Labouring with Large Stones: A Study into the Investment and Impact of Construction Projects on Mycenaean Communities in Late Bronze Age Greece

By Yannick Boswinkel. Leiden: Sidestone Press 2021. Pp. 196. €40. ISBN: 978-94-6428-009-8 (paperback). €15. ISBN: 978-94-6428-011-1 (PDF e-book).

REVIEWED BY MAUD DEVOLDER

The monograph addresses Late Helladic IIIB fortifications on the Greek mainland from an "architectural energetics" perspective that estimates the time invested in their construction. This research stems from the ERC-funded SETinSTONE project, which focused on the socioeconomic impact of Mycenaean fortifications. A key part of this broader study, the monograph estimates the labor costs—expressed in person-hours—of these monumental building projects to assess their interrelation with Mycenaean communities, paying special attention to the building materials and technologies used and the workforce involved. Framed between an introduction and conclusion, chapters 2 through 8 focus on the Late Bronze Age chronology and sociopolitical and economic background of Mycenaean Greece; the visual impact and building process of the fortifications; the presentation of the two case studies; the methodology; the measurements data; and the calculations and interpretation of the labor costs. This review considers the monograph's main contributions to the field of architectural energetics and to the understanding of Mycenaean society.

The construction of the 13th-century BCE fortification walls at Mycenae (Argolid) and Teichos Dymaion (Achaea) in the northern Peloponnese is investigated. At both sites the defensive walls were erected in "Cyclopean" masonry made of large, mostly unworked stones set in double walls that framed a fill of smaller stones. The focus on two case studies, while admittedly limiting the comparative scope of the research, makes it possible for the author to produce a detailed analysis of the volumes of each fortification wall and thus to provide better time estimates for the completion of each building project. This delicate balance echoes a recurring dilemma in architectural energetics—namely, trying to provide accurate cost estimates while investigating a statistically meaningful corpus of buildings. Here, the author deliberately avoids a broader comparative approach that would incur a loss in resolution.

The standard cost estimates, which are the standard units of working time that are applied to the volumes of the case studies for each building step, are based on a review of the literature pertaining to architectural energetics and were selected to best fit the specificities of the Mycenaean architectural record. All tasks in the construction project—the procurement, transport, and dressing of the building components, the leveling of the terrain, and the assembly of the materials into walls—are presented (ch. 3), estimated (ch. 5), calculated (ch. 7), and extrapolated (ch. 8) for each case study. Description and costs related to the procurement method and dressing of specific building components reflect a lack of detailed knowledge of the technologies used in Late Bronze Age Peloponnese, a hindrance in part related to the fact that the wedge-and-feather quarrying technique used for splitting the stones from the natural bedrock left little or no traces in the Mycenaean landscape. However, standard labor-time estimates for transport are thoroughly investigated by the author. A detailed comparison is offered of the efficiency and limitations of the different methods that may have been used for moving large building components. The stone sizes and topography suggest that sledges and wagons were the most likely means of transportation of the building blocks. These vehicles are thus considered for cost calculations, and the time necessary for loading and unloading them is included. With a similar eye for detail, when addressing the cost of assembling the walls, the author also takes into account the labor costs triggered by the building and removal of the ramps that allowed the builders to carry the stones up into the walls. Thoroughness in detailing the steps incurred by the construction of the Mycenaean fortifications makes the synthesis of available standard time estimates offered in the monograph

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replicable to similar structures made of large unworked stones in other regions and periods.

A significant contribution of the monograph to architectural energetics is its refining of the process of volume calculation. Instead of applying average stone dimensions based on a limited number of specimens in the walls, Boswinkel develops a systematic approach to more closely estimate the size of the building components. For doing so, ranges of ratios between the visible surface area and the depth of the stones are established, based on sections of the fortifications walls where the building components are entirely visible. The stones are then clustered into four size groups based on their surface area (measured through orthophotographs of targeted wall sections processed in a GIS), the relative representativity of which is projected—arbitrarily or through data clustering—along nine possible scenarios. This size-grouping and proportioning of the stones in the walls is intended to provide accurate estimations of the volume of the stones and, by extension, of the labor costs. An unexpected and interesting result of this analysis is the large incidence of small building components in the fortification walls at both Mycenae and Teichos Dymaion, with the largest stones sometimes accounting for less than half of the building components visible in the wall face. The small stones, probably coupled with large amounts of clay mortar (as suggested by a 17% gap in some wall faces as a minimum), thus played a key structural role in the Cyclopean masonry (97–98, 106). The variations in stone size within and between walls' sections at Mycenae is another important observation revealed by the author's volumetric study (95–97).

The commissioners of the fortifications had at their disposal two means of mobilizing the necessary workforce: paid rations and taxation (in the form of *corvée*) based on landholding. Such monumental building projects thus required food supplies in direct exchange for labor, or the ability to dispense with the material resources that taxpayers may have produced had they been left to take care of their own daily tasks. The technical features of the fortifications investigated in the book largely surpassed those required for a purely defensive purpose (47–52). However, a striking result of the study is that these building projects occurred over a limited duration and with a manageable work-team size (table 8.8). Their undertaking thus seems to have had a limited impact on the Mycenaean communities (esp. 138–39). The author clearly acknowledges that he only took into consideration current remains and not reconstruction of the original height of the fortifications (93) and that he did not calculate the labor cost for the mud mortar incorporated in the walls (97). But the minimum estimates he provides, when set against work-group sizes of 200 and 500 individuals, suggest that these monumental building projects were easily manageable by the local (Mycenae) and regional (Teichos Dymaion) estimated populations (tables 8.7, 8.8, figs. 5.5, 5.6). These results add significant value to the already interesting volumetric observations regarding the construction of the two fortifications and validate the monograph's targeted approach. They corroborate other studies that highlight how such a flow of energy investment is in tune with monumental expenses in the early phases of the Late Bronze Age in mainland Greece, but that became partially diverted in the 13th century BCE from monumental tombs toward other categories of buildings.

Hints at the organization of the building projects occur throughout the monograph. Implications of the calculated costs for the management of the workforce (139–40), bottlenecks (82), and the input of specialized builders for the conglomerate facade at Mycenae (138–39) are addressed. These are often based on references outside the evidence considered in the monograph, but readers may look forward to the author's future research stemming from this work. A promising avenue would perhaps be to integrate observations pertaining to technical variations between wall sections, including differences in wall faces and the creation of offsets, to refine the sequencing of construction and distribute the labor costs across building teams that may or may not reflect this diversity.

In showing what a relatively small impact the construction of some of the most extravagant achievements of Bronze Age Aegean societies had on the communities that built them, Boswinkel demonstrates that these monumental building projects played no role in the eventual economic, political, and social collapse of Mycenaean civilization. This monograph also provides the means for researchers to assess more precisely the time and workforce required for the construction of fortifications beyond the confines of the Late Bronze Age Greek mainland, especially in that it develops a more refined methodology for estimating the volumes of the building components in a wall, thus forming an important stepping stone in the field of architectural energetics.

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