

FULMINANTE, Francesca (2023) – *The Rise of Early Rome: Transportation Networks and Domination in Central Italy, 1050-500 BC*, Cambridge – New York: Cambridge University Press, 350 pp., ISBN 9781316516805

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This monograph is a novel approach to the debate on the different conditions that led Rome to become the dominant power in Italy. The author, Francesca Fulminante, Senior Research Fellow at the University of Bristol, carries out a study on transport routes in Latium and Etruria from the Late Bronze Age to the Archaic Period in which she implements quantitative techniques of network science and geographic information systems. Consequently, in addition to drawing interesting conclusions from this procedure on the forms of settlement, urbanization and socioeconomic development for this context, F. Fulminante makes a general vindication of the use of this methodology in archaeology.

Thus, F. Fulminante in this brief but complete book, almost conducts an exercise of didactics through the study of transport routes in this particular case study namely, on the various technical issues, concepts and forecasts to be assessed in the application of network analysis. Therefore, her research is an update in the way archaeology understands the interactions and relationships between population centers, and the repercussions in the process of urbanization.

As regards the structure, the work is divided into 9 sections, including the introduction (pp. 1-7), where F. Fulminante only makes a brief summary of each chapter and of the methodology and approach she has applied in her essay, and of the conclusions. In the first chapter, *The Ancient City* (pp. 8-28), the author makes a historiographic review of urbanism in Antiquity based on the approaches proposed by A. J. Zuiderhoek in his homonymous work (Cambridge, 2016) and the different models he presents for the definition of the city in Antiquity. In addition, F. Fulminante argues for the inclusion of a greater interdisciplinarity and the use of a quantitative approach, which she has already been advocating in the research topic and editorial *Where Do Cities Come From and Where Are They Going To?* (<https://www.frontiersin.org/research-topics/7460/where-do-cities-come-from-and-where-are-they-going-to-modelling-past-and-present-agglomerations-to-understand-urban-ways-of-life/magazine>) curated together with J. Hanson, S. Ortman and L. Bettencourt. Within this framework, a synthesis of the urbanization process from the Late Bronze Age to the Archaic Period in Etruria and Latium is developed, pointing

out some aspects to understand this process together with some related studies on these topics. As an example, the funerary aspect could be highlighted (see A. M. Bietti Sestieri, *The Iron Age Necropolis of Osteria dell'Osa*, Cambridge, 1992) because of the author's association between urban planning and the social hierarchy manifested in the burials.

To sum up, this first chapter is configured as a state of the art on urbanism in Antiquity in which the author intends to provide a novel perspective in terms of the study of networks for Latium and Etruria. Similar to the previous section, in the second chapter, *Transportation Infrastructures: A New Approach to Interactions* (pp. 29-45), F. Fulminante reviews first the different approaches in archaeology to the study of cultural contacts and interrelations. In this sense, it is important to underline the influence that the diffusionist theses still have since the first postulates of G. Childe in his work *The Dawn of European Civilization* (London, 1925). However, the author prefers a more flexible interpretative framework to understand regional interrelation, beyond an irradiation from an active nucleus to a passive periphery. For this reason, she highlights the distance-parity model or trade-diasporas model of G. Stein, in his work *Rethinking World-Systems. Diasporas, Colonies, and Interaction in Uruk Mesopotamia* (Tucson, 1999), where a greater variety of types of relationships and connections are presented. The author then briefly explains network theory and mentions some studies that have employed this perspective (e.g. *A Small Greek World. Networks in the Ancient Mediterranean*, Oxford, 2011 by I. Malkin). Nevertheless, F. Fulminante calls for a greater use of this approach and a quantitative way in which transport infrastructures and connections are valued as entities resulting from the interaction between communities. In this way, she argues that the processes of urbanization and conformation of political units could be better understood.

Chapter 3, *Data and Methodology* (pp. 46-57), shows the studies that the author has used to compile information on the settlements of central Italy. F. Fulminante presents a remarkable list of works, from the most classical ones, for example *The Changing Landscape of South Etruria* (London, 1979) by T. W. Potter, to the most recent research projects, such as the one carried out by H. Patterson, R. Witcher and H. Di Giuseppe (*The Changing Landscapes of Rome's Northern Hinterland: The British School at Rome's Tiber Valley Project*, Oxford, 2020). In parallel, the author has also valued previous researches on land and river routes, with more systematic studies for Latium (e.g. *Il Tevere e le altre vie d'acqua del Lazio antico*, Rome, 1986 by S. Quilici Gigli) while in the Etruscan case there is a lack of such works, so that the author has had to make reconstructions from research of various kinds, but with information on the territory, for example, the work of A. Zifferero on the border sanctuaries ("Economia divinità e frontiere: sul ruolo di alcuni santuari di confine in Etruria meridionale" in *Ostraka* 4, 2, 1995). Then, the methodological structure followed in the analysis is explained, beginning with the application of different degrees of centrality and intensity for the settlements to see the degree of efficiency between the transport networks of Etruria and Lazio. The last step is the establishment of models and

hypotheses of connectivity and networking. The next chapter, *Network Analysis Centrality Indexes* (pp. 58-86), is the first procedure of the methodology explained above. The author classifies the importance of the settlements in the two regions according to their size and centrality. The latter one is quantified according to the betweenness centrality, the degree to which the actors control the relationship with their peers or the indirect interconnectivity with other agents; closeness centrality, based on the closeness of one actor to another, which can be measured by the total distance and size of the network; and degree centrality, the way in which a node is connected to others and how it receives information from one point to another. F. Fulminante follows with the order of her method in Chapter 5, *Network Analysis Efficiency Indexes* (pp. 87-93), in which she measures the global efficiency of both spaces, the general capacity of connection between all nodes, and the local efficiency, based on the number of nodes, the length of connections and the capacity for adaptation.

In Chapter 6, *Multi-scale Analysis on Least-Cost Paths* (pp. 94-107), F. Fulminante studies the transport routes of Latium and Etruria established in the previous sections from the least-cost paths. Among the most important observations she makes we can highlight a remarkable coincidence between the connections in the Late Bronze Age and the later Roman road network or the interpretation of the *fora* as crossroads of regional and interregional routes. This would support the author's thesis of the influence of this connectivity, which goes back long before the Roman domination of Italy, on urban development. The next chapter, *Modelling* (pp. 108-124), sets out the different models put forward by the author to understand the network systems of Latium and Etruria at a general level, i.e. the logic behind the establishment of the connections. In this manner, she attempts to combine the previous criteria of global and local efficiency, together with those of average strength, average edge length and average (unweighted) clustering coefficient, with aspects of competition and collaboration between settlements. Finally, in the *Conclusions* section (pp. 125-129), the author again stresses the revaluation of the network perspective and, in general, of quantitative techniques for the study of the past. Likewise, she gathers the main corollaries of her analysis that appear throughout the work: F. Fulminante has observed a growing weight of land routes over river routes since the Bronze Age both in Etruria and in Latium, a region that presents a higher percentage of centrality than the previous one, due to its smaller extension and concentration of routes. At the same time, the network system of Etruria is characterized by its symmetry between the different nodes or sites as opposed to the hierarchy and inequality of Latium, whose dynamics favored the concentration of power in Rome, due to its superior centrality and privileged geographical position. This would be one of the answers given by the author to explain the later hegemony of Rome over the rest of Italy.

The book is completed with a remarkable documentary appendix with the graphical representation of the data and statistical and mathematical methods used by F. Fulminante throughout the work, with complete accessibility of

the results. Thus, the concepts and values that the author has tried to quantify are explained again. In *Appendix a: mathematical explanations and calculations for chapter 5* (pp. 133-135), as it can be seen from the title of the section, the explanation and justification of the quantification of global and local efficiency are given. Next, in *Appendix b: modelling from chapter 7 step-by-step* (pp. 137-157), the different measures of a network system (average strength; average edge length; average (unweighted) clustering coefficient; global efficiency and average local efficiency) are discussed, together with the formulas to obtain them. Based on these data, the author presents more systematically the analysis models presented for each region and the synthesis of the results reached. In *Appendix c: mathematical explanation and calculations for chapter 4* (pp. 159-206), the characterization of the study sites is presented again, based on betweenness centrality, closeness centrality, normalised degree centrality, together with the mathematical calculations for this purpose. In conjunction with this, the information regarding these indices is presented for each site according to its size and to whether they are land or river routes, as well as the graphs of the general correlation for each region according to the period (Final Bronze Age, Iron Age 1 and 2, Archaic Age). Finally, in *Appendix d: data* (pp. 207-208) appears the information relative to each site (coordinates, region and size) for each period, from which F. Fulminante used geographic information systems. For the specific data in these last two appendices, the author provides links to much more extensive and detailed information tables.

To sum up, the work of F. Fulminante is not only of great interest to better understand the urbanization processes and their connection with transport infrastructures in Central Italy since the Late Bronze Age. Her research shows the possibilities of the method of quantitative analysis that can be applied to different contexts. Therefore, one of the greatest merits of the author with this study is to have been able to combine the study of transport routes in Latium and Etruria from the Late Bronze Age to the Archaic Period with the exposition and vindication of the methodology she proposes.

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