

FUELLING ANCIENT MEDITERRANEAN CITIES: A FRAMEWORK FOR CHARCOAL RESEARCH*

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INTRODUCTION

Fuel in the ancient Mediterranean has to date received little detailed analysis. Humans in the Mediterranean consumed fuel in socio-culturally conditioned ways (i.e. history *'in'* the Mediterranean); but that they could consume fuel at all, and which fuels were available in which areas, is very much a *'history of'* topic.¹ Quantitative and qualitative studies of the economy have focused on production and trade of goods and slave labor, but the fuel economy has been difficult to trace in the historical sources, mentions being more incidental than material. The most important archaeological evidence, i.e. that of the archaeological charcoal, is not yet routinely collected by all excavators. This is an omission that begs attention, as ancient settlements could not function without fuel. The gathering of wood for fuel occasionally resulted in dramatic changes in the environment when over-exploitation occurred (for example, on islands), while in other places, more sustainable practices appear to have occurred. (Wood was not the only fuel in many parts of the Mediterranean: animal dung and agricultural waste such as chaff and olive lees were also consumed.) Geology, topography, and climate determine which trees may grow in a particular location; but

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¹ Cf. Horden and Purcell 2000. Fuel as a natural resource neatly straddles the nuanced distinction Horden and Purcell make between examining the (natural) history *of* the Mediterranean, as opposed to human history conducted *in* it. We may examine these from pre-history to the modern period using all data at our disposal for one any period: scientific, archaeological and historical.

politics, land ownership, cultural mores and agricultural practice moderated the physical factors.

This contribution provides a framework for examining ancient Mediterranean cities' fuel supplies. Archaeological charcoal is at the heart of this approach but aspects of the historic sources are also considered and a case study of Pompeii's fuel economy *c.* third c. BC to AD 79 is briefly overviewed in line with the methodology suggested. New scientific techniques beyond simple charcoal identification as to wood type have started to appear and are discussed here in terms of their usefulness for examining forest management and consumption.

Further aims of this contribution are to encourage researchers to collect charcoal, and to show the detailed ways in which it can now be used to examine a city's fuel supply. In time, with sufficient further research, it may be possible to synthesize regional patterns of supply and consumption for the Mediterranean (and the ancient world as a whole). Indeed the relevance of studying ancient wood fuel remains appears to have become greater today as we consider modern problems of climate change, and the potential of pelletized wood (at perhaps 70% of the calorific value of coal)² as a part of our fuel future.

STUDYING THE FUEL ECONOMY: MODERN AND ANCIENT DIFFICULTIES

Fuel is a central part of most production processes, and as such forms part of a city or state's, economic consumption. An economy's size may be estimated by its Gross Domestic Product, or GDP. Two methods are routinely used to calculate GDP: i) the income method, or ii) the expenditure/consumption method. For the income (of households) method, GDP is defined as labor income + capital interest + rent. Under the expenditure/consumption model, GDP is equivalent to consumption + investment + government spending + net exports. In the ancient world, the latter is often expressed in terms of grain equivalents.³ These two methods implicitly include some sort of value for fuel. They are meant to arrive at the same value, and they are

² Wynn 2011. See also Collaborative Partnership on Forests 2011.

³ The range of modern scholars' calculations of the size of the ancient Roman GDP has been summarized recently by Lo Cascio and Malanima forthcoming. See also Scheidel et al. 2007.