

# The Energetics of Polygonal Masonry: Building Cosa's Walls

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This paper presents the results of a field project to model the building techniques and labor costs of the walls of Cosa, the Latin colony founded in 272 BCE. Cosa's walls are the best-preserved example of Italian polygonal masonry outside Latium. Polygonal masonry is otherwise rare in Etruria, and the few other examples are either in a different technique (Roselle, Populonia), are much later (Saturnia), or otherwise may be related to Cosa's walls (Orbetello, Pyrgi). The connection between this Latin building technology and Cosa's status as a *colonia Latina* has been noted before, and the walls thus offer important evidence about the introduction and circulation of this building technique outside of Latium and around wider Hellenistic Italy.

Furthermore, the excellent preservation of the fortifications, as well as their sound date due to ceramic evidence dating to the 3<sup>rd</sup> century, has given the wall a prominent place in debates over the early colony's nature. Following his seminal excavations at Cosa in the mid-20<sup>th</sup> century, Brown<sup>1</sup> saw the solidity and massiveness of the fortifications as a signal of the permanent impact of Roman colonial power upon this region of Etruria. More recent work by Fentress<sup>2</sup>, Bispham<sup>3</sup>, and others revises this view of Cosa's earliest history, seeing the initial colonial effort as one brief and short-lived moment in the discontinuous history of Cosa over the *longue durée*. In this case, an assessment of the cost of Rome's initial investment in Cosa's fortifications takes on importance in our wider understanding of the mid-Republican colony and the expansion and stability of early Roman imperial power in coastal Etruria.

Modeling the labor costs of Cosa's polygonal masonry presents different challenges than serial techniques such as brickwork and ashlar; however, close technical study shows a systematic logic supportive of quantitative modeling and helps reconstruct the *chaîne opératoire* of the walls' manufacture. The study employs data from the construction-estimating manual of the Milanese railroad engineer Giovanni Pegoretti<sup>4</sup> to reconstruct the time-costs of assembling the walls' polygonal masonry. Importantly, Pegoretti formed his calculations based on the 19<sup>th</sup> century walls of Verona, built in a dry-set polygonal masonry of limestone blocks only a decade or so prior to the publication of his work. This gives a solid basis to the resulting calculation.

In order to understand what sort of burden the walls' construction put on the early colonial population of Cosa, I model the overall flow of household labor in a colony of somewhere between 2,500–6,000 male settlers, which Cosa is likely to have contained. The Albegna Valley survey suggests that settlement before and after the implantation of the colony was largely discontinuous, suggesting this was by and large the size of the population responsible for building the walls. Accounting for other significant labor costs on colonists' households, particularly agricultural production, most population

scenarios nonetheless see the walls having had minimal impact on the labor supply of the early colonial economy. That is, impressive as the monument may seem to us today, it did not represent a significant or burdensome cost to the early colonists. The walls cannot, therefore, be read as a sign of Rome's major investment in making Cosa into a permanent and durable site from its outset. This conclusion needs to be tested by further work incorporating the labor costs of other potential building projects of Cosa's earliest years, including the cisterns and possibly the colonial horreum, as well as the possible involvement of Cosa's settlers in the polygonal walls of Orbetello.

### Notes

<sup>1</sup> Brown 1951; 1980.

<sup>2</sup> Fentress 2000.

<sup>3</sup> Bispham 2006.

<sup>4</sup> Pegoretti 1864.

### References

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