

Proposed Title: Considering Variation in Ancient Architecture: A Study in Architectural Energetics

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Abstract:

Architecture is one of the main elements of material culture that archaeologists find in the archaeological record, with the primary research focused on the typology, function, and the life of the building as shown in the stratigraphy. There is, however, another important aspect which is less frequently explored: the process of construction leading up to the first use of the building. The *chaîne opératoire* methodology can be used to explore this process, allowing for its disarticulation into discrete steps. It cannot, however, explore the material, temporal, or energetic ‘cost’ of these steps; cost-calculation-algorithms are needed which can be applied to the volumes of ancient architecture. These algorithms attempt to answer specific questions regarding the cost (in time, material and/or energy) needed for the steps in the construction process on the basis of the actual (as present in the archaeological record) or estimated volumes of the building.

The Energetic Cost Calculator for Ancient Architecture (EnCAB) presents algorithms as a web-based digital calculator, allowing users to enter their own data, compare their results to a range of examples and explore the types of sources used in generating each algorithm. Due to the flexibility of the interface, users can also explore the process of construction by considering alternatives: if a different material was chosen for a particular architectural element, what would be the difference in energetic cost? If a building was larger or smaller (in rooms or percentage of built space), how much would the total energetic cost change? Such questions can help archaeologists understand the decisions taken by ancient builders and planners in organizing the spatial disposition within a building or a settlement as a whole.

Exploring the research potential of this digital tool, the paper will explore two architectural settings in Mesopotamia between the 3rd and 2nd millennia: the Royal Palace at ancient Urkesh and select private houses at ancient Nippur. The cost of construction of the Royal Palace of Urkesh will be examined, and, on the basis of this calculation, the choices made by the ancient architect(s) will be explored in light of possible variations, bringing to light aspects of monumentality and prestige. A number of private houses in ancient Nippur will also be studied, considering variation across a number of similar, contemporary constructions. These two examples will also be compared, leading to a discussion of the differences in cost between palatial and private dwellings.

In conclusion, Architectural Energetics as a nascent methodology will be critically discussed, particularly in light of the fundamentally digital aspect of this research approach.