Introduction

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Virtual Palaces

The rapid rise in new digital technologies has revolutionized the ways in which historic build-ings – such as palaces – are being recorded, digitized and virtualized. These new techniques of-fer unprecedented opportunities for architectural historians, but also lead to new problems and challenges. A first major challenge is to ensure the scientific validity of a virtual building. Here the reliability and verifiability of the information that is used to make a digital model is of vital importance. This applies not just to the tools and technologies that are used to survey a building in its actual state, but also to the methods that are employed to make a virtual reconstruction of a lost building (or a former state of an extant building). A second issue concerns the role of virtual buildings as research instruments in their own right. There is no doubt that digital models of court residences can be very useful, not just for communicating research results to the wider public, but also as genuine research tools that help visualize and clarify working hypotheses, for example about construction phases or the ceremonial use of the spaces. Yet the potential role of digital models as research tools in this domain has not been fully explored.

These two related methodological issues were the subject of two consecutive PALATIUM workshops held in Leuven (Belgium) in November 2011 and in Munich (Germany) in April 2012. The Leuven workshop, *Part I. Digitizing and Modelling Palaces*, focused on the surveying, record-ing, digitizing, and modelling of extant palaces in their actual state. It also looked at the potential role of the resulting digital models as research instruments and as vehicles for the preservation and dissemination of knowledge. The Munich workshop, *Part II. Lost Palaces and their Afterlife. Virtual Reconstruction between Science and Media*, dealt with virtual reconstructions of 'lost' palaces (including 'lost' states of still existing palaces). It explored different methods and technol-ogies for the visualization of non-extant buildings and examined the utility of such reconstructions as tools for research and communication.

Part I. Digitizing and Modelling Palaces

The PALATIUM workshop *Virtual Palaces, Part I. Digitizing and Modelling Palaces* was held in Leuven on 18–19 November 2011. It was organized by Krista De Jonge (KU Leuven, PALATIUM Chair), Pieter Martens (KU Leuven, PALATIUM Coordinator) and Mario Santana Quintero (KU Leuven and Carleton University, Canada), in collaboration with the Raymond Lemaire International Centre for Conservation (RLICC) of the University of Leuven.

The workshop took place in a suitable venue: the sixteenth-century Castle of Arenberg in Heverlee near Leuven. Now the seat of the Department of Architecture, this former court residence once belonged to the Dukes of Croÿ (who rose to prominence in the fifteenth and sixteenth century, especially under Emperor Charles V and King Philip II of Spain) and is itself the object of ongoing historical research and digital modelling.

As a preamble to the workshop a practical seminar on digital recording methods was organized by the RLICC. It included a demonstration of different 3D laser scanning techniques in the courtyard of the Arenberg Castle and a session in which the RLICC students presented the results of their ARCHDOC (Architectural Heritage Documentation for Conservation) Workshop. Thanks are due to the ARCHDOC team, to the Raymond Lemaire International Centre for Conservation, and especially to Mario Santana for organizing this instructive methodological seminar in conjunction with the PALATIUM workshop.

The workshop itself provided a platform for scholars to present and discuss different approaches in the effective use of digital tools to make virtual models of existing palaces. Because of its methodological nature, the workshop did not strictly limit itself to late medieval and early modern Europe, but embraced also case studies that fall outside the chronological and geographical boundaries of the PALATIUM programme.

The workshop opened with a presentation of the results of ten years of ongoing work on the Castle of Arenberg by Bill Blake (ICOMOS UK), Björn Van Genechten (University College St Lieven, KU Leuven) and Krista De Jonge (KU Leuven). The other keynote lectures, by Ana Almagro Vidal (Historic Heritage Conservation Department, Fundación Caja Madrid), on the Islamic palaces of Al-Andalus, and by Rand Eppich (Tecnalia Research & Innovation), on the future of 3D tools for capturing, modelling and documenting cultural heritage, provided further points of reference on the subject.

Various technological, methodological and theoretical aspects of virtual models and virtual reconstructions were then examined through fifteen case studies which focused on castles, palaces and residences from different periods and different regions, including Budapest, Monza, Potlogi, Sintra, Valladolid, Venice, Versailles and Vienna, as well as Jordan and Bengal. Most of these case studies were multidisciplinary in nature and the work of multiple authors combining an expertise in digital surveying and modelling techniques with an expertise in architectural history. Another common characteristic of these case studies is that they use digital models first and foremost as tools for scientific research; this implies that the 'look' of the virtual model (which may range from a basic schematic outline to the highest degree of realism) is not a goal in itself but subordinate to its usability as an instrument to visualize and test hypotheses.

The five papers collected in this volume are a selection of the papers presented at the workshop. They have been edited by Pieter Martens with the assistance of Heike Messemer (design and production) and Adam & Alisa Fowler (proofreading).

In the first paper Noémie Renaudin, Bertrand Rondot and Livio De Luca present their virtual reconstruction of the Petit Trianon in Versailles. A remarkable aspect of this case study is that it models not only the architecture of the building, but also its original pieces of furniture and other furnishings, which makes it possible to visualize the original appearance of the rooms at different moments in time. It also illustrates how a rigorous scientific approach can be combined with a highly realistic model destined for the wider public.

The paper of Daniela Oreni, Raffaella Brumana and Branka Cuca focuses on their 3D survey of the eighteenth-century Villa Reale in Monza. They pay particular attention to the vaults of the main rooms of the Villa and demonstrate how their digital model can help understand how these cloister vaults were originally designed and constructed.

In the third paper Anca Bratuleanu, Stefano D'Avino and Giovanni Mataloni present their ongoing research on the palace of Potlogi in southern Romania. Built in 1698 this palace played a key role in the development of residential architecture in Walachia. Their digital survey and 3D model allows this important historical building to be studied remotely and can also be used as an instrument for (virtual) restoration.

The paper of Md Mizanur Rashid and Hafizur Rahaman deals with the eighth-century Buddhist monastery of Sompur Mahavihara in Paharpur, Bangladesh. In this case the problem of modelling and virtual reconstruction is particularly difficult because only fragmentary ruins remain, without any other documentary evidence. This contribution shows that even in such circumstances a rudimentary digital model can be a useful scientific instrument, not so much to present a complete reconstruction of the lost monument, but rather to offer and compare different hypotheses.

The final paper, by João Neto, Maria Neto and Ricardo Silva, concentrates on the Monserrate Palace in Sintra, Portugal. It illustrates how a high-quality digital model of a historic building can be used in multimedia applications aimed at wider public, such as games. Emphasizing the potential of virtual models as didactic tools, they show how the experience of cultural tourism might be enhanced by enabling people to pay a virtual visit to the palace.

Together these five case studies offer a broad spectrum of possible uses for 'virtual palaces'. Indeed the different types of models presented here are as varied as the palaces themselves. Naturally this modest collection of papers does not pretend to cover the entire subject. Its purpose is merely to illustrate the potential of digital modelling for scientific research on extant historical palaces and similar buildings, while at the same time raising consciousness about the methodological difficulties involved. To better appreciate the wide range of possibilities of virtual models of residential architecture, the reader is advised to consult also the papers from the Munich workshop, which are collected in the second *Virtual Palaces* volume.