The Environmental Context of Riverine Trade in the Roman World

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Riverine transportation was highly dependent on environmental conditions in the pre-modern world, and understanding these conditions is an important step in understanding how rivers fitted into an Empire-wide network during the Roman era.[1] Contemporary Roman written sources are mainly silent about these issues, and they are difficult (but not impossible) to understand through archaeological evidence alone. Recent advances in palaeo-environmental and palaeo-climatic reconstruction have an enormous amount of information to contribute,[2] and can be added to comparative historical analysis of material observed in a Roman context.[3] This multi-disciplinary approach is the only way to fully appreciate the environmental realities of river-borne trade and transportation in antiquity, and has much to offer the economic historian. We must also recognize that modern rivers and modern shipping do not provide useful analogies to the ancient reality, influenced as they are by centuries of engineering projects and technological advancements. These issues are broadly applicable across the rivers of the Roman world, but are investigated here through the case study of the Rhine River and the provinces of Roman Germany.

Roman river ships, especially the barges that were used to move large cargoes of bulk products, relied on basic technologies of sail and oar to move with the flow of a river downstream. Examples of these ships from sites such as De Meern, Zwammerdam, and Woerden in the Netherlands or Mainz in Germany show that they could be up to 40 m long and 4.3 m wide with a 100-ton capacity.[4] Upstream movement was more complicated and often required the ship to be hauled against the current by men or animals on shore. Scenes of this activity in the Roman world can be found on the Igel Column near Trier, Germany, on the Avignon Relief from southern France, or on the statue of the god Tiber in the Louvre. We also find descriptions by authors such as Ausonius (Mosella 39–42), Cassiodorus (Variae 12, 24) and Wandalbert von Prüm (29, 2) that demonstrate that human labor from shore was a critical part of upstream travel in the Roman, late antique, and early medieval periods.

Comparative evidence also shows that riverine transportation was limited to certain seasons because it was so dependent on riverine conditions. Seasonal risks, including ice in winter, floods in spring and autumn, and drought in summer dictated when and where a ship could travel and with how much cargo. The largest Roman ships traveling the greatest distance were the most vulnerable, and comparative evidence from the 19th century demonstrates that the period from July to September was the most active for shipping bulk products on the Rhine.[5] Outside of this period, problems can be encountered: Tacitus (Hist. 4, 26–27) records a ship running aground as a result of drought in AD 69, and Ammianus Marcellinus (14, 10, 2–3) records that floods prevented the

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movement of grain through Gaul in AD 354. Thus, the Roman shipping season in northern Europe was carefully confined to the best conditions, but even these would fluctuate and change by year.

Long-term changes in the climate and landscape of the Roman Empire are increasingly evident. Floods, droughts, alluviation, sedimentation, and channel movement all posed significant problems for shipping and the maintenance of riverside infrastructure such as harbours, canals, quays, roads, and bridges. Archaeological evidence from about a dozen sites along the Rhine shows repeated evidence of hydrological change under the Roman period, resulting in settlement abandonment, infrastructural change, and changes to frontier policy. The influence of human-induced erosion leading to subsequent hydrological crisis is best signalled through increased alluviation and channel movement. We can also see the impact of climatic change as reports of the Rhine freezing increase over the 4th and 5th centuries, coinciding with a cooler climate shown through palaeo-climatological records. As the Rhine froze over in winter, the river was removed as a barrier for incursions, and this new reality had a noticeable impact on frontier policy – finally leading to the collapse of the defensive system when the Germans crossed the Rhine in winter of AD 406.

All of this is to say that a number of environmental conditions had an impact on the functioning of river transportation networks. The Roman Empire could not control these conditions in any meaningful way, so the only defence that shippers had against environmental hindrances was their training, knowledge, and experience with particular river systems. Thus we see the development of specialised shipping guilds, such as the *corpora nautarum* of Gaul, where specific groups handled the movement on specific rivers, i.e. the *corpus nautarum Rhodanicorum* handled the Rhône, while the *nautae Mosallici* handled the Mosel.[6] The development of these geographically-specialized groups ensured that goods traveling by river would be handled by experienced and knowledgeable captains and would therefore have the best chance of safe transit. This organisation bears striking resemblance to more recent groups, such as the Company of Watermen and Lightermen, based in London, England, who were responsible for the transhipment of goods in the lower Thames. This guild required seven years of apprenticeship to learn the character of the river, the seasonal variation in flows and tides, and how to safely handle a ship in these conditions.[7] Once licensed, a shipper could work independently or for a number of different companies – but all operated under the licensing aegis of the Company of Watermen and Lightermen. We have no clear records of how the Roman-era *corpora* operated, but it may well be that their *raison d'etre* was similar – to ensure that those shippers operating under their name on their rivers were highly trained and knowledgeable individuals who would guarantee safe passage to the best of their ability.

In sum, the environmental context of Roman riverine transportation required intensive local knowledge so that shippers could handle hydrological, climatic, and environmental obstacles that they faced on a daily, seasonal, and annual basis. These challenges

are evident in disparate pieces of information from the ancient world, but are best understood through interdisciplinary investigation that helps move past the obscuring blinders of modern riverine conditions. While the Rhine is used here as a case study, this situation holds true for all rivers in the ancient world, and we must understand the nuances of geography and environment to fully understand how river transportation functioned under Roman rule.

Notes

[1] Franconi 2016; Franconi 2017a; Franconi 2017b.

[2] Büntgen et al. 2011; Harper 2017.

[3] Thacker 1914; Suttor 1986; Rossiaud 2007.

[4] Bockius 2018.

[5] Wickert 1903.

[6] Schmidts 2011.

[7] Fagan – Burgess 1966.

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