

# The Visualisation of Unseen Planning States

## The Planning and Building States of Early Bern Minster in Visual Comparison

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### Introduction

#### What are planning states

As often in the scientific world of archaeology and building history, the verbal description of research results is the primary medium of communication. The set of illustrations that have been developed in this project intended to cover planned and realized building states. Thereby it is to be considered that both, not realized plans and states of the building that might have existed, are unseen and therefore hypothetical as they have never existed, even if of different degree of uncertainty. As a result the modelling of the unseen as well as the visualisations are primarily abstract, but all available methods of traditional architectural photography have been taken care of in order to make the church still as vivid as possible.

#### A suitable appearance

Creating visualisations for a contribution to historical building research first of all raises the question of a suitable appearance. The Bern Cathedral (Fig. 1) is a building that is not only marked by changes in plans but also by replacements. In addition, a largely unknown predecessor building stood in about the same place.



Fig. 1. Bern Minster platform around 1529, view from the opposite bank of the Aare (© Lengyel Toulouse).

The visualisation project was realised within the framework of a multidisciplinary, four-year research project at the University of Bern and the Bern Minster Foundation with archaeologists, art historians, building researchers, the cathedral architect and stone masons. The visualisations published by Lengyel Toulouse (2019) were an integrated part of the research and thus contributed to the gain in knowledge.

The changes in planning took place during the construction process. There are only a few findings from the predecessor building, and changes in the planning of the cathedral are indicated by structural elements, but without revealing all the details of the rejected plans. In many cases, therefore, there are clear indications of circumstances which cannot be definitively clarified on the basis of the present state of knowledge, as published by Druzynski v. Boetticher (2019). This is then called uncertain knowledge. For example, it is undisputed that there was a predecessor building (Fig. 2).



*Fig. 2. Predecessor building from the opposite bank of the Aare, 1310–1334 (© Lengyel Toulouse).*

However, the few foundation remains allow for several equally plausible building forms. The same applies to changes in planning. The indications of such changes are much more subtle than the remains of the previous foundation. They include, for example, begun vaulting beginners, whose form and orientation appear strange in the realized building, while they would fit for an alternative completion that does not correspond to the present one. The finding thus suggests a change in planning during the progress of the construction, but above all it raises the question of the form that was originally intended. A fundamental distinction is therefore made between planning and implementation stages. As in the case of the predecessor building, it is obvious that the cathedral is completed or compared with other buildings, which allows hypotheses to be made about the rejected planning.

In both cases, the predecessor building and the unrealized plans, the uncertainty is not only that many things cannot be clarified. The uncertainty also includes several mutually exclusive, i.e. contradictory possibilities. In view of these uncertainties, the fundamental question of what should and can be shown in such a visualisation is added to the considerations of an appropriate appearance. A visualisation is most likely to serve scientific knowledge if it remains as close as possible to the hypothesis. Since historical building research moves argumentatively between construction and appearance, it is obvious that the illustration should also be based on the specific characteristics of the phenomena investigated, i.e. to visualise both the constructive principle and the resulting spatial impression in a comprehensible way. To this end, some aspects are deliberately excluded from the depiction, of which perhaps the most obvious ones will be briefly explained in the following, namely materiality, stone joints and sculptures (Fig. 3).



Fig. 3. View into the choir, 1517–1528 (© Lengyel Toulouse).

The reproduction of each individual stone could only include those surfaces that are still preserved, while due to the uncertainty described above, stones that are no longer preserved as well as stones that were planned but not built upon could basically only be represented fictitiously.

The situation is quite similar with the representation of materiality. Equally the representation of the actual surface condition of each individual stone would be limited to the still preserved stones. All other surfaces would have to be shown without materiality anyway. Because a fictitious, but only apparently lifelike representation would create the wrong impression of certain knowledge. Moreover, the visual effect of natural surfaces would clearly dominate the geometric statement behind them. In order to keep the proportion of purely fictitious additions to a minimum, it was therefore decided to also exclude materiality from the present illustration of the building research hypotheses.

Finally, sculptures were excluded for various reasons. Firstly, they are of secondary importance for the building research investigations and statements. Although their volumetric presence already shapes the spatial impression, especially on the important sculptured western portal that has undergone a separate research as published by Nicolai (2019), the direct comparison between construction phases with and without sculptures seemed to be dispensable to building research. On the other hand, the limitations of uncertainty are particularly applicable to the sculptures, since here too, in many phases, especially in the planning stages that were not realised, it is unclear which sculptures were erected or planned at what point in time and at what location within or on the outer facade of the cathedral.

### **The potential of artificial intelligence**

Building research as well as architectural visualisation as such are highly individual methods. In every single case the prerequisites require professional experience and creativity in order to examine and develop reasonable scientific hypotheses and to visualise them in a way that explanation and imagery interact. While findings are clearly depictable, completions and complements require a more or less abstract substitute. Nevertheless, these substitutes mostly rely on analogies, i.e. preserved building fragments from a similar time and place. The selection of these references depends on the experience and knowledge of the building researcher. Here, artificial intelligence could massively assist in the way image databases find similarities. Artificial intelligence could analyse the existing findings and relate them to a virtually any preserved architectural building fragment in order to propose them to the researcher. Learning from the researcher's decisions, artificial intelligence could also consider personal preferences and expertise for an even better fit of recommendations.

## References

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