

W.V. Harris, ed., *The Ancient Mediterranean Environment between Science and History (Columbia Studies in the Classical Tradition 39)*. Leiden: Brill, 2013. Pp. xv + 332. ISBN: 978-90-04-25343-8 (hardback); ISBN: 978-90-04-25405-3 (e-book). \$145.00.

Largely composed of papers presented in Rome in 2011, *The Ancient Mediterranean Environment between Science and History* is an excellent example of both the complications and rewards of collaboration between historians and environmental scientists. Unlike previous studies, which rely heavily on historical sources, the scholars included in this volume employ a variety of evidence and recent techniques in their quest to better understand the nature of the ancient environment and the ways human beings managed and damaged it. This is an important contribution to the still nascent exploration of human interactions with the ancient environment; there is a tremendous amount of work yet to be done.

From these diverse papers, three significant issues emerge. First, the Mediterranean world itself possesses so varied a landscape and climate that it is very difficult and often over-reaching to generalize about the region as a whole. We clearly need many more studies of Mediterranean micro-regions before making large-scale claims about the entire Greco-Roman world. Second, different expectations regarding time-scale and temporal precision complicate collaborations between historians and climate scientists. Whereas scientists may date a change or event to within a range of a hundred or few hundred years, historians often wish to know the exact year or day on which a particular event occurred. I expect this situation will improve as dating techniques continue to develop, additional high-resolution (less than ten or twenty calendar years resolution) datasets become available, and future collaborations lead to refinements of the specific goals of these combined efforts. Lastly, this collection demonstrates just how crucial the careful interpretation of evidence is, especially, when derived from so many different sources.

After an introduction from W.V. Harris, which includes a succinct critique of P. Horden and N. Purcell's *The Corrupting Sea: a Study of Mediterranean History* (2000)—a book that continues to stimulate and provoke more than a decade after initial publication—this collection is divided into four parts followed by an excellent summarizing and forward-looking “Finale” from respondent Andrew Wilson. In the first part, “Frameworks,” the focus is on fuel and energy. In “Energy Consumption in the Roman World,” Paolo Malanima attempts to quantify the average expense for energy in the imperial period and suggests that, although estimates of the amount of land necessary to support an adequate energy supply are problematic, a rising population would likely have strained available resources. Malanima is also the first of several papers in the collection to refer to an “unfavorable climate phase” beginning in the late second-century CE, which he links, perhaps, precipitately, to economic decline. This late imperial, unfavorable climate phase, variously interpreted, is a leitmotif of the volume as a whole.

Robyn Veal's “Fuelling Ancient Mediterranean Cities: A Framework for Charcoal Research” is a surprising and surprisingly accessible highlight; who would have thought that the study of charcoal could be so interesting and offer so much? Making use of the historical sources, relating studies of the ancient fuel supply to contemporary climate

issues, and clearly explaining methodologies and problems of evidence-gathering, Veal effectively demonstrates the role charcoal studies plays in determining how a city like Rome sustained a complex fuel supply system and what social and economic structures were required to manage a variable fuel supply. Her paper should convince archaeologists to pay more attention to charcoal evidence in the field.

The second part, focusing on “Climate,” is the most challenging for the non-specialist. Michael McCormick’s “What Climate Science, Ausonius, Nile Floods, Rye, and Thatch Tell Us About the Environmental History of the Roman Empire” glides, like Ausonius’ *Moselle*, from the use of tree-ring data to fix the date of the *Mosella*, to how climate data supporting a peak cooling period in the sixth century CE corresponds to the movement of nomadic tribes into Europe, to different ways of interpreting the use of tile versus thatch as roofing material. McCormick is cautious not to equate co-occurrence with cause and also deserves credit for giving literary studies a place at the environmental studies table.

Whereas McCormick discusses general trends, Edward R. Cook in “Megadroughts, ENSO, and the Invasion of Late-Roman Europe by the Huns and Avars” and Sturt Manning in “The Roman World and Climate: Context, Relevance of Climate Change, and Some Issues” plunge deeply into data and its myriad problems. Using tree-ring data from China and considering the impact of ENSO, the El Niño-Southern Oscillation on the Asian steppes in the fourth to sixth centuries CE, both of which provide information about the wetness and dryness of the region, Cook argues that “megadroughts caused in part by ENSO are viable hypotheses for explaining what might have incited the Huns and Avars to migrate west and invade late-Roman Europe” (101).

Manning, wary of the over-generalizations flooding the field of ancient environmental studies, diagnoses several problems with current approaches to data collection and interpretation, including a lack of locally-based data and chronological control of data, and of effective ways of integrating palaeoclimate data with that of history and archaeology. His is a difficult paper seeming to enact the complexity of the problems involved in careful analyses of ancient climates. However, it is well worth sticking with as he attempts to model a more careful approach in his own analysis of what sunspots, speleothems (mineral deposits found in caves), and volcanic activity tell us about Roman climate and cultural development. After considering various kinds of evidence, he also concludes that “a stable and reasonably positive...climate regime was in place for the period from about the 2nd century BC through the 2nd century AD” (169) corresponding, arguably, to Rome’s cultural zenith.

In the third section, “Woodlands,” W. V. Harris also argues for a more careful analysis of the available data regarding deforestation in “Defining and Detecting Mediterranean Deforestation, 800 BCE to 700 CE.” Harris, using the evidence of ancient sources and pollen deposits, stresses the need for a better understanding of woodland and estate management practices, additional locally-based data, and a “typology of deforestations.” He tentatively concludes with a hypothesis more complex than those of his predecessors regarding the state of deforestation in the Greco-Roman

world, attending carefully to regional and temporal variations in the degree of deforestation and the recovery of deforested areas.

The fourth part, entitled, “Area Reports,” demonstrates the value of local studies and is the most accessible section for the non-specialist. In “Problems of Relating Environmental History and Human Settlement in the Classical and Late Classical Periods: The Example of Southern Jordan,” Paula Kouki uses proxy data in her examination of the relationship between the development of settlements and climatic conditions. For the Petra region, she shows how “the intensification of settlement and agriculture lagged behind the improved climatic conditions by at least two hundred years” (205-206); thus, suggesting that other political, economic, and social factors were driving the changes in settlement patterns. In “Human-Environment Interactions in the Southern Tyrrhenian Coastal Area: Hypotheses from Neapolis and Elea-Velia,” Elda Russo Ermolli, Paola Romano, and Maria Rosaria Ruello use the evidence of sea core samples to trace changes in the landscape and vegetation of Neapolis and Elea-Velia, shedding light on flooding and erosion in the area and the responses of inhabitants to these changing conditions.

In the final paper, “Large-Scale Water Management Projects in Roman Central-Southern Italy,” Duncan Keenan-Jones focuses on two water-related case studies: the Aqua Augusta and Tiber flood control. Regarding the Aqua Augusta, Keenan-Jones discusses aquifer recharge and the greater effect changes in rainfall would have had on towns near the aqueduct’s source rather than on Rome itself. In his second case study, Keenan-Jones focuses on elite attitudes towards nature, the desire for continual improvements in the productivity and profitability of agricultural land, and the political mileage to be gained from flood recovery, especially, after the development of the Campus Martius. He concludes by relating the Roman tension between a desire for progress and for living in balance with nature to our similar contemporary struggle to achieve both progress and balance.

Unfortunately, two problems limit the potential audience for this rich collection. For the non-specialist, the lack of explanation of scientific methods and ways of interpreting datasets in some of the papers will prove challenging. The simple inclusion of a glossary of terms and techniques could easily extend the reach of this important volume. The cost of the book is also prohibitive, which is a shame, as several of the papers could make a substantial contribution to an undergraduate course on ancient environmental studies. Given the various expertise required to undertake questions of the kind represented in this volume, we should be introducing students to future research possibilities at an early stage in their study of the ancient world. Who knows, but, by investigating the ancient environment, perhaps one of these future scholars will shed light on how to mitigate our own twenty-first century environmental and climate-related crises.

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