Using Digital Media to Mediate Archaeology in the LVR-Archaeological Park Xanten / LVR-RömerMuseum

Stephan Quick

LVR-Archaeological Park Xanten

Abstract

For the education and mediation work of the LVR-Archaeological Park Xanten / LVR-RömerMuseum, digital media play a central role. The museum and the park preserve the foundations of the former Roman city Colonia Ulpia Traiana. The area has not been built over since late antiquity. Today only the foundations of the Roman buildings are preserved beneath the surface. Various methods are in use to visualise the dimension of the former Roman city and some of their monumental buildings to the visitors. A main feature of the museum's education service is a virtual reconstruction of the Colonia. The film is displayed on huge screens in the museum's permanent exhibition. The visitors get an impression of the Roman city from the point of view of an ancient pedestrian. The aim is to give visitors of all target groups a comprehensive and detailed impression of the city's architectural appearance and to create a realistic impression of space and atmosphere of the Colonia Ulpia Traiana, based on the archaeological evidence.

Keywords

Roman, Archaeology, Museum Education, Virtual Reconstruction

The Roman history of Xanten begins at around the time of the birth of Christ. At the beginning of the Augustan campaigns, Roman legions established the military camp Vetera on the Fürstenberg, south of the present city of Xanten. Just outside the legionary camp, civilians and artisans settled on a shore of the Rhine. Over time, the settlement grew in size. At the initiative of Emperor Trajan, probably around the year CE 100, it was granted the highest Roman city status. The Colonia Ulpia Traiana (CUT) was one of the most important cities in the Germanic provinces. The 73-hectare city area was crossed by streets laid out in an orthogonal grid and was surrounded by a 3.4-km-long city wall, making a total of 40 insulae. Representative public buildings such as the Forum, the Capitol Temple, the large thermal baths and the amphitheatre dominated the cityscape (Figure 1). In the heyday of the Colonia, in the mid-2nd century, there were probably more than 10,000 people of various cultural origins living in the city. In addition to Roman veterans, native Teutons, Gauls and people from other parts of the Roman Empire settled there (Heimberg, Rieche & Grote 2009; Müller 2008a; 2008b). The decline of the city began at the end of the 3rd century CE. After a destruction, the city area was reduced in size of nine insulae in the centre. In the middle of the 4th century CE, this late antiquity fortress was probably extensively destroyed by the Franks or abandoned by the inhabitants. After the end of the Roman era, the focus shifted to today's Xanten Domhügel, the area of the former Roman cemetery road. The area of the Colonia
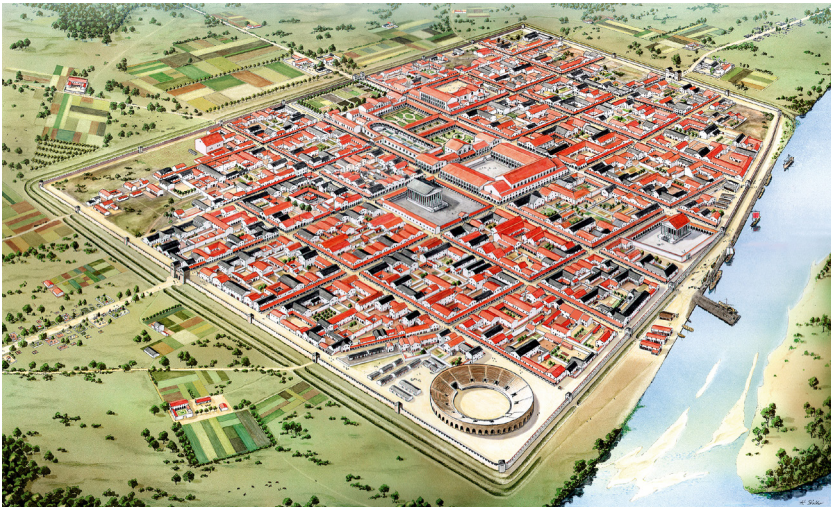

Figure 1: Impression of the Colonia Ulpia Traiana. © H. Stelter, LVR-APX.

had not been built over since late antiquity, so the ancient stone materials were plundered, sold or reused for the construction of the medieval city (Heimberg, Rieche & Grote 2009; Otten & Ristow 2008).

Today, only the foundations of Roman buildings or their underground trenches have been preserved. The LVR-Archaeological Park Xanten (LVR-APX) has been protecting, researching and mediating these remains since 1977 as one of the most important archaeological monuments in Germany. Based on the concept of the LVR-APX, the research results are presented to the general public. In order to provide visitors with an idea of what are today mostly invisible original findings, the archaeologically excavated remains are depicted using various methods: the modern layout of the Archaeological Park corresponds to the Roman street grid. Tree-lined avenues today mark the porticoes that were once in front of the ancient residential development. Important buildings of the Roman city such as the amphitheatre or the Roman inn have been built on their original sites and at a scale of one to one, as partial or full reconstructions in the form of 'walk-in models'. The foundations of the large town baths, on the other hand, were given a protective structure and made accessible by a footbridge to visitors. Guests to the south-eastern urban area can capture an impression of inner-city space on a section of the former Decumanus VI. Here the street line is framed by the buildings of the reconstructed craftsmen's houses and the neighbouring hostel with its small baths, based on the ancient model (Müller 2011; Hilke 1994: 58).

Recent approaches and learning objectives

Since 2008, the LVR-RömerMuseum has been part of the LVR-Archaeological Park Xanten. The permanent exhibition, with around 2,500 objects, tells the story of the Xanten area chronologically, from the time immediately before the Roman conquest, at about the time of the birth of Christ, to late antiquity and the beginning of the Franconian epoch. For the education and mediation work of the museum, digital media are of central importance. As one of the most recent projects, the LVR-RömerMuseum conceived an interactive unit for the exhibition 'The Flow of Goods – Trade, Logistics and Transport in the Roman Lower Rhine Area' to visualise different transport routes via land, river and sea as well as the provenance of edibles and raw and building materials which had to be imported to the CUT. The visitors were able to buy and sell goods, to choose different types of transportation and to gain profit like a Roman trader.

In the context of informal learning, simulations and games can offer a great potential to attract visitors in order to engage them in applying knowledge and to support historical learning. The use of virtual reconstructions is widespread in museums today. The different implementations are discussed as a tightrope walk between 'abstraction' on the one hand – in support of scientific reliability – and 'immersion' on the other hand – favouring a staged lifelike atmosphere. While

not every visitor can understand a purely abstract reconstruction with technical drawings, photorealistic impressions can offer a low-threshold approach to many lay persons. Rapid technical development leads to a growing hyperrealism of the reconstructions. However, since it is not always clear where knowledge is limited, this carries the danger of conveying a fictive reality as an image of historical reality (Süß & Gräf 2017: 14–16; Dreier 2010: 162; Franzmeier & Hageneuer 2017: 21; Wittur 2010: 157; Lengyel & Toulouse 2016).

The virtual reconstruction of the Colonia Ulpia Traiana

Building structures of the CUT on the surface are no longer preserved and direct access to the remaining archaeological evidence in the ground is hardly possible. In the years 2014 to 2016, the LVR-Archaeological Park Xanten / LVR-RömerMuseum, in cooperation with Faber Courtial GbR, produced a six-part virtual reconstruction of the CUT. The aim was to give the visitors a comprehensive impression of the architectural appearance in the form of an ancient city walk in the Roman town. In the following, three partial sequences of the virtual reconstruction will be discussed more in detail: the archaeological record of the Forum, the large town baths and the harbour will be examined as basis of their virtual reconstruction. At first, the technical realisation and the museum's implementation of the installation in the permanent exhibition of the LVR-RömerMuseum will be explained.

The film sequences are shown in the permanent exhibition on three large screens, which are installed above a real model of the CUT, 3 × 3 metres in size, on a scale of 1:350. The three-dimensional form of representation of the Colonia in the mid-imperial period contributes significantly to an understanding of the entire urban system. Visitors to the museum look at the extent of the Roman city from a bird's-eye view. The reduced scale representation allows the recording and conveying of large buildings such as the Forum and the amphitheatre, or infrastructural facilities such as the harbour, showing not only their location but also their proportions in the context of the city structure (Henke-Bockschatz 2016). The individual segments bounded by the grid are reversible and can be amended in the case of new scientific evidence.

Currently, about 20% of the inner-city area has been scientifically studied. A large part of this is attributable to public and religious buildings (Figure 2). These areas include insula 10, with the large town baths, insula 37, with the so-called Harbour Temple, and parts of insulae 38 and 39, with the hostel and small baths and the residential and craftsmen's houses. In the physical model these areas are characterised by special attention to detail such as a naturalistic colour scheme and tile-and-slate roof appearance. On the other hand, more than 80% of the inner-city area, including large parts of the civil buildings, has not been examined by archaeological excavations. Geo-prospecting methods that have been carried out continuously since 2006 have proven that these

Figure 2: Model of the Colonia Ulpia Traiana in the scale of 1:350. © O. Ostermann, LVR-APX.

areas were built up to a large extent. Sometimes, however, it is unclear how, for instance, the central area of individual insulae was developed and whether this served, for example, for keeping livestock, productive or working animals or was cultivated as acreage for self-supply (Kienzle 2008: 413; Müller & Zieling 2014; Babucic & Seifert 2018). In order to illustrate the different research statuses in the city model, these areas are displayed by residential and commercial buildings coloured in light grey without any architectural details.

The combination of the three-dimensional model with the virtual reconstruction not only offers the advantage of being able to convey an impression of the density of the ancient buildings but also allows the viewer to visualise the monumentality of the impressive representative buildings. The real model can be viewed from any angle, but the buildings can only be seen from the outside. The addition of the virtual reconstruction offers the possibility of a change of perspective, allowing an insight into the interiors and thus adding an ambience to the scene (Grellert 2007: 201; Lengyel & Toulouse 2016: 94). The buildings in the film sequences correspond to the archaeologically proven buildings of the ancient city at the current state of research. The findings of the buildings in the CUT generally provide detailed information on the floor plans of the buildings. In addition, researchers use structural considerations to presume the roof shape, e.g. caping or gable roofs. The findings of the areas of civilian housing that have been investigated so far by excavations have revealed a narrow perimeter block development with houses whose narrow front sides

were aligned with a portico facing the street. Owing to the lack of information on the upper floors in Xanten, however, only hypothetical statements on the height development of buildings and on the design and layout of rooms on the upper floors are possible (Kienzle 2008; 2016). On the basis of the archaeological ground plan and reconstruction drawings, which building researchers have compiled over years of research and critically discussed in scientific specialist colloquia, the buildings were reconstructed three-dimensionally using computer-generated images. In order to fill the Colonia with life, people, animals, wagons and cargo barges were visually integrated in natural motion in the film. Actors were filmed against a neutral background using the so-called green screen process and then were embedded in the virtually reconstructed scenery. Only humans and animals in the background were animated. The visual implementation is supported by soundtracks, e.g. cheering or battle noise in the arena, background conversations, or ambient sounds such as footsteps, hooves or wagons.

A walk to the Forum

At the beginning of the virtual city tour, the viewers slip into the role of a Roman pedestrian, who enters the Colonia from the south through the so-called Vetera Gate. Walking on the gravelled surface of the cardo maximus, they explore the city from his point of view: most of the houses of the craftsmen's district were made up from shops and workshops at ground level and living rooms upstairs. All Roman houses had covered walkways; in some areas of the city there is evidence for paving with pebbles (Müller 2008b). The Forum was located in the city centre. We enter the site by the main entrance from the west. Here, merchants would have sold their goods in the hustle and bustle of trading. The archaeological excavations give evidence of a square paved with trachyte flagstones. On the other hand, no remnants of the statues adorning the square have yet come to light. On the north and south sides, the square was lined by approximately 21-metre-high halls with gabled roofs, which are interpreted as storage areas. The Forum basilica to the east consisted of a single-aisled hall 70 metres long, 23 metres wide and 27 metres high. Excavations in the 1990s suggested that the Forum basilica was constructed column-free and the open-span roof structure covered the building with a width of more than 20 metres (Precht 1997; Precht 2008) (Figure 3).

Inside the large town baths

The baths usually opened in the early afternoon. In the first century CE, Iuvenal (Lorenz 2017: 325) states that it was possible to visit the baths during the fifth
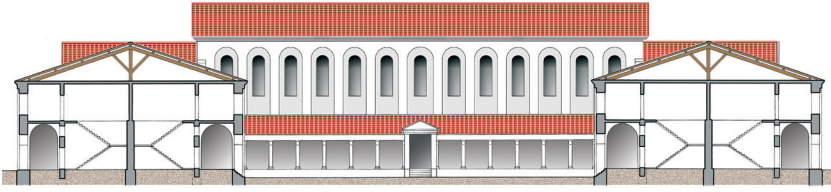
Figure 3: Reconstruction drawing of the Forum basilica with sectional view of the storage buildings. © G. Precht, LVR-APX.

Figure 4: Inside the virtual reconstructed basilica thermarum. © Faber Courtial GbR/LVR-APX.

hour, whereas Martialis (Martialis, Barié & Schindler 2002: 719) recommends going during the eighth hour of the day. For many Romans it was a matter of course or part of their daily routine to visit the baths. Most of the houses in the CUT had neither running water nor their own bathrooms. The camera movement takes us into the municipal baths built in Hadrian's time, where we first enter the large hall – the basilica thermarum. The LVR-RömerMuseum reveals both the dimensions and parts of the interior structure of the ancient building. Through the main entrance, the view opens into the hall, approximately 68 metres long and 19 metres wide (Figure 4). Excavations in the basilica revealed the foundations of a prestigious central portal and the charred remains of the floor, suggesting a flat wooden floor of oak planks. The interior of the museum incorporates these essential elements of the ancient entrance hall. In a narrow building located in the entrance area of the ancient hall, there were staircases leading to the upper galleries of the building, which was approximately

25 metres high. It is unclear whether bathers could use these probably circumferential galleries or if they were only accessible for servicing, e.g. for the cleaning of the windows. The wooden roof of the hall was probably clad in a cantilevered panelled ceiling. However, the excavated findings do not allow any specific statements on the exact use of this monumental hall. Probably there were shops or stands here, e.g. to buy bathing utensils, cosmetics or sports equipment. After leaving the basilica, the visitors enter the actual bathing area. The rooms of the frigidarium, tepidarium and caldarium were ordered in a row. From the cold through to the well-tempered room, one could finally approach the warm and the sweat baths (Zieling 2003: 27–28; Zieling 2008: 374–376; Schalles 2011: 146).

An efficient river port

Another perspective as seen through the eyes of the Roman pedestrian provides an impression of the harbour area, which in Roman times was located immediately in front of the north-eastern city walls of the Colonia. The Rhine flowed in the immediate vicinity of the city before it turned eastwards at the level of the so-called Harbour Temple. This is still evident today through the shape of the city's layout plan. Not only were raw materials and building materials scarce in the Lower Rhine area; the Romans also imported food, olive oil, wine and other products from almost every part of the empire. Last but not least, the Colonia was an important stop on the long-distance trade route to Britain. The CUT therefore needed a viable river port (Selke & Leih 2018; Selke & Franke 2018). Archaeological excavations have taken place since the 1930s and have revealed the remains of a multi-phase quay. Owing to the high groundwater level, there was a moist soil environment and thus a good state of preservation of the oak used for the construction. Consequently, dendrochronological investigations have been able to date the oldest construction phase to the Claudian period, around CE 46. The main landing stage was about 200 metres long and was located in the northern shore area of the CUT, running parallel to the city wall (Figure 5). The wooden structure on the river side consisted of a wall of five oak beams lying upon another stabilised laterally by posts. There are no archaeological remains of storage buildings or evidence of cranes, which had to be used for the loading and unloading of goods, as is shown in the virtual reconstruction. Although the total length of the quay can only be estimated, several barges, flat-bottomed ships, could certainly dock in parallel (Selke & Leih 2018: 286). In this type of ship, goods were stacked directly on deck. The draft of the 15- to 35-metre-long ships was usually hardly more than 50 centimetres (Schmidhuber-Aspöck 2018: 230). If there was no jetty, they could be driven directly onshore and the goods unloaded via the flat ramps at the bow and stern.

Figure 5: Virtual reconstruction of the Roman harbour of the CUT. © Faber Courtial GbR/LVR-APX.

Conclusions

The virtual reconstruction meets with a very positive response of visitors of all target groups. Guided tours such as school classes, but also families and individual visitors are able to visualise the cityscape in a vivid way. The combination of the three-dimensional model with the virtual reconstruction offers the unique advantage of being able not only to convey an impression of the densely built-up area in ancient times but also to enable the viewer to envision the monumentality of the representative buildings. The visitors can immerse themselves to a certain extent in the urban atmosphere. While observing these impressions, they are activated and motivated to pose questions about the everyday life of the Roman city and its inhabitants.

The question that museum visitors frequently ask – what was it really like in the Roman town? – is actually left open by the virtual presentation. The findings in the soil do not provide sufficient information for a clear reconstruction. Based on the current state of scientific research, the virtual reconstruction offers visitors, based on many different individual insights, a suggestion that shows what individual buildings in the context of the urban space of the CUT might have looked like in the middle of the 2nd century CE. However, only a small part of the complex construction history of the individual buildings is

visualised in their urban planning context. The potential impact or previous demolition of older predecessors as well as possible structural changes due to reuse are not apparent in the form of this reconstructed snapshot. The ongoing on-site archaeological research will provide new scientific insights that may require a reassessment of current reconstruction designs (Kienzle 2016).

Against the background of an increasingly heterogeneous audience, the museum must in the future pursue innovative ways of education and mediation. As a digital medium, virtual reconstructions in the context of informal learning in the museum offer many opportunities for communicating complex relationships and facts in the sense of historical learning (Schwan 2006; Scheersoi 2006). It is important to prepare relevant information and content in the right balance (Lengyel & Toulouse 2016: 96), taking into account the expectations of the visitors with regard to modern viewing habits, and also to take into account the scientific requirements of a virtual reconstruction. In order to achieve a comprehensive understanding of the individual findings in the CUT, an active dialogue with the archaeological content must be possible for visitors of all target groups and learning types. An ideal further development would be an extension of the physical model and virtual reconstruction in the form of an interactive module, for example using tablets that allow visitors to gain insights into the correlation between the results of the excavations and the reconstruction plans or even to try out different options of the reconstructions virtually.

References

Babucic, N. and Seifert, M. (2018). Teaching2Go – Geophysikalische Prospektionen der Hamburger Fieldschool in der Colonia Ulpia Traiana. *Archäologie im Rheinland*, 2017: 91–93.

Dreier, C. (2010). *Forumsbasilika und Topographie der römischen Siedlung von Riegel am Kaiserstuhl*, Stuttgart: Konrad Theiss Verlag.

Franzmeier, H. and Hageneuer, S. (2017). From the Nile Delta to Karlsruhe: Or how to present mud bricks in an exhibition. *CIPEG Journal*, 1: 15–26.

Grellert, M. (2007). *Immaterielle Zeugnisse. Synagogen in Deutschland. Potentiale digitaler Technologien für das Erinnern zerstörter Architektur*, Bielefeld: transcript Verlag.

Henke-Bockschatz, G. (2016). Rekonstruktionen und Modelle. Vergangenes wiederhergestellt. *Geschichte lernen*, 171: 2–7.

Heimberg, U., Rieche, A. and Grote, U. (2009). *Colonia Ulpia Traiana. Die römische Stadt. Planung, Architektur, Ausgrabung*, Cologne and Pulheim: Rheinland-Kultur.

Hilke, M. (1994). *Bäume, Sträucher, Kräuter. Botanischer Führer durch den Archäologischen Park Xanten*, Cologne: Rheinland-Verlag GmbH.

Kienzle, P. (2008). Die zivile Wohnbebauung in der CUT. In: M. Müller, H.-J. Schalles and N. Zieling, eds, *Colonia Ulpia Traiana. Xanten und sein*

Umland in römischer Zeit. Xantener Berichte, Sonderband = Geschichte der Stadt Xanten, 1. Mainz: Philipp von Zabern, pp. 413–432.

Kienzle, P. (2016). 'Sie sollten jedoch mit großer Vorsicht ausgeführt werden . . .' . Gedanken zur Rekonstruktion antiker Architektur am Beispiel des Archäologischen Parks Xanten. In: K. Zimmer, ed., *Von der Reproduktion zur Rekonstruktion – Umgang mit Antike(n) II. Summerschool vom 16.-19. Juni 2014 in Tübingen, TAF 21*, Rhaden/Westf., pp. 25–43.

Lengyel, D. and Toulouse, C. (2016). Die digitale Visualisierung von Architektur. *Blickpunkt Archäologie*, 2/2016: 91–98.

Lorenz, S. (2017). *Juvenal. Satiren*, Berlin/Boston, MA: De Gruyter.

Martialis, M., Barié, P. and Schindler, W. (2002). *Epigramme*, Düsseldorf: Artemis & Winkler.

Müller, M. (2008a). Die städtebauliche Entwicklung von der Coloniagründung bis zur Spätantike. In: M. Müller, H.-J. Schalles and N. Zieling, eds, *Colonia Ulpia Traiana. Xanten und sein Umland in römischer Zeit. Xantener Berichte Sonderband = Geschichte der Stadt Xanten, 1*, Mainz: Philipp von Zabern, pp. 269–275.

Müller, M. (2008b). Die Stadtmauer der CUT. In: M. Müller, H.-J. Schalles and N. Zieling, eds, *Colonia Ulpia Traiana. Xanten und sein Umland in römischer Zeit. Xantener Berichte, Sonderband = Geschichte der Stadt Xanten, 1*, Mainz: Philipp von Zabern, pp. 277–290.

Müller, M. (2011). Der LVR-Archäologische Park Xanten / LVR-Römer Museum – Zur Visualisierung des Bodendenkmals. In: M. Müller, T. Otten and U. Wulf-Rheidt, eds, *Schutzbauten und Rekonstruktionen in der Archäologie. Von der Ausgrabung zur Präsentation. Xantener Berichte, 19*, Mainz: Philipp von Zabern, pp. 55–69.

Müller, M. and Zieling, N. (2014). Aktueller Stand der Geoprospektionen auf dem Gelände der Colonia Ulpia Traiana. *Archäologie im Rheinland*, 2013: 91–93.

Otten, T. and Ristow, S. (2008). Xanten in der Spätantike. In: M. Müller, H.-J. Schalles and N. Zieling, eds, *Colonia Ulpia Traiana. Xanten und sein Umland in römischer Zeit. Xantener Berichte, Sonderband = Geschichte der Stadt Xanten, 1*, Mainz: Philipp von Zabern, pp. 549–582.

Precht, G. (1997). Colonia Ulpia Traiana, Archäologische Untersuchungen im Jahre 1996. *Bonner Jahrbücher*, 197: 169–175.

Precht, G. (2008). Das Forum. In: M. Müller, H.-J. Schalles and N. Zieling, eds, *Colonia Ulpia Traiana. Xanten und sein Umland in römischer Zeit. Xantener Berichte, Sonderband = Geschichte der Stadt Xanten, 1*, Mainz: Philipp von Zabern, pp. 341–353.

Schalles, H.-J. (2011). Die Inwertsetzung eines antiken Baubefundes – Schutzbau und Museum über den Großen Thermen der Colonia Ulpia Traiana/ Xanten. In: M. Müller, T. Otten and U. Wulf-Rheidt, eds, *Schutzbauten und Rekonstruktionen in der Archäologie. Von der Ausgrabung zur Präsentation. Xantener Berichte, 19*, Mainz: Philipp von Zabern, pp. 139–148.

Schwan, S. (2006). Lernen im Museum. Die Rolle der digitalen Medien für Wissenserwerb und Wissenskommunikation. In: S. Schwan, H. Trischler and M. Prenzel, eds, *Lernen im Museum. Die Rolle von Medien. Mitteilungen und Berichte aus dem Institut für Museumsforschung, 38*, Berlin: Institut für Museumsforschung, pp. 1–10.

Scheersoi, A. (2006). Computer in Museumsausstellungen – Top oder Flop? In: S. Schwan, H. Trischler and M. Prenzel, eds, *Lernen im Museum. Die Rolle von Medien. Mitteilungen und Berichte aus dem Institut für Museumsforschung, 38*. Berlin: Institut für Museumsforschung, pp. 44–54.

Selke, V. and Franke, R. (2018). Von Claudius bis Antoninus Pius (?) – zur Baugeschichte des Xantener Hafens. *Archäologie im Rheinland*, 2017: 101–103.

Selke, V. and Leih, S. (2018). Der Hafen der Colonia Ulpia Traiana. In: C. Eger, ed., *Warenwege – Warenflüsse. Handel, Logistik und Transport am römischen Niederrhein. Xantener Berichte, 19*, Mainz: Philipp von Zabern, pp. 271–288.

Schmidhuber-Aspöck, G. (2018). Binnenschifffahrt auf dem Rhein in römischer Zeit. In: C. Eger, ed., *Warenwege – Warenflüsse. Handel, Logistik und Transport am römischen Niederrhein. Xantener Berichte, 19*, Mainz: Philipp von Zabern, pp. 229–243.

Süß, J. and Gräf, B. (2017). *Lopodunum VI. Die 3D-Rekonstruktion des römischen Forums von Ladenburg. Beschreibung und Begründung der Nachbildung*, Wiesbaden: Dr. Ludwig Reichert Verlag.

Wittur, J. (2010). Darf es noch ein bisschen mehr sein? Anwendungsmöglichkeiten und Ethik computergenerierter Visualisierungen des animierten Museumsfilms. In: *Befund und Rekonstruktion. Mitteilungen der Deutschen Gesellschaft für Archäologie des Mittelalters und der Neuzeit*, 22, pp. 157–166.

Zieling, N. (2003). *Die Grossen Thermen der Colonia Ulpia Traiana. Die öffentliche Badeanlage der römischen Stadt bei Xanten*, Cologne: Rheinland-Verlag GmbH.

Zieling, N. (2008). Die Thermen. In: M. Müller, H.-J. Schalles and N. Zieling, eds, *Colonia Ulpia Traiana. Xanten und sein Umland in römischer Zeit. Xantener Berichte, Sonderband = Geschichte der Stadt Xanten*, 1, Mainz: Philipp von Zabern, pp. 373–389.