraphy and architectural outline of Ba'ja I. Within the 120 m² which were uncovered, six architectural units were excavated, subdividing the area into nearly rectangular plots (Figs. 8-9). Two architectural phases were distinguished, both dating, according to the associated pottery, into the late Islamic periods. So far, pre-Islamic remains were not encountered in that area. The well preserved walls of the excavated rooms were founded directly on bedrock. There is no evidence of older strata in this area.

A further excavation area was opened up to the north-west of the previously described one. Here, in accordance with previous surveys by Lindner, Lamprichs and Bienert, a considerable quantity of Roman and Nabataean artifacts was found below the late Islamic phases. However, a large pre-Islamic Nabataean settlement could not be found during the first weeks of fieldwork. But certainly, the canals, cisterns, water reservoirs, a wine press, and other rock-cut installations in the area point at least to a seasonal Nabataean settlement.

Fersh - A Nabataean and Ottoman Settlement

Also as part of the Ba'ja Project a small test trench was opened in Fersh, a small deserted hamlet, some 6 km to the west of Ba'ja. The work was carried out by Isabelle Ruben and Nasser Hindawi. The site stands above a shallow wadi situated a few hundred metres from the edge of the mountains as they fall away to the Wadi Arabah. Around it are some fields that are currently under the plough and the remains of a long boundary wall that encloses the hamlet and the fields. Today there are two complete house complexes still standing (built c. 1930's). These are built from local stones and with many re-used Nabataean blocks (that show the typical diagonal pick marks). Traces of ancient wall lines are visible in a few places near the standing structures. About 40 m to the south of the houses are two large rectangular rock-cut Nabataean cisterns, one of which has been emptied out in recent years, but the other remains completely silted up.

The results of the archaeological work confirmed what was already evident from the surface remains, i.e., that the original occupation dates to the Nabataean period. Apart from pottery, a few pieces of bone were found in one locus only, glass in two loci, and one piece of iron. Similar results were obtained from the surface collection in and around the village. The vast majority of sherds are Classical, with a very small number of coarse hand-made wares that probably date to the time of the standing buildings. The surface evidence of Nabataean pottery sherds and well-dressed Nabataean ashlar blocks in the two house complexes suggests that the original settlement here was from Nabataean times. The test trench confirmed this hypothesis. No artifacts were found that pre-date the Nabataean period. Furthermore, no evidence was found for any re-use of

Fig. 5. Remains of a terrace wall at Ba'ja III.

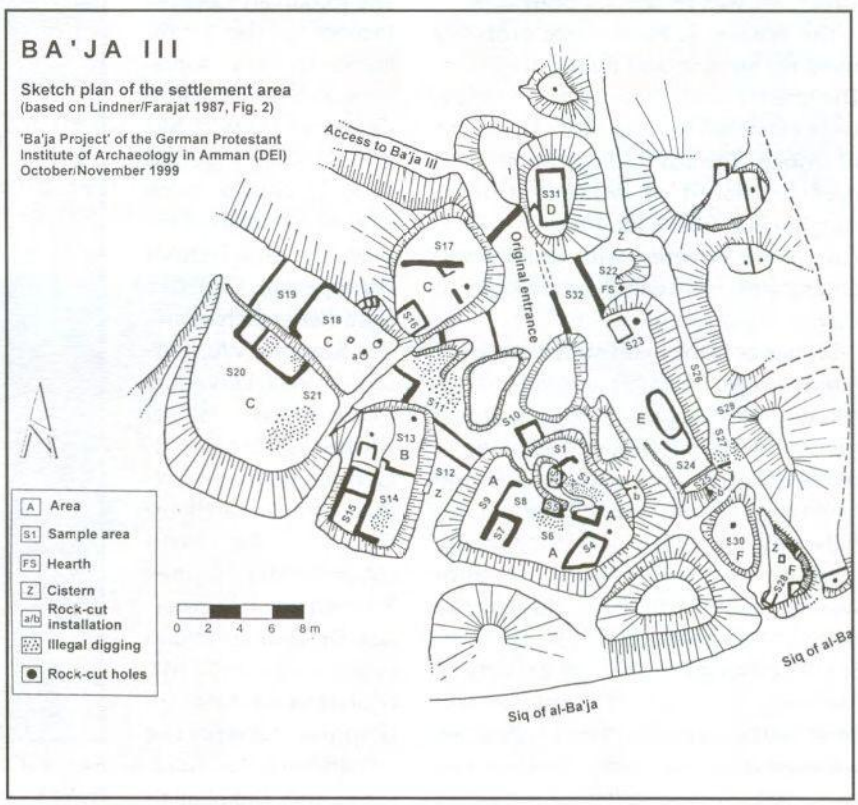

Fig. 6. Sketch plan of Ba'ja III.

Fig. 7. Installation found at Ba'ja III.

Fig. 8. View of the excavation area at Ba'ja.

the site after abandonment, which presumably occured in Nabataean times, until the houses were built in the 1930's.

Bedouin Architecture of the 20th Century

At two locations (Fersh and Ba'ja) abandoned but still standing structures of 20th century bedouin architecture were studied and documented. Local stone and wood were used as building materials. Better or more carefully dressed Nabataean limestone of ancient structures was re-used at both sites.

The houses at Fersh were probably used for storing and living purposes. The interior walls in some of the rooms were plastered with clay and bear traces of smoke. The scaffolding carrying the roof consisted of wooden trunks, roughly cut, with a length of 3 to 4 m. They were covered with brushwood and stones and sealed with a layer of clay.

Stones of Nabataean structures were often re-used for lintels and thresholds. All wooden doors show a uniform treatment: door furniture was made of old petrol cans, large uniform locks and nails made of iron. Of particular interest is the hinging of the doors. A cylindrical wooden shaft connected to the door was tapered at both ends, allowing the doors to turn between the sill and lintel. Small openings in the upper parts of the walls were left to illuminate and ventilate the rooms. Further, small niches were used as cupboards. These niches were sometimes built in a way that made it possible to use them as windows by taking out the wall stones.

Acknowledgements

Fieldwork was carried out in cooperation with the Department of Antiquities of Jordan, to whose Director General Dr. Fawwaz al-Khrayshah we are deeply indebted for his support. We received further help from the Petra Regional Planning Council and the Department of Antiquities, Petra office. The Jordanian-German Project for the Establishment of a Conservation and Restoration Center in Petra (CARCIP) provided logistical support. We also thank all team members of the project: Jens Eichner (Wuppertal), Christian Hartl-Reiter (Schwerin), Ute Koprivc (Wuppertal), Patrick Leiverkus (Wuppertal), Isabel Möller (Nürnberg), Gerhard Reimann (Offenbach), Dr. Gotthard G.G. Reinhold (Murrhardt), Esther Reinighaus (Wuppertal), Dr. Thomas Urban (Birkenwerder), Mr. Mohammad Salamin (Representative of the Department of Antiquities), and Dakhilallah Qublan, our "landlord" in the Bedoul housing. Many thanks also to all the local workmen and people who have supported the project. Furthermore we would like to thank the team of the German Protestant Institute of Archaeology in Amman, Nadia Shugair and Abu Hassan, who have always provided logistical support. ■

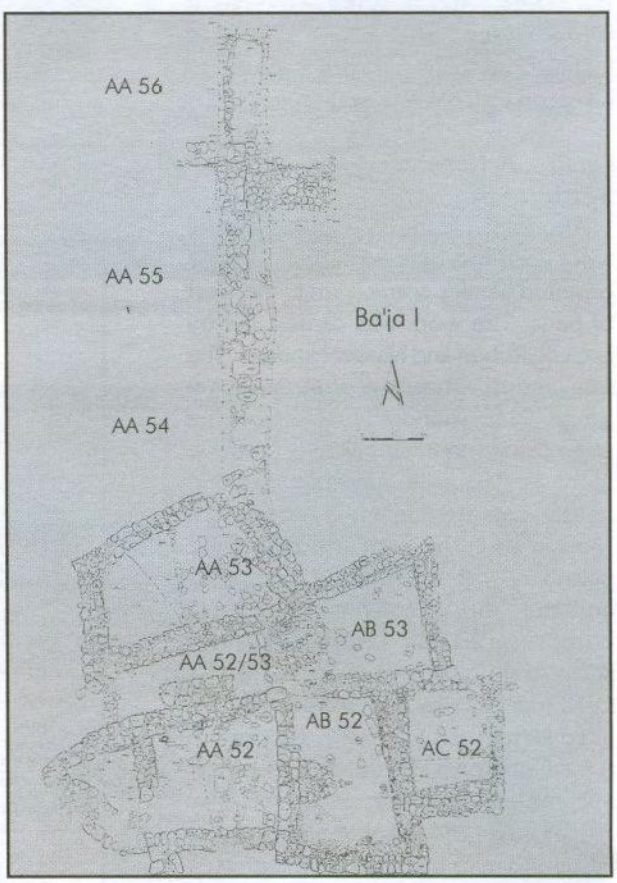

Fig. 9. Ground plan of the excavated architecture at Ba'ja I.

"A River Flowed From Eden..." (Gen. 2.10)

By: Hans-Dieter Bienert, German Protestant Institute of Archaeology in Amman (Jordan)

The water crisis of the past decade illustrates in a very striking way the vital significance of this element and the fact that providing adequate water supplies becomes harder with time, as demands of industry and agriculture, a rapidly growing population, and increasing pollution of the environment all lead to a dramatic shortage of this natural resource. Future "wars over water", as described in a book published in1993 (Bulloch and Darwisch 1993), seem possible in the Middle East, as water is transformed into a political instrument of power. In summer 1998, a dramatic water supply dilemma squarely confronted the Jordanian population, and one can already anticipate the dimensions of future water problems. For weeks the water distribution system failed to supply the city of millions, Amman, and drinking water had to be imported from neighboring countries (for example, Saudi Arabia and Syria) to cover local demand.

Water has always played a significant role in the development of human civilizations in the Middle East, whether used for the supply of settlements and cities or for agriculture. In the "Fertile Crescent", at whose south end is situated the Hashemite Kingdom Jordan, agriculture and stock-farming developed analogously to predecessors in the Zagros area. In modern Jordan, the oldest documented remains of permanent settlement in the Middle East were found in the form of the villages of the Pre-Pottery Neolithic B (7600-6000 B.C.). Because of the geographic location on the edge of the ancient world's dry-belt, large parts of the Middle East are classified among the water-poor regions of the earth. The larger permanent settlements in the Orient since the Neolithic period required year-round availability of water to support the lives of people and animals (Wirth 1998). From the earliest settlements through the development of larger villages and cities, this meant that people had to develop technical means of effectively using scarce water reserves. They developed systems of storing and moving water for use by settlements and irrigation. The ancient civilizations of Egypt and Mesopotamia developed more complex systems. Archaeologists and hydrologists have recently discovered new findings in this sector at the Fayyum Oasis (Egypt) that seem to confirm the reports of ancient writers who mentioned an artificial sea in the 3rd century B.C. (Garbrecht 1996).

To assess the significance of water in ancient and modern times, a six-day international symposium was held in June 1999 at Wadi Musa, next to the ancient Nabataean city of Petra (south Jordan). It was entiteld "Men of Dikes and Canals - The Archaeology of Water in the Middle East". The German Protestant Institute of Archaeology in Amman (DEI) and the Orient-Department of the German Archaeological Institute in Berlin (DAI) organized this conference in cooperation Yarmouk University, Irbid (Jordan), with the support of the Fritz Thyssen Foundation (Köln, Germany). More than 50 scholars were invited to discuss the lessons that could be learned from the past. In lectures, new archaeological research-results from the area were discussed, dealing with ancient water storage and distribution systems. The thematic treatment of modern aspects of the water use in the Middle East served the interdisciplinary exchange between archaeologists/his-

Fig. 1. Participants of the working-group at the World-Water-Forum in The Hague (Netherlands).

torians and scientists who deal with current water problems. Different contributions at the conference also illustrated the important role of water in the cultic-religious field. Among the most interesting recently excavated sites in Jordan is the "Baptism Site" along the Jordan River.

Scientific and public interest in the symposium was manifested by the presence of H.R.H Prince Ra'ad bin Zeid, who was also the patron of the conference. Other high-ranking Jordanian officials participated in the conference, e.g., the Director-General of the Ministry of Water and Irrigation and the Director-General of the Department of Antiquities of Jordan. The conference also provided an appropriate forum for discussing the possibility of future projects. The participants repeatedly stressed the importance of inviting scientists and technicians who deal with contemporary water questions. This made possible the exchange of knowledge, and many water-related matters were discussed in a totally different perspective. During the course of the symposium, the wish for further meetings of this kind was articulated, and hopes were expressed that the political situation would change in the near future so that a wider scientific exchange with all the countries in the region could take place. The importance of the "Water Question" clearly will increase in the coming years because of the fast growing population, and agriculture and industry's increasing need for more water quantities, to the point that even fossil water resources would have to be used. But water scarcity could also lead to major conflicts. To prevent this is not only the task of politicians, but also of scientists. Through the study of ancient water installations, the development of modern water distribution concepts, and the combination of both fields, ideas for easing potential conflicts could thus be developed, so that such conferences could have far-reaching political results through their pure scientific outcomes.

The possibility of influencing the global water sistuation and addressing economic problems were themes that were discussed in the largest global water conference, the Second World Water Forum in The Hague (Netherlands) on March 17-22, 2000, attended by over 5000 participants. The gravity of the situation was demonstrated by showing that half the rivers and seas of the earth are polluted or threatened by drying-up; groundwater levels are dropping because of intensive over-utilization, and more than half the world's population has no more access to clean drinking water. Future horror scenarios were outlined if no fast, global counter-measures were taken. Besides global water crisis issues, regional and specific problems were discussed in workgroups. One working group, organized by Prof. Dr. Henning Fahlbusch from Lübeck, Germany (Fig. 1), in which the director of the German Protestant Institute of Archaeology in Amman (DEI) took part, occupied itself with historical questions on the approach to water. In this context, Dr. Bienert represented Jordan and made it clear that ancient water-usage concepts on the regional level can offer important contributions today to help reduce tensions in the worldwide water crisis (Fig. 2). Careful use of water was a top priority for the ancient populations in these semi-arid regions, and lead to the development of water reservoirs and distribution canals that ensured survival in desert areas.

The presence of many ministers and heads of state gave the World Water Forum the required political weight. "Water is life", the message of the conference, hopefully will not only stay in the consciousness of the participants but also become an integral part of international politics that will oblige itself to protect human lives, so that a "Human Right to Water" will be defined, in keeping with Isaiah 66:12: "For Yahweh says this: Look, I am going to send peace flowing over her like a river, and the glory of the Gentiles like a flowing stream."

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Fig. 2. Dr. H.-D. Bienert lecturing at the World-Water-Forum in The Hague (Netherlands).

Excavations at Neolithic Ba'ja, 1999-2000

By: Hans Georg K. Gebel, Free University of Berlin, (Germany)

The second and third seasons of excavation at the early Neolithic mountain village of Ba'ja, in the Petra region, was carried out in collaboration with the Department of Antiquities, Amman, under the auspices of ex oriente at the Free University of Berlin. The second season lasted from 25 April to 30 May, 1999, and the third from 5 April – 15 May, 2000. Director of the Ba'ja Neolithic Project is Hans Georg K. Gebel; the deputy director is Bo Dahl Hermansen, Carsten Niebuhr-Institute, Copenhagen University; and the logistics and public relations director is Jürgen Baumgarten. Teams of 12-15 members from 4 different countries contributed to the success of the 1999 excavations, and a team of 24-27 members from 8 countries undertook the 2000 season. Up to 25 local workmen joined the efforts with quality, dedicated cooperation. In the 2000 season, wall conservation was started with the support of the German Foreign Ministry, Berlin, and the work of the Swiss conservator Ueli Bellwald, working at Petra, was essential for the preservation and removal of an unexpected fresco. Important reports so far include Gebel et al. 1997, Gebel and Hermansen 1999, Hermansen and Gebel 2000, and Gebel et al. 1998 (forthcoming).

Ba'ja has become more and more important in the academic and non-academic discussion of the Near Eastern neolithisation, especially because of its unique and dramatic setting (Fig. 1) as well as the extraordinary finds in the 2000 spring season. Enclosed by vertical gorges and rock formations, the site covers ca. 1.2-1.5 ha on a steeply sloped intramontane basin at 1140-1175 m a.s.l. The basin is completely covered by a pueblo type of architecture, extending out onto flat bedrock areas at the site's fringes. The settlement has only one "comfortable" access route, through gorgeincised as deep as 70 m into the sandstone mountains and filled with huge fallen rocks that require ropes or ladders to pass. The conditions for excavating are severe and more dangerous than usual, and this requires special considerations for project logistics.

Here we can only present a brief summary of the major results of the two seasons. Nevertheless, even after the third season (the first campaign was carried out with the German Protestant Institute of Archaeology in Amman in 1997), it is clear that with each campaign we obtain spectacular new results and insights, proving Ba'ja's large potential for early Neolithic research in the southern Levant. It is becoming increasingly clear that at Neolithic Ba'ja

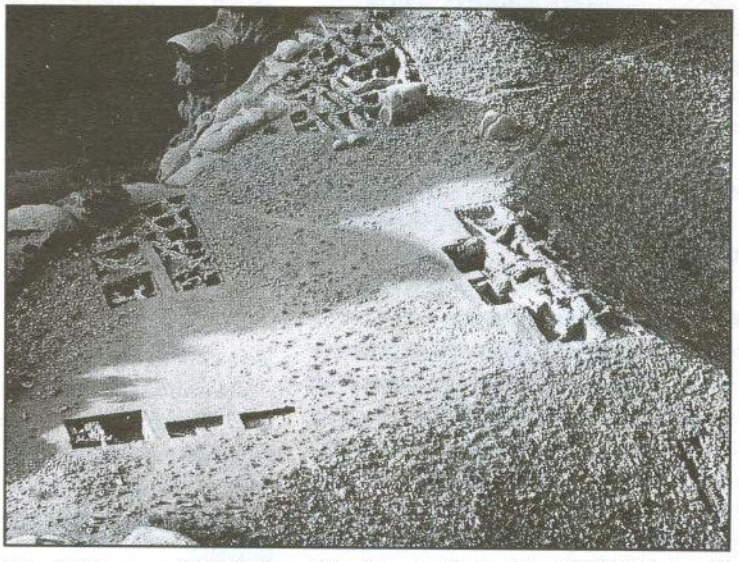

Fig. 1. Exposed LPPNB architecture in Ba'ja, May 2000 (photo: B. Borowski).

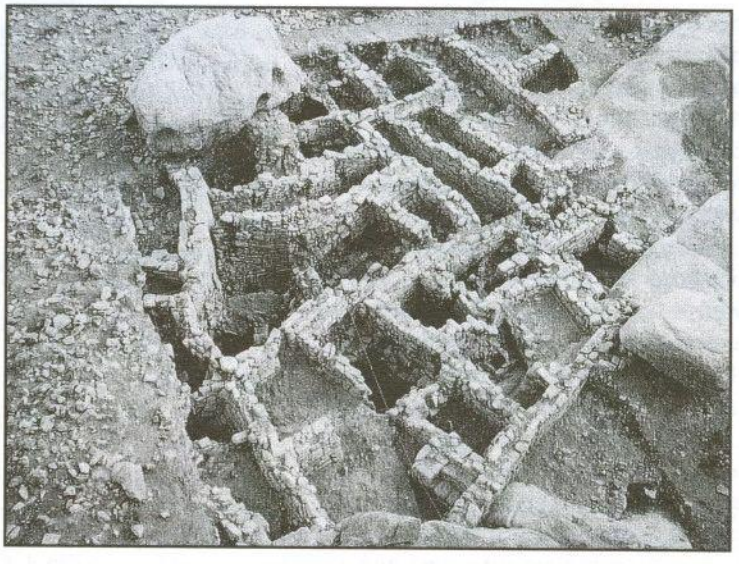

Fig. 2. LPPNB house in the summit area of Ba'ja (photo: H.G.K. Gebel).

we are dealing with a society of lineage families most likely headed by a chief (possibly a "flat-hierarchical" chiefdom, with village life regulated by a consensus of the heads of leading lineages). Clear evidence exists for magic practices and ritual, mostly related to "caching" of items and humans. The wealth of the site might be related to the manufacture and distribution of one of the luxury goods of the period: sandstone rings, produced in a sophisticated chaîne opératoire, and providing information about the dawn of social hierarchies. In addition to common domestic and hunted animals for the area and period (the herding of ovicaprines was the dominant source of animal protein), we have some evidence of fur production (leopard, fox, hyrax). Buildings, with walls preserved up to 4.20 m (!), show structural pre-planning of terraced central room/courtyard houses of the Basta-type.

The major results of the 1999 excavations included:

1) In the new Area D excavation on the site's summit, the basement of a large building (Fig. 2) covering some 75 sq. m was exposed; evidence of staircases prove the existence of a second storey. A central room/courtyard house was built on two terraces and partly on the bedrock. Daily life is expected to have mainly used the upper storey and roof, while the lower rooms show evidence of sandstone ring workshops and animal bone disposal.

2) The deep sounding in Area C exposed a large staircase with steps made of stone slabs, demonstrated in 2000 to be an exterior staircase leading from the plaza into a buttressed house (Fig. 3). Here there is likely red-stained plaster evidence on the exterior house walls.

3) Large quantities of workshop debris from sandstone ring production as well as two workshops bear witness to a more complex chaîne opératoire than thought before, including "individualized" features and failure management.

4) Four extremely large, finished but unused celts (and one that was unfinished) were found built into a house wall in Area D, showing some sort of magic "caching" of an unknown meaning.

5) The admixtures of plaster are much more diversified and specialized than expected (analysis by the Wilhelm Dyckerhoff Institut für Baustofftechnologie, Wiesbaden).

6) For the first time we can report an early Neolithic staircase outside the domestic areas: a rock cleft that lead up to the settlement from the gorge (siq) was furnished with stone steps, passing a quarry of (banked) sandstone used in the construction of the LPPNB houses.

7) Topographic situations in the siq were identified that may have been excellent possibilities for water storage. Our discussions have reached a point where we do not exclude Neolithic water dams below Ba'ja, adding a new aspect to our understanding of why the site setting was chosen.

8) Further investigations of the site's immediate vicinities made it clear that Ba'ja indeed is in a protected setting, but that it is also difficult to defend since any aggressor could have easily blocked the inhabitants' access to water and escape routes.

The findings from the 2000 season of excavation are far more exciting:

9) For the first time a true burial cham-

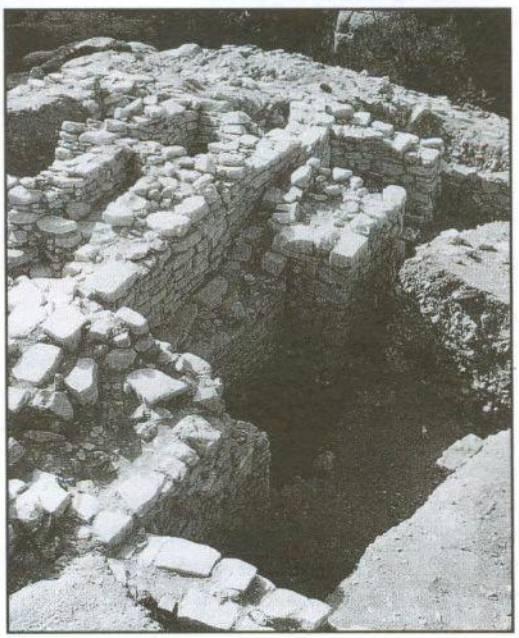

Fig.3. Buttressed LPPNB house wall bordering the Ba'ja communal space (photo: H.G.K. Gebel).

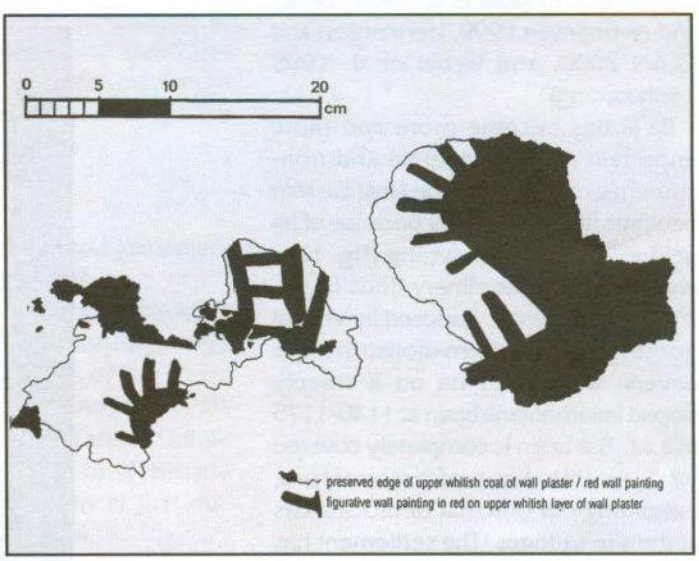

Fig.4. LPPNB wall fresco from Ba'ja (detail from upper layer of painted plaster) (drawing: H.G.K. Gebel).

ber was encountered in a southern Levantine Early Neolithic site. It was located in one of the houses and contained in its upper layer the skulls of at least 7 individuals, together with post-cranial bones stained in red, arrowheads stained in red, parts of necklaces, and mother-of-pearl pendants as grave goods. Among the skulls was found that of a newborn child.

10) One of the chamber walls intentionally hid a figurative wall painting in fresco technique, which depicts fragments of abstract motifs with radiating rays (human figure?) and a ladder-like image (Fig. 4).

11) More evidence was found for the practice of caching objects, such as celts and small stone bowls, in and between walls and floors, as well as laid-out (arranged) human bones sealed off in floor plaster, and animal remains arranged in wall clefts.

12) In the flat central part of the otherwise steeply sloped settlement evidence of a plaza was found. It is bordered by at least one regularly buttressed house (Fig. 3) on one side, and is accessible through a gate-like structure in a topographically "strategic" position on the other.

13) An additional 300 sq. m of the 1.5 ha settlement were investigated in 2000. Excavations revealed clearly that all the space of the site's setting was densely occupied by structures, including even steeply sloping terrain (c. 45°), with walls preserved up to 3.70 m.

14) Workshops for the production of sandstone rings can now be reported from all the domestic areas, indicating that each household contributed to this source of wealth for the settlement.

The fine character of the architectural layout, the oldest known burial chamber in the southern Levant hiding a fresco with mysterious symbols, and other features, lead us to think that Ba'ja is more than just a rural settlement. This last season of excavations has opened exciting insights into the world of beliefs and rituals of these early herders and farmers. The most pressing question now puzzling us is whether the wall painting connected with the multiple burial contains information on mortuary beliefs some 9000 years ago in Ba'ja.

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NEW BOOK – REVIEW

Koltermann, Ulrike, Die Palästinapolitik des Vatikans von 1947 bis 1997. Jerusalemer Theologisches Forum (JThF) II. Münster 2000.

By: Burkhard Jürgens, Osnabrück (Germany)

During the recent events of the Palestinian-Israeli conflict Pope John Paul II repeated his call for an internationally guaranteed status for Jerusalem. This key concept, which has found its way into UN resolutions as well, reflects the steady initiative of the Holy See in the Holy Land. Few people have an insight into the complex history and the influence of Vatican diplomacy. A recently published monograph presents a history and analysis of the Palestinian policy of the Holy See in the Middle East since 1947. In her book – a doctoral dissertation in Church history from Bonn University – the author shows the development of the Vatican's position, influenced by political events as well as by new theological aspects since the 2nd Vatican Council: The defence of Christian interests changes into a politico-religious concept, explicitly accepting more and more the right of existence of the State of Israel as well as the legitimate rights of the Palestinians to a homeland. The reader may discover new aspects of the historical background of the Palestinian-Israeli conflict and the Holy See's role as a transnational actor. Experts will find a well-founded presentation of the subject, unique in its complexity and density – and nonetheless most readable. The author combines material from accessible archives in Rome, Jerusalem and New York with many interviews with directly involved persons. Until the Vatican archives are opened, this book may be the standard work on Vatican policy in the Middle East. Thanks to the journalistic background of the author, the book is easy and fascinating to read.■

Farewell to a Great Friend of Jordanian Archaeology – An Obituary for Dr. Mujahed el-Muheisen

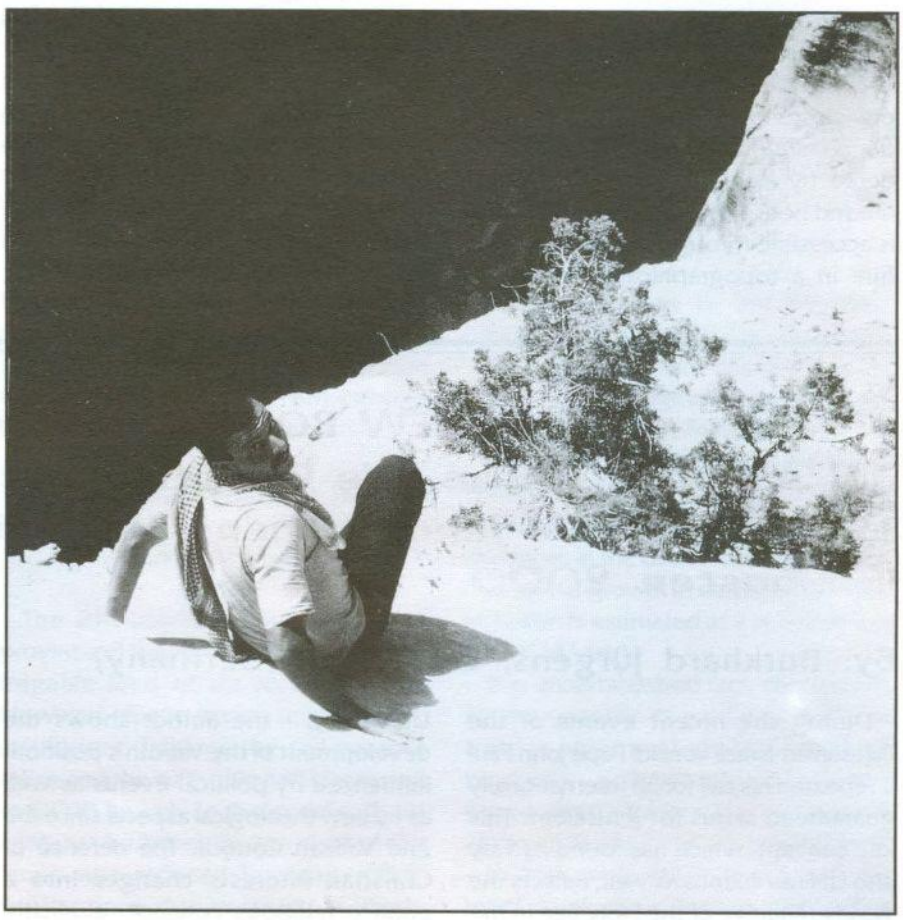
By: Hans Georg K. Gebel, Free University of Berlin (Germany)

Dr. Mujahed el-Muheisen devoted his academic life to Jordan's prehistory. He died in July this year at the age of 46 in Irbid, after suffering for almost 20 years from a fatal illness. His family lost a caring and loving father and husband. The academic community lost an excellent expert in chipped lithic analysis and a colleague who demanded high standards in research from himself and others.

Dr. Mujahed had finished his studies with the Doctorat d'État in Bordeaux, France, focusing on materials from his excavations at the Epipalaeolithic site of Kharaneh. In 1986, Dr. Mujahed was instrumental – among others – in the Basta Joint Archaeological Project, carried out by the Department of Antiquities, the Institute of Archaeology and Anthropology at Irbid, and the Free University of Berlin. He taught prehistory at the Institute of Archaeology and Anthropology at Yarmouk University, Irbid, Jordan, interrupted by a period of curatorship at the Museum of National Heritage, Yarmouk University. He also was the co-director of the Basta and 'Ain Rahub Joint Archaeological Projects, in which he represented his institute; he shared the direction of the excavations and analyzed the recovered chipped lithic materials. He was involved in many other projects, both in the analysis of materials and the excavation.

While Dr. Mujahed liked to joke and laugh, he was serious when he dealt with problems of archaeological research and policies. He followed up cases of violations of the Jordanian Antiquities Law and always insisted on respect for the national integrity of decision-making in Jordanian archaeology. His views were conservative in both social and private life.

Dr. Mujahed leaves behind three children, Batul, Fida' and Isra', and his wife Moona, who experienced his last years with deep love, care, trust and sorrow. May Allah help them and give them faith.■



Dr. Mujahed el-Muheisen in 1987, visiting the Neolithic site of Ba'ja (photo: H.G.K. Gebel).

Exhibitions, Conferences and Other Archaeological Events in Amman in the Year 2000

By: Jean-Pierre Braun, IFAPO-Amman (Jordan), Bill Finlayson, CBRL-Amman (Jordan) and Ina Kehrberg IFAPO-Amman (Jordan)

The Jerash Visitors' Centre: A new and revised town plan of ancient Jerash is shown on a transparent panel, measuring 2.5 x 3.0 m, in the Centre and serves as an orientation point for the monuments whose archaeological history is explained and illustrated on panels. This permanent exhibition of over 25 posters sheds light on the ancient as well as the modern history of Jerash in its geographical setting. The Ministry of Tourism and Antiquities sponsored and entrusted IFAPO with the creation of the exhibition and its installation, which was helped by local authorities and commercial enterprises.

IFAPO has organized and hosted 3 conferences this year. The first took place in July and the theme was Ancient North Arabic Languages. This international conference brought together many epigraphists specializing in this field, and the organizers (IFAPO/ S. Farès-Drappeau and DoA/F. al-Khrayshah) hope that a common consensus on how to deal with the diversity of information and its classification emerged from discussions on inscriptions from various regions of ancient northern Arabia. The colloquium included many papers by colleagues from Saudi Arabia and other neighbouring countries who met for the first time in Jordan, under the umbrella of this conference.

This was followed one month later, in August, by a 3-day Pottery Symposium (organizers IFAPO/I. Kehrberg and Univ. of Basle/Y. Gerber), which was held in the form of round-table discussions. A panel of international ceramicists specializing in Classical periods pottery and working on the common ware of the 1st to 7th century AD from Jordan were joined by field archaeologists dealing with ceramics and responsible for their publication. The discussions centred around problematic issues, especially chronology, related to pottery from north, south and central Jordan.

The proceedings of both conferences will be published by the organizers (editors) in BAH (Epigraphic conference) and in a regular volume of SYRIA (Ceramic Symposium) of IFAPO (publishers).

The CSBE (Center for the Study of the Built Environment, at Amman), GTZ (CARCIP) and IFAPO, with the Bavarian State Conservation Office (BIfD), sponsored and organized the course "The Use and Conservation of Stone in Buildings". The 6-day certificate course was held at IFAPO-Amman in September-October 2000. The lecturers are specialists from IFAPO and Jordanian as well as European institutions (e.g., CNRS, Yarmouk University) whose contributions are aimed at young architects and entrepreneurs concerned with modern buildings and reconstruction/preservation of older historical buildings and who work in architectural offices or teach. For this reason the sessions were held over 2 weekends (6 days).

This year also saw the foundation of a permanent ceramic database, the CCID (Classical Ceramics IFAPO Database), created and organized by Ina Kehrberg (IFAPO) and Yvonne Gerber (Univ. of Basle); Gabriel Humbert (IFAPO) will be the 'sherd librarian'. The database includes key sites from north, south and central Jordan, from the Late Hellenistic to the Early Umayyad periods. There will be a standard catalogue card system for consultation accompanying the sherds, to facilitate comparisons, as well as a computerized database which aims at providing more detailed information for research purposes. Both systems include drawings, photographs, and references to publications and museum collections in Jordan. It is hoped that, ultimately, the sherd library will include thin sections of the sherd samples, with description done by the laboratory. Upon completion, the CCID will be made available on the Internet, providing in-depth information of contexts and ceramic site parallels. The sherds are shelved in trays arranged according to north, central, or south regions and sorted according to site, type and date and/or period, to make comparison easier, with each catalogue card carrying the sherd and shelf-tray number. The CCID is, in fact, the database for a comprehensive revision of North-South Classical pottery studies in Jordan and will provide material for a new synthesis, to be published by Y.Gerber and I.Kehrberg (in BAH).

The 18th LIMES Conference at Amman, 2-11th September 2000

CBRL (The Council for British Research in the Levant) in collaboration with the Department of Antiquities of Jordan and the University of Liverpool organized the Roman Frontiers Congress. This is the biggest Roman Studies conference held every three years, usually in one of the countries which were once part of the Roman Empire. Jordan was host to this important event for the first time; in fact, this was the first time the conference was held in the Arab Middle East, despite the importance of this eastern frontier. Some 250 scholars

came from all over the world to participate in the 18th Congress The actual task of organizing this 9-day-long international event, including tours, transport, accommodation, and conference facilities, was carried out largely by a small team led by Dr Bill Finlayson of CBRL, Mrs Nazmieh Rida T. Darwish of the Department of Antiquities, Dr Phil Freeman of the University of Liverpool, and the conference chairman, Prof David Breeze of Historic Scotland. The planning of the programme of over 200 papers, covering every angle and aspect of the Roman Empire concerned with and related to its frontiers, began long before, and was looked after in Britain. The rich programme of papers was indeed a scholastic delight, and listening to contributions from Gaul, the lower Germanies and Britain, while comparing notes with those from the Roman frontier countries of Egypt, Jordan, Syria and further inland, was a stimulating exercise. Papers from one end of the empire on Hadrian's Wall added new ideas for research on defensive systems and methods of construction in the Roman East. Examination of pottery found with frontier posts in Germania informed on locals trading with the Roman troops and of inland stations providing foodstuffs in Britain shipped to feed soldiers of the frontiers posted in the lower Germanies. Coinage distributions and constructions of forts added invaluable insights to the mechanisms and changes brought about by local events, or new needs of the Roman defensive systems and their maintenance. Taken as a whole, the 18th congress advanced many ideas and will have instigated new research in the realm of Roman historical studies, whether through epigraphy, numismatics, town planning , defense structures or even ceramics, many of whose results will be presented as contributions at the forthcoming 19th Limes Congress to be held in Hungary in 2003.

Most memorable remain the visits to many historical sites in Jordan and travels through the varied countryside, at times travelling parallel to the famous and still visible via nova Trajana! The visits began with main sites like Amman (ancient Philadelphia) and Jerash. As for all tourists, sightseers and scholars alike, the finale of the congress reached its highlight in Petra, where everyone was allowed to relax and simply enjoy the splendours of the sculpted rocks set in an equally exotic and fascinating natural landscape. The Congress Patron, H.R.H. Prince Hassan, and the Jordanian Government very warmly welcomed the Congress participants. The Royal Cultural Centre was provided, and staff there worked hard to make

During the opening ceremony of the 18th LIMES Conference at Amman (from left to right): Jill Sindall, Adrian Sindall, David Breeze, Siegmar von Schnurbein, H.R.H. Prince Hassan and H.R.H. Princess Sumaya.

sure that the parallel sessions ran smoothly. The renowned Jordanian hospitality and kindred of spirit with the international participants was also manifested in the reception at Darat el-Funun, and generous dinners given in honour of the Limes Conference at Jerash and Petra. The dinner in Amman hosted by H.R.H. Prince Hassan was, however, the most memorable and moving event. Last but not least, the congress handbook "The Roman Army in Jordan" (D. Kennedy, "The Roman Army in Jordan". A handbook prepared on the occasion of the XVIIIth International Congress of Roman Frontier Studies, Amman, Jordan, 2-11 September 2000 [London: publ. by CBRL, 2000]), provided a much appreciated companion to the visits to the sites. More substantial than previous congress handbooks, this volume will continue to be a useful resource for those wishing to visit the Roman frontier sites of Jordan.

CBRL also organized another conference on Wadi Faynan and Southern Jordan. It arose out of CBRL's major research project in Faynan and gave an opportunity for the many scholars working in the area to present interim accounts of their work. At the same time, scholars from adjacent areas, and scholars who had previously worked in Faynan on the mining history of the area, were able to come and present papers, helping to place the current research within its broader context. Two days of papers were presented in the Royal Cultural Centre under the patronage of Princess Sumaya, followed by two days of field visits, staying at the CBRL/RSCN camp at the foot of Wadi Dana, where evening lectures were also presented. The conference brought together most of the principal researchers working in the area, and one of the strong points of the field visits was that in most locations talks were given by these experts. The conference covered all aspects of the multi-disciplinary research that is being conducted, from traditional archaeology, cultural heritage management, metallurgy, environmental studies, and studies of pollution, to studies on the effects of pollution on modern populations. It is hoped that the papers presented will be published as a CBRL monograph in 2001.

A regular event of quite a different nature is the "European Salon", created in 2000 by three European Archaeological Institutes in Amman: the British (CBRL= Council for British Research in the Levant), German (DEI= Deutsches Evangelisches Institut) and French (IFAPO= l'Institut Français d'Archéologie du Proche-Orient). The monthly evenings, usually held at IFAPO, provide a forum for informal discussion on topics concerned with archaeology and related fields, ranging from aspects of tourism, environment, local communities and management of sites, and museums and objects, to actual archaeological-historical problematics. There are no papers, but discussion themes are introduced by speakers chosen for their expertise in the subject. It is an open place to voice thoughts, to confront ideas, to meet with colleagues, and to offer food for thought. The visitors frequenting the Salon are considered as our guests, exchanging their personal views. There has been, however, unintended if silently hoped for, some far reaching echo among the Jordanian scholarly, and especially the institutional, community. The discussions at the European Salon have in part been responsible for the introduction of training courses in site management and presentation at the Department of Antiquities, sponsored the Ministry of Tourism and Antiquities. Twelve government employees, all archaeologists, are now attending a course at the Department to learn about site management and the presentation of Jordan's Archaeological and Architectural Heritage.■

How Ancient Water Structures are Relevant in Alleviating Present Water Shortages

By: Elias Salameh, University of Jordan, Amman (Jordan)

People without direct access to perennial rivers and springs in the Middle East throughout historic times have suffered shortages in water supply. This was very severe during the dry season of the year, whereas water was more available during the wet season. The problem has been, and still is, storage of water during water-rich winters for use during the dry, hot summers.

Ancient inhabitants of the area developed a variety of water storage structures, such as weirs, dams, pools, terraces, playa weirs, house cisterns, community cisterns and hidden cisterns.

Until the 1940s, most inhabitants of the area, having no access to running water, had depended on indigenous water structures to ensure their water supply during the dry season.

With improving standards of living, water use per capita increased many fold; in Jordan it increased around 6-fold from an estimated 15 l/c.d. in traditional villages and settlements to an average of 85 l/c.d. at present, while in Syria and Lebanon it increased 8-fold to 120 l/c.d.

The intensive efforts of Jordanian governments during the last five

(continued on page 61)

How Ancient Water Structures are Relevant in Alleviating Present Water Shortages

(continued from page 51)

decades to provide running water for the population throughout the year have been impacted by sudden population growth due to forced migration into the country.

After developing the available local water resources, it is becoming more clear that ensuring a satisfactory water supply system covering the needs of the inhabitants throughout all seasons of the year requires several years of intensive work and heavy investments, which does not seem to be on the way to being implemented in the coming years.

The question now is whether the methods developed by the indigenous inhabitants in the last 3-5 millennia can today alleviate water shortage problems during the dry seasons. The answer to this question can be answered with the following example: A Jordanian uses an average of 85 l/c.d. of water. During the winter months plentiful piped water is available for all Jordanians. Water supply shortages generally start at the beginning of May and persist until mid-September, a period of around five months. The shortage gradually reaches its maximum in July-August, and eases up towards the end of September.

The average winter use of inhabitants is around 60 l/c.d., increasing to an average of around 110 l/c.d. maximal demand in summer. This allows a calculation of 16.5 m^3/capita water demand in the five summer months. If the amounts supplied by the Water Authority continue at the same rate of the winter months of 85 l/c.d., then the gap between demand and supply will amount to 3075 m^3/person.

If the existing ancient cisterns (family, community, and hidden cisterns) can be rehabilitated and used, and new ones built, with an average capacity of 5m^3/person, then summer water shortages can be radically alleviated. Rehabilitating ancient family cisterns is not expensive. LA BIANCA in 1996 restored some, costing 100-200 JD per cistern, with capacities of 40-100 m^3 of water. The cost of one to two years' trucked water (40-100 m^3) exceeds the cost of rehabilitating cisterns which could be used for decades. ■

Archaeological Survey and Excavation at Wadi al-Yutum and Tall al-Magass Area – Aqaba (ASEYM), Field Season 2000 – The Survey

By: Lothar Herling, University of Heidelberg (Germany)

During the survey which was conducted simultaneously with the excavations of the ASEYM project, carried out by the University of Jordan, Amman (Prof. Dr. Lutfi Khalil) and the German Archaeological Institute (DAI), Berlin (Prof. Dr. Ricardo Eichmann) (Eichmann and Khalil 1998; Khalil and Eichmann et al. 1999), several new sites dating from Palaeolithic to modern times were recorded in the region east and south of Aqaba, up to the Saudi Arabian border.

In comparison to later times there are very few Palaeolithic findspots in the area of investigation. One site worth mentioning is located quite close to the "back road" leading to Aqaba port. In an area of several hundred square metres raw material flint of unknown provenance was tested and to some extent preliminarily prepared. A much greater abundance of finds comes from the Epipalaeolithic and the Pre-Pottery Neolithic. There are several places with evidence for both periods, with a considerable number of lithic implements such as backed bladelets, bladelets, bladelet cores and projectile points. Most of these places are to be found in the Wadi Umm Harraq south of Disi, and always in the vicinity of watering places. Some of these watering places have been used in the Epipalaeolithic period as well as in Roman times, and even today by bedouins.

The Chalcolithic site of Khirbet Rizqeh, already investigated by D. Kirkbride in 1959, was revisited. From the surface we collected some sparse finds from the Chalcolithic/Early Bronze period. The structures of an Iron Age sanctuary illustrated by Kirkbride have almost completely vanished. As seems to be the case at Khirbet Rizqeh, there is also some evidence for Chalcolithic and later activities in other places (for example, in Wadi Umm Harraq) which deserve futher investigation.

Numerous petroglyph sites in the region with Nabataean, Thamudic and Old Arabic inscriptions are evidence for the area's continous use as a route for

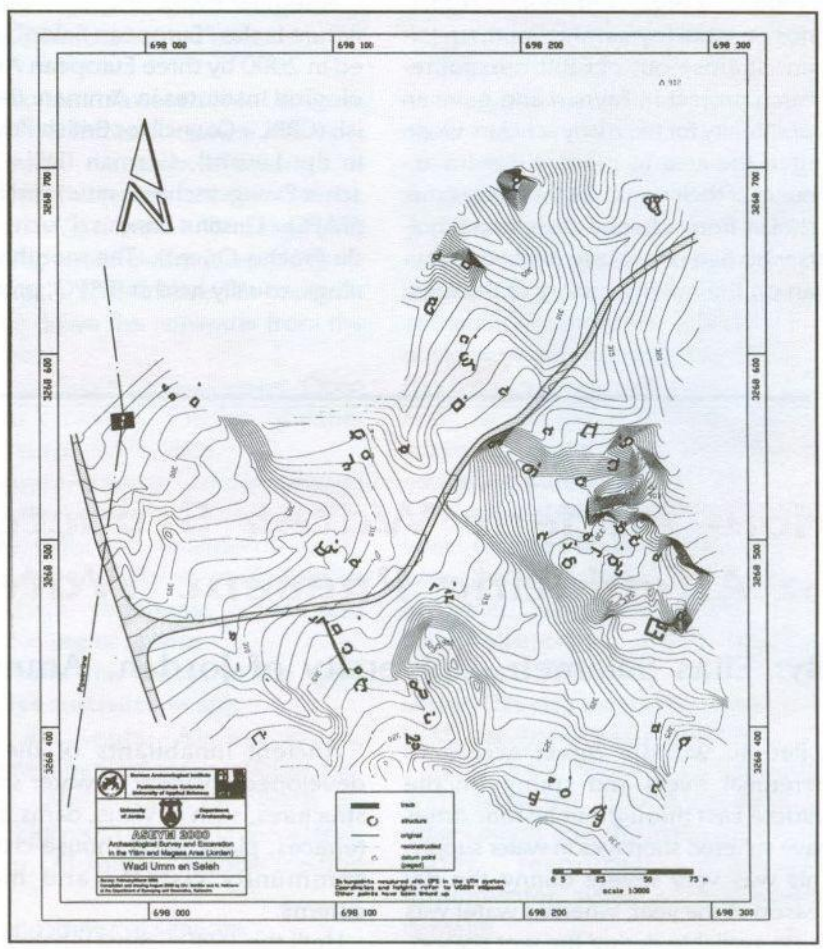


Fig. 1. Map of Umm Nselah with the recorded remains of stone structures.

trade with South Arabia and for Mecca pilgrims. There is a similar number of picked scenes showing animals like gazelles, ibexes and camels, and a few carnivores of uncertain species. In addition, there are depictions of human beings, quite often in the shape of camel-riders brandishing spears.

Like the petroglyph sites, the numerous tombs, cemeteries and watering places were mapped as well. Although there were no datable finds connected to them, the orientation of many tombs indicates, however, that they are Islamic burials.

Last but not least is Umm Nselah. This site covering several thousand square metres is located in a wadi of the same name to the east of Aqaba, and contains more than fifty building remains. The terrain and the structures were surveyed and mapped by the team from Karlsruhe University (Fig. 1). Corresponding plans have been prepared for other sites as well, e.g. Khirbet Rizqeh.

Several of the almost circular structures with a diametre of three to five metres had been built very carefully, and the walls are preserved up to one meter high. Some have irregular or rounded annexes (Fig. 2). There is no uniform orientation of the entrances. The only rectangular building containing several rooms occupies a high, centrally situated place in this rugged, unfavourable and, moreover, waterless wadi. It might have been a public building. According to some elderly inhabitants of Aqaba, Umm Nselah was the place of retreat of the townspeople; at the time of the bombardment of the Turkish garrison by British warships during World War I, they found refuge there at the site that was not observable from the Gulf of Aqaba. The necessary water had to be brought to Umm Nselah by night. The sparse finds, consisting mainly of porcelain sherds, press glass bracelets and ammunition, also support this date. Umm Nselah is seriously endangered and partially already destroyed by various construction works, for example by construction of a high-tension line (Fig. 2) and by a quarry directly to the south of it. This seems to have already destroyed a large part of the site. Further destruction should be prevented because Umm Nselah is one of the few places in Jordan directly connected to the Great Arab Revolt and is as such part of the national heritage. The survey will be continued in spring 2001.

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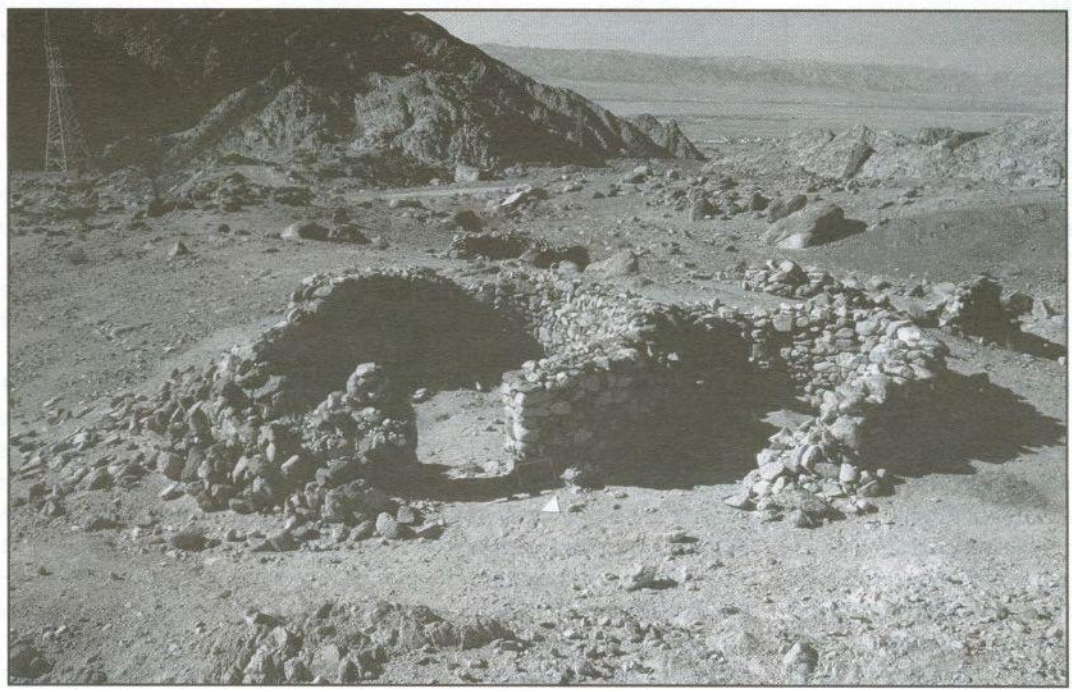

Fig. 2. Umm Nselah: One of the circular stone structures with a semi-circular annex. The Wadi Arabah and the outskirts of Aqaba are visible in the background (photo: I. Wagner).

The Biblical Archaeological Institute at Tübingen University (Germany) - History and Activities

By: Siegfried Mittmann, Tübingen University (Germany)

In 1959 Karl Elliger succeeded in establishing the Biblical Archaeological Institute and the Professorship for Biblical Archaeology at Tübingen University (Germany), to which Kurt Galling was appointed in 1962. It is no coincidence that only one year later (1963) Martin Noth, on instructions of the German Protestant Church (EKD), was sent to Jerusalem to re-open the "German Protestant Institute of Archaeology" that had been established in 1901 by Emperor Wilhelm II but that had closed its doors in Jerusalem during World War I. The opening of two institutes aimed at fully connecting German-Palestinian scientific research, first to the archaeology of the Holy Land that had flourished since the 1950s, while for the founder of the institute in Tübingen the primary concern was pioneering research in the Holy Land itself. Karl Elliger could henceforth tie up connections with a significant Tübingen tradition. Gottlieb Schumacher, who originated from Tübingen, was one of the great pioneers of scientific research in Palestine before World War I, and was, among others, the first excavator of Megiddo.

Biblical archaeology is not only the archaeology of the Bible, but the archaeology of the land of the Bible, certainly in the sense of comprehensive land and classical studies of Palestine together with its neighbouring environment. It looks at the biblical era along with the significance all cultural eras, assessing the material remains of past centuries and millennia before and after the turning point of time, along with historical geography and topography. Modern archaeology reconstructs and interprets artifacts, buildings, and towns, and also explores the natural life circumstances and the customs and traditions of concerned people. Finally, archaeology opens new sources of field-study for the history, history of religions, and exegesis.

The biblical archaeology tradition in Tübingen, through its almost 40 years of existence, has produced great achievements that reach far beyond Tübingen, and also generates benefits and honor to Protestant theology. Cooperation in the (Sonderforschungsbereich 19) "Tübinger Atlas des Vorderen Orients (TAVO)" and the large excavation projects of the institute in north Jordan (since 1984) should be named in particular. The excavations of the institute in northern Jordan are considered internationally as a key excavation for the Early Bronze Age (3.000 B.C.) in Palestine and the rest of the Levant. This project at Khirbet ez-Zeraqon, which is jointly conducted with the Institute of Archaeology and Anthropology of Yarmouk University in north Jordan, brought to light new information on an Early Bronze Age city in Jordan (Fig. 1); final publications of the excavation results are underway.

Fig. 1. The Temple Area at Khirbet ez-Zeraqon.

No other division of the Evangelical Theological Faculty enjoys so many connections with interdiciplinary cooperation within and beyond Tübingen. Especially strong are its cooperative relations with the Cultural-Scientific Faculty, not least in the field of education. Especially noteworthy is the intensive cooperation with the Institute of Archaeology and Anthropology of Yarmouk University (Irbid, Jordan). Not less that three professors of the two theological faculties are members of the administraion and the scientific institute advisory board of the German Protestant Institute of Archaeology in Amman and Jerusalem, an institution of the German Protestant Church (EKD). The present director of the Biblical-Archaeological Institute has been appointed to the expert-committee of German Archaeological Institute (Berlin, Germany).

The Biblical-Archaeological Institute has unique facilities. The specialized library, with ca. 9000 volumes and 60 specialist periodicals, as well as a collection of maps with about 1,750 items, is a counterpart/companion institute to the École Biblique in Jerusalem. The technical equipment (restoration and drawing room, photo lab) enjoys the latest technical standards. The university has spent about DM 120,000 for reconstruction work of the Theologicums.

The field of biblical archaeology, in its combination of professorship and Institute, has no equal in Germany or in Europe. It can only maintain this status if biblical archaeology retains the context of work outlined above.■

The Dana-Faynan Ghuwayr Early Prehistory Project (DFGEPP)

By: Bill Finlayson, CBRL-Amman (Jordan)

The Dana-Faynan Ghuwayr Early Prehistory Project (DFGEPP) is a study of the early prehistoric settlement of the wadis Dana, Faynan, and Ghuwayr in southern Jordan. The project involves survey, test-pitting, trial excavations and palaeoenvironmental research. Much of the focus of the project has been around the mouth of the Ghuwayr, where a PPNA site has been located (WF16) (Finlayson and Mithen 1998, Finlayson et al 2000). Field survey on the terraces of the Faynan have identified extensive Middle Palaeolithic flint scatters.

In spring 2000 the survey area was extended to the uplands in the area between Wadi Hamra and Wadi Al Bustan, lying north of El Khureiba and South of Dana village, to investigate the exploitation of the flint resources in this area at the top of the Wadi Ghuwayr system. The survey comprised three main elements: recording the nature of the flint sources, assessing the artifactual material, and collecting artifacts from sites defined by the assessment. No definite pre-pottery Neolithic sites were located, however, numerous Palaeolithic flint scatters were identified (Fig. 1). Although they showed relatively little sign of damage from movement, and several of the scatters appeared to be eroding from in situ deposits, the steep slopes seem unlikely to have presented stable surfaces over the time depth involved. The scatters were, however, typically discrete with fairly sharp boundaries, unlike the material located near Shobak at the edge of the plateau (Rollefson 1981; 1985). Material of Lower and Middle Palaeolithic date was found. Some of the Middle Palaeolithic material may represent industries transitional to the Upper Palaeolithic, but more research has to be undertaken on this.

This phase of the project was completed in spring 2000 with a season in Faynan. We hope to publish the results rapidly, and to follow this initial survey and trial trenching project with more detailed research on selected sites, especially WF16 as well as some of the Palaeolithic sites

The project has been operated since 1996 as a joint Universities of Edinburgh and Reading project, with major contributions by staff and postgraduates of the Universities of Stirling and Durham. At the end of 1999 Bill Finlayson moved from Edinburgh to CBRL in Amman. All project members are grateful for the support and assistance of the Department of Antiquities of Jordan, especially of Mr Jihad Darweesh, who was both our representative and our landlord.

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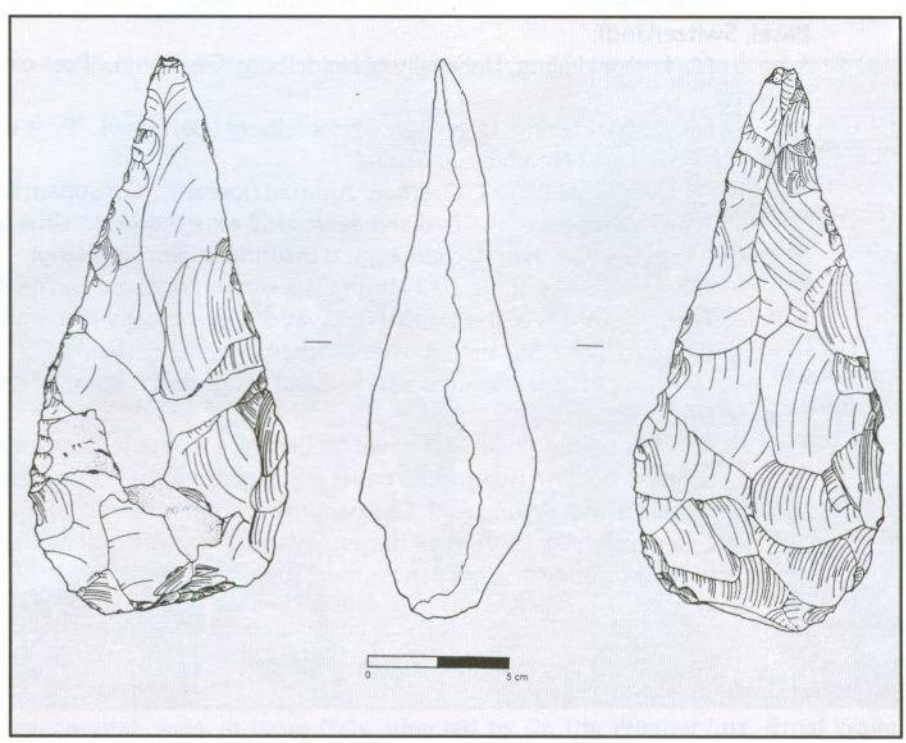

Fig. 1. Acheulian hand axe.

Fellows in Residence and Associated Fellows (December 1999 - November 2000)

- Team members of the joint Jordanian-German Project "Archaeological Survey and Excavation at Wadi el-Yutum and Tall el-Magass Area - Aqaba (ASEYM)" directed by Prof. Dr. Lutfi Khalil (University of Jordan, Amman, Jordan) and Prof. Dr. Ricardo Eichmann (German Archaeological Institute, Orient Department, Berlin, Germany).
- Dr. Ute Wagner-Lux, Basel (Switzerland), "Research on finds from archaeological excavations in Umm Qais (Church and Church Terrace, parts of the Decumanus, southern Basilica)".
- Dr. Karel Vriezen, Utrecht University (Netherlands), "Research on finds from archaeological excavations in Umm Qais (Church and Church Terrace, parts of the Decumanus, southern Basilica)".
- Prof. Dr. Dr. Dieter Vieweger, Kirchliche Hochschule Wuppertal (Germany), "Research for a new archaeological project in northern Jordan and research on finds from archaeological excavations at Ba'ja I".
- Dr. Roland Lamprichs, Dresden (Germany), "Research on finds from archaeological excavations at Ba'ja III and Fersh".
- Ms. Katharina Nötzold, University of Leipzig (Germany), "Arabic Language Studies at University of Jordan, Amman".
- Mr. Jens Eichner, Kirchliche Hochschule Wuppertal (Germany), "Pottery reading and analysis from Ba'ja I (Ayyubid-Mamluke) and preparing - in cooperation with the excavators - the final report on the pottery".
- Mrs. Katrin Bastert-Lamprichs, Dresden (Germany), "Pottery reading and analysis from late neolithic esh-Shallaf and preparing - in cooperation with the excavators - the final report on the pottery".
- Mr. Stefan Martens, Technical University, Freiberg (Germany), "Ground Water Investigations Along the Wadi Zerqa".
- Team members of the DAI-Umm Qais excavation, directed by Prof. Dr. Adolf Hoffmann (Technical University, Cottbus, Germany).
- Team members of the "Jerash Cathedral Project", directed by Prof. Dr. Beat Brenk (University of Basel, Switzerland).
- Mr. Lothar Herling, University of Heidelberg (Germany), "Post-excavation Research of the ASEYM-Project".
- Mr. Lothar Herling, University of Heidelberg (Germany), "Post-excavation Research on the Lithic Assemblage of Late Neolithic esh-Shallaf".
- Dr. Uwe Schleif, c/o GTZ office, Amman (Jordan), "Consultant for the Brackish Water Project".
- Team members of the DAI archaeological expeditions to Uruk and Sippar (Iraq), directed by Dr. Margarete van Ess (German Archaeological Institute Berlin, Germany).
- Team members of the DAI-Umm Qais survey, directed by Ms. Nadine Riedl (Berlin, Germany).
- Team members of the Danish excavations at the early Neolithic site of Shaqarat Mazyad (Petra region), directed by Dr. Susanne Kerner (Kopenhagen, Denmark).
- German participants of the international congress in "Roman Frontier Studies", held in Amman in September 2000.
- Scholars holding one-year travel scholarships from the German Archaeological Institute (DAI).
- Scholars holding two-month travel scholarships from German Protestant Institute of Archaeology (DEI): Mr. Jens Eichner (Wuppertal, Germany), Mr. Lothar Triebel (Berlin, Germany), Dr. Andreas Scherer (Bochum, Germany), Dr. Peter Wick (Basel, Switzerland), Mr. Irudhayasamy Raymond Joseph (at present: Innsbruck, Austria) and Mr. Christian Stettler (Tübingen, Germany).

Archaeological Excavations at Sal (Northern Jordan): A Chalcolithic and Early Bronze Age Site

By: Zeidan Kafafi, Yarmouk University, Irbid (Jordan) and Dieter Vieweger, Biblical-Archaeological Institut Wuppertal (Germany) in co-operation with Muhammad Jaradad, Patrick Leiverkus and Erich Lippmann

The excavation campaign at Sal (approx. 6.5 km north-east of Irbid, Palestine grid 2358.2195) carried out in 1999 is a Jordanian-German Joint Project directed by Zeidan Kafafi and Dieter Vieweger, on behalf of Yarmouk University, Irbid, and the Biblical Archaeological Institute Wuppertal. The excavation started on the 11th and ended on the 30th of September 1999.

The site of Sal offers naturally outstanding conditions for archaeological investigations: The strategic position in the vicinity of Wadi esh-Shellale at the northern edge of the Irbid-Ramtha basin enabled excellent possibilities for trade and agriculture, which stimulated the development of the large Chalcolithic site measuring some 36 ha.

As we expected during our visits to Sal prior to the excavation, the preservation state of the site is very poor in places. The modern village of Sal expanded briskly in recent years. It carves deep into Tell Sal itself and a large water basin made of concrete covers the highest point. Therefore we concentrated our attention on the large area from the south-east to the south-west of the Tell, Khirbet el-Bayaz el-Gharbiye. This region is now used for agriculture; about half of it is covered by olive trees. The farmers destroyed most of the ancient strata of this area by digging holes for planting olive trees, and also by ploughing the areas between the trees up to 35-40 cm deep. For this reason we decided to start our archaeological research in the large open fields between the olive plantations (area I) and west of them (area II). The authors carefully examined these fields in Spring 1999. We expected difficulties in field work because in some parts – especially in the southern part of area I – the bedrock is already visible on the surface. In addition a 'test trench' made by illegal diggers near our subsequent excavation square AB 53 showed that the cultural strata in this area are not deeper than 30-40 cm below the surface.

Knowing this, we decided to base our excavation campaign mainly on geoelectric prospecting. There are many advantages to such an approach in this region and under these special

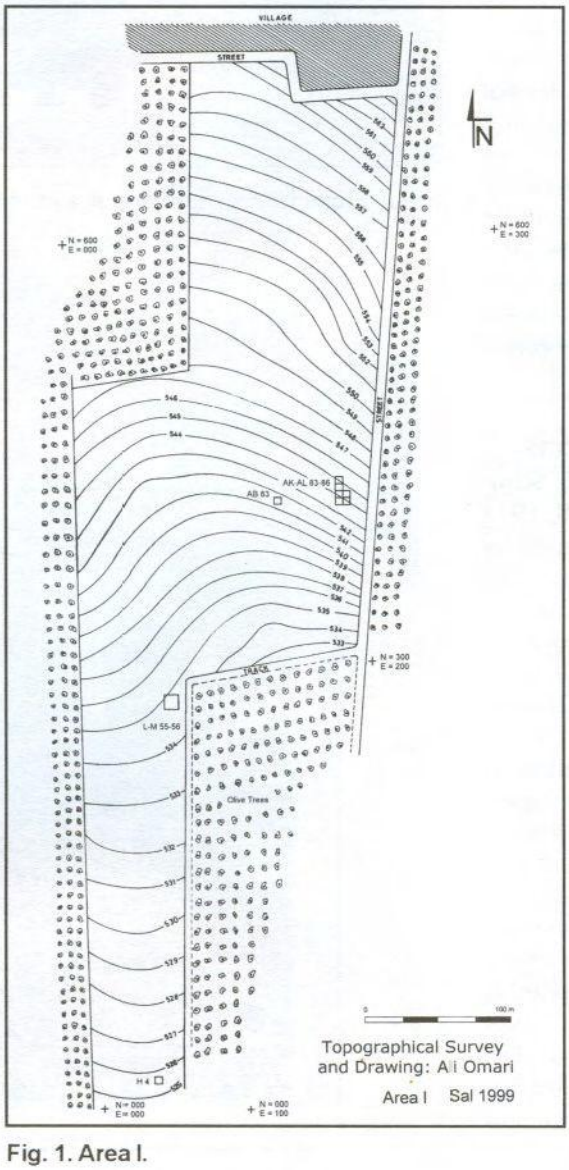

Fig. 1. Area I.

conditions. First, we can find the undisturbed (unploughed) areas much easier than through traditional archaeological work (such as test trenches), because we are able to examine between 1,600 to 2,400 sqm a day (even more under excellent conditions) with only one geophysical system. On the basis of the results, we decide in which parts of the fields in Sal we should expect architectonic features and undisturbed areas. Second, archaeological work – such as test trenches or squares in selected areas – can sufficiently interpret the geoelectric results over a large region. Third, after the season we can leave undisturbed areas – examined but not excavated (this means also 'destroyed') – for further investigations. Fourth, in some areas olive trees will soon be planted; so we could seize the last opportunity to gather much information about a large territory, which could not be obtained using traditional excavation methods with the existing budget.

Additional geomagnetic or geoelectromagnetic work was not carried out in Sal for geological reasons. The high percentage of basalt stones in the earth makes it impossible to obtain archaeological information with such geophysical methods.

History of Investigations

The site was discovered by G. Schumacher (1914, 51f.) on March 8, 1913 and was later described in a report by N. Glueck (1951, 113f.) after his visit on May 4, 1943. S. Mittmann (1970, 14f.) started his investigation in this region in 1964 during his survey of northern Transjordan. He visited the Tell and also the adjacent environment, which means the whole region of Khirbet el-Bayaz. On the Tell and the lower slopes, he found pottery of the Early Bronze Age I, Late Bronze Age I-II, and Iron Age I-II, in addition to two sherds from the Early Roman to the Mameluke period. A large amount of pottery from Khirbet el-Bayaz, which he classified at that time as Early Bronze Age I, was Chalcolithic (Mittmann, in print). The '1984 Survey of the Irbid-Beit Ras Region' carried out by C. J. Lenzen and A. M. McQuitty concentrated only on the Tell, and so the report says: "The retrieved pottery from the tell indicates occupation during the period between ca. 1300 B. C. to 1000 B. C." (Lenzen/ McQuitty 1988, 270). In October 1989 S. Mittmann and J. Kamlah (University of Tübingen, Germany) carried out a further systematic survey as part of the Khirbet ez-Zeraqon project. According to their work, the surface pottery of fields 7 and 8 at Khirbet el-Bayaz

Fig. 2. Stone from a courtyard in a modern house in Sal.

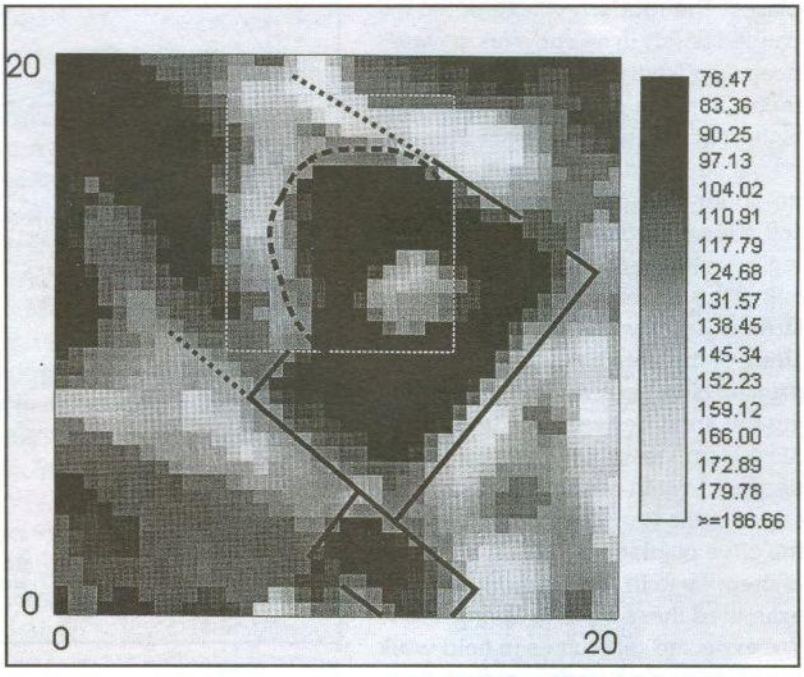

Fig. 3. Results of geoelectric work in area L-M/56-57.

must be dated mostly to the Chalcolithic period.

Geoelectric Prospecting

Resistivity Mapping for Archaeology means the determination of resistivity using a set of electrodes of constant geometry at closely spaced intervals. If some material of high resistivity like limestone is covered by a homogeneous layer of low resistivity topsoil, it is, in principle, possible to detect this underlying structure by resistivity mapping. However, some caution is necessary, for three important reasons:

First, the contrast between the resistivity values of surrounding material and the material that mapping should detect must be high enough. Second, the structures to be detected must be within the penetration depth of the electrode array used. As a rule of thumb, the penetration depth is equal to the dimensions of the electrode array. Third, the dimensions of the object to be detected must not be too small. Too small in this context means that it should be sized around the dimensions of the electrode array and the sample interval, which – again as a rule of thumb – is between 0.5 and 1 m. Objects of sufficient contrast, of 0.5 m in 0.5 m depth, should thus be detectable, using a 0.5 m electrode array.

All the above values are intentionally kept very vague, as detectablility depends on many factors, such as distortions of the homogeneity of the topsoil due to man-made interference, like ploughing, or trees and stones, or the varying composition of the topsoil.

The resistivity instrument used in the Sal survey is the 4Point light μC, manufactured by LGM Geophysikalische Messgeräte, Germany. The unit only measures 25 x 12 x 5 cm and weighs less than 800 grams. It has a storage capacity of more than 6000 data points, which corresponds to about 6-10 hours of continuous data acquisition in the field. The power supply for the unit are four internal, rechargeable NiMh-AA cells that can power the instrument for up to 40 hours. In case the internal batteries should be discharged they can easily be replaced by any Alkaline-AA cells.

The unit operates on AC current of 8.33 Hz and has a high suppression of the main frequency of 50 Hz. The current setting used for survey was either 1 or 0.1 mA. At a maximum output voltage of the instrument of 40 Volts, this provided for very safe operation; the electrodes can be touched with bare hands without any danger. Therefore field operation becomes much easier. After some research on the market for resistivity tools, we found this instrument to have by far the best performance-to-price-ratio.

The acquired resistivity data is usually displayed as a black and white image, where the different apparent resistivities are visualised by different shades of grey. For a campaign like this, where we took more than 90,000 readings which had to be visualised right away for archaeological interpretation, one has to use software which is capable of managing such amounts of data. Therefore we developed a software package which consists of several components for downloading, managing, converting, and visualising the resistivity data.

The data is downloaded from the 4-Point Light μC resistivity meter by a serial connection. The data of one square is stored in one file. These files can be edited with a special editor that allows one to correct the data by hand, which is often useful, e.g., in case of false order of data acquisition. The area manager combines the different squares of one area. The data is converted into apparent resistivity values. False readings are replaced. Offsets in the data among the different squares can be corrected automatically and by hand. The user can already view the data which is optionally filtered. The data is then exported to Idrisi, a GIS software package, where the extensive filtering work can be done.

The work extended across three hectares in areas I and II. According to our geoelectric results we decided to excavate four trenches.

Excavation Results

In square L-M/56-57, area I (8 by 9 m), the cultural features – especially the round ones – stood in close interaction with the near bedrock formations. First we exposed a round/oval shaped Chalcolithic house partly carved into the bedrock (L 16). The installations also were all carved into the bedrock – like L 19 and 20 (postholes; also L 18?), L 24 (inlet for a large vessel) and L 29 (storage pit). One can distinguish between two different phases of the Chalcolithic settlement. During the earlier phase there was a larger area of house L 16, which was rebuilt or restored later with the walls L 14 and 15. It was a surprise to expose a further stratigraphic

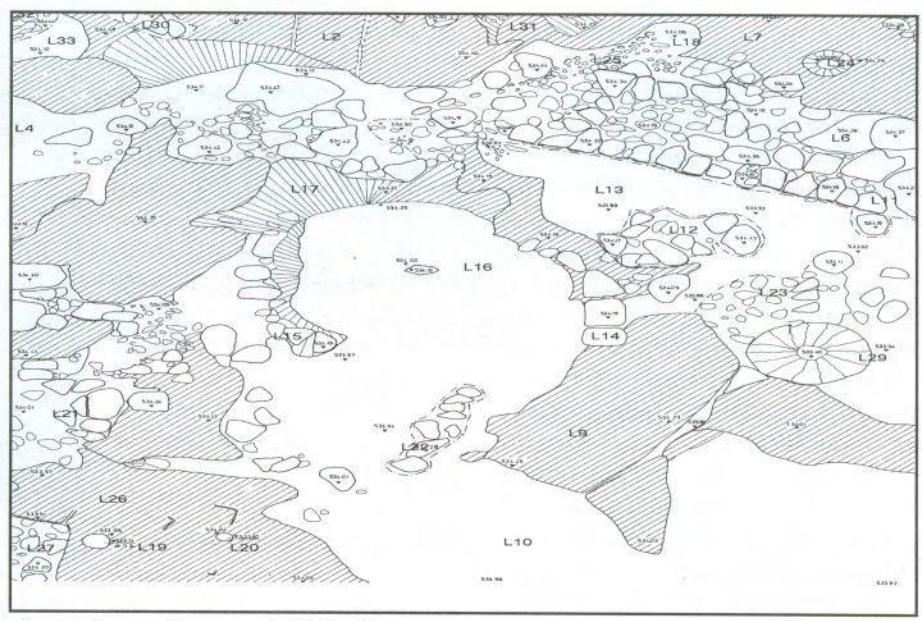

Fig. 4. Excavation area L-M/56-57.

detail: The wall L 6 with a bench-like part in the south (L 11) gives strong support to our geoelectric reconstruction of a rectangular structure. The style of architecture is similar to the nearby Khirbet ez-Zeraqon architecture and the associated large quantity of EB ceramics leads us to date this building to the (middle) EB period. Wall L 6 covers Chalcolithic wall L 25.

Square AB 83 (area I) is located in the northern part of area I. Our expectation of thicker deposit layers on top of the cultural strata was correct only for the Chalcolithic layer. Under a small surface layer with mixed pottery sherds, flint tools and plant roots (from LB to Islamic) we exposed a corner of a rectangular building (L 3. 4) from the EB period. By digging the sounding (L 10-12) we reached the Chalcolithic about 80-95 cm under the EB stratum; Chalcolithic remains are in good condition there. This and the adjacent area are undoubtedly favourable for further exploration of the Chalcolithic culture of Sal.

We found no suitable material to obtain a C14 dating. But we collected earth samples from the self-contained loci (like L 19, 20 and 29) to prepare an analysis of pollen, fungi, and viruses.

The Idols

The great majority of the 48 idols from the Golan and the Huleh Valley (already published by C. Epstein) were excavated in reliable house contexts or discovered within the limits of a recognised Chalcolithic site. Some of them were found in secondary usage in villages located near subsequently identified Chalcolithic sites, where they were presumably found on the surface. Like this second group, the two new objects from Sal were discovered by the villagers, they say, when they were digging holes for the new olive trees.

It is generally accepted that these objects are essentially cultic in character, and, since they were originally placed in houses, that they formed part of a domestic cult intended to promote fertility. They are closely connected with the two main branches of the contemporary economy: sheep and goat rearing, and agriculture.

We already know of ten theriomorphous cultic stands from this area. They will be published with a complete description and extensive discussion by S. Mittmann (in print). We found two new idols. The larger basalt stand is 26.6 cm high (front; back: 23.5 cm) and at the bottom 21.8 cm in diameter. With ears the maximum width is 24.5, without it is 22.2 cm. The smaller one is partly (nose and face) damaged. Its height is 13.6, width at the bottom 12.5, on top 15.4 cm, with ears 17.4 cm.

Tentative Conclusion

We can see the extraordinary value of geophysical work in the archaeology of the Near East, even under the difficult conditions of a partly destroyed prehistoric site. We could demonstrate the following advantages of this geophysical method:

1. We could prospect a large area in a short period of time and base our archaeological strategy on these results (e.g., places of work);

2. We can partially interpret prospected areas with the knowledge gained from our excavation work;

3. We can leave unexcavated/undestroyed parts of ancient sites for future archaeological work.

Chalcolithic inhabitants at Sal seemed to have lived in houses, partly carved into the bedrock. The prospected areas show a large area covered with houses, but not cramped or densely populated. There seemed to be enough space for courtyards, household areas, etc. There certainly is a (middle) EB settlement outside the Tell with well built architecture in rectangular style. Unfortunately, we do not know specific facts about this society because of the large destruction all over the site.

Acknowledgements

First the authors would like to express their gratitude to the Department of Antiquities of Jordan, especially its Director General, Dr. Fawwaz Khreisheh, for its constant support. We are extremely thankful for the help of Wajeh Karasneh, director of the Department of Antiquities Irbid, and inspector Adnan Naqrash. The campaign is based on the recent field survey which was part of the Khirbet ez-Zeraqon survey, conducted during four weeks in 1989 by Prof. Dr. Siegfried Mittmann (Tübingen) and Dr. Jens Kamlah (Kiel) (Kamlah 2000, 44-53) . We would also like to express our thanks for the valuable information given by S. Mittmann and J. Kamlah about their survey work in Sal. The authors prepared their excavation by field inspections in Sal during Spring 1999 and Autumn 1998. Siegfried Mittmann visited the site at that time. He gave us

Fig. 5. Basalt idol from Sal.

important advice and generous aid. The excavation also obtained strong support from the German Protestant Institute, Amman. We are deeply impressed by the personal engagement and the selfless help of its director, Dr. Hans-Dieter Bienert. The authors would like to express thanks for the hard, precious, and keen work of our staff members, Muhammad Jaradad (Irbid), Patricia Ilona Kende (Stuttgart), Ute Koprivc (Remscheid), Patrick Leiverkus (Wuppertal), Erich Lippmann (Schaufling), Ali Omari (Irbid), and Abdul al-Rahim (Irbid). We are also grateful for the support of Jens Eichner (Wuppertal).

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Hydrogeological Investigations in the North-Eastern Dead Sea Area, Jordan: the Thermal Springs Along Wadi Zerqa Ma'in and 'Ain Ez-Zara

By: Martin Rother, University of Karlsruhe (Germany)

Introduction

Jordan comprises several hot springs, which are commonly associated with the Wadi Araba-Jordan Valley Graben. Two areas of hot spring activity were selected for further investigations within this study. The chosen regions are located some 60 kilometres south-west of Amman, the capital of Jordan. They are set close to the north-eastern shore of the Dead Sea, the lowest land depression on earth with a recent water table of 408 m below mean sea level.

Wadi Zerqa Ma'in hot springs are situated about five kilometres east of the shoreline, established between contour lines 80 m above mean sea-level and 160 m below mean sea-level. 'Ain ez-Zara is located around four kilometres to the south-west. The springs issue at an average distance of 700 metres from the Dead Sea, situated between contour lines 200 m below mean sea-level and 400 m below mean sea-level. Both areas have been a place of human recreation, curative treatment, and vacation since ancient times. Several times referred to in the Bible (e.g., Genesis 36, 24; Ant.17, 6) and well known from the notes of the Roman historian Flavius Josephus (Jewish Antiquities, XVII. 170-173; Jewish War, VII. 178-189) these places went down into history as Baaras (modern Hammamat Ma'in) and Therma Callirrhoe (modern Zara).

Wadi Zerqa Ma'in represents the major drainage system of the study area, extending about 38 km in an E-W direction to the Dead Sea. The drop in elevation of around 1,150 m is achieved essentially within the last 5-10 km to the Dead Sea. Eroding water floods as well as tectonic movement lead to the configuration of a very narrow and deep gorge. Due also to abundant scattered debris, the terrain is rather inaccessible.

Climate

The climate of Jordan is influenced by the Mediterranean, which is characterized by a hot dry summer and cool wet winter, with two short transitional periods in between. The study area falls within the transition zone of the two climatic zones of the ghor (Jordan Valley) and highland. The ghor is characterized by warm winters and very hot summers, resulting in average daily mean temperatures from 15° C to 31° C. The highlands experience cold wet winters and hot dry summers, with average daily mean temperatures of 9° C to 25° C (Jordan Climatological Data Hand Book 1997).

Jordan is an arid area, with 91% of the country desert. Rainfall is rare and decreases from 600 mm/a in the western and 400 mm/a in the northern parts of the country to less than 50 mm/a in the eastern and southern parts. Precipitation usually occurs during short but intense events in the winter rainy season. Average annual rainfall is in the order of 94 mm/a. Hence rain-fed agriculture is feasible in about 3.3 % of the whole area of Jordan (UNDP 1992).

Mean annual evaporation ranges from 2,500 mm a^{-1} in the northern heights and the Jordan Valley to more than 4,500 mm a^{-1} in the south-eastern desert area. A particular localised mound can be observed around Karak-Rabba area (3,000 - 4,000 mm a^{-1}).

Mean sunshine duration ranges from 5.1 to 7.2 hrs/day in December to 11.4 to 12 hrs/day in July (Jordan Climatological Data Hand Book 1997).

Geology

The study area is situated on the eastern side of the Wadi Araba - Jordan Valley Graben, part of the East African Rift System which extends over 6,000 km. It links the East African spreading centre in the south with the conver-

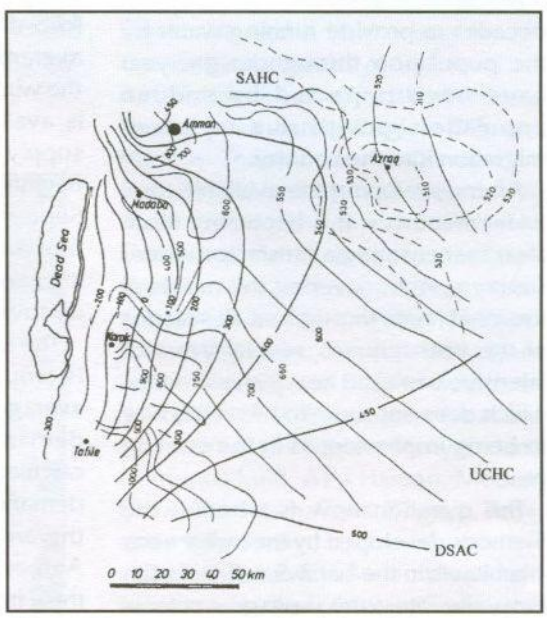

Fig. 1. Piezometric heads of the distinct aquifer complexes.

gence zone of Taurus-Zagros in the north. Despite its name "Graben" or "Rift", the structure is a transform fault along a young intracontinental plate boundary, separating the Arabian from the Sinai-Palestine Plate. Along the left lateral transform a sinistral movement of about 105 km in the basement structure has been estimated by different authors. Several morphotectonic depressions are evident, the most prominent of them forming the Dead Sea Basin of approximately 150 km length and 15-17 km width. These depressions can be considered as rhomb-shaped pull-apart basins that formed between left-stepping fault strands.

In connection with the development of the Wadi Araba-Jordan Valley Graben intense tectonic forces formed several faults and folds in its vicinity, hence modifying the study area. The most striking ones are E-W trending Wadi Zerqa Ma'in Fault and N-S trending Zara Fault. The major joint direction runs 30° NNE, accomplished by two significant directions of 120° ESE and 160° SSE.

Mapping of the study area revealed several geological units starting from Cambrian Ram Group, which includes the formations of Burj Dolomite-Shale (Lower Cambrian) and Umm Ishrin Sandstone (Middle to Upper Cambrian). Zerqa Ma'in-Group comprises Umm Irna (Permo-Triassic), Ma'in (Triassic) and Dardun (Triassic) Formations, consisting of sandstones, alternating siltstones, marls, shales and partly dolomitic limestones. Kurnub Sandstone (Lower Cretaceous) and limestones of Upper Cretaceous crop out as well. Lisan marl (Pleistocene) represents the oldest Quaternary sediments. Debris, gravels and travertine cover large stretches of the area.

The area of Jordan was situated throughout geological history within a transition from continental to marine deposition environments. Accumulation and sedimentation alternated abrasion and erosion. Hence hiata are a common feature of the region. In particular strata of Ordovician, Silurian, Devonian, Carboniferous, Jurassic, Upper Cretaceous from Turonian on and Tertiary sediments are lacking in the study area.

Discharge sites of the distinct hot springs are characterized by travertine deposits, covering huge zones of the study area. According to Khoury/ Salameh/Udluft (1984) older and younger travertines can be classified. Older ones generally are thicker, darker and of a more solid consistency. Usually they are set closer to the Dead Sea than recent ones. Formers consist of calcite, partly showing pseudomorphs to aragonite, while recent ones in fact are aragonites. The dark color of old travertines corresponds to high contents of iron and manganese. These as well as SiO2 contents indicate higher water temperatures in the past. Gradual cooling of buried basaltic bodies associated with Zerqa Ma'in Fault may be a reason for the variance.

Hydrogeology

Throughout Jordan distinct aquifer complexes can be determined. The Deep Sandstone Aquifer Complex (DSAC) comprises Disi Group (Cambrian sandstones and quartzites) as well as Kurnub and Zerqa Group (fine to medium grained sandstones). In the Jordan Rift Valley it is expected to be situated in a depth of some 1,500 m below mean sea-level, while it crops out in the south of Jordan. Downward leakage from overlying aquifers and aquitards probably feeds the Deep Sandstone Aquifer Complex. El-Naser (1991) calculated the leakage from the Upper Cretaceous Hydraulic Complex, in particular from $A_{1/2}$ (Na'ur formation) to Kurnub Group, to be 0.017 l/km²*s in the northern part of Jordan. El-Naser (1991) estimated transmissivities of approximately $T = 9.6 * 10^{-4}$ m²/s for the Kurnub Sandstone in the northern part of Jordan. Salameh/Udluft (1985) calculated an average permeability of $k_f = 4.48 * 10^{-5}$ m/s in the central part of Jordan.

The Upper Cretaceous Hydraulic Complex (UCHC) comprises different sedimentary sequences of Ajlun (A) and Belqa (B) Group. In respect to water-bearing properties seven subdivisions of Ajlun and two subdivisions of Belqa Group can be made. In general limestones and dolomites act as important aquifers ($A_{1/2}$, A_1, A_7, B_2) while interbedded marls and chert-beds are recognized as aquitards. Joints, caverns and even karstic configurations are common throughout the whole Upper Cretaceous Hydraulic Complex, which measures about 700 m in the central part of Jordan. Outcrops are evident in large stretches all over the country, besides its very eastern parts. Significant recharge occurs along the highlands of the Jordan Valley-Wadi Araba Rift system.

The Shallow Aquifers Hydraulic Complex (SAHC) can be observed throughout the country. Due to variance of thickness, extension and connection to other water-bearing structures no general hydraulic characterization is suitable. Nevertheless wells of good yield are recognized.

Basaltic flows, often situated in the vicinity of, and associated with faults and fractures, are seen throughout Jordan. Nevertheless most of the bodies are too small to form beneficial aquifers, situated in regions of poor groundwater recharge respectively. Nevertheless the North-East Jordanian Plateau Basalts act as an important aquifer, stretching from Syria in the north to far beyond the border to Saudi Arabia in the south.

Hydrodynamic pattern

The hot springs generate their discharge from three different sources. In order of significance, these are old thermal groundwater (the absolute majority), recent meteoric groundwater, and Dead Sea brine. The flow pattern of old thermal water is subjected to the unique configuration of the Dead Sea Basin. The highlands along the Dead Sea act as a surface watershed, which in particular is situated around 30 kilometres east of the shoreline. Hence drainage is separated into a western portion to the Dead Sea – representing the recent meteoric groundwater discharge – and an eastern one towards Azraq. As strata gently dip to the east, groundwater of Upper Cretaceous Hydraulic Complex as well as Shallow

Aquifers Hydraulic Complex traces this direction. During its movement water infiltrates deeper into the ground, finally approaching the Deep Sandstone Aquifer Complex.

Since piezometric heads still remain well above mean sea-level, the Dead Sea as the ultimate base level (408 m below mean sea-level) has to be taken into consideration. The flow direction of the groundwater reverses, starting to move towards the Dead Sea in the west (Rimawi/Salameh 1988).

Groundwater continuously penetrates into deeper portions as it follows hydraulic gradients. The movement mirrors underground structures to some extent, as infiltration is facilitated by faults acting as passageways. In particular the area 20-30 km east of the Dead Sea is characterized by intense tectonic structures such as deep reaching faults and shear-belts. This supports percolation to depths of several hundred meters below sea-level.

Deep circulation seems likely to generate reservoir temperatures of up to 78° C ± 5° C as estimated by SiO_2-hydrogeothermometry. Buried basaltic bodies in the region may account for a slightly elevated geothermal gradient of 3.85° C / 100 m, but do not act as the main source for water temperatures (Rimawi/Salameh 1988).

Salameh/Udluft (1985) estimated an average travel time of about 3,500 years for the illustrated flow path. This would explain the high mineral content of the thermal water discharging at the Dead Sea. Time and temperature suggest efficient properties for evaporation and dissolution processes as water reacts with the rock matrix.

Along the escarpments to the Dead Sea Basin the water ascends to the surface where it discharges, e.g., at Wadi Zerqa Ma'in and ez-Zara. Dead Sea brine mixes at a very low ratio of 3‰ with the paleowater. Their interface remains rather sharp and stable, due to the high density of 1.23 kg/l Dead Sea brine, 1.35 kg/l end brines respectively (Niemi/Ben-Avraham/Gat 1997). Salameh/Khudeir (1983) computed the interface's depth to be more than 1,700 m below Dead Sea level at Wadi Zerqa Ma'in hot springs and 600 m to 1,000 m below Dead Sea level at ez-Zara.

The ascending hot water mixes at different depths and ratios with recent meteoric water of a temperature about 22° C. Hence discharge temperatures represent the variance of these ratios.

The hot springs of Wadi Zerqa Ma'in and ez-Zara chiefly are fed by the same hydrogeological system. Nevertheless, significant differences regarding the amount of total dissolved solids and ionic concentrations are obvious. Tectonical setting and position of the distinct springs define these parameters. Wadi Zerqa Ma'in is characterized by its deep-reaching, nearly vertical, main fault and several minor structures in its vicinity. These extend close to the interface of freshwater to Dead Sea brine. The faults allow confined water to ascend from the interface and issue at the surface. Hence the hot springs' composition in Wadi Zerqa Ma'in represent the lower part of the groundwater system, rising vertical to the surface.

Contrary to this setting, faults at ez-Zara do not reach as close to the interface. Additionally the faults often are clogged by travertine precipitation. Hence deeper parts of the groundwater body do not exhibit a probability to rise to the surface. A more or less horizontal flow system is established, discharge representing the upper portion of the groundwater body.

Hydrochemistry

The hot springs area of Wadi Zerqa Ma'in and ez-Zara comprises about one-hundred distinct discharge sites. Three springs at each area were

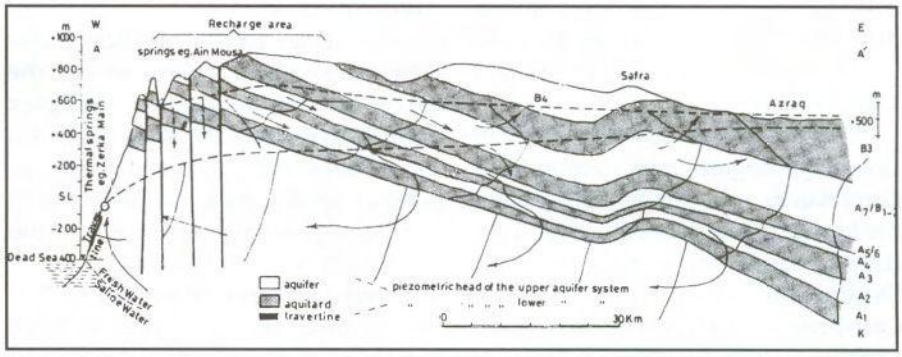

Fig. 2. Hydrodynamic pattern of the central part of Jordan.

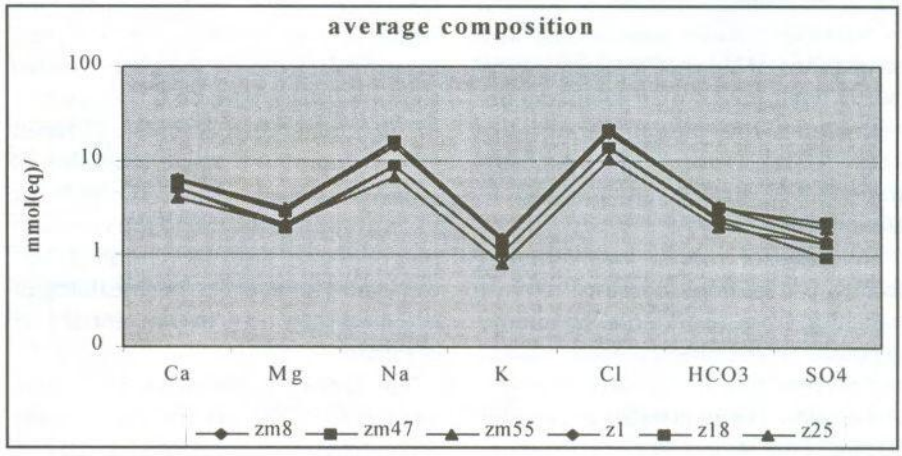

Fig. 3. Average composition of the hot springs.

sampled six times during fieldwork from May to September 1999. Analysis in the field included T, EC, pH, and Radon content (only in September). Major anions and cations were analysed at the hydrochemical laboratory of the University of Jordan, Amman, and isotopes were analysed at the Umweltforschungszentrum Halle, Germany.

The main criterion for the selection of springs to sample was temperature at discharge. As three end members of relative constant temperature mix, resulting temperature gives an image of their ratios. Since the interface configuration from freshwater to Dead Sea brine is sharp, blending remains more or less persistent at about 3‰ brine. The controlling variable on discharge temperature is operated by recent meteoric groundwater of 22° C. The ascending mixture of paleowater and brine cools down as it mixes with the cold compound. Distinct provinces of temperature were chosen to verify hydrochemistry of the discharge. Hence springs displaying average temperatures of 61° C (zm8), 54° C (zm47) and 48° C (zm55) at Wadi Zerqa Ma'in and, respectively, 53° C (z18), 44° C (z1) and 40° C (z25) at ez-Zara were selected. All the springs issue from Kurnub Sandstone, overlying travertines and gravels.

According to Furtak/Langguth (1967) discharge of all springs can be classified as alkaline water with prevalent chloride. Ionic ratios follow the trend $Na^{+} > Ca^{2+} > Mg^{2+} > K^{+}$ and $Cl^{-} > HCO_3^{-} > SO_4^{2-}$. Both areas reveal similar ionic concentrations, supporting the idea of one hydrodynamic system feeding the springs. Nevertheless average electrical conductivity of 2.92 mS/cm at Wadi Zerqa Ma'in, 1.59 mS/cm at ez-Zara indicates different patterns. The general variance of concentration between the two areas is attributed to the utilisation of distinct portions of the groundwater body. Discharge at Wadi Zerqa Ma'in represents the lower portion, and at ez-Zara the upper portion of the groundwater body, respectively.

The concentration of distinct ions varied throughout the fieldwork, without correlation to each other. Local hydrogeology seems to affect the single parameters, as the fluids mix at different depths and ratios. Particularly the northern part of ez-Zara area is characterized by extensive cavities and hollows in the ground as a result of subsurface dissolution processes. Passageways and mixing zones of the distinct springs are not determined.

The effluents of hot springs in Jordan generally plot between the meteoric and Mediterranean waterline. They show a similar composition to the thermal groundwaters of the Deep Sandstone Aquifer Complex. A weak tritium content indicates a small ratio of recent meteoric water at the discharge site. The exceptions are the hot springs of Wadi Zerqa Ma'in and ez-Zara, where isotopic composition differs. This region's waters plot right of both waterlines, still showing similarities in tritium content. Hence they are isotopically enriched and characterized by a negative d-parameter. These waters follow the equation $\delta D = 3.97\delta^{18}O - 16.9$.

The isotopic composition of hot springs discharge supports the idea of blending of three distinct end members. Their content is predominately attributed to ionic concentrations of paleowater and Dead Sea brine.■

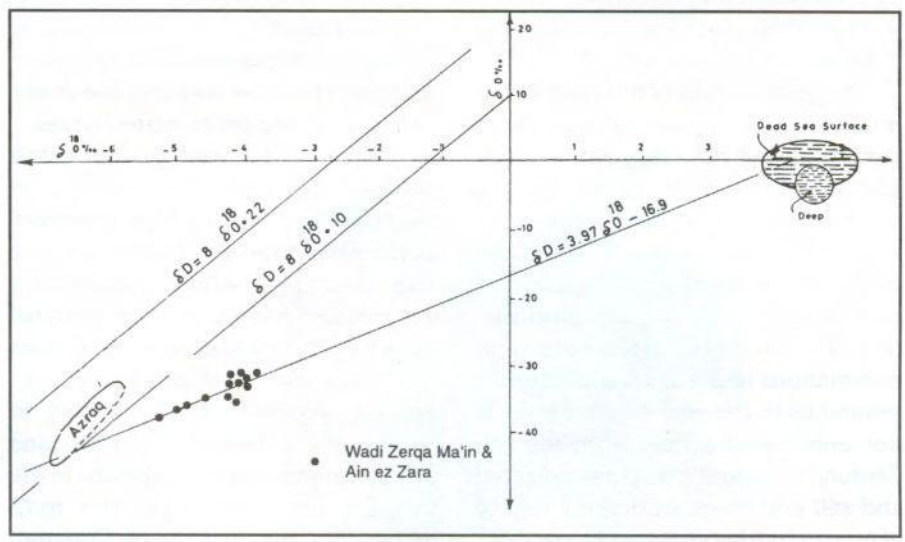

Fig. 4. Isotopic composition of waterlines water from Azraq Basin, Dead Sea, and hot springs, modified after Salameh/Rimawi (1984).

be transported to other worlds, times, and places.

The many stunning close-up color photographs of all parts of the mosaic map make this artistic treasure more easily accessible to people around the region or the world who may not have the chance to visit the map in the Church of St George in Madaba. Even more useful to scholars and interested lay people is the chapter on 'The Legends of the Madaba Map'. Here the editors have put together the single most comprehensive listing of all the Greek inscriptions in the map, including English translations, Arabic names of sites identified with the text, Palestine grid map coordinates, biblical references, and texts mentioning the sites in ancient sources such as Jerome, Josephus, Eusebius and others (in both the original language and English translations). This section provides color photos and black and white drawings of each section of the map, along with a detailed b&w drawing of each inscription with any accompanying representations.

The net result is that this book today, like the map of the holy land in the 6th Century, serves as a visually attractive and intellectually stimulating link among several different dimensions of life and time related to this area and its ancient tradition of faith: here we have links between the old and the new testaments of the Bible, among all parts of the Holy Land, between human faith and art, between man's technological prowess and his relationships to the divine, between the past and the present, and, finally, for us today in this area, among the three Abrahamic faiths of Judaism, Christianity and Islam.

While the map was created at a time when the world knew only Judaism and Christianity, it also reminds us of the common moral and theological continuities with Islam because of the expansive, inclusive nature of God's Revelation message in the three Abrahamic faiths. The map and the book both challenge us to better understand the significance of this land of modern Jordan, Palestine, and Israel in the long history of prophecy – a land that God used to send His message of righteous living to all humankind. The Quranic testament to God's sending Abraham and Lot "unto the land that we had blessed for all beings" (Quran 21:70) is another way of sending the same message that the 6th Century map seems to send: righteousness and trust in God are life options that all human beings can choose in order to enter God's kingdom, regardless of their tribal, religious, or national identities.

The challenges that face us in Jordan today include not only excavating and protecting such valuable antiquities and works of art, but also continuously reinterpreting them in light of what we know about the past and what we aspire to achieve in the future. Our responsibility as custodians of this ancient treasure of religious art includes the need to modernize the message of God's inclusive faith and salvation that the map's creators and sponsors intended to express. His Royal Highness Prince Hassan bin Talal, in his preface to the book, rightly mentions the map in the context of Jordan's legacy of "revering that pluralistic heritage" of religious, historical, and archaeological wealth that has been bequeathed to us by history.

This book and this map, therefore, are not only about ancient art and faith, but also encompass the important dimension of continuity in the Abrahamic tradition of pluralistic faith in a single God – a God who often revealed Himself in this land and continues to challenge us to grasp His message every time we look at this map or any other piece of religious art.

The Franciscans who have had custody of the Mt Nebo memorial to Moses since the 1930s provide the single best example in Jordan of four elements that are also obvious in this book: continuity of presence and activities in Jordan over a long period of time; archaeological excavations and conservation of the highest standard; a satisfying synthesis between historical, archaeological, and theological studies; and, rapid and comprehensive publication of the results of their work.

This is the latest in an ongoing series of large-size, full-colour books that the editors have published in Jordan, Jerusalem, and Italy in recent years, following books on the Mosaics of Jordan, Umm er-Rasas, and Mount Nebo. This is another high quality piece of work that will bring satisfaction to scholars and interested members of the general public for years to come.

Pilgrims from all over the world have come to the Mount Nebo and Madaba area for many centuries; now, this book can go out from Madaba to the rest of the world as a form of reverse pilgrimage, a messenger of faith and beauty that emanates from the land of modern Jordan, in the same spirit that has defined this blessed land for thousands of year.■

NEW BOOK - REVIEW

Abu-Odeh, Adnan, Jordanians, Palestinians and the Hashemite Kingdom in the Middle East Peace Process. United States Institute of Peace Press. Washington, D.C., 1999.

By: Wolfgang Ule, Goethe Institute, Amman (Jordan)

The title mentions the three points of emphasis in this book that has been published at an opportune moment by a most knowledgeable man. Adnan Abu-Odeh has been for decades one of the most important players among those who want peace achieved between Jordan and Israel, and who also seek a new relationship between the Jordanian state and its Palestinian immigrants.

Abu-Odeh, who has dedicated all his professional life to his work for the Jordanian government, was appointed in 1999 as the political advisor to King Abdullah II. He is of Palestinian origin, which makes his book even more interesting. He reviews all the characteristics of the changing relations between Jordanians and Palestinians, with utmost detail and open-mindedness, in a way never achieved before.

His historical presentation reviews the theme of peace in the Near East from the beginning of the 20th century to the present, accurately and including some explosive topics. Abu-Odeh experienced all the strengths and weaknesses of relations between Palestinians and Jordanians, and he is not shy to represent them as themes of common interest or contrast.

That is why his book is important and provocative for those concerned, and for the interested European reader, who for the first time can look deep into the issue and gain knowledge and understanding of the whole situation.

This book is so convincing that one can only wish that it would be soon available in the German language. It would surely find a large market and open new and balanced horizons for a complete understanding of political realities in Jordan and the country's relations to peace in the Near East and to its fellow citizens from Palestine. ■

Donors to the Library

For very generous donations of books to our library we would like to thank the German Archaeological Institute, Berlin (Germany) and the Römisch-Germanische-Kommission of the German Archaeological Institute at Frankfurt/Main (Germany). We are also grateful to Mr. Franz Rutzen and Dr. Annette Nünnerich-Asmus, Philipp von Zabern Publishers, for their long-lasting and constant support and the many donations they have made.

We also would like to extend our thanks to the following institutions and persons who made donations to our library: German Institute of Archaeology, Damascus Branch; Friedrich Ebert Foundation, Amman (Jordan); Institut Français d'Archéologie du Proche-Orient (IFAPO), Amman (Jordan); American Center of Oriental Research (ACOR), Amman (Jordan); The Institute of Archaeology and Anthropology, Yarmouk University, Irbid (Jordan); Prof. Dr. Siegmar von Schnurbein, Frankfurt (Germany); Prof. Dr. Henning Fahlbusch, University of Applied Sciences, Lübeck (Germany); Friends of Archaeology, Amman (Jordan); University of Jordan, Amman (Jordan); Yarmouk University, Irbid (Jordan); Dr. Gotthard Reinhold, Murrhardt (Germany); Prof. Dr. Günther Grabrecht, Braunschweig (Germany); Prof. Dr. Herbert Donner, Kiel University, Kiel (Germany); Prof. Dr. Andreas Hauptmann, Bergbau-Museum, Bochum (Germany); Dr. Roland Lamprichs, Dresden (Germany); Theologische Hochschule Friendensau, (Germany).