

NEW APPROACH TO ARCHITECTURAL RECONSTRUCTIONS: THE CASE OF KARNAK IN EGYPT

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The definition and development of new modeling methods is the objective of a research project in progress at the CAD research group (GRCAO) of Université de Montréal. These methods aim for a better integration of the varying types of knowledge implicated in the reconstitution of ancient architectural structures, as well as greater flexibility in the manipulation and utilization of this knowledge: ideally, we are attempting to formulate a universal solution to the problem of the optimal processing of archeological, essentially architectural, information.

To reach this objective, technology will not suffice. It is necessary to integrate methods, knowledge and goals of a collection of scientific disciplines that are not used to working together (without forgetting the inherent incoherences): to social sciences as with archeology (in the classical and not the anthropological sense of the term), history, art history, epigraphy and chronology, architecture, geometry, optics, and information technology must be joined. This requires that each discipline define itself in terms of what it can bring to the reconstitution of physical objects in an environment, and thus, the reconstitution of architectural heritage. From this a new modeling methodology will see the light of day, adapted to the needs of each science and susceptible to creating meta-models which will become better guides for the on-site researcher.

To do this, the project uses as laboratory the Karnak temples in Egypt: certain information is already available in the form of plans, surveys, elevations and sections of existing monuments (with or without proposed restitutions), and excavation reports, while other information is still to be surveyed on site, or catalogued. Beyond the technical aspects that allow for the precise encoding of the basic components of constructions and structures, the method allows for the elaboration of a reconstitution that takes into consideration the fourth dimension (time), and it notes the different proposed reconstitutions of parts that are either currently missing or have been modified several times over a millennium of history. Also the method takes into account the degree of probability of the proposed reconstitutions.

The research is conducted in collaboration with members of the permanent mission of the French *Centre National de la Recherche Scientifique* (CNRS-UPR 1002) established at Karnak in Egypt and researchers from the *Centre d'archéométrie de Liège* in Belgium. With their collaboration, we reflect on the foundations of pertinent representation for the work of architectural reconstitution and develop new methodologies in order to give rise to models that are capable of facilitating the work of on-site researchers.

* GRCAO stands for « Groupe de recherche en conception assistée par ordinateur ».