A Stanford Digital Humanities Project
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Geographic Network Analysis of the Roman Empire

Abstract

The proposed project seeks to transform our understanding of ancient history by creating networks and maps that express distance in real terms (i.e., in terms of travel time and cost incurred), allowing us to reconstruct the 'true' shape and structure of the Roman Empire and thereby providing a new foundation for our understanding of its emergence, functioning, and unraveling.

Objective

The Roman Empire was the largest state that has ever existed in the Mediterranean and Europe west of Russia. In its mature form it lasted for some 700 years and has never been re-built or succeeded by comparable polities. This uniqueness raises fundamental questions about the causes of its emergence, maintenance, and eventual disintegration. This project proposes to address these questions by reconstructing, for the first time, the "real" physical structure of the Roman Empire. Conventional maps fail to reflect the actual cost of transferring people, goods, and information across space and of managing heterogeneous territories with pre-modern technology. We need more realistic maps that account for differences in travel speed and cost associated with specific media, such as land, river, and sea, but no such maps currently exist. The restructuring of space (and therefore maps) in order to reflect "real distances" in terms of travel time and cost is essential to our understanding of how the Roman Empire worked. To give an example, Mediterranean ports in Spain or Egypt would have been easier to reach from Rome than locations in northern Italy, let alone across the Alps, even though they were many more miles away. Physical distances as displayed on conventional maps massively distort the realities of distance between center and different regions of the Empire and between regions; they fail to reflect the differences between movement by land and by sea; and they fail to capture the actual difference between coastal or riverine sites and those located in hinterlands.

Process

This projects aims to measure and to visualize real communication and transfer costs by expressing physical distance as travel time and cost. In a first step, it will reconfigure the principal Roman networks to reflect real distance. The objective is, first, to create a basic dendritic network that shows real distances from any one point on the network to another (analogous to the travel time version of the London subway map: http://www.tom-carden.co.uk/p5/tube_map_travel_times/applet/), and, second, to create flexible maps that reflect these adjustments whilst retaining natural features. This conversion process is made possible by scholarly resources that have recently become available, most notably the *Barrington Atlas of the Greek and Roman World* (2000), which provides detailed maps of ancient sites and roads, and *Itinerarium provinciarum Antonini Augusti* (2006), which reproduces Roman itineraries, as well as existing digital

resources on campus, including the recently acquired Euro-Atlas dataset that gives a general overview of Roman political geography at the centennial scale.

In a second step, this network will be expanded by incorporating the real cost of naval transfers, by sea and on the main rivers. Only by combining different types of transportation will we be able to understand how the system as a whole functioned. This step will be greatly aided by P Arnaud, *Les routes de la navigation antique: itinéraires en Méditerranée* (2005), which provides systematic information on all ancient Mediterranean sea routes. Correlating these itineraries with known environmental systems (ocean currents, wind patterns and historical river routes) will allow for the extrapolation of known travel costs in areas where textual sources may be lacking.

Results

This project will, for the first time, accomplish two things: represent the Roman Empire as it would have been perceived by ancient observers who were familiar with differences in travel speed depending on terrain and means of transportation, and, more importantly, establish its structural properties as a premodern world system that determined its development and internal set-up. This, in turn, will enable us to re-assess the pace and direction of the expansion of the Roman Empire, its differential resilience, and its unraveling.

Project Category

This project provides infrastructure by creating a database that will allow us as well as future users of the website to run specific analyses. It also has a strong incremental component: the database and website will be expanded and refined as further support becomes available, in various ways including the addition of locales, the addition of different media and travel methods, geographical extension beyond the Roman Empire, and refinement of the visual presentation (e.g. by upgrading from simplified networks to modified maps that retain proper geographical features). The project is deliberately designed to be open-ended, and the underlying approach can readily be applied to other parts of the world and other historical periods.