

The Relative Economics of Merchant Vessel Rigging

This paper aims to establish the relative cost of outfitting and manning the square- and lateen-rigged vessels of the Roman merchant fleet, as a possible cause for the transition between the use of the two rigs. For over a millennium (ca. 600 BCE–400 CE) the square rig was the dominant form of sail in the ancient Mediterranean. While the first appearance of a vastly different rig, the lateen, has been dated from 200 to 500 CE, it supplanted the square rig by 700 CE as the most common sail plan on the Mediterranean (Whitewright 2009). Traditionally this transition in sail technology has been attributed to the lateen rig's superior speed and ability to made headway against the wind (*inter al.* Casson 1995, 243; McCormick 2001, 458; Castro et al. 2008, 347-48; Polzer 2008, 242). This theory of “technological determinism” has come under attack recently, as there is no evidence that the lateen rig was a better performer (Whitewright 2011). Indeed, the existence of the vastly more efficient spritsail-rigged vessels from the second-century-BCE Mediterranean, yet lack of widespread adoption of this superior rigging, demonstrates that sailing performance and speed was not the defining factor in the rigging of sailing vessels.

I posit that that relative simplicity of lateen-rigged vessels meant that they were cheaper to build and man. As the Mediterranean was divided between different states in late antiquity, the stability and profitability of shipping was severely reduced and thus merchants sought cost reduction in the design of their rigs. The lateen sail provided the same performance with a reduction in cost through a reduction in sail area, total line length, specific rigging devices such as brails, and men needed to sail the ship. Analysis of the few literary sources that discuss ship handling and crew size along, with a logical reconstruction of the rigs indicates that a lateen

vessel could be operated with fewer men. Likewise, iconographic evidence indicates that the rigging of a square sail was more complicated. For the square rig, particularly illustrative are the graffito of the *Europa* from Pompeii (Maiuri 1958: 22) and the many mosaic depictions from the *Piazzale delle Corporazioni* in Ostia (Friedman 2011: 89-133). Lateen rig depictions are rarer, but this paper will examine a mosaic from Kelenderis in Cilicia (Friedman 2011: 38-49) and a graffito on a roof tile from the island of Thasos in the Northern Aegean (Casson 1995: fig. 180), among others. The few material remains of sail, line, and brails give a sense of this relative complication and reduced cost in the transition to lateen rigged vessels (Polzer 2008). Through these various data it is established that the widespread adoption of the lateen rig in late antiquity was due to a reduced cost and not due to a nonexistent performance advantage. This serves as a poignant reminder that technology does not as a rule always advance, and thus, we must consider other factors in the analysis of the implementation of new technologies.

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