

The visualisation of Uruk

First impressions of the first metropolis in the world

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Abstract: Since 2008, a collaboration between the Oriental Department of the German Archaeological Institute under the supervision of Dr. Margarete van Ess and the Berlin-based conceptual design agency Artefacts has been carried out to visualise major parts of one of the oldest cities in the world. A mixture of archaeological data, textual sources, ethnographic parallels and structural considerations were used to reconstruct an ancient city, that is in some places preserved only to a height of a couple of centimetres. The scarce archaeological evidence required a multidisciplinary approach in reconstructing the site. During our work, we developed three modes of presentation: Basic Models, Technical Reconstructions and Extended Reconstructions, each building up on each other. This paper will show their characteristics, advantages and field of usability and present my own concept of Visualised Theories.

Keywords: Uruk, Visualisation, Architecture, Reconstruction, Visualised Theories

Introduction

Uruk is situated in modern-day Iraq (fig. 1) and was one of the first cities in the world. It was populated almost without interruption for nearly 5,000 years - from the end of the 5th millennium BCE to the 3rd century CE. After its abandonment, it was still in existence and part of the Sasanian Empire until the 7th century CE (VAN ESS 2013:95). Uruk is linked with terms like Early City State, Communal Buildings or Sophisticated Administration (NISSEN 1999:44-48).

Uruk is also famous for the invention of cuneiform writing at the end of the 4th millennium BCE, the so-called *Late Uruk Period* (NISSEN 1999:45), which is also the time during which many distinctive architectural features were invented and developed: the first monumental buildings were constructed and elaborated by the extensive use of complex designs and décors (EICHMANN 2013:118ff.).

The excavations, that were initiated by Julius Jordan and Conrad Preußner 100 years ago and lasted over 40 excavation seasons until the last surveys and geomorphological investigations in 2002 (VAN ESS 2013), revealed only scarce remains of that early period. This can be linked to the building material, which is unburned mud-brick, but also to the Near Eastern tradition of flattening older buildings and rebuilding new ones on top of them. Furthermore, during the transition from the 4th to the 3rd millennium BCE a major reorganisation of the central district had taken place, during which many of the previous existing buildings in that area were restructured (NISSEN 1999:48). Therefore, various layers of different building phases lay directly on top of each other and the stratigraphic differentiation is a complex task.

In the late 3rd millennium BCE, in the so called *Ur-III Period*, Uruk was surrounded by a massive city-wall, which was possibly built by the famous king Gilgamesh in the beginning of the 3rd millennium BCE. It surrounded an area of about 5.5 square kilometres within which over 40.000 inhabitants were

accommodated (CRÜSEMANN 2013:32). The central district in Uruk was dominated by a massive ziggurat with adjoining rooms, courts and walls.

Since the 2nd millennium BCE, various dynasties ruled over Uruk and the city was part of the Old-Babylonian, Kassite, Neo-Babylonian, Achaemenid, Seleucid, Parthian and Sasanian empires until the conquest of the Arabs in 634 CE (VAN ESS 2013:95 & FINKBEINER 2013:221).

Different archaeologists collected a vast amount of data that is now largely published and archived by the German Archaeological Institute. In a long-term process the Institute compiled the excavation data in a large series of publications offering detailed plans, sections and descriptions.¹

New research by surveys and remote sensing add to the existing excavation data (BECKER et al. 2013, BRÜCKNER 2013 & VAN ESS 2013:101). Due to the fact that results were accumulated over a long time span and the resulting complicated set of data accompanied by the lack of remains of monumental architecture like it is present in Babylon², only a handful of specialists could imagine what Uruk might have looked like.

The Uruk Visualisation Project

The Uruk Visualisation Project was initiated by the Oriental Department of the German Archaeological Institute in Berlin by Dr. Margarete van Ess in 2007. M. van Ess is the Scientific Director of the Oriental Department and also the Site Director of the excavations in Uruk itself, where she has worked since 1989. The Uruk Visualisation Project has three distinct goals: (1) to enable discussion on and scientific work with the architectural remains by evaluating the archived material and developing reconstructions and visualisations, (2) the use of these visualisations in an exhibition³ and (3) the use of these visualisations for a Visitors Centre in Uruk itself⁴.

We⁵ were commissioned in 2008 by the German Archaeological Institute to work closely with Margarete van Ess, Ricardo Eichmann and their assistants Frank Voigt and Sebastian Bator to realize the Visualisation Project. Our task was to develop scientific models and designs for reconstructions based on previous attempts, the scientific material and foremost intense discussions with the clients to achieve the goals mentioned before. The basis was the publications of the architectural remains in Uruk (EICHMANN 2007, VAN ESS 2001 & KOSE 1998), which cover different chronological periods. Each period was reconstructed

¹ The series is called *Ausgrabungen in Uruk-Warka Endberichte (AUWE)* and up until now 25 volumes are published.

² Except the remains of the very much eroded ziggurat in the centre of Uruk.

³ The exhibition called „Uruk – 5000 years of megacity“ was shown in the Pergamonmuseum Berlin from the 25th of April 2013 – 8th of September 2013 and in the LWL-Museum für Archäologie in Herne from the 3rd of November 2013 – 21st of April 2014. For more information, see the exhibition catalogue (CRÜSEMANN et al. 2013).

⁴ Visualisierung der antiken Stadt Uruk. Deutsches Archäologisches Institut. [online] <<http://www.dainst.org/de/project/visualisierung-uruk>> [Accessed 6 February 2014]

⁵ We are a Berlin-based conceptual design agency called *Artefacts* consisting of two freelancing archaeologists. For more information, please visit our website at: <http://en.artefacts-berlin.de/>

in varying detail with one or more buildings, depending on the requirements given by the Oriental Department. Besides the scientific work of reconstructing these buildings, we tried to find a way to present them to different audiences – from a scientific community to the public. During our work, we developed three different modes of presentation, each building up on each other and increasing in detail, fulfilling different requirements of the Visualisation Project.

Modes of presentation

As a first step, simple models were needed to compare possible approaches to reconstruction and to provide a basis for further discussion. As the project proceeded, the need for more detail and finally the requirements given by the Uruk exhibition demanded more sophisticated models and final renderings.

Clearly, the scientific work and presentation required different approaches than the presentation in an exhibition or a Visitors Centre to a broader audience. Both shared the responsibility of presenting these images as scientific representations of Uruk. Therefore, we needed a fast (and cheap) way of evaluating different reconstructions that would also be suitable to be archived by the German Archaeological Institute in order to be available for further research at a later point.

Basic Models

The first goal of the Uruk Visualisation Project was the re-evaluation of older reconstructions and the creation of new scientific 3D models based on the most recent publications and research. The purpose was to answer detailed questions about the buildings, interrelations between them and the overall city composition in different chronological periods. Furthermore, a detailed documentation about the reconstruction process was pursued to ensure future researchers to be able to retrace each decision made.

By working with the material and intense discussions with M. van Ess, her team and consulting specialists, we came - very early on - to the conclusion, that in some cases different versions of a building had to be developed (BATOR 2013:366ff.). We therefore created so called *Basic Models*, showing every discussed aspect and possibility in a very simple way.⁶ These Basic Models provided the basis for further discussions. The creation of these models was fast and flexible and allowed us to compare and discuss different versions of a building.

A very vivid example of these Basic Models is given by *Building C* of the Late Uruk Period (fig. 2). Building C is part of a greater architectural assembly of the Late Uruk Period and one of the biggest buildings of that time.

The remains of the building were very scarce and its walls were standing only to a height of a couple of centimetres revealing only the basic outline of the ground-plan (fig. 3). The function of the building is unclear. Although later parallels maybe hint to a sacral use (that is not confirmed for the Late Uruk Period), we can attribute it as a special communal building at the least (NUNN 2006:171f.). Figure 4 shows different

⁶ These models had a polygon count between 1.000 and 10.000.

proposals for the reconstruction of that building, based on older and more recent attempts. By rebuilding and analysing these Basic Models, we could finally decide for two versions of Building C that we continued to work on at a later stage (see below).

Additionally, we exported the models in VRML format for the Oriental Department to archive and use at a later point. The VRML file format is a lightweight and easy-to-handle 3D format importable into a wide range of software. These models are now part of the archive of the Oriental Department.

Technical Reconstructions

After creating the Basic Models and also deciding for the most probable versions of each building, we started to think about the presentation of these models. The Oriental Department required models for two different purposes: scientific presentation in publications and talks and presentation for a broader audience in the Uruk exhibition and the Visitors Centre in Uruk itself.

The first idea was, that a presentation for a scientific audience had to be different than to a non-scientific one. We came to the conclusion that these two modes of presentation do not have to rule each other out necessarily. While refining the Basic Models, we created a presentation mode we called *Technical Reconstruction*.⁷ This mode is marked by using only as much details as necessary to complete a building and by presenting it on the archaeological ground-plan (fig. 5). There is no elaboration and the reconstruction is held to a minimum amount of secondary sources or free interpretation. Two versions of the Basic Models of building C mentioned before were refined and improved into technical reconstructions, of which one possibility is shown in figure 5.

Step by step we rebuilt the whole inner city of the Late Uruk Period and repeated the steps explained above of evaluating Basic Models, deciding for one or more versions of a reconstruction and refining them with the information given to a certain point for each building. Remains with no information, but their approximate location and size, were visualised as semi-transparent boxes. This way, we were able to combine a nearly complete reconstruction of the inner city at that time, an image that existed only in form of a plan before (fig. 6).

We decided that this form of presentation is suitable for both requirements given by the Oriental Department: the presentation to a scientific and to a broader audience. On the one hand, we were able to add all scientific details and at the same time, by presenting the models on the archaeological ground-plan, show the uncertainty that is inherent in reconstructions. On the other hand, by texturing the models and setting them into a realistic light, the Technical Reconstructions were appealing enough to present them in the exhibition as images and animations, without risking to create an *image hammered in stone*. After talking to visitors of the exhibition in Berlin, it became apparent that this mode was much appreciated by the audience, who felt integrated into the scientific process and fully understood the intended visualisation of uncertainty.⁸

⁷ These models had a polygon count between 10.000 and 100.000.

⁸ Personal communication.

Extended Reconstructions

Additionally, the Oriental Department wanted to create another mode of presentation, which we called *Extended Reconstructions*. This mode is based on the Technical Reconstructions, but enhanced by certain details to render an even more completed image.⁹ In addition to the architectural reconstruction, a reconstruction of the society was desired as well. The intention behind that was to fill the reconstruction with life and not only to show where people lived, but also how the inhabitants occupied that space. To achieve this, secondary sources were needed and provided by the Oriental Department. Nevertheless, every detail was based on archaeological, historical, ethnographic or textual evidence.

A very good example is the reconstruction of the central Eanna district of 21st century BCE Uruk. We started with the Technical Reconstruction of the excavated material to render a non-elaborated picture of that area (fig. 7). Again, details were only added where necessary to complete single structures. Fortunately, for this time period, additional archaeological data exists from surveys and satellite images that provide an approximate layout of the city (BECKER, H. et al. 2013, BRÜCKNER, H. 2013, VAN ESS 2013:101 & FINKBEINER 1991). One can now say what the surrounding looked like, where residential buildings, gardens, other communal buildings or the city wall were located. Furthermore, texts describe a festivity that took place in the morning of the Sumerian New Year (e.g. NUNN 2006, PALLIS 1926 or SALLABERGER 1993). Although these sources describe the festivity in different cities, we know that it has taken place in Uruk also and its events are transferable (SALLABERGER 1993:209ff.). From these texts, a whole amount of detail was considered to complete the image of 21st century BCE Uruk architecturally as well as socially. In this Extended Reconstruction (fig. 8), we were able to show a vast amount of detail. A comprehensive description of every information depicted in this visualisation would go beyond the scope of this paper. I therefore present only a small description of the main events.¹⁰

We can see a parade of priests walking through various courts up to the divine image of Ishtar, where the king, who is leading the procession (PALLIS 1926:139-143 & SALLABERGER 1993:311), is offering a lamb to the goddess (SALLABERGER 1993:175, 209-214 & NUNN 2006:184f.). Behind that court, rows of priests await the ascension of the king up to the temple placed on the ziggurat. We know, that these people were celebrating and were accompanied by musicians (SALLABERGER 1993:178 & NUNN 2006:182f. & PALLIS 1926:145) and naked female dancers. Outside the holy inner district, which was restricted to certain personnel (NUNN 2006:174-175), the residents of Uruk were also celebrating (SALLABERGER 1993:177 & PALLIS 1926:150-152). In the background one can see the residential areas, the city river and channels with adjoining gardens and the city wall (BECKER et al. 2013 & BRÜCKNER 2013). This very small description of the visualisation shows how much information can be included into a single image.

⁹ These models had a polygon count of over 2.000.000.

¹⁰ A detailed publication of the Uruk visualisations is in preparation.

Visualized Theories

As appealing as it may seem a visualisation of that kind harbours danger. Images suggest certainty.

Although most of the specialised archaeologists may know that this is just a proposal, the broader audience or even archaeologists from other fields might not. I consider it therefore necessary to communicate these images, but also the Technical Reconstructions shown before, as *Visualised Theories*.

Many examples of the past have shown that presenting visualisations of ancient cultures or societies may lead easily to a false image intentionally as well as unintentionally. As Moser & Gamble (1997) have shown, the image of prehistoric cave-men is victim of miscommunication even today. Pratt (2005) could present the same misconceptions for the visualisation of Ancient Europe that developed out of romanticised images of American Indians. Micale (2010) has even shown that the first archaeological representations of ancient cultures were used later on to build modern national identities. Phillips (2005) pointed to something similar for the presentation of early 20th century Britain with the aid of the famous paintings of Amédée Forestier of the Glastonbury Lake Village.

Reconstructions are always theoretical assumptions about what something might have looked like or how something might have been constructed. In the scientific method, if you have a theory, you propose it by publication. At that point the theory is available for discussion and other researchers might consent to it or not. Reconstructions are very similar: they are Visualised Theories. But in order to provide a medium for discussion, these visualisations have to be contextualized by means of description, documentation and explanation. The combination of explanatory text and illustration is the best way to convey the maximum amount of information or as Golvin puts it: "*It is better to draw what is difficult to describe with words, and to write what cannot be rendered with visual signs.*" (GOLVIN 2012:82). To reach this, two things have to be considered: (1) the mode of presentation and (2) the documentation of the reconstruction process.

The mode of presentation is, as shown above, dependent on the requirements of the setting in which the visualisations are presented. The possibilities are endless and I have argued, that a scientific presentation has not to be constrained to a scientific audience as well as a popular (i.e. realistic) one has to be to popular media. It is more a question about which mode of presentation offers the best way to convey the desired information. More importantly and strongly connected to this issue is the direct description of such images, may it be as accompanying captions in a publication or as a short text besides the visualisations in an exhibition. Terms like "*reconstruction*", "*proposal*" or "*one of many possibilities*" are simple ways of communicating the uncertainty of reconstructions. Detailed descriptions of the sources and uncertainties are a more elaborate way to do so of course. Visual possibilities like semi-transparent texturing, colour-coded (un)certainities or the presentation on an archaeological ground-plan are helpful tools. As there is no such thing as a certain reconstruction, we have to make absolutely sure, that nobody is expecting one.

The other very important point of presenting a Visualised Theory is the documentation of it and its publication. Here, a coherent way of documenting, publishing and archiving has still to be developed. A straightforward approach, that was used by the Uruk Visualisation Project up until the exhibition, are detailed protocols about the decision process that document every step of the reconstruction, all available sources

but also all uncertainties and disagreements between the people involved. These guidelines are recommended by the IT department of the German Archaeological Institute¹¹ and based on the London Charter for the computer-based visualisation of Cultural Heritage.¹² These protocols are simple to produce at first, but need a certain amount of processing afterwards to be suitable for publication or archiving. Another (still experimental) way of documenting a decision process is the use of a Wiki. This freely available platform is in my own experience very much suitable for documenting and cross-referencing a reconstruction process on a multiple-user basis. Although the installation and familiarisation with a Wiki takes an effort at first, a structured and already edited protocol is easily produced after a while. Furthermore, a publication of the protocol is very easy if it is done online, but also does not cost much more effort in a printed version. Also, a Wiki is by nature an online archive, so that the archiving is taken care of automatically.¹³ At the moment, we are testing this medium to document the reconstruction process for our new projects.

These are just a few preliminary suggestions on how to describe, document and archive reconstructions which I presented in order to demonstrate what needs to be developed in the future to ensure correct presentation and documentation. In a time, where the use and fabrication of computer generated visualisations is getting easier every year, we have to take care that we do not drown in a flood of undocumented and incomprehensible (and therefore indisputable) reconstructions.

These examples show, that we have to be careful in reading and furthermore *presenting* archaeological reconstructions. Our task is to find a way to present these images objectively as possible and without the danger of misconception. By thoughtful presentation and documentation of the decision process, every reconstruction, no matter how detailed and elaborated it is, is able to be discussed. In this way Visualised Theories become contextualized and are open for scientific discussion.

Conclusion

The work of the past five years has not only taught us a lot about visualisation techniques, but also about the responsibility connected to presenting these images. By creating an image of the past, we actively create that image in other people's minds, whether they are visitors to an exhibition, students of archaeology or archaeologists like ourselves.

I hope to have shown that different modes of presentation can not only help the scientific process of creating a reconstruction, but also have certain characteristics that are helping to convey this image to different audiences. We have to present these images carefully and always communicate them as Visualised Theories in order to make absolutely clear, that these reconstructions are only one of many possibilities. No

¹¹ IT-Leitfaden, erster Teil (V.1.0.4) - spezifische Vorgaben des DAI. Deutsches Archäologisches Institut. [online] <<http://www.dainst.org/en/project/it-leitfaden?ft=all>> [Accessed 27 February 2014]

¹² The London Charter (Draft 2.1). [online] <http://www.londoncharter.org/fileadmin/templates/main/docs/london_charter_2_1_en.pdf> [Accessed 27 February 2014]

¹³ Of course, one always has to think of the long-term storage problems of such data. The approach to this matter will be part of the development of a solid reconstruction method.

matter what mode of presentation one uses, it is always imperative to provide proper documentation to allow proper discussion.

Acknowledgements

I would like to thank the Organising Committee of the Conference on Cultural Heritage and New Technologies 18 for providing an excellent opportunity to present this work to an interested audience and for their hospitality in the beautiful town of Vienna. I am also grateful to the German Archaeological Institute and foremost to Dr. Margarete van Ess for the fruitful cooperation over the last five years and for the permission to use the plans of Uruk in this paper. Furthermore, I would like to thank Carolin Jauss and Henning Franzmeier for their editorial remarks and helpful comments.

References

- BATOR, S. et al. (2013). *Visualisierung der Architektur von Uruk*. In: CRÜSEMANN, N. et al. (eds.), 365-371.
- BECKER, H. et al. (2013). *Uruk: Urbane Strukturen im Magnet- und Satellitenbild*. In: CRÜSEMANN, N. et al. (eds.), 355-361.
- BRÜCKNER, H. (2013). *Uruk – Aus Geoarchäologischer Sicht*. In: CRÜSEMANN, N. et al. (eds.), 343-351.
- CRÜSEMANN, N. (2013). *Uruk – 5000 Jahre Megacity. Die Ausstellung*. In: CRÜSEMANN, N. et al. (eds.), 29-35.
- CRÜSEMANN, N. et al. (eds.) (2013). *Uruk - 5000 Jahre Megacity: Exhibition Catalogue "Uruk - 5000 Jahre Megacity"*. Petersberg: Imhof.
- EICHMANN, R. (2007). *Uruk. Architektur I. Von den Anfängen bis zur frühdynastischen Zeit*. Mainz am Rhein: von Zabern.
- EICHMANN, R. (2013). *Frühe Grossarchitektur der Stadt Uruk*. In: CRÜSEMANN, N. et al. (eds.), 117-129.
- VAN ESS, M. (2001). *Uruk. Architektur II. Von der Akkad- bis zur mittelbabylonischen Zeit*. Mainz am Rhein: von Zabern.
- VAN ESS, M. (2013). *Uruk – Die Forschungsgeschichte*. In: CRÜSEMANN, N. et al. (eds.), 95-101.
- GOLVIN, J.-C. (2012). *Drawing Reconstruction Images of Ancient Sites*, in: GREEN, J. et al. (eds.), *Picturing the Past. Imaging and Imagining the Ancient Middle East*, Oriental Institute Museum Publication 34, Chicago: Oriental Institute, 77-82.
- FINKBEINER, U. (1991). *Uruk: Kampagne 35-37. 1982-1984. Die archäologische Oberflächenuntersuchung (Survey)*. Mainz am Rhein: von Zabern.
- FINKBEINER, U. (2013). *Die Stadt Uruk im Wandel der Geschichte*. In: CRÜSEMANN, N. et al. (eds.), 215-221.
- KOSE, A. (1998). *Uruk. Architektur IV. Von der Seleukiden- bis zur Sasanidenzeit*. Mainz am Rhein: von Zabern.
- MICALE, M.G. (2010). *Designing architecture, building identities. The discovery and use of mesopotamian features in modern architecture between Orientalism and the definition of contemporary identities*, in: MATTHIAE, P. et al. (eds.), *Proceedings of the 6th International Congress on the Archaeology of the Ancient Near East (Rome, May 5-10 2008)*, Wiesbaden: Harrasowitz, 93-112.
- MOSER, S./GAMBLE, C. (1997). *Revolutionary Images. The iconic vocabulary for representing human antiquity*, in: MOLYNEAUX, B.L. (ed.), *Cultural Life of Images. Visual Representation in Archaeology*, Oxfordshire: Routledge, 184-212.
- NISSEN, H.J. (1999). *Geschichte Alt-Vorderasiens*. München: Oldenbourg.
- NUNN, A. (2006). *Kulttopographie und Kultbläufe in mesopotamischen Tempeln: drei Beispiele*, in: Kratz, R.G./Spieckermann, H. (eds.), *Götterbilder, Gottesbilder, Weltbilder. Polytheismus und Monotheismus in der Welt der Antike Band 1*, Tübingen: Mohr Siebeck, 167-195.
- PALLIS, S.A. (1926). *The Babylonian Akîtu Festival*. Copenhagen: Bianco Lunos Bogtrykkeri.

PHILLIPS, J.E. (2005). *“To Make Dry Bones Live”*: Amédée Forestier’s Glastonbury Lake Village, in: SMILES, S./MOSER, S. (eds.), *Envisioning the Past. Archaeology and the Image*, Oxford: Blackwell, 72-91.

PRATT, S. (2005). *The American Time Machine: Indians and the Visualization of Ancient Europe*, in: SMILES, S./MOSER, S. (eds.), *Envisioning the Past. Archaeology and the Image*, Oxford: Blackwell, 51-71.

SALLABERGER, W. (1993). *Der kultische Kalender der Ur III-Zeit*, Untersuchungen zur Assyriologie und Vorderasiatischen Archäologie 7/1, Berlin/New York: de Gruyter.

Figures



Fig. 1 – Map of the Near East with the in the text mentioned locations (Copyright: Sebastian Hageneuer)

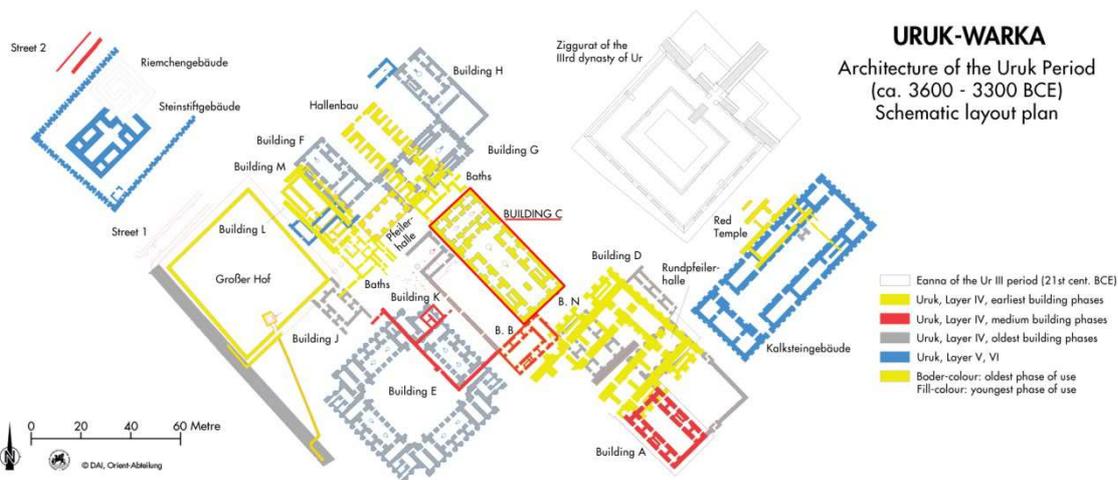


Fig. 2 – Schematic plan of the Late Uruk Period (Copyright: DAI, Orient-Abteilung)

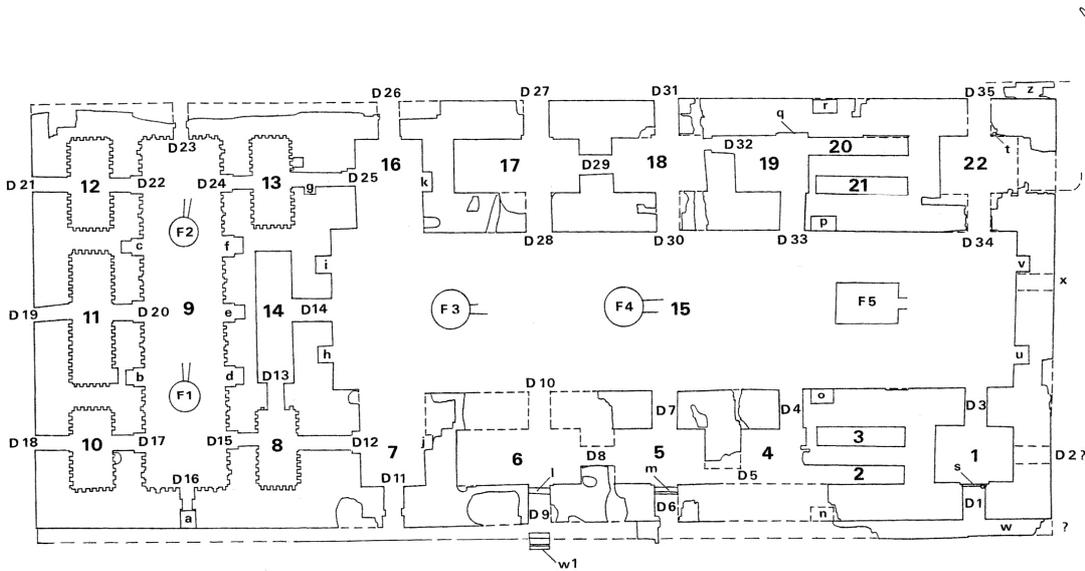


Fig. 3 – Plan of Building C of the Late Uruk Period (Copyright: DAI, Orient-Abteilung)

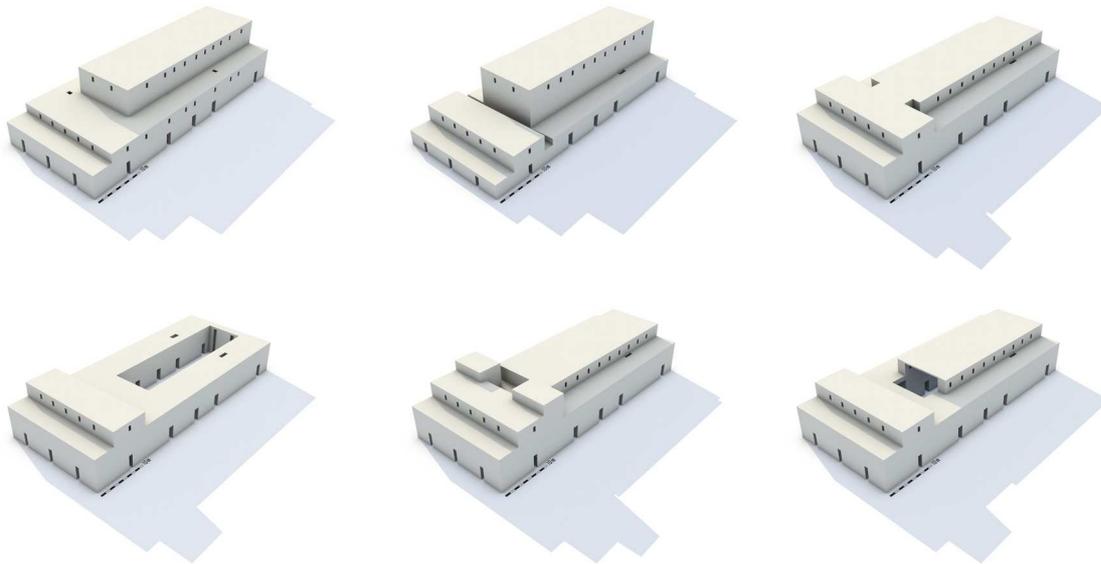


Fig. 4 – Proposals of different reconstructions by Basic Models of Building C (Copyright: artefacts-berlin.de; Material: DAI)

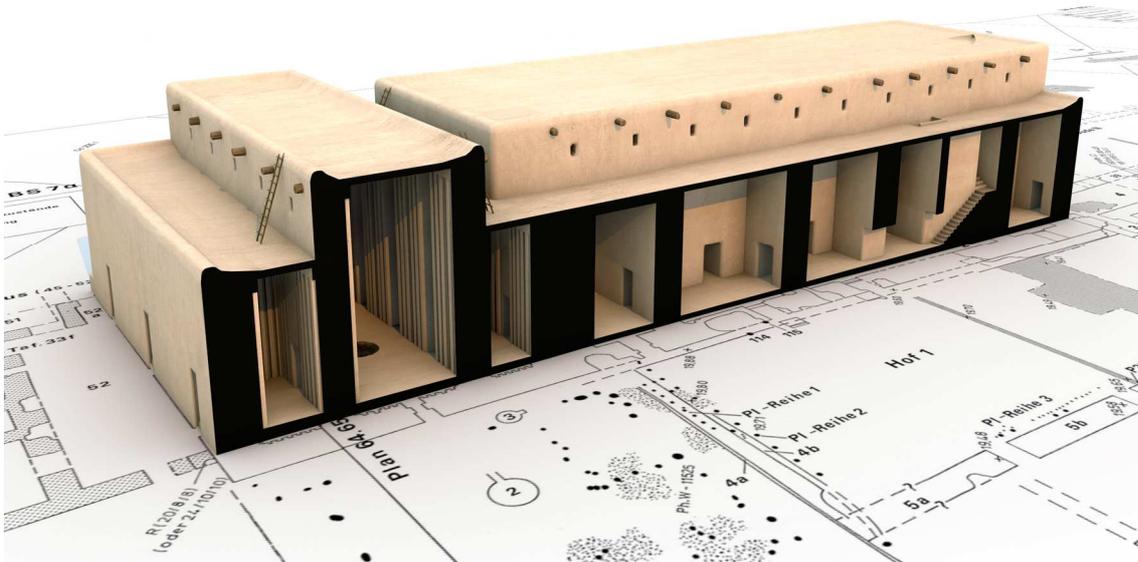


Fig. 5 – Technical Reconstruction of Building C in the Late Uruk Period (proposed one-storey version) (Copyright: artefacts-berlin.de; Material: DAI)

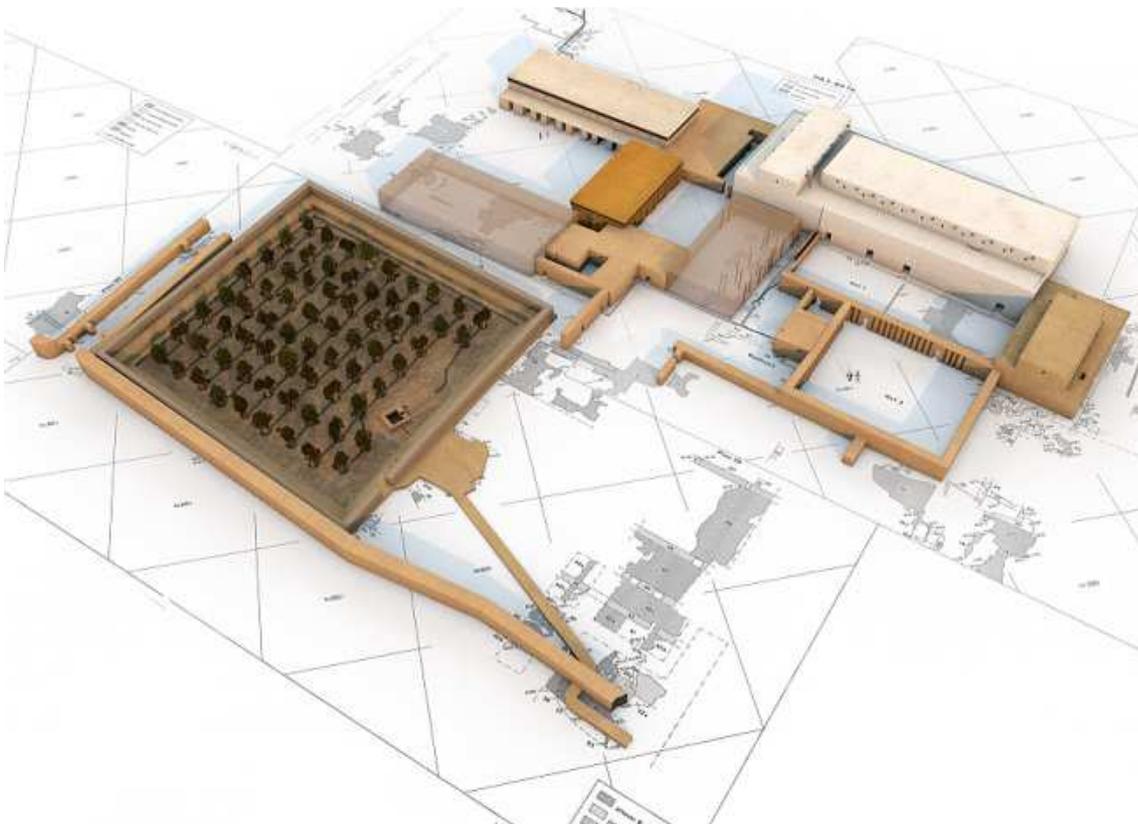


Fig. 6 – Overview of the reconstructed central district of Uruk in the Late Uruk Period (Copyright: artefacts-berlin.de; Material: DAI)

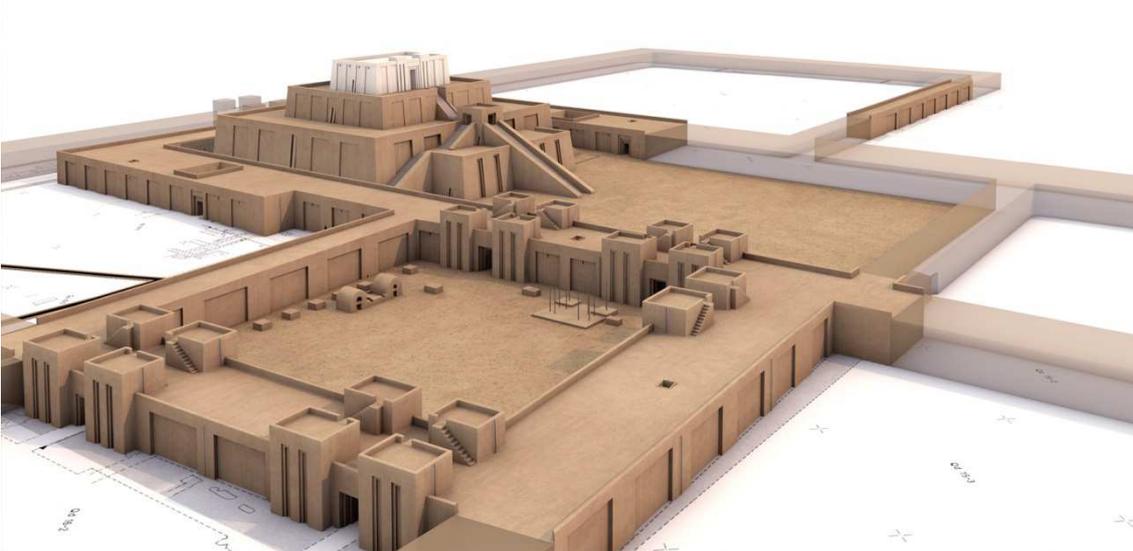


Fig. 7 – Technical Reconstruction of the central district in Uruk in the Ur-III Period (Copyright: artefacts-berlin.de; Material: DAI)

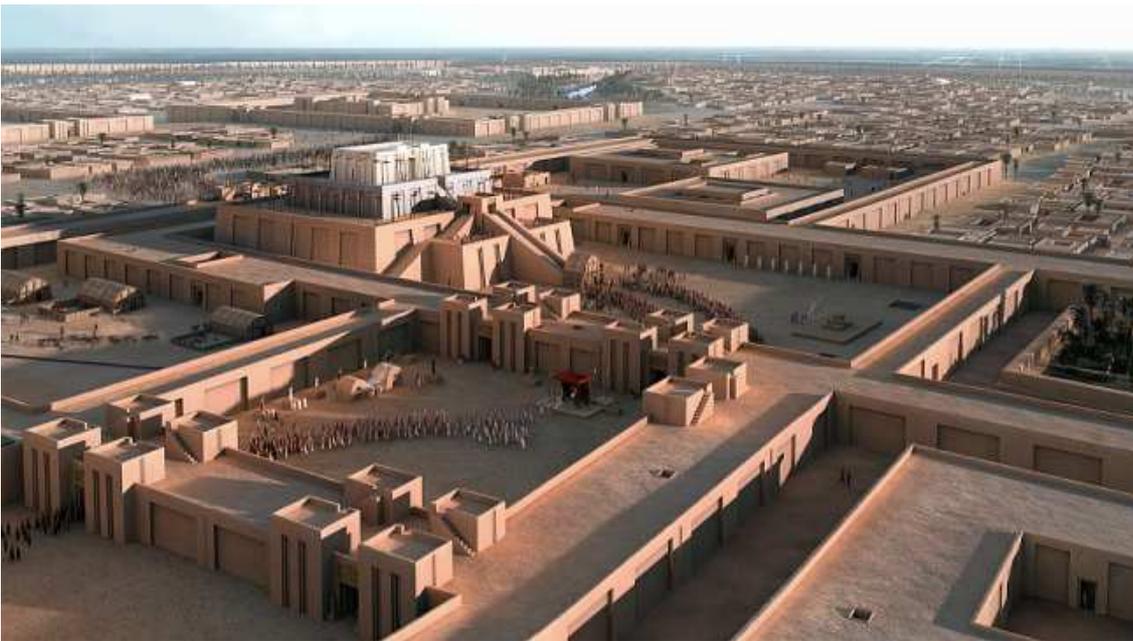


Fig. 8 – Extended Reconstruction of the central district in Uruk in the Ur-III Period (Copyright: artefacts-berlin.de; Material: DAI)

Imprint:

Proceedings of the 18th International Conference on Cultural Heritage and New Technologies 2013 (CHNT 18, 2013)

Vienna 2014

<http://www.chnt.at/proceedings-chnt-18/>

ISBN 978-3-200-03676-5

Editor/Publisher: Museen der Stadt Wien – Stadtarchäologie

Editorial Team: Wolfgang Börner, Susanne Uhlirz

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