CULTURAL HERITAGE
Turkey – Restoration work in the Red Hall in Bergama

PORTRAIT
Brita Wagener – German ambassador in Baghdad

INTERVIEW
IT construction sites in the archaeological sciences
At Baalbek, 45 million year old, weathering-resistant nummulitic limestone, which lies in thick shelves in the earth in this locality, gained fame in monumental architecture. It was just good enough for Jupiter and his gigantic temple. For columns that were 18 metres high the architects needed no more than three drums each; they measured 2.2 metres in diameter. The temple podium is constructed of colossal limestone blocks that fit precisely together. The upper layer of the podium, today called the "trilithon", was never completed. Weighing up to 1,000 tons, these blocks are the biggest known megaliths in history.
DEAR READERS,

You don’t always need a crane or a bulldozer to do archaeological fieldwork. But there certainly are projects that require the use of heavy equipment. When ancient walls are at risk of collapse, when the plough horizon has to be removed in rough terrain, the big machines go into action.

An excavation site is like a building site in that it demands meticulous planning with respect to logistics. People, tools, machines have to be transported and deployed according to their capabilities and specifications. Licences have to be issued, cooperation agreements drafted and concluded, flight tickets booked and vehicles made ready for use.

And if on top of that other disciplines are involved – and archaeology these days brings many different branches of the humanities, social sciences and natural sciences together – not to mention regional, national and international partner institutions that all have to be coordinated, then archaeological work rapidly takes on the character of a massive academic building site. And if what the research project is looking at is an ancient building site, then the logistics, resource management and interdisciplinary and political negotiations can become challenging to say the least.

It was also a challenge, of course, to carry through the often gigantic construction projects of antiquity which were managed without the technology that is available today and which tied down vast resources for years and sometimes for centuries in order to create monuments that still amaze us today. Public works of this kind weren’t “only” the business of the master-builders and stonemasons and a handful of labourers they directed. The big construction sites of antiquity were always social and political building sites too, and they could go right or go wrong – as a result of technical failure or the opposition of an overstretched population.

The Title Story and the Report in this second issue of Archaeology Worldwide look at big building sites of antiquity and focus on their technical, social and cultural aspects. The introduction of new IT solutions in the field of archaeological sciences poses considerable logistical and political challenges itself, as the Interview makes clear, while the Portraits give a picture of what federal government sponsored cultural and educational programmes in the countries of the Middle East are capable of.

We would like to thank all readers of the first issue of Archaeology Worldwide for the enthusiastic reception they gave our new magazine.

I hope you enjoy reading this one too!

Prof. Dr. Friederike Fless
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ARCHAEOLOGY WORLDWIDE
Cemeteries have at all times said a great deal about how a particular society is constituted. For Athens in the Classical era, the Kerameikos, with its grave terraces and mortuary reliefs, gives us a picture of the way in which people in that place and time commemorated their dead. Situated today in central Athens between Hermes and Piraeus streets, the site – which covers an area of 3.85 hectares (approx. 9 acres) – lay at the north-western edge of the city in antiquity.

On 13 July 2013, a ceremony in the Kerameikos attended by the Greek Minister of Culture Panos Panaiotopoulos celebrated the 100 year long history of a successful collaboration. “The Kerameikos, as it appears before us today, is a symbol: a symbol of long-lasting cooperation, of trust and hospitality,” said the President of the DAI, Friederike Fless. “But it is also a symbol that serves to remind us of our responsibility towards common global heritage.”

One hundred years ago, in July 1913, the licence to excavate at the famous Athenian cemetery was awarded to the German Archaeological Institute following cooperation that had already lasted 40 years. At the same time the institute was entrusted with “seeing to the recovery and erection of the finds, embellishing the ruin site in a dignified manner and thus, at this notable place in the capital, expressing our gratitude for the hospitality that Germans of all circles enjoy in Hellas,” as the Reichs- und Staats-Anzeiger (Imperial Gazette) put it. Researching and conserving the public structures in Athens’ famous necropolis remains a challenge today, but it is one that is being successfully met by German and Greek archaeologists, architects and conservators in close cooperation, as constantly increasing visitor figures show. In 2012 alone, the Kerameikos received 65,000 visits.

Also last year the DAI launched another large-scale campaign on the restoration and permanent display of ground monuments, and it is to be continued systemati-
New guide to the archaeological site

To mark the 100 year anniversary, Jutta Stroszeck has written a new guide to the Kerameikos. The trilingual publication (German, English and Greek) was made possible by a donation by Dr Jürgen Trumpf and Dr Maria Trumpf-Lyritzaki via the Society of Friends of the German Archaeological Institute – Theodor Wiegand Gesellschaft – e.V.

cally in the years to come. In 2013 – in tried and trusted cooperation and supported by the Theodor Wiegand Gesellschaft – renovation measures will begin on the marble grave monument of Agathon of Herakleia from 350 BC which is at risk of collapse. The archaeologists will carefully deconstruct the monument in order to be able to restore it. While restoration work is underway, it will be replaced on site by a copy.

“The long-lasting institutional relationship between Greece and Germany, which has outlived several political systems, is one side of the story,” said Dr Jutta Stroszeck, head of the Kerameikos project during the ceremony. “The other part is made up of the people who are involved, the many researchers, the architects, conservators, draughtsmen and -women, excavators, students, custodians and gardeners and everyone who has personally contributed to the care and preservation of the antiquities, the terrain and the museum over the years.”

1 The Kerameikos a few years after archaeological exploration began.
2 The Kerameikos today.

Photo: DAI, Athens Department
Archaeology has been an international science from its very beginnings and has attracted the interest of the general public for just as long. This fact has been recognized also by the European Commission, which has made 2.5 million euros available to fund a new collaborative project launched in 2013 and set to run for five years: NEARCH – New Scenarios for a Community-involved Archaeology.

The German Archaeological Institute is involved in all the project’s spheres of activity and will prepare and organize the international conference "Archaeology and cultural resource management at world heritage sites: social and economic implications" when the project ends in 2018. The proceedings of the conference will subsequently be published.

NEARCH is currently the most comprehensive European programme dedicated to archaeological research in almost all its aspects. Fifteen university and non-university research institutes from eleven European countries are taking part. The programme is made up of a wide spectrum of themes, each with a corresponding set of activities:

- "Archaeology for the community" explores ways of informing people about topics relevant to archaeology and of encouraging their involvement. The aim is to develop current practice further and to reach new target groups.
- "Archaeology and the imaginary" focuses on the interactions between science and art. It will promote creative dialogue between archaeologists and contemporary artists and the results will be presented at exhibitions.
- "Archaeology and knowledge" will develop modalities of sharing and disseminating information from the sphere of research and cultural resource management by innovative, above all web-based means.
- Particular emphasis will be placed on promoting researchers of the younger generation. Ways of communicating archaeological knowledge and practices to junior researchers will be investigated.
- "Archaeology in a changing economy: towards sustainability" will seek to develop a new economic model for sustainable work in the archaeological sciences: a model that is based on the exchange of experience and on relevant studies in different parts of Europe.
- "European archaeology and the world": on the path towards a global archaeology, this theme considers the social components of archaeology in various parts of the world and investigates interdependencies and mutual developments.
- Important components of international cooperation are coordination and project communication, the facilitation of research periods abroad for archaeologists, and specific strategies for the dissemination of project aims.

Activities in the collaborative network NEARCH are being coordinated and directed for the DAI by Dr Friedrich Lüth, special representative for the protection of cultural resources and site management at the DAI.
SEA SHELLS
It’s obvious at a glance that these shells are not native. How did they come to be here?
In 2022, the football world championships will be hosted by a country that has hardly appeared on the sporting map to date. Big investments are needed to create a suitable arena for the event, and the Emirate of Qatar is planning to spend 120 billion euros on infrastructural development and construction projects.

The structures to be built will have a massive impact on the natural environment. In view of this the Qatari Museums Authority has decided to launch an extensive archaeological survey programme to document the country’s cultural heritage. One of the partners in this project is the German Archaeological Institute (DAI). An agreement on archaeological cooperation between the Qatari Museums Authority (QMA) and the DAI was signed last year in Doha. The project in question will first of all explore the archaeological potential of an arid region on the Arabian Peninsula. The DAI will furthermore provide the QMA with expertise in the systematic documentation of archaeological sites. The first field research campaign, in which nine archaeologists and geomorphologists from the DAI took part, ran from the beginning of November to mid December 2012. The area surveyed covered the southern half of the peninsula of Qatar, which had not been systematically surveyed before.

So far, around 250 find sites have been located and documented. The remains of human occupancy and land use date from a period stretching from the Neolithic to the state’s most recent past, and are clearly distributed on different landscape types. Ancient beach ridges and coastlines are being investigated and reconstructed by geomorphologists, while other studies are producing data on changes to the environment in the Holocene.

"Among outstanding find sites are places that were involved in trans-regional goods and technology transfer," explains Prof. Dr Ricardo Eichmann, director of the Orient Department of the DAI. "That was in the Neolithic, so from the 7th to the 5th millennium BC, but also during the colonial period in the 19th century." So far the archaeologists have mainly found flint tools and fragments of ceramic vessels.

The next campaign begins in February 2014.

Cultural landscapes in arid regions
Archaeology in Qatar

Finds from a prehistoric settlement site: stone axes and flint knife.
Photos: DAI, Orient Department

1 Inspection of a find site with a local representative of the QMA.
2 Foundations of a building in the fortress of Asaila.
SEA SHELL PAVING

Next we see the walls of a building whose floor has been carefully paved with countless sea shells in …
Today, 3D models of sculptures and buildings, landscapes and cities are an important tool in the study of ancient cultures. When models are compared and linked with other data, new insights can be gained into the nature of ancient societies. But to do this you need to be able to find and analyse data easily. This interface between archaeology and computer science is the domain of the collaborative project "MayaArch3D", in which the German Archaeological Institute (DAI) is cooperating with Heidelberg University. Using 3D technologies and web-based geographic information services, MayaArch3D creates new research tools for archaeology, art history and heritage conservation. Archaeological sites, widely dispersed information and objects are documented, geo-referenced, virtually combined and analysed on an internet platform according to international standards.

The "web-based 3D geographic information system (GIS) for the analysis of the archaeology of Copán, Honduras" under the direction of Dr Jennifer von Schwerin and Dr Markus Reindel from the DAI’s Commission for Archaeology of Non-European Cultures (KAAK) in Bonn is a sort of pilot project for the development of these new tools. Information on archaeology, architecture and finds from Copán is gathered and structured according to data type, informational content as well as their later utilization for GIS analysis, and is stored in a database from which they can be retrieved. "This allows us to carry out an analysis of the spatial structure for Copán that can provide important information on the socio-economic situation, the evolution of the town in the course of time, and on the history of the Maya culture in general," says Jennifer von Schwerin. "By examining patterns of access we can distinguish public spaces from non-public spaces. Lines of sight between buildings and monuments reveal information about urban structures and the transformational principles of a given ruler." Exploiting a technology that is normally used in computer games and combining it with a geographic information system containing detailed data on Copán’s buildings means that a three-dimensional image of the complex can be created in which it is possible to go on a virtual tour round the site. Additional information is accessible by mouse click. The tool should allow researchers to combine the advantages of 3D presentation and simulation with the analytical possibilities of a GIS, making it possible to compare and analyse a multitude of data types online and in real time and thus to view architecture and landscape as integrated.

Development of the system is being supported by the Federal Ministry of Education and Research. Further tasks will include the development of new open-source software for three-dimensional movement and its own geo-browser. Jennifer von Schwerin: "Most important of all is that we have standards for the management of three-dimensional data."
Los Castillejos de Alcórín lies in the district of Manilva not far from Málaga in Spain. Los Castillejos was the biggest fortified settlement in the far west. It emerged during the earliest phase of the Phoenician expansion at the end of the 9th century BC but was already abandoned in the late 8th century BC. By that time the Phoenician trading posts on the coast were solidly established.

The Madrid Department of the DAI, directed by Prof. Dr. Dirce Marzoli, is investigating a culture that displays both eastern Mediterranean and indigenous characteristics. The finds at Alcórín show the results of contacts between the indigenous population and the Phoenicians, manifested in the form of an orientalizing hybrid culture.

More in the next issue.
HADRIAN'S MIGHTY TEMPLE

Restoration work at the Red Hall in Bergama

Bergama is a small town in Turkey, 80 kilometres north of Izmir. Its archaeological fame derives above all from an altar, the remains of which are displayed in a Berlin museum that even bears the town's ancient Greek name: Pergamon. Not quite so famous as the altar is the enormous temple dedicated to multiple deities and situated in the heart of Bergama; together with a forecourt it covers an area almost as large as that of Trajan's Forum in Rome. The towering structure threw much else into the shade and inside it were sculptures on the same colossal scale. Figures eight metres high and wearing bulky headdresses held up the stoa roofs, creating the right atmosphere for worship of the gods and practice of the imperial cult – for the temple was Roman, dates from the 2nd century AD and was built on the orders of Emperor Hadrian. The support figures were inspired by images of Egyptian deities that Hadrian saw on his journey to the Nile and wished to have in his monumental sanctuary in Asia Minor. The imperial building project radically changed the urban landscape; even the river Selinus was channelled through two tunnels, and today the ancient ruin is still a dominant feature of modern Bergama, which accordingly can boast one of the most significant Roman monuments in all Asia.
Minor. The main temple building is known as the “Red Hall” after the red bricks from which it is made.

**CONSOLIDATION MEASURES**

Unlike the ruins of the Hellenistic citadel, the Red Hall was absorbed into the modern town. It therefore never became covered by earth, but was reused for various purposes over a period of nearly two thousand years. This repurposing necessarily left its mark. The southernmost of the two round towers, for instance, once accommodated an olive processing factory, among other things, and was particularly at risk. Rainwater entered the building through the original Roman dome, while archaeological finds weighing several tons were stored on a fragile, vault-borne floor which had already collapsed at several points.

In 2006, the Istanbul Department of the DAI launched a long-term project – directed by Felix Pirson and Martin Bachmann and supported by the Studiosus Foundation e.V. – to restore the tower and to consolidate and re-cover the original Roman dome construction. In 2008, with funding from the Foreign Office’s cultural heritage preservation programme, a durable lead covering was laid on
When the Ottoman houses occupying the interior of the Red Hall were demolished in the 1930s, excavators found fragments of Roman monumental sculptures executed in the Egyptian style and with faces of black marble. The members of the German Pergamon Excavation surmised that the building had been a temple for Serapis or Isis. The interpretation as a sanctuary dedicated to Egyptian deities was confirmed by subsequent research, although it turned out that the gods were not worshipped here alone: there was also a cult for the Roman Emperor himself.

The supporting figure that has now been restored is in all probability the goddess Sekhmet, who was responsible for war, disease and epidemics, but could be propitiated by prayer. In the completed reconstruction there is no deceptively ancient-looking workmanship. Modern additions to the figure can be clearly distinguished from the original parts. The inserted pieces of marble were modelled using laser scanners and a digital milling machine on the basis of original fragments found in the Red Hall. The upper section of the figure was sculpted entirely anew by a master stonemason from Bergama emulating ancient craftsmanship. It was carved from white marble from the island of Prokonnesos, the material used for the original fragments. The dark marble was sourced from near the town of Afyon in western Turkey. The technical construction of the original figures was done with great precision and skill, and so combining modern technology with classical sculpture in the restoration proved to be ideal for achieving the necessary degree of precision in manufacturing the complex joints.

Sekhmet and her companions are not only of great cultural historical significance in view of their Egyptianizing style, but they are probably also the most unusual works of Roman sculpture in Asia Minor.

The dome to protect the ancient fabric for the coming decades. Once this part of the project was finished, visitors could be admitted for the first time to the impressive interior of the rotunda. The opening ceremony took place in September 2009. In the same year another project began in one of the side courtyards of the Red Hall – likewise with the assistance of the Studiosus Foundation. Here, one of the support figures which formerly lined the courtyard in place of columns and fragments of which are now exhibited inside the rotunda was reconstructed in its original height and using some of the original pieces.

The Egyptian deity Sekhmet was re-erected in Bergama on 26 September 2013.
**RESEARCH FOR THE TOWN**

The combination of research and preservation as practised by the German Archaeological Institute produces lasting and sustainable results and has created milestones in the preservation and presentation of archaeological monuments in Turkey. Modern urban and social contexts are playing an increasingly important role in this. The Red Hall was chosen as a core project because it fulfils a key function in the new tourism development plan for Pergamon. In future, the old town of Bergama with its many monuments of Ottoman and multi-ethnically influenced architecture will be integrated to a larger extent in the sightseeing programme. Visitors will thus be able to experience 4,000 years of settlement and urban history in the eastern Aegean in and around a modern Turkish town. The new presentation plan for the town of Bergama spans the epochs and encompasses the surrounding area. It is central to Bergama’s application to be added to the list UNESCO World Heritage Sites. The past, present and future of the town are consequently woven together in this DAI project in a way that benefits not only archaeological research but also the town itself. The project provides specialist training for people from the locality and some artisan families have worked for the German Archaeological Institute for generations.

\[Felix Pirson and Martin Bachmann\]
THE SPONSORS
The restoration, refurbishment and museum conversion of the south rotunda of the "Red Hall" were financed from 2005 by the Studiosus Foundation e.V., whose sponsorship in the years 2008 to 2009 allowed the restoration work to be completed. Additionally from 2009 to 2013 the foundation financed the project "Egyptian Atlantes" with the restoration and re-erection of the Egyptianizing atlantes in the courtyard of the Red Hall.
Funding from the Foreign Office's cultural heritage preservation programme made it possible to roof the south tower of the Red Hall with lead sheeting. Further support was provided by the Ernst Reuter Initiative and the Culture Foundation of German-Turkish Business.

COOPERATION
German Archaeological Institute (direction and implementation)
Institute of Building History, Building Archaeology and Conservation at the TU München (structural documentation)
Josef Steiner – Construction Engineering Group, Karlsruhe (support structure planning)
Adnan Elidenk, Bergama (steel construction)
Christof Kronewirth, Berlin (stonemasonry)
Semih Uçar, Istanbul (lead roofing)

1 46 tonnes of material had to be cleared away.
2 Two surviving marble consoles – last remnants of the Roman roof finish – were no longer attached to the dome owing to moisture and were on the point of toppling off together with the wall block.
3 A master roofer from Bergama laid the new lead sheeting on the dome. The dome of the south rotunda of the Red Hall now has a durable roof of the kind it may also have had in antiquity.

Photos: DAI, Istanbul Department
ARCHAEOLOGY ON REMOTE ISLANDS
Research into the settlement history of the western Pacific
It’s hot, it’s muddy, it’s hard going and some places are out of bounds. And without malaria prophylaxis you shouldn’t be in these parts at all. There are none of the conventional forms of entertainment and no cool cocktails served by smiling waiters. Still, whenever Johannes Moser is asked where he works, the reaction to his answer is always the same: “Straight away people have this photo-wallpaper image before their eyes of palm-fringed, white sandy beaches, and tell me, ‘You work where other people go on holiday!’”
Johannes Moser is a prehistorian and a researcher at the DAI’s Commission for Archaeology of Non-European Cultures (KAAK) based in Bonn. The past he is probing is as distant as the islands at the other end of the world where, since 2011, he has been investigating the remains of human presence in a region little explored by archaeologists. For while the settlement history of South-East Asia, Australia and the Bismarck Archipelago has been comparatively well researched, we still know very little about the spread of prehistoric populations into the Pacific region: what route they chose, why they came, and when they first appeared. Initial data prove that humans set out a good 30,000 years ago to explore the far-flung island world of western Oceania, equipped with vessels adequate to the task and with excellent navigational skills. 3,500 years ago there was a second wave of migration into the area. The newcomers brought pottery decorated with designs impressed by stamping technique, which today is known as Lapita ware. Trade in obsidian and flint attests to far-reaching resource management. Where the “Lapita” people came from is not known exactly. What archaeologists do know about them is that they travelled a lot in order to engage in trade.

DAI researchers now want to investigate the hows and why of the long-lasting tradition of stone tool manufacture, which only broke off at the time of the first contacts with the Europeans and seems to have then disappeared.

The Solomon Islands were historically a significant, densely interlinked cultural contact zone between the neighbouring regions of South-East Asia, Australia and the Pacific islands. Today they are a parliamentary monarchy with Queen Elizabeth II as head of state; since gaining independence in 1978 the Solomon Islands have belonged to the Commonwealth of Nations. The official language is
English, while the indigenous languages are part of the Oceanic language group which itself belongs to the Austronesian family with 1,150 languages.

**CODE OF CONDUCT**

“The archaeologists and hosts communicate with each other in pidgin English,” Johannes Moser explains. And communicating, as always, means more than just the language itself. The Ministry of Culture and Tourism may issue you with a licence to excavate, but that doesn’t mean you can start right away. You also need the approval of the Provincial Governor, and most important of all is the OK of the local chief, who isn’t particularly interested if the “state” has authorized something or not.

What is needed apart from the language is patience, respect, tact and sensitivity. The islanders have every reason to be mistrustful. The collective memory is full of stories of pillaging and killing that came with the colonizers. “During the colonial period, masses of ethnographic objects were taken out of the country,” Moser says. They were sold or put in a museum. “Luckily, someone who works at the ministry comes from Malaita. He can mediate between us, the authorities and the villagers.”

“Once they accept you, it’s almost like you’ve been adopted,” Moser explains. The responsibility for the guest thus passes indissolubly to the hosts. God forbid that something should happen to him in these unfamiliar parts! “By the same token, I would never dream of breaking a taboo,” he adds, pointing out the boundaries that circumscribe archaeological work. There are places that are unmistakably under a strict taboo and may not be disturbed on any account. Times have changed. Today, “in the name of science” also means knowing when and where to stop.

“If we discover or suspect something, we always ask first if we can take a closer look,” the archaeologist says. “If they say ‘no’, then that is no, and nobody says anything more about it.”
In late autumn 2011, archaeologists from the DAi went on a first exploratory tour of the island of Malaita. “We discovered several caves and rock shelters that revealed evidence of human presence in prehistoric times,” Moser says. Debitage, lithic debris that was evidently not from the locality was found along with shells from various species of snail and mussel. The archaeologists investigated two flaking stations, one of which was situated above the small village of Maniaha in a mountainous region that is hard to access. Measuring and mapping is quite a feat amid the dense vegetation of the ever-humid rainforest. The villagers know that the lithic site must cover several thousand square metres; and the mass of cores and flakes, hammer-stones, half-finished products and finished implements that largely seem to be unused show that the find-site was used primarily for the manufacture of stone hatchets and other tools. “That wasn’t us,” the islanders assure Moser. The population of Nariwarawa and Maniaha know their genealogy and can name their forebears – the rioanimai or “great ancestors” – going back 13 generations to the 18th and 17th century. The age of the finds, as determined by 14C dating, lies in the time before the first contact with Europeans in the middle of the 16th century.

“What we have here is a large-scale production centre, from which the artefacts entered into transregional circulation as wares for sale or barter,” Moser states. In this regard the finding place referred to as Apunirereha occupies a key position on the island of Malaita. Contacts between islands, even across great distances, and functioning networks of relations have a long tradition in the Melanesian region – as does navigation on the high seas, whose skills were passed down from old to young and where problems of determining a vessel’s longitude had long been solved before John Harrison constructed his famous clock in the early 18th century.

Johannes Moser has built himself a house out of pandan leaves and it serves as a more than acceptable dig house. Three rooms with a veranda – construction costs: 500 euros. The greater part of that went on fuel for the chainsaw. “It’s important that people taking part in a campaign have experience,” Moser stresses. The hot and humid climate can prey on one’s nerves, and there’s a complete absence of conventional forms of recreation. Now and again perhaps a cassette recorder can be heard playing in the village, but otherwise it’s pretty damn quiet. “I don’t miss anything,” the archaeologist says. “You learn to entertain yourself in the evenings again.”

The locals’ diet centres on fish, yams and taro. Instant noodles provide a bit of variety. On the Solomon Islands, too, it’s the Chinese who run the small convenience stores. The islanders have come to like “their” archaeologists and are even rather proud that somebody from outside is interested in them and their history. Sometimes they turn a blind eye when a taboo has been unintentionally broken. “It’s OK to make the occasional small mistake,” Johannes Moser says. “But they let us know.” Andrew the chief is always present when there are discussions.
The prehistorian **Dr Johannes Moser** is responsible for the western Pacific at the DAI’s Commission for Archaeology of Non-European Cultures (KAAK).

**THE ARCHAEOLOGICAL WORK**

“The selected find-site ‘Apunirereha’ defines an area measuring approx. 1,000 m² and encompassing exceptionally large quantities of flint nodules and hammered stone implements that did not originate at the site. A geodetic survey of the site was conducted and a 2 m x 3 m trench was dug in the centre. The aim of this trial excavation was to determine the extent of accumulation of Stone Age remains, discern possible patterns of distribution and clarify the stratigraphic situation. Datable material was also sought for the purpose of age-determination. During fieldwork this year the trench was sunk to a depth of 60 cm below the current ground level. At fireplaces, charcoal specimens were recovered from various stratum contexts. Two specimens from the lowermost strata of the trench were sent to the AMS laboratory at Erlangen-Nuremberg University (Institute of Physics) for radiocarbon dating. According to these results, the lithic flaking station ‘Apunirereha’ was in use in the period between 672 BP ± 42 and 395 BP ± 40.”

*Johannes Moser*
Digital construction site

Interview with Reinhard Förtsch about information technologies in the ancient studies

The changeover to a digital system is under way in archaeology too. Now documentation is getting easier, data stocks that are at risk of being lost can be better safeguarded, and the exchange of information worldwide is being improved. But the expansion of the horizons of research brings with it an exponential growth in the amount of – digital – data. How can something like that be controlled?

It is, at first. But on this thick layer of cloud there is IANUS, the new “research data centre for the archaeological sciences”, conceived as a relay and a national and international resource, where all paths converge and which creates a new IT infrastructure for worldwide networking. The particular challenge here is processing the heterogeneous data in such a way that they are interoperable, that is they can “communicate” with other – ideally for a very long time. So in IANUS the data are curated differently than in the Cloud. It brings an organizational principle to the teeming mass of data.

Who has access to IANUS?

IANUS offers its services primarily to archaeological science colleges and their staff, but also of course to heritage conservation bodies and university projects in Germany and abroad as well as for didactic purposes in schools or in further educational establishments. IANUS or the DAI will also be the first port of call for institutions that would like to use the new IT infrastructure for their own internal networks.

Reinhard Förtsch

... and let’s not forget that the archaeological sciences cover an extraordinary variety of fields of work that generate very heterogeneous data. We deal with texts and art historical analyses, for instance, with bones, sherds and statues, and with large-scale regional studies and landscape reconstructions. Now, the first step towards getting a handle on this is purely a process of compilation. It’s a data cloud where information is first of all stored as it is – all types of data, so also unprocessed source data and even random data. That is the source database.

That sounds like a jumble.

In libraries, photograph collections, archives and in the posthumous papers of scientists the data occasionally overlap and the classifications are not always unambiguous. Many of these “old” data are, however, of inestimable value to researchers and have to be stored securely. And it still happens today that vast quantities of data are generated on similar things in dissimilar ways – just by the many excavations and surveys of the DAI. We have to try and convert these island dialects into a kind of Esperanto for the dynamic archiving of research work. For search queries in texts, known as text mining, there will be a partly automated analysis instrument that searches for patterns and can therefore relate individual data to each other in a meaningful way.

How much new grammar will have to be learned for this digital Esperanto?

When it comes to “translation” into digital languages, the rules are newly formulated, of course; old categories are replaced by new ones. That applies to vocabulary as much as to grammatical structures. We no longer sort only according to “sculpture”, “image”, “vase”, “sanctuary”, “grave”, etc., but also according to the contexts in which all these things interactively existed in a certain culture at a certain time. That means, for example, establishing what data are associated with a particular object, person or building and – even more importantly – establishing the form in which quantifiable dynamics ensuing from this and occurring in space and time are perceivable and presentable.

Archaeological data are therefore to be gathered in a central service facility. Are there any reservations in the scientific community?

Naturally enough, we still have a bit of persuading to do in certain places, particularly when it comes to the point that data need to be documented and prepared from the
outset in such a way that they can be easily implemented within the new infrastructure. But in actual fact institutions and individuals are showing a high degree of willingness to take part in the project, because a place where they can store their data safely has now been put at their disposal. We see ourselves first and foremost as a service facility.

Now someone might argue: I have my data, people in my field understand me, that’s enough...

We are living in a globally networked environment and it’s been that way for some time now. Cooperation is fundamental to the work of every one of us, and the DAI does a great deal of it. Our collaborations in host countries oblige us to make collectively acquired data available to all. That’s also and especially the case with old data that have so far only been available in analogue form and are now being digitized so that researchers all over the world will be able to work with them.

How is the changeover to the digital system going in the field of archaeology?

The process is going very well. It’s important to get the message over that IT is a key technology and therefore a universal task that can’t be divorced from the ordinary work we do.
LIFE ON THE MOUNTAIN PLATEAU

A newly discovered cultural landscape in the North Caucasus
Running from west-northwest to east-southeast for a length of 1,100 kilometres between the Black Sea and the Caspian Sea is a mountain range rich in significance, resources and conflict ever since ancient times: the Caucasus. Prison of Prometheus, apple of discord between empires throughout the ages, barrier against the "Huns", but also transit zone, cultural melting pot and raw materials depot. These borderlands between Europe and western Asia are ethnographically and linguistically one of the most diverse regions of the world.

Excavation of the stone circles.

Kabardinka necropolis: stone circles were laid around the graves.

The site Verkhniaya Kichmalka 1, viewed from the slope. This is a settlement from the 15th/14th century BC.
Large parts of the Caucasus are archaeologically well researched. It was therefore all the more surprising when, in 2004, traces of human presence were discovered on a plateau in the area of Kislovodsk in the North Caucasus, opening up entirely new perspectives on the region’s settlement history.

“What we are investigating here is a previously totally unknown settlement type from the late Bronze and early Iron age,” says Sabine Reinhold of the Eurasia Department of the German Archaeological Institute. Since 2006 she has directed the project entitled “Settlement types of the late Bronze age in Kislovodsk, North Caucasus, Russia.”

The settlements lie on a highland plateau on the southern rim of the basin of Kislovodsk, one of the famous mineral spas of the Caucasus. The basin is strategically situated on a route that leads from the North Caucasus steppe zone through the Gumbashi Pass – altitude: 2,242 metres – on the upper reaches of the Kuban river and then down to the Black Sea. The valley is formed by five fairly small tributaries that finally flow into the Podkumok river near Kislovodsk. From there it is just 70 kilometres to the mythological rock, memory of which is still kept alive in poetry, proverbs and science. It was to this “rock” – a towering 5,642 metres high – that Prometheus was chained for having stolen fire and given it back to mankind (in a giant fennel stalk) after Zeus had deprived man of it. Known in antiquity as Strobilus, the volcanic cone is today called Mount Elbrus. It vies with Mont Blanc for the title of Europe’s highest mountain.

Dwellings for Humans and Animals

“The stone architecture of this culture from the 2nd millennium BC is unique,” Sabine Reinhold says. So far, researchers have been able to locate 190 settlement sites. Field surveying combined with modern remote sensing methods allows the architecture to be documented down to the level of individual buildings. “The find sites lie at elevations between 1,400 and 2,400 metres, so above the level of arable farming today,” Reinhold says.

The buildings were a combination of house and barn: people and livestock lived together under one roof, separated by a wall. “That’s the only way the livestock could get through the harsh winters,” Reinhold explains. From the bones that the archaeologists have recovered it can be established that sheep made up two thirds of the livestock. Cattle, however, were evidently more important for supplying meat.

The archaeologist explains how it was possible for specific statements to be made about the presence of animals in the houses: “The cattle sheds differ from the human dwelling areas in the proportion of micro-organisms that break down the enzyme urease, and in the proportion of keratinophilic microfungi which live and feed on animal hair,” Sabine Reinhold says. “In the earth their spores can survive for millennia and can be reactivated today in the laboratory, affording a unique insight into the layout and use of the buildings.”

As well as understanding the structure of the buildings, the researchers have been able to determine the form of the villages through a combination of excavation and aerial methods.
buildings were grouped around a large central space,” Reinhold says. “Small villages developed that way, about one hectare in size, generally with an oval plan, though sometimes they even had a fish-shaped symmetrical plan.”

The start of the occupation of the region is dated by archaeologists to the 2nd millennium BC. This was a period of decisive changes that were part of a development that occurred also in other regions of Eurasia, probably as a result of an improvement in the climate – sedentism. The settlers were not the first here however. One thousand years before them herdsmen brought their cattle to graze on the mountain pastures. They left no dwellings behind, but they did leave a large number of grave mounds.

**Highland Farming**

The archaeologists know that the population in these permanent settlements grew rapidly, and they assume that, in order to feed themselves and their animals, the inhabitants developed a classical highland farming system. In summer the cattle was driven up to the mountain pastures and it was brought back down to the villages in winter.

Many questions about this unusual cultural landscape in the Caucasus have been answered, but one puzzle remains unsolved. “After seven years of intensive research it’s still not clear why the settlers didn’t move down into the valleys but instead stuck it out for so long on what from our point of view today are bare highland plateaus.”

The evidence namely shows that the first settlements are not established in the lower zones until the beginning of the 1st millennium BC. It was probably another climate change that forced people to give up their accustomed lifestyle. A mere 100 years later the highlands are virtually devoid of people, whereas the valleys of today’s Caucasian mineral spas become rapidly populated.

“In terms of landscape archaeology we have an extremely interesting problem to solve,” Sabine Reinhold says. “We have to find out where the first people in the region actually came from. Maybe then we’ll be able to answer the questions that are still open.”

**Settlement and Nutrition**

“Initial finds from the grave monuments, examined using modern anthropological methods and isotope analyses on the nutritional basis, were able to provide answers to a range of questions about the settlers’ alimentation and subsistence strategies. They show that between living in the mountains in the 2nd millennium BC and settlement of the valleys in the 1st millennium BC a radical change in nutrition and mode of subsistence took place: while the mountain dwellers largely subsisted on animal products – meat, milk, cheese – we were able to establish that the valley dwellers, for their part, ate considerably more grain but virtually no meat. The isotope analyses confirm the changeover in the mode of subsistence – postulated on the basis of the settlement structures – between the older period in the mountains and the more recent period in the valley. Recent excavations have also shed some light on the people who first settled this extreme landscape. Initial indications from one of the oldest find sites suggest that some of the mountain settlers may have come from the North Caucasian or North Pontic Steppe.

Analysis of grave types, the material culture and the cultural traditions, and above all the way these things evolved over time is another aim of our North Caucasus project. These too can reveal facets of social dynamics that are already implied in the settlement development.”

**Sabine Reinhold**

Prehistorian Dr Sabine Reinhold from the DAI’s Eurasia Department has directed the project “Settlement types in the North Caucasus in the late Bronze Age: Kislovodsk” since 2006. The main focus of her work is the prehistory and protohistory of the Black Sea region and the Caucasus. The project is supported by the German Research Foundation (DFG) and the Russian Foundation for the Humanities and Social Sciences (RGNF).
Salonina, wife of the Roman emperor Gallienus (253–268 AD), always wore an elaborate coiffure. The long hair is parted in the centre, plaited into braids, drawn up from the nape of the neck, and laid like a broad band over the crown of the head, where it is folded under and pinned in place. The Empress’s hairstyle became the fashion all over the empire. And the same style of dressing the hair can be seen on the portrait heads of two Athenians – a young girl and a young woman – which were found recently in a well in front of the Dipylon.

The heads came to light in April 2013 in the Kerameikos of Athens. The well had been discovered in 1934 and extensively excavated and investigated by 1936. At that time, no documentation was done because the ground water level was too high. This work was carried out in 2013 and was only possible thanks to the simultaneous use of four powerful pumps. The well, built of stone and plastered on the inside with hydraulic mortar, dates from the 4th century BC and was in use for more than 800 years. The marble portrait heads, found at a depth of 5.20 metres below the water table, were carved in the 3rd century AD and are in an unusually good state of preservation. Without doubt they were once displayed in front of the Dipylon, the double gate: either as honorary statues, as grave statues or as recumbent figures on a marble sarcophagus.

At some point the statues were destroyed, probably at the same time. They were decapitated, cut in two by a well-directed chisel blow and the heads were thrown into the well. The portrayed women belonged to the Athenian elite, who were close to Rome, and this may have been the reason for the disposal of the sculptures and the annihilation of what they represented. The reign of Gallienus was marked by barbarian incursions and army revolts throughout the empire. In the year 268 he was murdered by his own military commanders during the siege of Milan. An occasion for the destruction of the marble statues could therefore have been the political situation at the end of Emperor Gallienus’ reign; following his assassination his wife, relatives and supporters were murdered. But alternatively a later, religiously motivated destruction of the portraits, for instance by Christian fanatics, cannot be ruled out. The investigation of the well and the analysis of the finds are not yet concluded.

Jutta Stroszeck

SUNKEN SCULPTURE
Female portrait heads from a well in the Kerameikos
Dr. Jutta Stroszeck from the Athens Department of the DAI directs the work in the Kerameikos, the most famous cemetery of classical Greece. The DAI has conducted research at the site for 100 years. (See "100 Years of the Kerameikos", p. 4) For this excavation the team was made up of Greek and German archaeologists, reinforced by a small group of students from different universities in Berlin, Gießen, Mainz and Rostock. Excavation of the well was part of a research project on the water supply system of the Classical baths in front of the Dipylon.
Major construction sites in research

Marvelling at the Pyramids of Giza, the Colossus of Rhodes, the tomb of King Mausolus and the statue of Zeus in his temple at Olympia was common in antiquity, too. A list of seven outstanding monuments was compiled, and was constantly amended and added to. The "Seven Wonders of the World" made it onto the list by virtue of special qualities: they were remarkable for their size, technical ingenuity, or the properties of the materials from which they were made. And so they became sights and hence monuments that one had to see.

The desire for a canon of phenomenal monuments is what inspires contemporary efforts to make an up-to-date list of wonders of the world. The majority of the monuments included are already world heritage sites and as such have attained a level of general public awareness. In these modern lists, too, the structures' sheer physical presence and monumental proportions are of fundamental importance, as with the Great Wall of China, the Colosseum in Rome and the statue of Christ the Redeemer in Rio de Janeiro, for instance.

Marvelling at monuments is however only one way of approaching them. Like canonization, it blinds you to certain essential factors that are of interest to researchers. Modern scholars of antiquity study much more than the monument itself. They enquire into the social framework behind its creation, the implications of its erection and the way in which a large-scale building site was organized. "XXL – Monumentalized Knowledge. Extra-large Projects in Ancient Civilizations" is the title of a major collaborative initiative of the Berlin-based Excellence Cluster TOPOI, in which researchers from the Freie Universität Berlin, the Prussian Cultural Heritage Foundation, the heritage conservation office of the federal state of Brandenburg and the University of Technology in Cottbus have joined forces in order to study big construction sites in antiquity. Scythian grave mounds are as much a subject of the research as the monumental buildings of the Ancient Near East at Uruk and Babylon as well as Rome.

Researchers from the German Archaeological Institute are looking into the question of what resources were necessary to build the palaces of the Roman emperors on the Palatine and what forms of building site logistics can be detected. The situation is similar with the monumental structures of Uruk. There, too, it is a question of calculating the quantities of material required and combining this data with information from the cuneiform texts on the number of workers, their provenance and the supply of provisions so as to gain an understanding of the gesamtkunstwerk that a big building site represents. How technologi-
cal solutions were found and architectural challenges mastered is also an object of study. How were the gigantic building blocks for the temple of Baalbek in present-day Lebanon obtained from the quarry and how were they moved?

Looking at the resources, the technological problems and their solutions is only one aspect of the phenomenon. It opens the way to further questions. Was the use of megaliths at the Baalbek temple intended to convey a sense of permanence and immutability? Were big building projects in Rome the result of the megalomania of Roman emperors, as Peter Ustinov’s portrayal of Emperor Nero in the film Quo Vadis suggests? Or was it simply the emperors’ duty to erect a large baths complex – was it expected by the populace? What circumstances led to monumental buildings not being completed, and what caused many to be finished after all?

Friederike Fless

The author, Prof. Dr Friederike Fless, is President of the German Archaeological Institute

BAALBEK, URUK, UKRAINE, ROME AND JERUSALEM – THESE MONUMENTAL CONSTRUCTION PROJECTS, WHERE THE GERMAN ARCHAEOLOGICAL INSTITUTE IS CONDUCTING RESEARCH, ARE FEATURED IN THE TITLE STORY ON THE FOLLOWING PAGES.

1 The Temple of Jupiter in Baalbek in present-day Lebanon
2 The sanctuary of the goddess Inanna/Ishtar at Uruk
3 Villa Castel Gandolfo of the Roman emperor Domitian
4 The Herodium not far from Jerusalem
GIANT BUILDING SITES IN ANTIQUITY
The culture, politics and technology of monumental architecture
The Temple of Jupiter was built around a prehistoric settlement hill. Construction began in the late 1st century AD and continued in stages until the 3rd century. The sanctuary consists of four components: the Temple of Jupiter, the Great Court, the Hexagonal Forecourt and the Propylaea.

Photo: DAI, Orient Department
Sheer Mass
Technology and logistics at the big building sites of Baalbek and Uruk

Even today, the fashioning, transporting and erecting of architectural elements each weighing 1,000 tons poses a considerable challenge for people and machines. In spite of the difficulties, the biggest megaliths known in history were used as building blocks at Baalbek in the 2nd century AD.

Two layers of massive blocks formed the podium on the west side of the Temple of Jupiter. After the Roman era ended, only these stone layers were visible, and they made Baalbek famous in the Middle Ages and early modern era. Travellers called the upper layer the “Trilithon”. Its blocks have extraordinary dimensions: 19 metres long, 4.34 metres high and 3.65 metres wide.

Photo: DAI, Orient Department
Vast quantities of material were required to build the big ziggurat at Uruk c. 2100 BC. Imposing and solidly constructed, the sanctuary of Ishtar was made of 30 million bricks.
When Baalbek was a stopping point on the Grand Tour in the 19th century and was visited by poets, thinkers and painters, the romanticization of ruins was at its height in Europe. Architectural remains of bygone ages were supposed to awe, to stir feelings of sublimity and solitude, and remind onlookers of the transience of man and his works. Where there were no real ruins, fake ones were built. In all the Romantic fervour it was sometimes forgotten that the real ruins had once been real buildings which owed their existence to deftly proficient building site logistics as well as more or less incalculable effort and expense. The giant stones used in building Baalbek still lay hidden from view when the site was first settled c. 7000 BC. It was only very much later that the 45 million year old, weathering-resistant nummulitic limestone gained fame for being used in spectacular temple buildings. The limestone lies in thick shelves in the earth. Well protected, homogeneous layers of rock formed with a thickness of 4.20 metres and more. Just good enough for Jupiter and his colossal temple that was built, along with other extra-large buildings, at a time when the fertile, prosperous and well situated region around Baalbek was part of the Roman Empire. For columns that were 18 metres high the architects needed no more than three drums each, measuring 2.2 metres in diameter. The temple podium is constructed of enormous limestone blocks that fit precisely together – although the upper layer of the podium, today called the “trilithon”, was never completed. These blocks weigh up to 1,000 tons and are the biggest megaliths known in history.

Baalbek is one of the German Archaeological Institute’s long-term projects and is divided into a number of sub-projects. They are directed by Margarete van Ess together with the archaeological architect Prof. Dr.-Ing. Klaus Rheidt from the Brandenburg University of Technology (BTU Cottbus).

The quarry the megaliths originate from lay a good kilometre from the building site – a very long way for a 1,000 ton block, especially 2,000 years ago. But Rome and the Orient would not have been what they were if this circumstance had proved too daunting to overcome. The question of how they actually managed it has still not been fully answered, however. The stones were extracted from open-cut quarries by cutting work trenches and separating the blocks from the bedrock using wedges.
**QUARRYING TECHNIQUE**

“Owing to the size and the weight of the blocks, special techniques were required to detach them from the bedrock. Like other stones, the megalith was first separated from the surrounding rock by wide trenches on the sides. Additionally, a trench was cut under the stone and rollers or round timbers were inserted to support it. When the monolith was free, it could be moved on these rollers, the engineers exploiting the natural downward slope from the quarry to the temple complex. To stop the 1,000 ton megalith sliding off course, it was secured by an anchoring system and guyed to capstans.”

*Margarete van Ess*

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Dr. Margarete van Ess, scientific director at the Orient Department of the DAI, is in charge of excavations at Baalbek.

Photo: Obeloer
There are a host of new questions which archaeologists can only answer in collaboration with natural scientists and economists. Was the entire undertaking perhaps also conceived as an investment in the region’s infrastructure? Was it intended to boost the economy and provide employment for lots of people, which would in turn increase purchasing power? How many people worked on the building site, and for how long? And who precisely carried out the Emperor’s instructions concerning the building of the sanctuary? It can hardly have been the Emperor himself, even though he will have occasionally come to inspect the site, accompanied by nobles. And when there wasn’t enough time left before the imperial visit, in Baalbek too people resorted to a notorious, though possibly legendary trick from a later age in history: they built Potemkin villages.

COOPERATION
“Research into the Urban Development of Baalbek (Lebanon)” is the name of the sub-project that is being carried out by the construction history working group at the Brandenburg University of Technology (BTU Cottbus) under the direction of Prof. Dr.-Ing. Klaus Rheidt. Research centres on the analysis of the technology, construction and material of the buildings as well as the buildings’ historical context. The DAI and BTU have been working together since 2002 and a cooperation agreement was signed in 2008. The two cooperation partners are also involved in the project “XXL – Monumentalized Knowledge: Extra-Large Projects in Ancient Civilizations” of the Excellence Cluster “Topoi.”
At Uruk, buildings of immeasurable size were constructed using millions upon millions of mud bricks, the products of a technology that was invented 11,000 years ago at a time when southern Mesopotamia was not yet inhabited. Uruk’s builders had experimented with stones, but there were too few, and the material would anyway not have been suitable for what was subsequently to be erected there.

Settlements begin to appear in the region from 6th millennium BC; Uruk is first settled at the end of the 5th millennium. Archaeologists working there have identified 35 superimposed layers and have managed to put together a virtually complete settlement history for the city. The DAI’s projects at Uruk are directed by Margarete van Ess.

Even in early strata, dating from c. 3600 BC, archaeologists discovered buildings of large dimensions that were typical of the end of an epoch that came to be termed the Uruk Period. About 3300 BC these buildings were razed and buried in their own debris. On those ruins a sanctuary was built that would survive for thousands of years: a temple for the goddess of war and love, Inanna (Semitic: Ishtar). The ziggurat that King Ur-Namma later erected on top of the older temple buildings dedicated to the goddess, c. 2100 BC, was a colossus of 30 million bricks, consisting of two solid brickwork terraces that carried the actual temple.

In archaeological terms Uruk is exceptionally well preserved and the site today still conveys a very clear sense of its great significance as an economic, religious and scientific centre over a period of 3,500 years. Even though its significance waned at times, the city was always a notable entity among south Mesopotamian city states and later among the empires of the Near East.

Given the nature of the building materials, the adobe walls of Uruk’s architecture have perished, but the foundations can still be made out clearly. The structural remains lie piled on top of each other in many strata, and the detailed analysis of these remains and of the construction layers has become a methodological focus of the excavations by German archaeologists in general and also specifically by the DAI at Uruk. It is supplemented by modern techniques of virtual reconstruction.
A building may typically have been erected in these phases. The example shown here is the Stone Cone Mosaic Temple (“Steinstiftgebäude”). The images are stills from an animation.

A BUILDING SITE 5,500 YEARS AGO

In a building pit, reed matting was laid on top of strips of fired bricks. A 1.9 metre high terrace of rammed earth was erected on top, covered with a layer of bitumen and surrounded by a wall of bricks. Limestone slabs were used for the foundations of the building itself. An L-shaped room was lined with especially hard, grey-white, alabaster-like stones set in bitumen, while the floor was paved with stone slabs. In this room only the foundation walls and floor were plastered with mortar. For other rooms, masonry blocks of fired bricks were inserted.

Outside the foundations, the building pit was filled with rammed earth, stone chippings and bitumen up to ground level, as were the rooms inside the building except for the L-shaped room. For the above-ground masonry the same materials were used as for the foundations in addition to an artificial stone made of slaked lime and ceramic powder. This was prepared and applied in layers when in a viscous state. Ceramic plates laid at regular intervals between the artificial stone layers had the function of fastening the different coloured stone cones of the mosaic wall cladding.

The reconstruction of the roof draws on the traditional architecture of the Near East and is analogous to excavation features discovered in younger contexts. As the position of the doors, the enclosure walls, post-holes, gutters and one fireplace is known, it is possible to reconstruct to some extent the layout and design of the interior and how it was entered from the courtyard.
The loam for the 30 million bricks probably came from the periphery of the city. But was there always enough water and enough straw to mix into the brick compound? After being individually shaped the bricks had to be individually dried in the sun. Laying them out to dry requires a lot of space. And above all: who did what jobs? As in Baalbek, archaeologists are investigating the building site logistics at Uruk with its gigantic structures. The organization of a building site on such a vast scale demanded expert management and the well targeted deployment of an exactly specified number of workers.

The sophisticated technological and spatial knowledge required by the master-builders was actually taught at school. A typical exercise in a mathematics lesson would be: "How many bricks of a given size do I need to build a wall of given dimensions?" When Uruk was at its largest, c. 2900, the city wall was erected: 9 kilometres long, 5 metres wide, 8 or more metres high, with 900 towers – and built of more than 306 millions bricks. It is described in the Epic of Gilgamesh as the work of that legendary king of Uruk.
MEGA-CITY OR MEGA-SITE
Different concepts of settlement policy
in Mesopotamia and eastern Europe

The city of Uruk seems to be the blue-print for everything we associate with a metropolis: big, loud, many-layered, innovative, heterogeneous and dominated by tall buildings. Uruk, the world’s first mega-city.
An entirely different concept of the "city" is shown by the Tripolye culture in ancient eastern Europe. The population of the sprawling settlements there had no desire to build cities. They stayed at a mega-site for two or three generations and then moved on, burning their houses.
From the small settlements on either side of the ancient bed of the River Euphrates Uruk developed into a city of unprecedented size. By c. 3300 BC it already covered an area of approx. 2.5 square kilometres, and reached its greatest size — 5.5 square kilometres — at the beginning of the 3rd millennium. Before this could happen, however, one had learned to master the rivers Euphrates and Tigris which flowed from their sources in Turkey through southern Mesopotamia, bringing peak discharge from melting snow in April just in time for the harvests. This required technical expertise, organization and division of labour, agreements and hierarchies, hence the kind of social developments that were necessary if enormous building projects utilizing great amounts of material and manpower were to be put into action.

The fame of the city derived from two significant cult centres: one for the sky-god Anu and another for the goddess of love and war Inanna/Ishtar. But in political and economic respects, too, Uruk was of outstanding importance in the region, and to cope with the ever increasing volume of goods and processes a system of signs was invented as a memory aid for, above all, the administrative personnel that was in charge of managing the business of a sanctuary, palace, estate or large-scale building site. With trade intensifying, the movement of goods had to be recorded: head of sheep and cattle, quantities of stored grain, the copper that a smith had received for the manufacture of utensils, the amount of bricks or the number of workers that needed to be supplied.

As the city grew, ceramic vessels and items of everyday utility began for the first time to be mass produced; production had to be regulated and the wares had to be sold. The myriad processes could no longer be controlled from memory alone. Notes in the form of heads of cattle, ears of corn and drinking bowls combined.
with numerals are the origin of the Sumerian writing system, cuneiform, which was invented at Uruk and which quickly made the rounds. Further developed at the Sumerian power centres of Ur, Fara, Nippur and Lagash, cuneiform was inscribed on air-dried clay tablets, an extremely durable data storage medium that was to survive for millennia.

The invention of writing as an administrative aid for record-keeping purposes also promoted the development of science in the Near East. There were lists of everyday objects, of types of animals; we have lists of stars from the end of the 3rd millennium when observation of the sky played an important role. Archaeologists have also found lists with designations of various occupations and official functions, the first evidence that society here had become divided up into hierarchies. Some of the administrative texts even record the rations that people received for performing certain tasks. Rations were allotted according to a complicated system and appear to have been very precisely calculated to ensure that people did not quite starve.

Temples and palaces were the focus of life for Uruk society. The ancient Babylonian palace of King Sin-kashid – which has also been investigated by the DAI – was not "only" used for ruling. From the 2nd millennium BC onwards it was also a place where the elite assembled, business was conducted, diplomatic correspondence and juridical documents were deposited, and where specialized craftsmen and artists fashioned the finest raw materials into precious, high-prestige products. And since writing had become indispensable in what was now a differentiated society, the royal palace was also where the training of scribes took place.
The other extreme of archaeological work can be seen in a more northerly region of the world, where a completely different human settlement policy is being studied. Flat grassland as far as the eye can see and no sign of ancient ruins. Until, that is, high-tech natural science devices are deployed to search under the surface. It is a search that is bringing many archaeologists from around the world to Ukraine. Researchers from the Roman-Germanic Commission (RGK) of the DAI are here, carrying out large-scale geophysical prospection to locate early Copper Age settlement sites in the east of Europe. Thousands of houses once stood here, and the field research is supplying valuable and precise new data about the position and size of the houses and their technical facilities. And above all the information allows the entire settlement site and its fortifications to be reconstructed.

There has been a long history of excavation at the Copper Age settlements, but the significance and true size of the sites only became clear once aerial photographs of the area were taken in the 1960s. Archaeologists quickly realized that by traditional methods alone it would not be possible to cope with such vast spaces. Combination with modern methods from the natural sciences was the order of the day. Since then, geomagnetic investigations have provided detailed maps of the settlement that plot dwellings, ancillary structures and technical facilities.

ALTERNATIVE CONCEPTS

Developments here took a different course than in the city states of the Near East, even though the components were similar. The settlements were used only for a short time and then abandoned after two or three generations. And the inhabitants didn't simply leave – they burnt down the houses, apparently systematically – just as at other find-sites of the Tripolje/Tripillya culture which the DAI is exploring in Romania, Moldova and Ukraine. Ukrainian archaeologists have found out that these conflagrations cannot be considered the result of war. The destruction patterns are too regular. The question archaeologists are now seeking to answer is why the inhabitants left their settlements after so short a time. A complicated task because historical events in eastern Europe can only be reconstructed from archaeological data, since in contrast to the Near East there are no written records.

Survey methods that can cover a lot of ground are necessary given the settlements’ great size. DAI researchers used vehicle-drawn geomagnetic investigation systems for the first time. They were able to survey 20 to 30 hectares a day.
COPPER AGE MEGA-SITES

“Settlements in general are the consequence of the development of arable farming and animal husbandry in the Near East. Small, loose-knit, village-like settlements then start to form in the 7th millennium BC. One millennium later the new way of life spreads to Europe. In south-eastern Europe in the 6th millennium, the first settlements of up to 30 hectares appear, accommodating several hundred to about 2,000 inhabitants. If you compare this with villages in the Middle Ages, which hardly had more than 100 to 200 people as a rule, you can appreciate the extraordinary dynamic of social and economic change. This process stabilizes itself in south-eastern Europe in the 5th millennium. Another far-reaching transformation takes place in this period. It’s characterized by the use of a completely new material: copper. The new technology doesn’t only affect the economy but also pervades society and implies social change. In this period, societies form in a region between the Carpathians and the Dnieper, and their settlements display a new quality of proto-urban life, not only because of their size. These finally – in the first half of the 4th millennium BC – lead into settlements of the Tripillya culture with several thousand inhabitants.”

Knut Rassmann

The prehistorian Dr Knut Rassmann is director of the Technical Department of the RGK.

The DAI supported the Christian Albrecht University of Kiel (CAU) in its prospection project in Romania; two Cucuteni settlements in Bessarabia were also investigated. The Roman-Germanic Commission of the DAI has surveyed key settlements in Moldova and Ukraine. Collation of the data sheds new light on the settlement structure of the Copper Age in south-eastern Europe.

The north-west section of the settlement of Talianki. The houses all measure five by ten metres. Some buildings are larger and always occupy prominent locations.

Replica of a house in the open-air museum at Legedsine, not far from Talianki. The two-storey construction is attested by the excavation results.

Photos and Illustration: DAI, RGK; CAU Kiel

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3 Replica of a house in the open-air museum at Legedsine, not far from Talianki. The two-storey construction is attested by the excavation results.

Photos and Illustration: DAI, RGK; CAU Kiel
On the way to meet their emperor, visitors to Domitian’s villa at Castel Gandolfo were guided by architecture and light effects towards their "higher" goal.

The gallery was divided into two parts. The northern section, about 250 metres long, was lit by a row of close-set windows that opened onto a garden terrace. The south section, 90 metres long, ended in a flight of stairs that connected the two different levels of the terrace. In this section, the barrel vault of the ceiling was plain and uncoffered but with a row of small windows on either side. As a result, light entered the gallery initially from the side and later on from above.

Graphic: DAI, Rome Department
The "King of Jerusalem" is not remembered mainly for his buildings. Yet Herod the Great's construction programme is a classic example of the architectural display of autocratic power.
Emperor Domitian and his architects had a brilliant idea. For the imperial villa at Castel Gandolfo they transformed the concept of the subterranean vaulted passageway, or cryptoporticus, into a reception hall that surpassed everything that had gone before.

A visitor approaching from the Via Appia entered the hall through the north entrance and made his way towards the emperor. There were no doors at the side, but the windows, being of unequal width, produced an undulating effect in the light that streamed in – drawing the visitor on towards the podium on which the emperor, surrounded by his Praetorian guards and selected officeholders, received those who had been admitted to the morning salutatio.

In the gallery below him various section of the populace stood ranged according to rank, and the ruler had the opportunity to interact with them in the appropriate style – from a general greeting to a conversation in person. Henner von Hesberg, director of the Rome Department of the German Archaeological Institute, is in charge of researching and reconstructing the villa.

The emperors possessed a monopoly on building; private firms (redemptores) were commissioned to carry out the construction work and were supervised by the chief architect and the curator of the building project. With such a constellation the shell of a building like the cryptoporticus could be completed in a few weeks. Brick production, marble quarries and other facilities essential to the marble industry lay in many cases in the hands of members of the emperor’s family including their freedmen and slaves. Domitian’s monetary policy was very solid, contrary to certain assertions by his opponents, and hence he had no problems implementing large-scale building projects, be they new residences on the Palatine, his villas or monumental new complexes for games and theatre.

Given the vast amount of building material that was in circulation at that time, it could happen that an imperial contractor was unable to resist taking some of it to embellish projects of his own. The Roman author and historian Suetonius reports that Domitian had a redemptor executed and thrown into the River Tiber for having purloined too many blocks intended for the construction of the temple of Capitoline Jupiter and using them for his own mausoleum – which was then demolished.
The main terrace in the grounds of the villa was bounded by the cryptoporticus. This was 340 metres long, 7.35 metres wide and 10.35 metres high at the apex of the vault – the largest known hall of its kind.

On the podium the emperor, surrounded by his Praetorian guards and selected office-holders, received those who had been admitted to the morning salutatio.
THEIDEOLOGICAL GAMBLE

"Imperial building projects served not only to demonstrate the principes’ untiring concern for the capitals of the Imperium Romanum or provide employment. Much more than this they were, in an extraordinarily complex way, an expression of what the rulers felt was their due. Relationships between the emperor and the people and also between the various groups within the population in very different spheres of communication were constantly redefined in such works; they delineated and stabilized appropriate patterns of behaviour. These impulses came directly from the ruler and his inner circle. A suitable answer to questions about the quality and meaning of the big building projects of imperial Rome can perhaps be inferred from this constellation. Rapid implementation was necessary at all costs not least because, in it, power was directly palpable.

In this connection it would be nice to know how the emperor with dealt with the "ideological gamble". The singularity and unprecedented scale of the building complex opened the door to misunderstandings and hostile interpretations among the population. There is abundant evidence of such polemics, as the reception of the Domus Aurea, Nero’s palace in Rome, in particular makes clear. Domitian and his intimate associates were very certainly aware of this criticism and had to take it into account. To what extent they took a gamble or simply gave free rein to their fancies when planning the villa can hardly be established any more."

Henner von Hesberg

The exact size of the Emperor’s villa is not known. It presumably extended as far as the lake and the Via Appia as well as the villages of Castel Gandolfo and Albano. If so, it would have been one of the largest of all imperial villas, approximately the same size as Hadrian’s well-known villa complex at Tivoli. Photos and Graphic: DAI, Rome Department

The archaeologist Prof. Dr. Henner von Hesberg is director of the Rome Department of the DAI.
In the archaeological park underneath the Church of the Redeemer in Jerusalem the path leads back into the past through 2,000 years of history via a medieval church, a forum of Constantine, architectural remains from the time of Hadrian and masses of rubble from Titus' destruction, until one finally reaches a quarry. This dates from the time of Herod the Great, "King of Jerusalem" by the grace of Rome from 37 to 4 BC. And Herod truly built like a Roman. In 27 BC he had a theatre and an amphitheatre built, followed a few years later by a large royal palace in Jerusalem and a huge residence in Judaea, the Herodium. Then came construction of the city and harbour of Caesarea Maritima. Aqueducts and fortresses are further testimony to his fondness for building; and when in the year 20 BC he launched the lavish rebuilding of the Jewish temple, he founded a new city district in the process. As king of the province of Juda he proclaimed his rule by offering the new quarter his protection and erecting a large wall around it.

The course of this "Second Wall" is indicated by the Jewish-Roman historian and author Josephus Flavius: "The second wall began at a gate that stood in the first wall [Jerusalem's old city wall] and was called Gennat; it extended as far as the Antonia [a fortress in the northern part of the temple compound], enclosing only the north part of the city."

THE SECOND WALL

The "Second Wall" was long thought to lie directly under the Church of the Redeemer, construction of which began in 1893. But the conjecture did not stand up to later archaeological examination. The big wall under the church instead turned out to be the enclosing wall of the forum that dates from the time of Constantine the Great and adjoins the Church of the Holy Sepulchre.
Jerusalem at the time of Herod the Great. 3D model with Temple Mount, Herod’s Palace and the garden area outside the “Second Wall”. The pin marks the location of the Church of the Redeemer today.

The city c. 4 BC (green and red with grey background) compared to the Old City today (black). The asterisk marks the location of the Church of the Redeemer; ‘A’ marks the Antonia Fortress.

Reconstruction of the quarries for the Herodian city. Original drawing, probably by the government surveyor E. W. Krüger.

Archaeologists have excavated a large part of the area beneath the Church of the Redeemer and cut an approx. 8 metre deep section that goes down to the bottom of the quarry first worked in the reign of Herod the Great. Marks in the bedrock still show the cutting direction of the Roman stone saws.

Illustrations from: Dieter Vieweger and Gabriele Förder-Hoff: Der archäologische Park unter der Erlöserkirche von Jerusalem. DEI Jerusalem the German Protestant Institute of Archaeology of the Holy Land (DEI), linked to the DAI by a cooperation agreement, is going to survey the terrain together with geophysicists from Ilmenau Technical University (TU). They are hoping to establish the exact location of the “Second Wall”, an archaeological puzzle for over 150 years.

Since the terrain is heavily built up, further excavation is not possible and researchers are obliged to apply non-destructive methods in their quest to prove the existence of the “Second Wall” and determine its position. The deep section cut into the ground below the church is a good starting point.

Ground-penetrating radar is the technology of choice. The experts from Ilmenau TU, Prof. Dr.-Ing. Reiner S. Thomä and Dr.-Ing. Jürgen Sachs, pull antennas that are in contact with the ground across the area of investigation. If buried objects are in sufficiently high contrast to the material in which they are embedded – soil, sand or similar – then the slightly blurred outline of, say, foundation structures can be made out from the radar data received by the antennas. The task taken on by project leader Dieter Vieweger is not altogether easy: the Church of the Redeemer is 14 metres above the horizon on which Herod built.
The German Protestant Institute of Archaeology of the Holy Land (DEI) was founded in 1900 by a resolution of the Protestant churches of Germany, endorsed by the Emperor’s signature. The mission of the DEI was to research the history and cultural history of the Holy Land on both sides of the Jordan with a particular focus on the biblical epochs and the origins of Christianity. To this end the DEI conducts its own projects and excavations, such as the Gadara Region Project, and supports other German research initiatives. It disseminates its research findings, especially in the field of archaeology and cultural studies, to a broad audience and promotes discussion within the scientific community. For this purpose the institute maintains its own libraries, issues its own publications, organizes conferences, lecture series and exhibitions. One of its projects is the archaeological park under the Church of the Redeemer, a showcase of its activities in Jerusalem. The institute exists as a foundation of the German Protestant Church and is also a research unit of the German Archaeological Institute (DAI). It has offices in Jerusalem and Amman (www.deiahl.de).

Dieter Vieweger

Prof. Dr Dr h.c. Dieter Vieweger is director general of the Institute in Jerusalem and Amman.
The feeling of coming home

In 1994, Margarete van Ess returned to Lebanon for the first time after the long years of the civil war. "It smelt like it did in childhood," the archaeologist says. She grew up in a family of orientalists that spent a lot of time in the country – considered to be one of the most beautiful in the Middle East. That feeling of coming home accompanies Margarete van Ess all over a region that is clearly under her skin, even though her love for it is constantly being put to the test. "The political situation is really a strain for me," she admits. For her, the best remedy is to throw herself into work.

Having studied Near Eastern archaeology, Ancient Oriental studies as well as prehistory and early history at Tübingen and Berlin, she joined the scientific staff of the Baghdad Department of the German Archaeological Institute in 1989 and assumed direction of the DAI’s excavations at Uruk (today Warka). After completing her doctorate in 1996 with a thesis on "The Architecture of the Eanna Sanctuary at Uruk in Ur III and Ancient Babylonian Times. Building Conception of a Sanctuary" she became scientific director of the Orient Department of the DAI. In 1997 she also took charge of excavation projects in Lebanon.

"Preserving culture is a difficult business in the countries of the Middle East too, just as it is everywhere else," the archaeologist says. And not only in troubled times. The abundance of remains of ancient cultures is not always only a blessing. "The wholesale preservation of everything that’s found is not an option. Different interests make for a complex situation; the needs of today’s inhabitants need to be respected. "What’s important is that a mechanism is found to decide what stays and what doesn’t," van Ess says. Transparency is paramount for all the parties involved, and the question is often whether a consensus has been reached among the population or whether the interests of particular groups have been served. "Talking helps, says van Ess. She knows this since DAI research personnel are always diplomats too, and she also knows that lecturing is fatal to international cooperation. "When young Iraqi researchers come to Germany, we show them how we work – as one possible approach. We do not explain to them how it’s done." Margarete van Ess remembers once travelling to Potsdam with them by ship. From the water you understand the visual axes and the organizational principle of this UNESCO world heritage site. "The Iraqi guests realize that not only material cultural resources, but also ideas can be assets worth protecting."

Dr Margarete van Ess is scientific director of the Orient Department of the DAI. She has directed excavations at Uruk/Warka in Iraq since 1989 and has been in charge of excavation projects in Lebanon since 1997.

Photo: Obeloer

This kind of tact and diplomacy is not learned at university, of course. "At some point you come to realize anyway that university didn’t train you for everything," van Ess says. In her view, studies cannot be more than a point of departure for further enquiry. Without intrinsic motivation it’s impossible to bear many of the jobs that are nonetheless the foundation of everything that follows. "Some people are defeated by 20,000 sherds that have to be statistically recorded," the archaeologist says. "Of course, that sort of thing can be dead boring, but when you know where you want to get to, it can be incredibly exciting." Then you can also live with the feeling of never finishing, of constantly having to read, scan, document and archive something. In the end the hard training pays dividends when you come to do research work on your own and independently, and when you organize an excavation where efficient project management is called for. Ever since her student days, Margarete van Ess has been working on temple building in Mesopotamia. "My wish is to write a big monograph on the subject one day, comparing the different temple concepts in southern and northern Mesopotamia and the Levant. But at the moment I simply can’t sit down and work away at it for months on end." Her working day is taken up not only by research but also by administration – which is not altogether disagreeable – and by students that need to be supervised. Margarete van Ess does have one other wish: "It would be nice – and helpful in terms of international cooperation – if our view of the countries of the Middle East reflected reality more with all its cultural and human strengths which after all don’t disappear in difficult times, and wasn’t so dominated by sensationalist news reports of perpetual war."

Her warm appreciation is reciprocated. In 2009 she was awarded an honorary doctorate by the Institute of Arab History and the Scientific Heritage of Iraq, an institution of the Union of Arab Historians. 
Brita Wagener is the ambassador of the Federal Republic of Germany in the Republic of Iraq. Photo: Foreign Office, press and information office

"Important things can also be achieved by small steps," says Brita Wagener. It would be out of touch with reality to hope to solve big problems at one stroke. After decades in various states of emergency, Iraq today is characterized by efforts to restore normality to everyday life and make institutions functional. Brita Wagener has been German ambassador in Baghdad since August 2012. The jurist has been in the External Action Service since 1983. A specialist in international law, she has held appointments in Cairo, New Delhi, Istanbul and Tel Aviv. "It’s important to see different sides, so that your point of view doesn’t become too narrow."

Given the challenging security situation, members of the embassy staff are subject to considerable restrictions in their freedom of movement. "All in all we have good access, though," says Wagener. "The Iraqis seek dialogue on all levels." They are particularly interested in economic relations, which are being rebuilt at the moment in what is proving to be a complicated process.

There is a long tradition of good relations between the two countries in cultural and scientific policy. An essential part in this is played by the projects and collaborations of the German Archaeological Institute, which has maintained a branch in Baghdad since 1955. It is from this base, in cooperation with Iraqi and international partners, that research is conducted that delves more than 5,000 years into the past, shedding light on monumental religious buildings and palaces and on the remarkable cultural accomplishments of the world’s first mega-city, Uruk (modern Warka).

"Foreign cultural and educational policy is a highly significant part of our work," Brita Wagener says. Politics, culture and science work hand in hand, which makes communication on difficult terrain much easier for all involved. "Via culture and education you can not only gain access," the diplomat says. "You can also proactively do something for those people who are suffering particularly under the strain of the current situation, but who the country will urgently need one day." When weapons are no longer seen as a means of settling political differences, it will be the intellectuals, the artists and the academics that do the talking, carrying on debate in the public arena. And then it is important not to lose sight of the country and to send out the right signals. "It’s not always just about money."

"The challenges are enormous," Brita Wagener admits frankly. "There’s no end of things to do and to discuss. The important issues concern how the various components of the country want to organize the way they live together. And beyond that they concern the creation of structures, the management of institutions and possibilities of normalizing procedures here to some degree."

For German-Iraqi cultural exchange there is already light on the horizon. The Goethe Institute, whose office is in Erbil in the quieter autonomous region of Iraqi Kurdistan, is due to start offering German courses in Baghdad once more in 2013 after a very long hiatus. When the Baghdad branch of the DAI can resume its operations in the city is still unclear. At the moment the security situation does not permit the return of German research personnel, however much the Iraqi colleagues want them to come. "We’ll be checking that regularly," the ambassador says.

"It’s sometimes very demanding when you can’t lead a normal life in the city," Brita Wagener says. Going for a stroll around the block is out of the question, of course. On the other hand, when the situation permits the embassy’s doors are open for events, whether it’s performances by a women’s theatre group or a panel discussion with Iraqi artists. "With all the restrictions, it’s good to see there are things that we can do and that hopefully will have a lasting effect," says Brita Wagener. "The small steps shouldn’t be underestimated."
TIRYNS
Model citadel of the Mycenaean kings
On a Sunday in August, Athens doesn’t necessarily welcome the visitor with open doors. It’s quiet in the sprawling city and most of all it’s hot. The people have melted away to shady spaces or left for the countryside. For most of the scientific personnel of the Athens Department of the German Archaeological Institute it is now that the excavation period begins. The Athens Department is one of the oldest in the DAI and was established in 1872. Since 1888 it has been housed in a building that Heinrich Schliemann had erected in the centre of Athens. Olympia and Kerameikos are names to conjure with; another DAI excavation with a long tradition but a less sonorous name perhaps is Tiryns, which is about two hours’ drive to the south of the Greek capital.

The “model citadel” of the Mycenaean kings is well preserved and affords a unique insight into Mycenaean palatial architecture. The acropolis was built in three phases from the 14th to the 12th cent. BC and is divided into three complexes: the Upper Citadel with the palace, the Middle Citadel lying about two metres below it, and the Lower Citadel to the north, on the lowest part of the hill.

Photo: A. Papadimitriou:
After travelling about one and a half hours you see road signs that name a place you first heard of at school when learning something about the great poetry of the ancient world; a mythical place, glorified in literature already in antiquity. Mycenae. Suddenly in the 17th century BC it seems to have become prominent, a civilization in central and southern Greece that has been called "Mycenaean culture" since Schliemann's discovery, in 1876, of richly furnished shaft graves evidently belonging to persons of high rank. At its height during the 14th and 13th century BC "Mycenae" developed a grand palatial culture, had trade links with distant lands and showed all the signs of prosperity. But then around 1200 BC, in a phase of dramatic upheaval, the city was destroyed by fire; the palaces lost their splendour; Linear B, the script in which an early form of Greek was written, was forgotten; administrative structures and royal titles faded into oblivion.

**MAJOR LOGISTICAL OPERATION**

The Mycenaean palaces sank into the "Dark Age" – or so it seemed. The causes of the catastrophe are still being debated: wars, internecine feuding, earthquakes or raids by the "Sea Peoples" are the most frequently proposed explanations for the culture's spectacular decline.

Tiryns lies 20 kilometres south of Mycenae, closer to the sea, and is well suited as a harbour. The site was occupied as early as the 6th millennium BC and played an important role long before the kings came. Then between 1400 and 1200 BC, in a major logistical operation, a strongly fortified palace of Mycenaean type was built, a planned community with a model citadel, whose mighty walls re-

**COOPERATION**

At the entrance to the palace ruins a panel informs visitors that the archaeological site of Tiryns was inscribed on the UNESCO World Heritage List in 1999. A small visitors' centre and the kiosk where admission tickets and the archaeological guidebook by Alkestis Papadimitriou (available in seven languages) can be purchased stand in peculiar contrast to the cyclopean ruins of the citadel, which – as the Greek geographer and historian Strabo wrote – could only have been built by giants.

For decades, Tiryns has been the site of fruitful collaboration between Greek and German researchers. The archaeologist Alkestis Papadimitriou, director of the Greek antiquities service in Argolis and Laconia, is Maran’s cooperation partner at Tiryns and knows the site from the time when Klaus Kilian from the Athens Department of the DAI directed a large-scale excavation in the Lower Citadel from 1976 to 1983 and set new standards in archaeological research at Tiryns.

In the storeroom cum work room of the current Tiryns excavation, housed in a former cheese factory, the first excavation personnel and students have already assembled: this year’s campaign is about to begin. Alkestis Papadimitriou and Joseph Maran – with funding from the German Research Foundation...
remained visible, and anchored in popular memory, for a long time. The kings possessed the power and the know-how needed to mobilize the manpower and the material for a project of this kind to be realized. But Tiryns, too, was engulfed in the conflagrations – and yet unlike the other scenes of devastation, here something new rose up out of the ruins. “What’s most interesting is the time after the catastrophe,” says archaeologist Joseph Maran from Heidelberg University, who has directed the Tiryns project on behalf of the DAI since 1994. “Between about 1200 and 1050 BC, Tiryns goes against the tide of history, as it were, because it expanded while the other former palatial centres shrank or disappeared.”

**The Ideology of Kingship**
The outer wall is a good seven metres thick and is built of massive blocks of stone. The cyclopean nature of the fortifications only fully strikes you when, after passing through the gate-less main entrance, you find yourself inside the citadel. After changing direction you reach the main gateway and, still blinded by the glaring sunlight, enter a narrow, dark and forbidding passage whose walls consist of huge, undressed stones. The path ascends a slope, narrows even further, and leads deeper into darkness. Sturdy scaffolding supports the still standing sections of the once mighty wall so that it doesn’t lean any further to one side. A crane will be brought in to repair the wall at this point and plaster will be put in the cracks to stabilize it.

“Liminal points” is how Maran describes the points of enforced change of direction on the approach to the palace, which are intended to give it the character of a ritual journey. At each change of direction the symbolic charge increases. At some stage the stone blocks become smaller, the stonework finer, and suddenly we have reached the cultivated zone in which brightly coloured frescoes of great beauty show visitors exactly what has just brought them there: a procession to the sanctum in the heart of the palace, where, before the eyes of a few initiates, the deity would manifest itself at the central fireplace and merge with the king and queen. “It is the core of the ideology of kingship,” Maran says. There are no images of the kings themselves. All that mattered was the ritual, which had to be enacted according to a strict procedure. “The whole complex was tailor-made for that, right down to the last detail,” Maran explains. And processions played a dominant role.

It was only on special occasions that the king and queen came from Mycenae to the palace in the harbour city, and it was only then, the archaeologist conjectures, that the great processional way was used as such. In everyday life there were stairways, ramps and roads for artisans, rulers, servants and the general populace on which no ritual harm could be done.

**The Vicious Circle of Care and Exploitation**
The repeated attempt to reinforce the harmony between gods and humans had its price. And possibly that brought about exactly...
The great wall is at risk of collapse. It is being supported by scaffolding until it can be straightened.

what it was meant to avert. In order to fulfil its religious duties, the palace had to exploit the surrounding communities. If unremunerated services to the king, poor harvests and external threats all came together, it could have driven people to the limits of endurance; and at the first signs of instability in that severely hierarchical society, smouldering resentment could have rapidly flared up into open conflict.

Whether a massive earthquake caused the downfall of the palaces is now being investigated in a project funded by the foundations Gerda Henkel-Stiftung and Fritz Thyssen-Stiftung and in which Alkestis Papadimitriou and the seismologist Klaus-Günter Hinzen from the University of Cologne are participating. Joseph Maran has considerable doubts about what is the majority opinion among researchers, namely that earthquakes were responsible for the destruction of the palace c. 1200 BC. “In historical times at any rate, Argolis was not one of the most dangerous earthquake zones in Greece – unlike Corinth, for example, which was destroyed several times.”

“Maybe the Mycenaean kings in fact dug their own grave by instigating a burst of building activity in the final decades of their rule,” the archaeologist speculates. Not that they had any real chance of acting differently if they wanted to remain kings. After all, they did what the gods demanded, and found themselves as a result in a vicious circle of economic exploitation and sacerdotal care – as was expected of them.

Another factor was protection against the forces of nature. A small river flooded and destroyed the fields, and so – still 50 years prior to the catastrophe – a gigantic dam was built. “It was the first dam completely blocking the river bed,” Joseph Maran explains. “At the convergence point of several streams the engineers found exactly the right spot at which they had to seal off the ancient waterway. They re-routed the river down a new channel a long way away from Tiryns.” After that their fields were never damaged and new agricultural land was won – all in all a triumph of engineering. “But it may be that building the giant dam was the nail in the coffin for the palace and sealed its fate when the catastrophe ultimately came.”

NEW BUILDING PROJECTS

Tiryns is the only Mycenaean centre of the palatial period where a new beginning was attempted following the wave of destruction c. 1200 BC. Newly acquired land in the northern part of the Lower Citadel was then systematically used for new building projects. “It all looks as though palace officials from the back row took long-existing plans out of the drawer in order to put them into operation,” says Maran. They must have had the knowledge and ability to command the social structures that made it possible to implement such projects. The settlement grew to an estimated 25 hectares, a sensational size for that place and time. The political background to this great expansion still lies in the dark, as does the question of the city’s economic basis and the ethnic make-up of the population, many inhabitants having no doubt moved to the city from the surrounding area or even further afield. After 1200, the new ruling elite even sought to reoccupy important parts of the fire-ravaged palace and exploit them for their own purposes by means of building projects that incorporated central symbols of the previous religious and political order, such as the throne site and an altar in the courtyard. Many of the new structures were held to be part of an insignificant 8th century temple by Schlie-
The "cyclopean" walls of Tiryns are being restored with great care. Finds from the destruction layer of a workshop afford insights into the intensity of Tiryns' contacts with Cyprus and the Levant. Many of the objects recovered originate from the Ancient Near East. They include unique finds like the fragment of an ivory staff inscribed with cuneiform signs, the faience head of an ape or of the Ancient Near Eastern demon Humbaba, and the first clay ball with Cypro-Minoan characters found outside Cyprus and the northern Levant.

CONSTRUCTION SITE
Most of the visitors to ancient Tiryns are day-trippers from nearby Nafplion; in the sweltering heat of August they savour the light breezes on the Upper Citadel. But researchers also come here from all over the world, to a site where every new discovery throws up yet more questions, and which will long remain a kind of large-scale construction site where knowledge is the product: where the humanities, cultural sciences and natural sciences join forces in an attempt to understand a vanished culture in its entirety.

On the way back to Athens you drive past Mycenae again. It is no longer quite the Mycenae of the bards, a fabled place created in literature for the purpose of self-reassurance by reference to the past. It is now the Mycenae of archaeologists, who see not only the grandeur but also the price that was paid for it, and in the process bring "Mycenae" a good deal nearer to the present.

Finds from the destruction layer of a workshop afford insights into the intensity of Tiryns' contacts with Cyprus and the Levant. Many of the objects recovered originate from the Ancient Near East. They include unique finds like the fragment of an ivory staff inscribed with cuneiform signs, the faience head of an ape or of the Ancient Near Eastern demon Humbaba, and the first clay ball with Cypro-Minoan characters found outside Cyprus and the northern Levant.

1 and 2 Photo and graphics: Kostoula
3 Photo: Vetters
Epigraphers could be described as decipherers and scholars of ancient writing. At all events they are historians, too – specialists in ancient history, particularly in those aspects that are connected with the archaeological sciences. Greek and Latin inscriptions, coins and papyri are by no means a closed field of study. Deciphering them means not only patiently reading faded lettering but also placing it in its context of the social, political and economic history of the ancient world and thus making it speak.

The Commission was founded in Munich in 1951 and incorporated into the German Archaeological Institute in 1967. Interdisciplinary work was a principle from the outset and it remains as current as ever. The heart of the Commission is its library, which is one of the best in the world in its key focal areas and is frequented by researchers of all nationalities. The Commission is noted for its pure research and for its publications: the journal "Chiron. Mitteilungen der Kommission für Alte Geschichte und Epigraphik des Deutschen Archäologischen Instituts" and the series "Vestigia" are firmly established and highly regarded in the study of ancient history internationally. Young researchers are supported by the Jacobi Scholarship, which is financed by the Elise and Annemarie Jacobi Foundation and the Gerda Henkel Foundation. The scholarship enables graduate students to visit the Commission’s library for a period of normally two months and it has attracted great interest internationally since its inception in 2005. The Commission is part of the Munich Centre for Ancient Worlds (MZAiW), a platform in the field of ancient studies in Munich. The Commission is involved specifically in the doctoral student programme and in the Graduate School "Distant Worlds" that has been federally approved as an Excellence Initiative. Just as at other DAI locations, members of the scientific personnel at the Commission hold teaching posts at universities, in particular the Ludwig Maximilian University of Munich, with which it has close ties.
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The uncommon lentil

The lentil is one of the oldest cultivated plants in human history.

The lentil is a delicate plant with pinnate leaves, bluish white flowers and weak roots. Lentils are an undemanding crop and grow on many types of soil – they dislike only acidic soils and heavy clay soils. Most of the domesticated forms have grey-brown seeds – they are reddish when the husk is removed – but there are more colourful varieties that are black, green and yellow.

Like all pulses, lentils are immensely nutritious and healthy. In combination with cereals they can replace meat entirely since they contain all important amino acids. Although in the Bible a “mess of pottage” is synonymous for a bad exchange, and the Roman elites had little appetite for them, lentils are therefore anything other than a humble, low-value alternative.

But that is not all the small round pulses can do. “Lentils are among the oldest cultivated plants in human history,” says Reinder Neef, chief archaeobotanist at the German Archaeological Institute. The oldest finds come from the eastern Mediterranean. Via south-east Europe they reached Central Europe. “We even have Bronze Age lentil finds from Mecklenburg-Vorpommern,” Neef says. Today lentil cultivation has completely disappeared from Central Europe. These days they are traditionally grown mainly in southern latitudes in countries like Ethiopia, Turkey, Iran, North Africa and parts of South and West Asia.

10,000 YEARS

Ain Ghazal is a prehistoric site near the city of Amman in Jordan. It was inhabited from about 7500 BC to 5000 BC, a period that archaeologists call the “Aceramic Neolithic”. The site is one of the oldest settled by arable farming communities. Covering 15 hectares, Ain Ghazal was moreover a very large settlement at times, numbering among the biggest prehistoric settlements in the Ancient Near East. Reinder Neef first found lentils there in the 1990s. The immediate assumption is that they must be wild species. “We found masses of lentils, well over 200,000,” the archaeobotanist recounts. That fact alone, he explains, is a sign that the lentils had been cultivated as crops. “And they weren’t the result of initial experiments in cultivation, but were fully developed varieties,” Neef says. The same is true of the other cultivated plants that were found at Ain Ghazal. “Normally, in cereals or pulses, the seeds are loose so they can fall onto the earth,” says Neef, describing the characteristics of wild species. “The plant wants to multiply, after all.” But that trait is very inconvenient if you want to make the seeds into food. That is why specimens with a firm rachilla or pod were selected for planting.

Whether people used wild or cultivated plants, and if so how, can be established by archaeobotanists on the basis of botanical macroremains or pollen. Analysis provides reliable indications about how people in prehistoric times exploited natural resources, grew agricultural plants and developed farming, and ultimately established trade routes. Pulses put up little resistance to attempts to domesticate them. They rapidly transform into cultivated varieties, which is not only interesting botanically but also allows inferences to be drawn about the way of life pursued by people who must be count-
Panorama among the first crop farmers. A large settlement has a large number of inhabitants, all of whom need to be fed. Pulses are easily stored and highly nourishing. Lentils might offer low yields per pod, each containing one, two or at most three seeds, but they are easily harvested — the plants are simply pulled out of the ground. The deracinated plants make protein-rich fodder for livestock and in addition the roots host a bacterium that causes the plant to draw nitrogen from the air into the earth — a natural fertilizer.

As lentils, like cereals, cannot be eaten raw, how they were made edible 10,000 years ago is a question that will probably remain a mystery for ever. "In the pre-ceramic Neolithic there were neither metal nor ceramic vessels for cooking," Neef points out. "Vessels of wood or stone are unsuitable. What remains are furnaces, open fireplaces or hot stones as a kind of baking tray." An alternative would be the immersion coil principle whereby a leather bag is filled with water, vegetables, meat and fat, and the contents are then parboiled by the insertion of hot stones. "What we do know is that the biological finds, even after nearly 10,000 years, allow a reconstruction of man’s environment and means of subsistence," says Reinder Neef.

Next year the archaeobotanist returns to Ain Ghazal to collect more samples. We will afterwards most probably remain in the dark about how the inhabitants of the early settlement prepared their lentils.

Marcus Gavius Apicius, a Roman gourmet of the first century AD whom Pliny the Elder held to be a luxury-obsessed glutton, did not disdain pulses at all. His cookbook De re coquinaria ("On the art of cooking") contains several recipes that, though fairly sophisticated, are still lentil dishes. That fits well with the botanical name for the common lentil: Lens culinaris.

At Ain Ghazal, archaeobotanists have found 10,000-year-old lentils in great quantities. This in itself indicates they are cultivated varieties, not wild species.

**Drs. Reinder Neef is head of the archaeobotanical laboratory in the Natural Science Section of the DAI.**
The baobab climate archive
Ancient tree offers a window on history

The baobab (Adansonia digitata) can grow very big and very old. It could provide testimony of what happened long ago in the ancient Kingdom of Zimbabwe.
Panorama

On the inside it’s a bit like a sponge and it’s hard to make out any rings. As an object of dendrochronological analysis the baobab is a genuine challenge. This mammoth tree, also known as *Adansonia digitata* from the family of Malvaceae, is a stem succulent, which means that it stores water in its thick trunk to sustain it through periods of drought. This is the reason for the sponge-like consistency of the wood. “But it can be done,” says Karl-Uwe Heußner, head of the dendrochronological laboratory at the DAI. The researchers want to find out if the baobab is suitable as a climate archive.

Well defined growth rings are a familiar sight from domestic trees. By measuring a tree’s rings, its conditions for growth can be gauged – good years leave behind wider rings than bad years. The data acquired in this way can cast light on climate changes in the distant past. If the ring patterns of a large number of trees with overlapping lifespans are compared, in a process known as cross-dating, a continuous average chronology can be built up that can reach back several thousand years. In the same way it is possible to determine the age of wood used in ancient structures. Wood specimens recovered from archaeological excavations can extend such chronologies further back in time. “Interference factors” like nutrient intake, competition among species, fires and diseases can be eliminated by mathematical methods.

**End of a City**
The ancient kingdom of Zimbabwe is the reason why the researchers are studying the baobab. Today, Great Zimbabwe is an archaeological site 240 kilometres south of Harare, the capital of the modern state of Zimbabwe. The site consists of the sprawling ruins of monumental architecture covering seven square kilometres. The walls are built of granite blocks without the use of mortar. Archaeologists have found imported Chinese pottery, and signs of wealth and luxury all round. The great wall is five metres wide at its base, nine metres high and 244 metres long. An estimated 18,000 people lived there. Until about 1500 AD, when the magnificent city was abandoned. Why this happened has still not been fully explained.

The baobabs that stand inside or near the ruined city were already there when the inhabitants left Great Zimbabwe. It is said the trees can live for up to 2,000 years; the average age is 1,000 years. This longevity assures them of sacred status in the region. Apart from that their fruit is not only tasty but also nutritious and beneficial to health. Their ability to function as a water reserve makes them worth protecting and honouring. If it were possible to extract the growth history from these mighty trees by means of dendrochronological analysis, they would be an ideal climate archive.

**Tree Rings under UV Light**

Even though they are not always noticeable at first sight, “the baobab does have rings too,” says Franziska Slotta. The palaeontologist is writing her doctorate on the baobab on an Elsa Neumann Scholarship at the Freie Universität Berlin, and is working alongside natural scientists from the DAI. “The structures in the wood are just very hard to interpret.” Slotta first took timber core samples from baobabs in spring 2011 while working on her master’s thesis. “After the rainy season, the trunks had soaked up so much water and the core samples were very soft, rather like noodles.” Yet under UV light, experts are able to discern the structure of the spongy timber. In the dendroanatomical measurements the researchers are cooperating with the German Research Centre for Geosciences (GFZ), based in Potsdam, which was also present when the samples were taken. “In the long term we’re going to be is a position to reconstruct the climate history of southern Africa,” Heußner declares. The findings may make it possible to deduce the reasons for which the city was abandoned. The investigations are leading the DAI research team into totally new terrain. “Exploiting the baobab as a climate archive is ground-breaking work,” Heußner says. These giant old trees definitely have enormous potential.

Photos: Slotta

Franziska Slotta and Dr Karl-Uwe Heußner are looking into the baobab’s potential as a climate archive.
THE SMALL BOAT Sophia belongs to the Madrid Department of the German Archaeological Institute. She is moored at the harbour of Mogador, a small island off Essaouira on Morocco’s Atlantic coast, and is used for exploring the island in search of the Phoenicians.

From the 9th century BC onwards the Mediterranean Sea became a cross-frontier zone encompassing the coasts of three continents. Having left their Lebanese homeland, the Phoenicians sailed all round the Mediterranean to carry on trade, setting up trading posts here and there on the coasts. These trading posts developed into busy crossroads for different cultures and economic areas – even as far away as exotic Mogador, on the edge of the ancient world.
In the next issue of Archaeology Worldwide

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Thank you!

Time takes its toll on antiquities, and in many places our cultural heritage is under threat. The *naiskos* of Agathon in the grave circle of the Herakleotes on the Street of the Tombs is a marble, gabled funerary monument, whose rear wall once bore a painted portrait of Agathon. Construction of the metro station together with repeated heavy rainfall have damaged the structural integrity of the monument. The *naiskos* was discovered in 1863 – and collapsed the same year. It has been restored many times since the 19th century, but some metal elements added in previous repairs are now badly corroded, and the *naiskos* as a whole has tilted forwards. Water does not flow off the sloping roof properly now, which further promotes corrosion. Repairs carried out after the earthquake of 1999 urgently needed improving because some pieces of the funerary monument were in immediate danger of breaking off.

The repair work was carried out as part of an extensive DAI campaign on the restoration and long-term presentation of ground monuments at the Kerameikos. The campaign is to be continued systematically in the coming years. For the restoration of the *naiskos* of Agathon, archaeologists will carefully take the monument to pieces, and it will be replaced *in situ* by a copy.