Rethinking the Problem of the Pantheon Columns: An Economic Analysis of the Extraction and Transport of the Pantheon's Monolithic Shafts.

This paper utilizes an energetics analysis of the columns of the Pantheon porch in order to assess whether the porch was originally designed for forty-foot or fifty-foot monolithic shafts. The unique design choices of the building—most notably the termination of the porch cornices upon meeting the rotunda, the secondary shadow pediment that mirrors the functional pediment, and the presence and nature of the awkward transitional block—led Davies, Hemsoll, and Wilson Jones to suggest that these features were the result of the architect's inability to acquire the necessary number of fifty-foot shafts, due to either temporal or economic circumstances (Davies, Hemsoll, Wilson Jones 1987). Most recently, Wilson Jones has reiterated this interpretation by arguing that the Pantheon suffered two major setbacks in its construction, the first structural with the cracking of the Rotunda, remedied by the addition of the Grottoni, and the second economic with the non-appearance of the fifty-foot shafts (Wilson Jones 2015). In particular, Wilson Jones suggests that the decision to use forty-foot shafts only occurred late in the project's schedule, sometime between 122 and 124 CE, after the completion of the dome and the transitional block (Wilson Jones 2015).

My analysis focuses on three economic vectors of procuring monolithic shafts for the Pantheon—extraction, land-transport, and maritime transport. For the extraction of the columns from Mons Claudianus, I focus on the relative manhours required to quarry and finish forty and fifty-foot columns in the context of the population available for labor and the topography of Mons Claudianus. I then argue that the major source of traction for transport by land was likely the dromedary, as suggested by Adams, given their relative abundance in Egypt and their superior strength as draught animals, as opposed to the use of slaves or oxen (Adams 2007;

Peacock 1997; Russell 2013). As for the maritime transport of monolithic shafts, I argue that a double-ship construction, originally utilized by Egyptians for the river transport of obelisks, was used as a barge for Nile transport (Wirsching 2000). Further, I suggest that trans-Mediterranean transport of monolithic shafts could be achieved with existing maritime technology, given the lack of evidence outside of Egypt of any shaft from Mons Claudianus weighing more than 111 tons, a reasonably safe weight to be transported by the typical Roman freighter. Lastly, given the lack of stockpiled granite from Mons Claudianus, I suggest that each monolithic column would have been specifically ordered for particular projects, as would have been the case for the Pantheon.

In conclusion, my calculations suggest that the economic realities of procuring monolithic shafts from Mons Claudianus—quarrying, carving, land transport, and maritime transport—would have necessitated a period of two to three years between the initial order of a column shaft and its delivery in Rome. DeLaine has suggested that decoration and finishing of the Pantheon would have been completed by 122 CE barring any delays, though completion in 123 CE is more likely (DeLaine 2015). Given that decoration, an approximately two year process, could not begin before the portico was completed, and taking into consideration the two to three year process of acquiring monolithic shafts from Mons Claudianus, the decision to use forty-foot shafts would have taken place in 118/9 CE—before the rotunda and the transitional block were completed, and therefore with ample opportunity to alter the design of the structure to better correspond to the new forty-foot column shafts. Therefore this study suggests that the design elements of the Pantheon porch were intentional, in opposition to Wilson Jones' thesis of forced compromise.

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