

REVIEW ARTICLE

Environment, sustainability, and Hellenic studies

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Abstract

This article reviews a selection of books published over the last decade that explore the relationship between humans and the environment in the ancient Greek world. These publications represent a new phase of the ecological turn in classical studies, in which ancient environmental studies has emerged as a distinct subdivision of the environmental humanities. Their contributions can roughly be divided into two groups according to their approaches and goals: one applies ecocritical analyses to Greek literature, presenting alternative ecologies to those that have produced contemporary environmental crises; the other applies historical methods to written and material evidence to illuminate the realities of ancient Greek human–environment relations. The three subsections of this review provide overviews of scholarship addressing sustainability and the conservation of natural resources; ecology and religion; and societal resilience in the face of ecological stress. I suggest productive avenues for further research in each area, arguing that interdisciplinary communication and collaboration are becoming increasingly important in this evidentially, methodologically and theoretically variegated field.

Keywords: Anthropocene; ecocriticism; eco-theology; environment; resilience; sustainability

BOSAK-SCHROEDER (C.) **Other Natures: Environmental Encounters with Ancient Greek Ethnography.** Berkeley: University of California Press, 2020. Pp. 270. \$95. 9780520343481.

ERDKAMP (P.), MANNING (J.G.) and VERBOVEN (K.) (eds) **Climate Change and Ancient Societies in Europe and the Near East: Diversity in Collapse and Resilience.** Cham: Palgrave Macmillan, 2021. Pp. 623. £119.99. 9783030811020.

HUNT (A.) and MARLOW (H.F.) (eds) **Ecology and Theology in the Ancient World: Cross-Disciplinary Perspectives.** London and New York: Bloomsbury, 2019. Pp. 216. £29.99. 9781350004061.

LANE (M.) **Eco-Republic: What the Ancients Can Teach Us about Ethics, Virtue, and Sustainable Living.** Princeton: Princeton University Press, 2011. Pp. 256. \$52.50. 9780691151243.

MCINERNEY (J.) and SLUITER (I.) (eds) **Valuing Landscape in Classical Antiquity: Natural Environment and Cultural Imagination.** Leiden: Brill, 2016. Pp. 495. €155. 9789004319707.

OLSHAUSEN (E.) and SAUER (V.) (eds) **Die Schätze der Erde—Natürliche Ressourcen in der antiken Welt.** Stuttgart: Franz Steiner Verlag, 2012. Pp. 425. €71. 9783515101431.

SCHEEER (T.) (ed.) **Natur – Mythos – Religion im antiken Griechenland/Nature – Myth – Religion in Ancient Greece.** Stuttgart: Franz Steiner Verlag, 2019. Pp. 297. €54. 9783515122085.

SCHLOSSER (J.A.) **Herodotus in the Anthropocene.** Chicago: The University of Chicago Press, 2020. Pp. 216. \$30. 9780226704982.

SCHLIEPHAKE (C.) (ed.) **Ecocriticism, Ecology, and the Cultures of Antiquity.** Lanham: Lexington Books, 2016a. Pp. 390. \$139. 9781498532846.

SCHLIEPHAKE (C.) **The Environmental Humanities and the Ancient World: Questions and Perspectives.** Cambridge: Cambridge University Press, 2020. Pp. 75. £15. 9781108749046.

SCHLIEPHAKE (C.), SOJC (N.) and WEBER (G.) (eds) **Nachhaltigkeit in der Antike: Diskurse, Praktiken, Perspektiven.** Stuttgart: Franz Steiner Verlag, 2020. Pp. 265. €53. 9783515127332.

USHER (M.) **Plato's Pigs and Other Ruminations: Ancient Guides to Living with Nature.** Cambridge: Cambridge University Press, 2020. Pp. 282. £29.99. 9781108839587.

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I. Introduction

There are few subdisciplines in the study of the ancient world more innovative, rapidly growing or directly relevant to contemporary issues than ancient environmental studies. The variegated possibilities presented by the study of past human–environment relationships have only just begun to crystallize since the turn of the millennium, and the excitement generated by the infusion of entirely new evidence types and methodologies into classical studies has stimulated a steady stream of recent projects, conferences and publications. The past few years have also witnessed the publication of one of the first up-to-date introductory texts for ancient environmental studies,¹ though the breadth of material, themes and debates covered by this label continues to make entry into it difficult for the uninitiated.

The publications reviewed in this article represent a cross-section of the research strands that have been particularly prominent in studies of human–environment relations in the ancient Mediterranean world over the last decade; whilst only a few focus exclusively on the ancient Greek world, all devote attention to or touch on almost every aspect of Hellenic studies in some way, from poetics and economics to gender and medicine.² I have focused on text-based scholarship, largely omitting the vast body of research on ancient environmental studies conducted by archaeologists and environmental scientists, though I occasionally cite representative publications from these groups throughout. Many of the contributions surveyed integrate approaches and material derived from disciplines beyond those traditionally associated with classical studies, including geology, climatology, biology, neuroscience and anthropology, and attempt to identify shared aims and complementary methodologies between philologists, historians, archaeologists and scientists studying the ancient world; others seek to define the role that classical studies can or should play in environmental studies and the contemporary environmentalist movement more broadly.

The origins of interest in the relationship between humans and the environment in the ancient Greek world can be traced back to diverse 19th- and 20th-century intellectual movements, such as Romanticism in the German-speaking countries,³ human geography in the English-speaking world⁴ and the Annales School in France.⁵ The study of the environment in the ancient world only assumed a form recognizable today, however, with the rise of the environmentalist movement in the 1960s. That intellectual revolution was spurred by a recognition of humanity’s capacity to change the Earth system engendered by the widespread post-war exploitation of petroleum products and nuclear energy. As activists began to highlight the deleterious effects of such developments, scholars responded by examining the historical roots of large-scale anthropogenic environmental change.

1967 was a watershed year in ancient environmental studies. In that year, Lynn White, a prominent American medieval historian, published a brief but important article in *Science*, ‘The historical roots of our ecological crisis’.⁶ In it, he argued that the origin of modern environmental crises could be traced to the break between the ‘pagan animism’ of ancient Graeco-Roman societies: the notion that natural features, phenomena and organisms were inhabited or impelled by spirits and Christianity’s assertion of human dominion over the natural world. Whilst this article has seldom been read by scholars of classical studies,

¹ Schliephake (2020). Jeskins (1998) is now thoroughly outdated.

² I have had to be selective in compiling this list, excluding most notably Sallis (2016), Bennett (2017), Cordovana and Chiaï (2017), Bianchi et al. (2019) and Brockliss (2019).

³ See Gordon (2019).

⁴ For example, Huntington (1915); Semple (1931).

⁵ For example, Braudel (1949); Le Roy Ladurie (1967).

⁶ White (1967).

White's argument that 'by destroying pagan animism, Christianity made it possible to exploit nature in a mood of indifference to the feelings of natural objects' went on to be highly influential in many corners of environmental studies.⁷ That same year, Clarence Glacken published his seminal book *Traces on the Rhodian Shore*, which delineated the relationship between conceptions of culture and nature in the Western tradition. The first quarter of this monumental tome (which, whilst similarly rarely read by scholars of classical studies, has come to be seen as a foundational text in environmental history)⁸ is devoted to the Graeco-Roman world, making it the earliest comprehensive attempt to trace the ancient history of environmental thought.⁹

In subsequent decades, ancient environmental studies slowly began to coalesce as a discipline, bringing together motley approaches to the study of human–environment relations in the distant Mediterranean past. The work now collected under this label can roughly be grouped into two strands: ecocriticism, the study of the representations of human–environment relations in literature (also called 'storied ecology' or 'environmental philology'), and environmental history, the study of the realities of those relations (also termed 'ecologized history').¹⁰

Ecocriticism was a product of the environmentalist foment in literary studies in the 1970s and 1980s.¹¹ Early ecocritical scholarship emerged from the tradition of studying discourses centred on 'wilderness' in modern 'nature writing';¹² as it has grown, however, the proponents of ecocriticism have recognized the value of examining all sorts of literature through an environmental lens in order to challenge anthropocentric conceptions of nature and illuminate discourses relating to the relationship between humans and the environment.¹³ As such, in recent decades ecocriticism has come to serve as an umbrella term for a varied assortment of literary critical approaches to human–environment relations, such as new materialism and posthumanism, but one of its chief characteristics is the use of ecologically inflected literary analysis for political ends.¹⁴ Ecocritical approaches to ancient Greek literature have only attracted attention in their own right since the turn of the millennium, in parallel with the development of Mediterranean ecocriticism, which examines this region as a 'natural-cultural compound'.¹⁵

Environmental history emerged slightly earlier, in the 1960s, among historians examining the broad ecological shifts of the early modern world.¹⁶ Apart from Glacken, very few early environmental historians paid any attention to the premodern world; the notable exception was J. Donald Hughes, whose publications defined ancient environmental history's research agenda for a generation.¹⁷ Much of Hughes' work reflects the declensionist narratives of the conservationist milieu in which he developed as a scholar, namely the overexploitation of natural resources, ecological degradation and societal collapse.¹⁸ But whilst Hughes (1994) and its revised edition, Hughes (2014), are among the few overviews of ancient environmental studies available for decades, scholars of ancient Greek culture and society have been slow to take up the gauntlet thrown down by his work.¹⁹

⁷ White (1967) 1205; Whitney (2015); Jedan (2017); LeVasseur and Peterson (2017).

⁸ Schliephake (2016b) 6; Rajan (2019).

⁹ Glacken (1967) 3–149.

¹⁰ Schliephake (2016b); Schliephake (2020) 8–9; Usher (2020), 7–10. Cf. Garrard (2014) 3–5.

¹¹ Rueckert (1978).

¹² Buell (2005) 13–16.

¹³ Armbruster and Wallace (2001); Rigby (2002).

¹⁴ Lousley (2014).

¹⁵ Iovino (2013); Past (2016); Schliephake (2016b) 1–10.

¹⁶ McNeill (2011) 161–63.

¹⁷ Hughes (1975); (1994); (2014).

¹⁸ Cf. Cioc and Miller (2010).

¹⁹ Sallares (1991) remains a unique, and uniquely ambitious, early foray into this realm.

Much more influential has been Horden and Purcell (2000), which embraced an historical-ecological approach as a means of exploring the defining features of ancient and medieval Mediterranean history. Their exploration of ‘microecologies’ as an important factor driving the exceptional connectivity of the premodern Mediterranean world has set much of the agenda of subsequent ancient Greek environmental history.²⁰

Whilst a gulf remains between ecocritical philologists and environmental historians working on the ancient Greek world, recent years have witnessed signal efforts to bring the two fields into greater dialogue.²¹ No single concept has been more stimulating in this regard than that of the Anthropocene. Whilst in the physical sciences the Anthropocene has been rather strictly defined as the period during which human activity has left a distinct global trace in the Earth System,²² in the environmental humanities it has been embraced as a more expansive heuristic framework for studying the relationship between humans and the environment over long timescales.²³ Disagreements over how the term should be employed in the humanities have caused some friction,²⁴ but the Anthropocene has already proved fertile intellectual ground for Greek ecocritical philologists and environmental historians alike, and, as will be highlighted below, promising convergences in research aims are beginning to appear. I will focus on three themes that have emerged as key topics: sustainability, eco-theology and resilience.

II. Sustainability

Most of the earliest works of ancient environmental studies reflected the primary concerns of the contemporary environmentalist movement, conservation and sustainability. Most notable among these are Hughes’ publications, which collected evidence for deleterious ecological practices that echoed contemporary environmental issues, overgrazing, deforestation, overhunting, the exhaustion of mineral resources, pollution, in Greek and Roman written and material evidence.²⁵ In the recent wave of scholarship examining ecological themes in ancient literature, some scholars have continued this tradition, excavating the ancient origins of concepts that have been viewed by environmentalists as primary drivers of environmental degradation, such as anthropocentrism.²⁶ But many ecocritical classicists have now begun to take the opposite approach, examining ancient texts in an effort to excavate useful alternative ways of thinking about humans’ relationship to the environment.

A tenet of this approach is the contention that the modern perception of a divide between nature and society is a fiction of which we can be disabused by reading ancient authors. As its proponents argue, governmental initiatives and technological innovations have not brought about the drastic changes necessary to combat contemporary ecological crises because the ultimate driver of those changes is individuals’ attitudes to the environment. Societal paralysis in the face of looming ecological crises is thus at base a failure of the collective imagination, and crafting a new ecological ethos requires the dissemination of alternative ways of thinking. Classical literature continues to enjoy a cultural cachet in the Western world, but the world views of its authors, who were generally closer to, and more aware of, the boons and hazards of the environment than us today,

²⁰ See now Horden and Purcell (2019).

²¹ Schliephake (2020) 17–31.

²² First proposed by Crutzen and Stoermer (2000). See Williams et al. (2011); Zalasiewicz et al. (2019).

²³ Many publications exploring the role of the Anthropocene in the environmental humanities are now available; see, for example, Horn and Bergthaller (2020); Merchant (2020).

²⁴ For example, Thomas (2021).

²⁵ For example, Hughes (2014) 68–182.

²⁶ For example, Egerton (2012) 1–16; Attfield (2019) 80–83.

are often alien to contemporary audiences.²⁷ This combination of familiarity and strangeness makes classical texts a potent source of material on which ecocritics can draw to encourage readers to escape the cultural blinders that have allowed us to sleepwalk into contemporary environmental crises.²⁸ Thus, a number of the ecocritical monographs reviewed here have argued that Greek environmental discourses, together with various other discourses from past societies, can and should serve as a pillar of a ‘new mythology’ for a more sustainable Anthropocene.²⁹

One particularly expansive treatise is Usher (2020), which examines ancient ‘environmental philology’ primarily through Greek texts.³⁰ Usher embraces the writings of Greek philosophers from Anaximander to Diogenes to compare ancient ecological reflections on human–environment relations to modern thought on sustainable systems.³¹ His primary aim is to explore sustainability in ancient Greek philosophers’ works through the paired lenses of ecology and cybernetics,³² arguing that their views illuminate the need to recognize the complex nature of the Earth as a system and use that recognition to achieve true sustainability, rather than just disparate eco-conscious practices. The title of this book, *Plato’s Pigs and Other Ruminations*, references the famous ‘city for pigs’ from the *Republic*,³³ and Plato has unsurprisingly been the subject of considerable interest in discussions of sustainability. Plato conceived of the world as a divine self-sufficient superorganism, but one that could only persist because of its endless recycling of all matter;³⁴ in this regard, he prefigured the Gaia Hypothesis, the theory that Earth and its biological systems comprise a single entity whose self-regulatory feedback loops keep the planet habitable.³⁵

But it is Plato’s concern with how best to shape and govern societies and his enduring cultural appeal that has made his corpus a rich vein of material for those seeking ancient Greek ecological wisdom. The *Republic*’s reflections on managing the public good and addressing threats to it has appealed in particular to politically minded ecocritical classicists,³⁶ and among the most stimulating entries in this field has been Lane (2011). As Lane has argued, Plato’s aim was ‘transforming the ethos of his own time’, and his writings are thus useful guides for expanding political imagination and overcoming collective inertia in the face of looming crises.³⁷ A key topic in both Usher’s and Lane’s analyses of Plato is the importance of addressing the relationship between private action and public good, in particular with regard to *pleonexia* (‘an immoderate, overreaching desire for more than one’s share’, as Lane defines it),³⁸ in order to ensure the sustainable exploitation of the environment.³⁹

The *Histories* of Herodotus, with its reflections on the myriad ways in which societies and their environments related to one another, has been the subject of another two monographs. Schlosser (2020) explores the relationships between society, politics and sustainability in this text, arguing that Herodotus’ nuanced engagement with human–environment relations prefigures the complex ecological dynamics that we have become

²⁷ Hunt and Marlow (2019) 7.

²⁸ Hunt and Marlow (2019) 2, 7; Schlosser (2020) 3.

²⁹ Lane (2011) 8–9; cf. Eidinow (2016).

³⁰ Usher (2020) 9–10.

³¹ Usher (2020) 14–154.

³² Usher (2020) 216.

³³ *Pl. Resp.* 369a–372c; Usher (2020) 91–109.

³⁴ Sedley (2019).

³⁵ Lovelock (1979); Attfield (2019) 76.

³⁶ Cf. Stone (2017).

³⁷ Lane (2011) 6, 25, 163.

³⁸ Lane (2011) 32.

³⁹ Lane (2011) 32–36, 40, 45, 98; Usher (2020) 105–07.

increasingly aware of in recent decades.⁴⁰ He emphasizes the importance of *nomoi*, ‘the patterns or orders of collective life including both humans and nonhumans’,⁴¹ in establishing the bounds of *eleutheria*, defined primarily as the political freedom to organize collectively.⁴² But, Schlosser asserts, Herodotus viewed the ultimate goal of all societies to be not *eleutheria* in itself, but rather ‘the condition of dynamic equilibrium where human and nonhuman flourish equally well’.⁴³ The complexity of the *Histories*’ ecological vision thus illuminates the fluid connections between private life, public institutions and the environment; as Schlosser argues, a sensitive reading of this text can help readers from contemporary democracies in particular to expand their political imaginations with respect to environmental issues.

Bosak-Schroeder (2020) similarly analyses what might be termed Herodotus’ political ecology, but she also broadens the scope of her examination in two ways. First, she draws on ethnographic anthropology and the analogy of the modern museum to examine the many interactions among humans, non-human species and the ecosystems they shared in the *Histories*; second, she juxtaposes this text with Diodorus Siculus’ *Historical Library*, another relatively completely preserved work of Greek historiography with wide-ranging coverage of non-Greek settings. Bosak-Schroeder explores in particular the ways Herodotus and Diodorus discuss ‘natural’ categories or units, such as continents, species, sexes and foodways, and the boundaries between them, noting that characters within these texts and the authors themselves constantly alter ‘natural’ bounds.⁴⁴ By presenting a smorgasbord of alternative ecologies, these texts demonstrate that sustainability is highly contingent on changeable societal structures.⁴⁵ For Herodotus, there was no politics without ecology, and no economy without sustainability.

A related but more traditional strand of scholarship on ancient sustainability has examined how individuals and communities in the Graeco-Roman world conceived of ecological sustainability and acted to conserve natural resources.⁴⁶ This approach has been especially popular in recent German scholarship,⁴⁷ reflecting a long-standing interest in the history of sustainability (*Nachhaltigkeit*) in German environmental studies.⁴⁸ This scholarship has been heavily influenced by economic history, which is reflected in its focus on the tensions between the exploitation of natural resources for profit and their long-term conservation. What is most striking about these contributions is that whilst ecocritical analyses of Greek texts emphasize ecological sensitivities that ranged beyond immediate human self-interest, evidence of sustainable practices that directly conflicted with economic interests is meagre; almost all of the chapters in Olshausen and Sauer (2012) and Schliephake et al. (2020), for instance, discuss the sustainable treatment of environmental elements that were valued economically, such as marble, fish or soil.⁴⁹ Schliephake’s case study of the cultural value of olive trees is a case in point: olives were of obvious economic value, so their conservation was of economic interest; if less profitable trees had been the focus of such conservation efforts, a stronger case could be made for cultural imperatives divorced from economic incentives driving sustainability.⁵⁰ Furthermore, as Grassl (2012) and Thommen (2020) have observed, there seems generally to have been little

⁴⁰ Schlosser (2020) 6.

⁴¹ Schlosser (2020) 4–5.

⁴² Schlosser (2020) 112–15, 126–27.

⁴³ Schlosser (2020) 83, 114.

⁴⁴ Bosak-Schroeder (2020) 32–105.

⁴⁵ Bosak-Schroeder (2020) 133–50.

⁴⁶ Schliephake et al. (2020) 11.

⁴⁷ Thommen (2011); Olshausen and Sauer (2012); Reitemeier et al. (2019); Rempe (2021).

⁴⁸ Radkau (2005).

⁴⁹ Bekker-Nielsen (2012); Emberger (2012); Kull (2012); DeLaine (2020); Sojc (2020); Voigts (2020); Weber (2020).

⁵⁰ Schliephake (2020).

awareness that inert natural resources such as metals did not regenerate over human timescales.

One of the most interesting topics in this regard is the exploitation of wild vegetation, especially forests. Hughes' drastic assessments of the extent of deforestation in the classical and Hellenistic Greek world based on literary evidence, such as Plato's oft-quoted description of the eroded slopes of Mount Parnes in Attica,⁵¹ has given way to the conclusion that the clearance of Aegean forests in the first millennium BC was probably not nearly as severe or consequential as once thought.⁵² Nonetheless, Akrigg's recent study of the demographic history of Classical Athens suggests that its fuel demands and those of other large *poleis* may have been very high, perhaps even requiring the large-scale importation of fuel.⁵³ Burgeoning interest in the archaeology of fuel consumption in the ancient Mediterranean is notable in this regard; whilst work in this area has so far largely been restricted to Roman Italy,⁵⁴ the application of recent developments in anthracology (the study of charcoal remains) to Greek material promises to move the deforestation debate beyond the scant written evidence on which it has heretofore centred.

One promising avenue for future research on sustainability in the ancient Greek world is thus working to marry the prescriptive or descriptive discussions of the organization of human–environment relations in literary sources on the one hand and archaeological and scientific evidence for those relations on the other. This work will require more communication and collaboration between philologists, historians, archaeologists and environmental scientists, but it will undoubtedly yield invaluable insight into the everyday practices of sustainability in the distant Greek past and the lessons we might learn from them in shaping a more sustainable future.

III. Eco-theology

In 'The ancient roots of our ecological crisis', White argued that the single most profound factor conditioning premodern cultural ecology was religion.⁵⁵ Ritual activity shaped the environment; the environment was explained by cosmological thought; and the translation of that thought into mythology in turn shaped and justified ritual activity.⁵⁶ This triangular connection between humans, the environment and the divine has been called 'eco-theology',⁵⁷ and philologists, historians and archaeologists alike have been particularly active in studying the eco-theology of the ancient Greek world. Their work can roughly be grouped into publications that examine ritual activity and those that study the realm of the imaginary;⁵⁸ whilst the majority of scholarship has focused on the latter, with a strong emphasis on philosophical texts,⁵⁹ multidisciplinary conferences and projects are beginning to integrate the analysis of ancient Greek eco-theological thought and activity with promising results. (Note that the role of non-human organisms in Greek religion has proved a particularly fruitful topic, but it has been covered in another recent review article, and so will not be discussed here.)⁶⁰

⁵¹ Pl. *Criti.* 110e–111d; Hughes (2014) 68–87; (2017).

⁵² Harris (2011); (2013); Kull (2012) 230–33.

⁵³ Akrigg (2019) 199–204.

⁵⁴ See now Veal and Leitch (2019).

⁵⁵ White (1967) 1205–07.

⁵⁶ Scheer (2019a) 18.

⁵⁷ Hunt and Marlow (2019) 2, 6.

⁵⁸ Scheer (2019a) 18.

⁵⁹ For instance, of the seven chapters indirectly or directly addressing the Greek world in Hunt and Marlow (2019), four deal exclusively with philosophy: Attfield (2019); Jedan (2019); Sedley (2019); Wildberger (2019).

⁶⁰ Kindt (2017).

Among the most prominent focuses of this research has been animism.⁶¹ White assumed that the attribution of divine agency to and respect for elements of the environment was ubiquitous in the Greek world,⁶² and authors such as Hughes have echoed this sentiment.⁶³ The personification of natural features or entities, such as rivers, winds or animals, continues to stimulate interest; as numerous contributions in Marlow and Hunt (2019) and Scheer (2019) show, however, this phenomenon was highly heterogeneous across the ancient world, and scholars now tend to treat it with greater sensitivity to broader social, economic and political contexts.⁶⁴ Indeed, such nuanced re-evaluations of animistic beliefs and their relation to action, both ritual and otherwise, have even led Hunt to call into question the foundational assumption that they translated into greater reverence for the natural world.⁶⁵

A closely related topic in the study of Greek eco-theology is discourses relating environmental features or processes to divine will. Whilst all Greek deities were thought to have had the power to influence the natural world, some, such as Zeus and Poseidon, were particularly closely associated with environmental events, especially hazards,⁶⁶ and recent studies have sought greater clarity on how the relationship between divine agency and such phenomena was understood. Herodotus, for instance, recognized ‘natural’ boundaries whose transgression by humans might provoke the wrath of the gods, but he in fact represents these as more flexible than has previously been recognized.⁶⁷ Similarly, Aeschylus depicted the Erinyes in the *Oresteia* as the punishers of those who thoughtlessly wasted natural resources, thus ensuring the balance between the needs of humans and the bounty of the environment.⁶⁸

A particularly promising new approach to the study of Greek eco-theology is the application of cognitive science to ancient religious written and material evidence. In a stimulating contribution, Larson (2019) examines some insights the cognitive science of religion has offered on the relationship between ‘intuitive’ and ‘reflective’ religious thought.⁶⁹ These findings indicate that rather than believing either that anthropomorphic deities inhabited natural entities or that they literally were those entities, ancient Greeks could have held both these ideas simultaneously and, indeed, that even modern theists to a certain extent concurrently hold intuitive animistic beliefs and more reflective theological views.⁷⁰ In this way, cognitive science is contributing to the creation of an intellectual framework in which the intuitive experiences of religion manifested in ritual practice can be integrated with the reflective discourses about divinities found in myth.⁷¹

Since the mid-20th century, most analyses of the relationship between cultic activity and the environment in the ancient Greek world have been shaped by the theoretical framework of polis religion, which has tended to view the natural world as a component of the *chōra*, distinct from and peripheral to the urban core of the *astu*.⁷² Thus, whilst much attention has been devoted to sacred landscapes and ‘numinous wilderness’ in recent decades, this has largely been refracted through the lens of the formation and modification of

⁶¹ Larson (2019) 72.

⁶² White (1967) 1205–06.

⁶³ For example, Hughes (2014) 43, 65, 184, 189, 195, 203.

⁶⁴ For example, Bremmer (2019); Eidinow (2019); Kindt (2019).

⁶⁵ Hunt (2019).

⁶⁶ Hughes (2014) 50–52.

⁶⁷ Bosak-Schroeder (2020) 32–56.

⁶⁸ Bakola (2019).

⁶⁹ Larson (2019).

⁷⁰ Larson (2019) 79–83.

⁷¹ Larson (2019) 81.

⁷² Sourvinou-Inwood (1990); Kindt (2009); (2012) 12–35.

polis structures.⁷³ This is also true, for instance, of the study of how organic and human-made elements were integrated in Greek sanctuaries, especially with respect to ‘natural’ sites of worship (caves, springs, groves, etc.) and monumental architecture.⁷⁴ Some scholars have sought to nuance the polis religion model by devoting greater attention to supra-polis religious dynamics, and one theme offering great promise in this regard is localism. The exploration in Beck (2020) of the variation and local significance of myths and ritual practices in ancient Greece has demonstrated the many ways in which myth and ritual were constantly shaped and reshaped in the dynamic relationship between the local and the translocal.⁷⁵

An example of the promise offered by such supra-polis studies for our understanding of eco-theology comes from recent work on Arkadia. Viewed already in the Classical period as ecologically and religiously distinct from the rest of Greece, this region came to be a source of fascination for outsiders. Whilst individual Arkadian *poleis* had their own distinct cults and myths, their inhabitants, who were traditionally believed to have been among the oldest peoples in Greece, were seen as being united by primordial and inscrutable habits and cults, such as the eating of acorns and the worship of unusually theriomorphic divinities.⁷⁶ Because of this perceived ancient connection to ‘nature’, Arkadian landscapes were exceptionally dense palimpsests of religious meaning, with distinctive environmental elements, such as the sinkholes, seasonal lakes and caves typical of this region, foci of rich ritual and mythological associations.⁷⁷ This profound layering of eco-theological meaning came to produce a fascinating conjuncture of the imaginary and the quotidian in the Roman period. Pausanias depicted second-century AD Arkadia as a region whose once-flourishing human communities were on the wane, whilst its rural cults and the myths associated with them continued to thrive;⁷⁸ epigraphical sources suggest that this portrayal was influenced by the active preservation and promotion of cults that represented unusual connection to the natural world by local elites and Roman authorities alike.⁷⁹ Such research highlights the potential to enrich our understanding of Greek eco-theology beyond the polis model through the careful integration of literary, epigraphical and archaeological evidence for ritual and myth.

IV. Resilience

The scope of the contemporary ecological challenges confronting humanity, in particular the climate crisis, has triggered a sweeping reconceptualization of history in the 21st century. This has entailed a re-evaluation of the relationship between societal and environmental factors over the *longue durée*, as well as the boundaries between history and the earth sciences.⁸⁰ One of the most important themes to have emerged from this shift in the ancient environmental humanities is ecological resilience, or the capacity of societies to adapt to deleterious environmental change without breaking down. The agenda of pre-modern resilience research has largely been set by scholars in fields to which Hellenists often have little exposure, such as geography, prehistoric archaeology and the environmental sciences.⁸¹ Nonetheless, as scientific evidence for environmental change in the

⁷³ De Polignac (1984); Alcock and Osborne (1994); Mylonopoulos (2008). For a recent example, see Ganter (2019).

⁷⁴ Sporn (2015); (2019); Miles (2016); Robinson (2016); Horster (2019); Schliephake (2020) 31–46.

⁷⁵ Beck (2020) 121–60.

⁷⁶ Jost (2005); (2007); Balériaux (2017); Romano (2019); Scheer (2019b).

⁷⁷ Balériaux (2016); Connors and Clendenon (2016); Neff (2019).

⁷⁸ Balériaux (2017) 141–50.

⁷⁹ Balériaux (2017) 151–56.

⁸⁰ Chakrabarty (2009).

⁸¹ Redman (2005); Folke (2006); Weiberg (2012); Bradtmöller et al. (2017).

ancient Greek world has accumulated, historians and archaeologists have begun to play a more active role in contextualizing how physical and biological processes affected its societies.

Studies on the ecological resilience and vulnerability of premodern Greek societies can broadly be divided into those studying slow change, such as climate change and landscape degradation, and those studying rapid shocks, such as seismic, volcanic and epidemiological events.⁸² Much of the liveliest discussion has focused on periods of societal breakdown, which in the ancient eastern Mediterranean has primarily been the Late Bronze Age and Late Antiquity,⁸³ two periods that bookend the *floruit* of the polis between the Archaic period and the Imperial period. This has obscured the notable fact that, despite many *poleis* experiencing considerable environmental stress over the centuries, few are known to have disappeared as a direct result of ecological pressure; this seems to have been the case because *poleis* generally drew on intercommunity links to maintain their sociopolitical integrity and buffer against risk.⁸⁴ This may be contrasted with the history of the Mayan city states, for instance, whose relatively rapid disappearance after close to a millennium of development is now widely accepted to have been at least in part the result of climate change.⁸⁵ The sociopolitical flexibility of Greek communities in the first millennium BC makes them an ideal subject for comparative analyses of practices and institutions that engendered resilience in the premodern world. This is one area in which ancient evidence for sustainable thought and practice is of obvious relevance.

In the study of adaptation to slow environmental change in the Greek world, some of the most stimulating contributions have come from the ‘Domesticated Landscapes of the Peloponnese’ project. The team behind this project has focused on reconstructing the relationship between climate change, landscape dynamics and sociopolitical systems in the Peloponnese between the Bronze Age and Late Antiquity, publishing several new palaeoclimatic records as well as methodologically robust analyses of the rich array of written, archaeological and environmental data already available from this region.⁸⁶ Whilst much of the team’s attention has been devoted to the connection between climate change and the disappearance of Mycenaean states in the Late Bronze Age,⁸⁷ its members have also examined later periods, arguing, for instance, that a reduction in the occupation of marginal land in the northeastern Peloponnese in the late Hellenistic and Roman periods was in part the result of a long stretch of drier climatic conditions.⁸⁸ Three chapters in Erdkamp et al. (2021) build on this project’s work, addressing the resilience of societies in the Peloponnese to climate change, but whilst two examine Mycenaean communities of the Late Bronze Age,⁸⁹ only a single chapter covers the *poleis* of this peninsula across the entire first millennium BC.⁹⁰ Future studies will need to provide a more even analysis of vulnerability and resilience among Greek populations over the *longue durée* of antiquity.

The availability of more written and archaeological evidence testifying to the impact of rapid ecological shocks, in particular earthquakes and epidemics, in the Greek world has contributed to the greater abundance of studies of the resilience of *poleis* to such hazardous episodes. This research has been bolstered in recent years by the incipient subdiscipline of

⁸² Cf. van Bavel et al. (2020) 22–25.

⁸³ Cline (2014); Harper (2017); Izdebski and Mulryan (2019).

⁸⁴ Meißner (1998); Mackil (2004).

⁸⁵ Kennett et al. (2012); Douglas et al. (2016).

⁸⁶ For the publications of this project, see now the overviews provided by Weiberg and Finné (2021) and Bonnier and Finné (2021).

⁸⁷ For example, Finné et al. (2017); Weiberg and Finné (2018).

⁸⁸ Bonnier and Finné (2020).

⁸⁹ Weiberg and Finné (2021); Timonen and Brysbaert (2021).

⁹⁰ Bonnier and Finné (2021).

disaster studies.⁹¹ Key foci of its research agenda include the importance of cultural memory in natural disaster preparedness and the role that religious beliefs and institutions played in shaping or justifying communal activity in response to such events.⁹²

Given the seismicity of most areas of the Mediterranean settled by Greeks in antiquity, earthquakes have emerged as an important theme in the study of the resilience of Greek communities. Some of this research is of practical interest for disaster preparedness; for example, a palaeoseismological study demonstrated that the last significant seismic event to occur along the Sparta fault was the famous earthquake of ca. 464 BC, which caused huge loss of life in Sparta and precipitated a widespread helot revolt,⁹³ and that the periodicity of prior such events indicates that it is overdue for another.⁹⁴ For Hellenists, however, the primary value of this research lies in examining the social, economic, cultural and political dynamics laid bare by these exogenous shocks.⁹⁵

The most fascinating case study of resilience, or lack thereof, in the face of a seismic event in the Greek world is that of the Achaian polis of Helike, which has been studied intensively by the Helike Project since the 1990s.⁹⁶ On a winter night in 373 BC, western Achaia was shaken by an earthquake and subsequently submerged by an inundation,⁹⁷ many *poleis* belonging to the Achaian League were damaged in this event, but only Helike, home to the most prominent sanctuary in Achaia, disappeared as a result.⁹⁸ The apparent extent of the destruction and the supposed visibility of portions of the submerged town for centuries afterwards contributed to the preservation of the memory of this disaster, which became a point of fascination for both Greeks and Romans.⁹⁹ This persistent ancient curiosity in turn piqued the interest of modern scholars, who attributed the disappearance of Helike to the devastating effect of an exceptionally powerful earthquake followed by a huge tsunami.¹⁰⁰

Recent scientific, archaeological and literary reassessments under the auspices of the Helike Project have, however, presented a rather different narrative. A geomorphological study has indicated that the earthquake of 373 BC was probably not very powerful, and that it most likely caused extraordinary damage because it triggered landslides that formed natural dams in rivers to the southwest of the city; when aftershocks hit the region hours after the initial tremors, these dams were dislodged, causing an enormous flood that submerged the plain below.¹⁰¹ Archaeological evidence also now indicates that Helike's territory was at least partly reoccupied by the mid-fourth century BC,¹⁰² and there is slight evidence suggesting that an attenuated polis may even have survived for a short time after 373 BC.¹⁰³ Why then did the polis of Helike not survive, as its comparably damaged neighbour, Boura, apparently did?¹⁰⁴ The widespread impact of this earthquake on other members of the Achaian League may have hindered relief efforts¹⁰⁵ but, as Walter (2016) has argued, references to neighbouring *poleis* dividing up its territory suggest that Helike fell

⁹¹ Van Bavel et al. (2020).

⁹² Van Bavel et al. (2020) 100–16.

⁹³ Thuc. 1.128; Diod. Sic. 11.63–64; Plut. *Cim.* 16.4–5.

⁹⁴ Papanastassiou et al. (2005).

⁹⁵ Walter (2014); Borsch and Carrara (2016); Mordechai and Pickett (2018).

⁹⁶ The publications of the Helike Project are extensive; for a recent entry citing previous scholarship, see Katsonopoulou (2019).

⁹⁷ Strabo 8.7.2; Diod. Sic. 15.48.1–49.4; Paus. 7.24.5–13.

⁹⁸ Cf. Mackil (2004) 497–99.

⁹⁹ Strabo 8.7.2; Ov. *Met.* 15.293; Paus. 7.24.13; Katsonopoulou (2016) 139–40.

¹⁰⁰ Lafond (1998).

¹⁰¹ Koukouvelas et al. (2020).

¹⁰² Katsonopoulou (2005) 35, 39–40.

¹⁰³ Mackil (2004) 498–99; Katsonopoulou (2019) 94–95.

¹⁰⁴ Paus. 7.25.8–9.

¹⁰⁵ Meißner (1998).

victim to the opportunistic predation of its neighbours, who resented its control over the premier federal sanctuary of Poseidon. This action was then retrospectively justified by the propagation of narratives that the Helikaian's impious actions had provoked the wrath of that god.¹⁰⁶ Thus, whilst environmental hazards caused widespread damage to the community of Helike, its disappearance as a political entity was ultimately a result of social processes.

In recent years, ancient historians' analyses of similar events have been bolstered by the adoption of increasingly sophisticated frameworks for understanding societal responses to environmental shocks adapted from other disciplines, most notably anthropology, medieval history and early modern history. One such framework is the social burden of resilience, the idea that the benefits and costs of resilience are always unevenly distributed across a society.¹⁰⁷ A good example of the utility of examining ancient disasters through this lens comes from the famous earthquake that damaged Rhodes in 227 BC. As Polybius' account indicates, this renowned commercial and maritime power of the Hellenistic world derived resilience from its extraordinary political and economic relationships with other powers in the eastern Mediterranean, drawing on those ties in the wake of this disaster to obtain generous donations in support of its rebuilding effort.¹⁰⁸ But whilst the redistribution of those donated resources and the extension of economic privileges to encourage the reconstruction of Rhodes greatly benefited traders based in that polis, many of whom were not Rhodian citizens, much less direct assistance seems to have been offered to the rest of the polis' population, who must have borne the brunt of the earthquake's impact.¹⁰⁹

Environmental evidence testifying to the frequency and magnitude of environmental shifts and shocks experienced by the inhabitants of the ancient Greek world is rapidly accumulating, with new palaeoclimatic evidence from the Aegean, for instance, being published on an almost annual basis;¹¹⁰ the opportunities for collaboration between scholars within and without the traditional bounds of classical studies to explore Greek ecological resilience are growing accordingly. As the contributions in Erdkamp et al. (2021) show, however, scholars of the ancient Mediterranean have only just begun to grapple with the monumental methodological hurdles involved in integrating such evidence into traditional research strands. The development of more robust methodologies for integrating scientific, archaeological and historical evidence for environmental and societal change thus remains a pressing need. In this respect, there is promising work on climate change and natural disasters in more recent periods of history, for which richer, more fine-grained data sets are available that present greater opportunities to test theories of correlation and causation.¹¹¹

V. Conclusion

As contemporary environmental issues continue to shape research agendas across the humanities, the need for Hellenists to engage directly with ancient environmental studies will continue to grow. At a time when many scholars of classical studies are grappling with the contemporary relevance of their scholarship, facing atrophying institutional support and deconstructing the past complicity of their discipline in various ills afflicting our

¹⁰⁶ Strabo 8.7.2; Walter (2016) 36–40.

¹⁰⁷ Röder et al. (2013); Izdebski et al. (2018).

¹⁰⁸ Polyb. 5.85.5–90.4.

¹⁰⁹ Bresson (2021) 215–17.

¹¹⁰ Palaeoclimatic proxy records from the Aegean region published over the last five years include Finné et al. (2017); Psomiadis et al. (2018); Katrantsiotis et al. (2019); Seguin et al. (2019); (2020); and Jacobson et al. (2021).

¹¹¹ Haldon et al. (2018); van Bavel et al. (2020); Ljungqvist et al. (2021).

world, the ecological turn provides a welcome opportunity to reflect on the enduring value of studying antiquity. The ancient Greek world continues to fascinate people globally, and the intellectual influence that Classics has had on the environmentalist movement lends it a particular relevance in the environmental humanities.¹¹² Moreover, the ancient Greek world offers an abundance of different types of evidence testifying to cultural ecology in the distant past which can be paralleled by only a few other times and places in the premodern world. The relative familiarity of ancient Greek culture to many today lends this material an air of accessibility, but the strangeness to contemporary audiences of many of its ways of viewing the cosmos make it a valuable source of alternative ecologies.

This review has highlighted a few of the most prominent strands in the study of human–environment relations in the ancient Greek world, but many more remain under-explored. The topics of gender and health, for instance, intersect with numerous facets of ancient environmental studies.¹¹³ Identifying such convergences and making meaningful progress in studying them will require specialists of all stripes working on the societies or environments of the ancient Mediterranean to familiarize themselves with the work of and collaborate with colleagues in other disciplines. As such, it will be increasingly important going forward for scholars of ancient environmental studies to collaborate in order to maximize disciplinary complementarity, minimize biases, eliminate blind spots and ensure the representation of all stakeholders. Such cooperation not only has the potential to infuse the study of the Greek past with greater vitality, but even, perhaps, to go some way towards creating a future in which both human and non-human can thrive.

Bibliography

- Akrigg, B. (2019) *Population and Economy in Classical Athens* (Cambridge)
- Alcock, S. and Osborne, R. (eds) (1994) *Placing the Gods: Sanctuaries and Sacred Space in Ancient Greece* (Oxford)
- Armbruster, K. and Wallace, K. (eds) (2001) *Beyond Nature Writing: Expanding the Boundaries of Ecocriticism* (Charlottesville)
- Attfield, R. (2019) 'Some ancient philosophical and religious roots of modern environmentalism', in A. Hunt and H. Marlow (eds), *Ecology and Theology in the Ancient World* (London) 75–90
- Bakola, E. (2019) 'Reconsidering the chthonic in Aeschylus' *Oresteia*: Erinyes, the earth's resources and the cosmic order', in A. Hunt and H. Marlow (eds), *Ecology and Theology in the Ancient World* (London) 103–18
- Balériaux, J. (2016) 'Diving underground: giving meaning to subterranean rivers', in J. McInerney and I. Sluiter (eds), *Valuing Landscape in Classical Antiquity: Natural Environment and Cultural Imagination* (Leiden) 103–21
- (2017) 'Pausanias' Arcadia between conservatism and innovation', in G. Hawes (ed.), *Myths on the Map: The Storied Landscapes of Ancient Greece* (Oxford) 141–58
- Beck, H. (2020) *Localism and the Ancient Greek City-State* (Chicago)
- Bekker-Nielson, T. (2012) 'Die Schätze des Meeres', in E. Olshausen and V. Sauer (eds), *Die Schätze der Erde—Natürliche Ressourcen in der antiken Welt* (Stuttgart) 9–18
- Bennett, M.J. (2017) *Deleuze and Ancient Greek Physics: The Image of Nature* (London)
- Bianchi, E., Brill, S. and Holmes, B. (eds) (2019) *Antiquities beyond Humanism* (Oxford)
- Bonnier, A. and Finné, M. (2020) 'Climate variability and landscape dynamics in the late Hellenistic and Roman north-eastern Peloponnese', *Antiquity* 94.378, 1482–1500
- (2021) 'Peloponnesian land use dynamics and climate variability in the first millennium BCE', in P. Erdkamp, J.G. Manning and K. Verboven (eds), *Climate Change and Ancient Societies in Europe and the Near East: Diversity in Collapse and Resilience* (Cham) 277–300
- Borsch, J. and Carrara, L. (2016) 'Zwischen Natur und Kultur: Erdbeben als Gegenstand der Altertumswissenschaften', in J. Borsch and L. Carrara (eds), *Erdbeben in der Antike. Deutungen—Folgen—Repräsentationen* (Tübingen) 1–14
- Bosak-Schroeder, C. (2015) 'The ecology of health in Herodotus, Dicaearchus, and Agatharchides', in R.F. Kennedy and M. Jones-Lewis (eds), *The Routledge Handbook of Identity and the Environment in the Classical and Medieval Worlds* (London) 29–44

¹¹² Cf. Attfield (2019).

¹¹³ See, for example, Bosak-Schroeder (2015); (2020) 57–83.

- Bradtmöller M., Grimm, S. and Riel-Salvatore, J. (2017) 'Resilience theory in archaeological practice: an annotated review', *Quaternary International* 446, 3–16
- Braudel, F. (1949) *La Méditerranée et le monde méditerranéen à l'époque de Philippe II* (Paris)
- Bremmer, J.N. (2019) 'Rivers and river gods in ancient Greek religion and culture', in T.S. Scheer (ed.), *Natur—Mythos—Religion im antiken Griechenland/Nature—Myth—Religion in Ancient Greece* (Stuttgart) 89–112
- Bresson, A. (2021) 'Rhodes circa 227 B.C.: destruction and recovery', in S. Fachard and E.M. Harris (eds), *The Destruction of Cities in the Ancient Greek World: Integrating the Archaeological and Literary Evidence* (Cambridge) 189–227
- Brockliss, W. (2019) *Homeric Imagery and the Natural Environment* (Washington DC)
- Buell, L. (2005) *The Future of Environmental Criticism: Environmental Crisis and Literary Imagination* (Hoboken)
- Chakrabarty, D. (2009) 'The climate of history: four theses', *Critical Inquiry* 35.2, 197–222
- Cioc, M. and Miller, C. (2010) 'Interview: J. Donald Hughes', *Environmental History* 15.2, 1–14
- Cline, E.H. (2014) *1177 B.C.: The Year Civilization Collapsed* (Princeton)
- Connors, C. and Clendenen, C. (2016) 'Mapping Tartaros: observation, inference, and belief in ancient Greek and Roman accounts of karst terrain', *ClAnt* 35.2, 147–88
- Cordovana, O.D. and Chiai, G.F. (eds) (2017) *Pollution and the Environment in Ancient Life and Thought* (Stuttgart)
- Crutzen, P.J. and Stoermer, E. (2000) 'The "Anthropocene"', *Global Change Newsletter* 41, 17–18
- DeLaine, J. (2020) 'Strategies and technologies of environmental manipulation in the Roman world. The thermal economy of baths', in C. Schliephake, N. Sojc and G. Weber (eds), *Nachhaltigkeit in der Antike. Diskurse, Praktiken, Perspektiven* (Stuttgart) 75–93
- De Polignac, F. (1984) *La naissance de la cité grecque: cultes, espace et société VIII^e-VIII^e siècle avant J.-C.* (Paris)
- Douglas, P.M.J., Demarest, A.A., Brenner, M. and Canuto, M.A. (2016) 'Impacts of climate change on the collapse of lowland Maya civilization', *Annual Review of Earth and Planetary Sciences* 44, 613–45
- Egerton, F. (2012) *Roots of Ecology: Antiquity to Haeckel* (Berkeley)
- Eidinow, E. (2016) 'Telling stories: exploring the relationship between myths and ecological wisdom', *Landscape and Urban Planning* 155, 47–52
- (2019) "'They blow now one way, now another'" (Hes. *Theog.* 875): winds in the ancient Greek imaginary', in T.S. Scheer (ed.), *Natur—Mythos—Religion im antiken Griechenland/Nature—Myth—Religion in Ancient Greece* (Stuttgart) 155–70
- Emberger, P. (2012) 'Zur Unfruchtbarkeit von Böden in der antiken Welt', in E. Olshausen and V. Sauer (eds), *Die Schätze der Erde—Natürliche Ressourcen in der antiken Welt* (Stuttgart) 87–102
- Finné, M., Holmgren, K., Shen, C.-C., Hu, H.-M., Boyd, M. and Stocker, S. (2017) 'Late Bronze Age climate change and the destruction of the Mycenaean palace of Nestor at Pylos', *PLoS ONE* 12.12, e0189447
- Folke, C. (2006) 'Resilience: the emergence of a perspective for social-ecological systems analyses', *Global Environmental Change* 16, 253–67
- Ganter, A. (2019) 'Encoding *asty* and *chora*: Theban polis identity between nature and religion', in T.S. Scheer (ed.), *Natur—Mythos—Religion im antiken Griechenland/Nature—Myth—Religion in Ancient Greece* (Stuttgart) 241–51
- Garrard, G. (2014) 'Introduction', in G. Garrard (ed.), *The Oxford Handbook of Ecocriticism* (Oxford) 1–8
- Glacken, C. J. (1967) *Traces on the Rhodian Shore: Nature and Culture in Western Thought from Ancient Times to the End of the Eighteenth Century* (Berkeley)
- Gordon, R. (2019) 'The Greeks, religion and nature in German neo-humanist discourse from Romanticism to early industrialisation', in T.S. Scheer (ed.), *Natur—Mythos—Religion im antiken Griechenland/Nature—Myth—Religion in Ancient Greece* (Stuttgart) 49–70
- Grassl, H. (2012) 'Zum Problem der Nachhaltigkeit in der Ressourcenausbeutung im Altertum', in E. Olshausen and V. Sauer (eds), *Die Schätze der Erde—Natürliche Ressourcen in der antiken Welt* (Stuttgart) 137–42
- Haldon, J., Mordechai, L., Newfield, T.P., Chase, A.F., Izdebski, A., Guzowski, P., Labuhn, I. and Roberts, N. (2018) 'History meets palaeoscience: consilience and collaboration in studying past societal responses to environmental change', *Proceedings of the National Academy of Sciences* 115.13, 3210–18
- Harper, K. (2017) *The Fate of Rome: Climate, Disease, and the End of an Empire* (Princeton)
- Harris, W.V. (2011) 'Plato and the deforestation of Attica', *Athenaeum* 99, 479–82
- (2013) 'Defining and detecting Mediterranean deforestation, 800 BCE to 700 CE', in W.V. Harris (ed.), *The Ancient Mediterranean Environment between Science and History* (Leiden) 173–96
- Horden, P. and Purcell, N. (2000) *The Corrupting Sea: A Study of Mediterranean History* (Malden)
- (2019) *The Boundless Sea: Writing Mediterranean History* (Oxford and New York)
- Horn, E. and Bergthaller, H. (2020) *The Anthropocene: Key Issues for the Humanities* (Oxford and New York)
- Horster, M. (2019) 'Apollo's servants—cleaning the sanctuary and keeping things in order', in T.S. Scheer (ed.), *Natur—Mythos—Religion im antiken Griechenland/Nature—Myth—Religion in Ancient Greece* (Stuttgart) 201–18
- Hughes, J.D. (1975) *Ecology in Ancient Civilizations* (Albuquerque)
- (1994) *Pan's Travail: Environmental Problems of the Ancient Greeks and Romans* (Baltimore)

- (2014) *Environmental Problems of the Greeks and Romans: Ecology in the Ancient Mediterranean* (Baltimore)
- (2017) 'Deforestation and forest protection in the ancient world', in O.D. Cordovana and G.F. Chiai (eds), *Pollution and the Environment in Ancient Life and Thought* (Stuttgart) 203–16
- Hunt, A. (2019) 'Pagan animism: a modern myth for a Green Age', in A. Hunt and H. Marlow (eds), *Ecology and Theology in the Ancient World* (London) 137–52
- Hunt, A. and H. Marlow (eds) (2019) *Ecology and Theology in the Ancient World* (London)
- Huntington, E. (1915) *Civilization and Climate* (New Haven)
- Iovino, S. (2013) 'Mediterranean ecocriticism, or, a blueprint for cultural amphibians', *Ecozon@* 4.2, 1–14
- Izdebski, A., Mordechai, L. and White, S. (2018) 'The social burden of resilience: a historical perspective', *Human Ecology* 46, 291–303
- Izdebski, A. and Mulryan, A. (2019) *Environment and Society in the Long Late Antiquity* (Leiden)
- Jacobson, M.T., Flohr, P., Gascoigne, A., Leng, M.J., Sadekov, A., Cheng, H., Edwards, R.L., Tüsiyü, O. and Fleitmann, D. (2021) 'Heterogenous Late Holocene climate in the eastern Mediterranean—the Kocain Cave record from SW Turkey', *Geophysical Research Letters* 48, e2021GL094733
- Jedan, C. (2017) 'A different kind of reformation: revisiting the Lynn White thesis', *NTT: Journal for Theology and the Study of Religion* 37.2, 283–309
- (2019) 'A lighter shade of green: Stoic gods and environmental virtue ethics', in A. Hunt and H. Marlow (eds), *Ecology and Theology in the Ancient World* (London) 49–62
- Jeskins, P. (1998) *The Environment and the Classical World* (London)
- Jost, M. (2005) 'Bêtes, hommes et dieux dans la religion arcadienne', in E. Østby (ed.), *Ancient Arcadia* (Athens) 93–104
- (2007) 'The religious system in Arcadia', in Daniel Ogden (ed.), *A Companion to Greek Religion* (Malden) 264–80
- Katrantsiotis, C., Norström, E., Smittenberg, R.H., Finné, M., Weiberg, E., Hättestrand, M., Avramidis, P. and Wastegård, S. (2019) 'Climate changes in the eastern Mediterranean over the last 5000 years and their links to the high-latitude atmospheric patterns and Asian monsoons', *Global and Planetary Change* 175, 36–51
- Katsonopoulou, D. (2005) 'Test excavations in the Helike Delta in 2000', in D. Katsonopoulou, S. Soter and I. Koukouvelas (eds), *Helike III. Archaeological Sites in Geologically Active Regions* (Athens) 33–64
- (2016) 'Natural catastrophes in the Gulf of Corinth, northwestern Peloponnese, from Prehistory to Late Antiquity: the example of Helike', in J. Borsch and L. Carrara (eds), *Erdbeben in der Antike, Deutungen—Folgen—Repräsentationen* (Tübingen) 137–52
- (2019) 'Observations on the history and topography of two major sanctuaries of Poseidon and Zeus in Aigialeia of Achaëa', in E.C. Partida and B. Schmidt-Dounas (eds), *Listening to the Stones Essays on Architecture and Function in Ancient Greek Sanctuaries in Honour of Richard Alan Tomlinson* (Oxford) 88–97
- Kennett, D.J., Breitenbach, S.F.M., Aquino, V.V., Asmerom, Y., Awe, J., Baldini, J.U.L. and Bartlein, P. (2012) 'Development and disintegration of Maya political systems in response to climate change', *Science* 338, 788–91
- Kindt, J. (2009) 'Polis religion—a critical appreciation', *Kernos* 22, 9–34
- (2012) *Rethinking Greek Religion* (Cambridge)
- (2017) 'Review article. Capturing the ancient animal: human/animal studies and the Classics', *JHS* 137, 213–25
- (2019) 'Animals in ancient Greek religion: divine zoomorphism and the anthropomorphic divine body', in T.S. Scheer (ed.), *Natur—Mythos—Religion im antiken Griechenland/Nature—Myth—Religion in Ancient Greece* (Stuttgart) 155–70
- Koukouvelas, I.K., Piper, D.J.W., Katsonopoulou, D., Kontopoulos, N., Verroios, S., Nikolakopoulos, K. and Zygouri, V. (2020) 'Earthquake-triggered landslides and mudflows: was this the wave that engulfed Ancient Helike?', *The Holocene* 30.12, 1653–68
- Kull, U. (2012) 'Pflanzliche Ressourcen im Mittelmeerraum', in E. Olshausen and V. Sauer (eds), *Die Schätze der Erde—Natürliche Ressourcen in der antiken Welt* (Stuttgart) 221–44
- Lafond, Y. (1998) 'Die Katastrophe von 373 v. Chr. und das Verschwinden der Stadt Helike in Achaia', in E. Olshausen and H. Sonnabend (eds), *Naturkatastrophen in der antiken Welt* (Stuttgart) 118–23
- Larson, J. (2019) 'Nature gods, nymphs and the cognitive science of religion', in A. Hunt and H. Marlow (eds), *Ecology and Theology in the Ancient World* (London) 71–88
- Le Roy Ladurie, E. (1967) *Histoire du climat depuis l'an mil* (Paris)
- LeVasseur, T. and Peterson, A. (2017) *Religion and Ecological Crisis: The 'Lynn White Thesis' at Fifty* (New York)
- Ljungqvist, F.C., Seim, A. and Huhtamaa, H. (2021) 'Climate and society in European history', *WIREs Climate Change* 12.2, e691.
- Lousley, C. (2014) 'Ecocriticism and the politics of representation', in G. Garrard (ed.), *The Oxford Handbook of Ecocriticism* (Oxford) 155–71
- Lovelock J. (1979) *Gaia: A New Look at Life on Earth* (Oxford)
- Mackil, E. (2004) 'Wandering cities: alternatives to catastrophe in the Greek polis', *AJA* 108.4, 493–516

- McNeill, J.R. (2011) 'The historiography of environmental history', in A. Schneider and D. Woolf (eds), *The Oxford History of Historical Writing 5: Historical Writing since 1945* (Oxford) 160–77
- Meißner, B. (1998) 'Naturkatastrophen und zwischenstaatliche Solidarität im klassischen und hellenistischen Griechenland', in E. Olshausen and H. Sonnabend (eds), *Naturkatastrophen in der antiken Welt* (Stuttgart) 242–62
- Merchant, C. (2020) *The Anthropocene and the Humanities: From Climate Change to a New Age of Sustainability* (New Haven)
- Miles, M.M. (2016) 'Birds around the temple: constructing a sacred environment', in J. McInerney and I. Sluiter (eds), *Valuing Landscape in Classical Antiquity. Natural Environment and Cultural Imagination* (Leiden) 151–96
- Mordechai, L. and Pickett, J. (2018) 'Earthquakes as the quintessential SCE: methodology and societal resilience', *Human Ecology* 46, 335–48
- Mylonopoulos, I. (2008) 'Natur als Heiligtum—Natur im Heiligtum', in F. Hölscher and T. Hölscher (eds), *Religion und Raum* (Leipzig) 45–76
- Neff, A.C. (2019) 'Von den Azania kaka zur euhydros Arkadia: Wasser in Arkadien', in T.S. Scheer (ed.), *Natur—Mythos—Religion im antiken Griechenland/Nature—Myth—Religion in Ancient Greece* (Stuttgart) 251–68
- Papanastassiou, D., Gaki-Papanastassiou, K. and H. Maroukian (2005) 'Recognition of past earthquakes along the Sparta Fault (Peloponnesus, Southern Greece) during the Holocene, by combining results of different dating techniques', *Journal of Geodynamics* 40, 189–99
- Past, E. (2016) 'Mediterranean ecocriticism: the sea in the middle', in H. Zapf (ed.), *Handbook of Ecocriticism and Cultural Ecology* (Berlin and Boston) 368–84
- Psomiadis, D., Dotsika, E., Albanakis, K., Ghaleb, B. and Hillaire-Marcel, C. (2018) 'Speleothem record of climatic changes in the northern Aegean region (Greece) from the Bronze Age to the collapse of the Roman Empire', *Palaeogeography, Palaeoclimatology, Palaeoecology* 489, 272–83
- Radkau, J. (2005) 'Germany as a focus of European "particularities" in environmental history', in T. Lekan and T. Zeller (eds), *Germany's Nature: Cultural Landscapes and Environmental History* (New Brunswick) 17–32
- Rajan, S.R. (2019) 'Clarence Glacken: pioneer environmental historian', *Environment and History* 25, 245–67
- Redman, C.L. (2005) 'Resilience theory in archaeology', *American Anthropologist* 107.1, 70–77.
- Reitemeier, A., Schanbacher, A. and Scheer, T.S. (eds) (2019) *Nachhaltigkeit in der Geschichte. Argumente—Ressourcen—Zwänge* (Göttingen)
- Rempe, M. (2021) *Antike Siedlungstopographie und nachhaltiger Umgang mit Ressourcen im griechischen Sizilien* (Rahden)
- Rigby, K.E. (2002) 'Ecocriticism', in J. Wolfreys (ed.), *Introducing Criticism at the Twenty-First Century* (Edinburgh) 151–78
- Robinson, B.A. (2016) 'Charismatic landscapes? Scenes from central Greece under Roman rule', in J. McInerney and I. Sluiter (eds), *Valuing Landscape in Classical Antiquity: Natural Environment and Cultural Imagination* (Leiden) 228–54
- Röder, B., Pichler, S. and Doppler, T. (2013) 'Coping with crises II: the impact of social aspects on vulnerability and resilience', in T. Kerig and A. Zimmerman (eds), *Economic Archaeology: From Structure to Performance in European Archaeology* (Bonn) 177–90
- Romano, D.G. (2019) 'Mt. Lykaion as the Arcadian birthplace of Zeus', in T.S. Scheer (ed.), *Natur—Mythos—Religion im antiken Griechenland/Nature—Myth—Religion in Ancient Greece* (Stuttgart) 219–40
- Rueckert, W. (1978) 'Literature and ecology: an experiment in ecocriticism', *Iowa Review* 9.1, 71–86
- Sallares, R. (1991) *The Ecology of the Ancient Greek World* (Ithaca)
- Sallis, J. (2016) *The Figure of Nature: On Greek Origins* (Bloomington)
- Scheer, T.S. (2019a) 'Natur-Mythos-Religion im antiken Griechenland: Eine Einleitung', in T.S. Scheer (ed.), *Natur—Mythos—Religion im antiken Griechenland/Nature—Myth—Religion in Ancient Greece* (Stuttgart) 13–28
- (2019b) 'The ambivalence of Mother Earth: concepts of autochthony in ancient Arcadia', in T.S. Scheer (ed.), *Natur—Mythos—Religion im antiken Griechenland/Nature—Myth—Religion in Ancient Greece* (Stuttgart) 269–90
- Schliephake, C. (2016b) 'Introduction', in C. Schliephake (ed.), *Ecocriticism, Ecology, and the Cultures of Antiquity* (Lanham) 1–16
- Sedley, D. (2019) 'Self-sufficiency as a divine attribute in Greek philosophy', in A. Hunt and H. Marlow (eds), *Ecology and Theology in the Ancient World* (London) 41–48
- Seguin, J., Avramidis, P., Dörfler, W., Emmanouilidis, A. and Unkel, I. (2020) 'A 2600-year high-resolution climate record from Lake Trichonida (SW Greece)', *E&G Quaternary Science Journal* 69, 139–60
- Seguin, J., Bintliff, J.L., Grootes, P.M., Bauersachs, T., Dörfler, W., Heymann, C. and Manning, S.W. (2019) '2500 years of anthropogenic and climatic landscape transformation in the Stymphalia Polje, Greece', *Quaternary Science Reviews* 213, 133–54
- Semple, E.C. (1931) *The Geography of the Mediterranean Region: Its Relation to Ancient History* (New York)
- Sojc, N. (2020) 'Beseitigung, Verwahrung oder Kreislauf? Zum stofflichen Potenzial deponierter Materialien in antiken griechischen Heiligtümern. Das Beispiel des extrarbanen Heiligtums S. Anna bei Agrigent

- (Sizilien)', in C. Schliephake, N. Sojc and G. Weber (eds), *Nachhaltigkeit in der Antike. Diskurse, Praktiken, Perspektiven* (Stuttgart) 117–43
- Sourvinou-Inwood, C. (1990) 'What is polis religion?', in R. Buxton (ed.), *The Greek City from Homer to Alexander* (Oxford) 295–322
- Sporn, K. (2015) 'Natur-Kult-Raum. Eine Einführung in Methode und Inhalt', in K. Sporn, S. Ladstätter and M. Kerschner (eds), *Natur—Kult—Raum* (Vienna) 339–56
- (2019) 'Natural features in Greek cult places: the case of Athens', in T.S. Scheer (ed.), *Natur—Mythos—Religion im antiken Griechenland/Nature—Myth—Religion in Ancient Greece* (Stuttgart) 29–48
- Stone, M. (2017) 'Plato, environmental sustainability, and social justice', *Athens Journal of Humanities & Arts* 5.1, 105–18
- Thomas, J.A. (2021) 'Review of Joel Alden Schlosser: *Herodotus in the Anthropocene*. (Chicago: University of Chicago Press, 2020. Pp. 191.)', *The Review of Politics* 83.3, 457–59
- Thommen, L. (2011) 'Nachhaltigkeit in der Antike? Begriffsgeschichtliche Überlegungen zum Umweltverhalten der Griechen und Römer', in B. Hermann (ed.), *Beiträge zum Göttinger Umwelthistorischen Kolloquium 2010–2011* (Göttingen) 9–24
- (2020) 'Nachwachsende und erschöpfte Ressourcen: Zum Problem des 'Umdenkens' und der 'Ökologie' in der Antike', in C. Schliephake, N. Sojc and G. Weber (eds), *Nachhaltigkeit in der Antike. Diskurse, Praktiken, Perspektiven* (Stuttgart) 25–42
- Timonen, R. and Brysbaert, A. (2021) 'Saving up for a rainy day? Climate events, human-induced processes and their potential effects on people's coping strategies in the Mycenaean Argive plain, Greece', in P. Erdkamp, J.G. Manning and K. Verboven (eds), *Climate Change and Ancient Societies in Europe and the Near East: Diversity in Collapse and Resilience* (Cham) 243–76
- Van Bavel, B., Curtis, D.R., Dijkman, J., Hannaford, M., de Keyzer, M., van Onacker, E. and Soens, T. (2020) *Disasters and History: The Vulnerability and Resilience of Past Societies* (Cambridge)
- Veal, R. and Leitch, V. (eds) (2019) *Fuel and Fire in the Ancient Roman World: Towards an Integrated Economic Understanding* (Cambridge)
- Voigts, C. (2020) 'Nachhaltigkeit oder Sparsamkeit? Verwendung und Wiederverwendung von Marmorbauteilen im kaiserzeitlichen Rom', in C. Schliephake, N. Sojc and G. Weber (eds), *Nachhaltigkeit in der Antike. Diskurse, Praktiken, Perspektiven* (Stuttgart) 95–116
- Walter, J. (2014) 'Threats from the environment? The perception of earthquakes in ancient Greece', in G. Casagrande and D. Del Gusto (eds), *Air, Fire, Water and Earth(quake): Perceived Threats from and to the Environment: Case Studies between Geography and History* (Rome) 7–16
- (2016) 'Poseidon's wrath and the end of Helike: Notions about the anthropogenic character of disasters in Antiquity', in C. Schliephake (ed.), *Ecocriticism, Ecology, and the Cultures of Antiquity* (Lanham) 31–44
- Weber, G. (2020) 'Nachhaltigkeit und Ressourcenschonung. Handlungs-, Deutungs- und Wissenskategorien in den Zauberpapyri und in Artemidors *Oneirokritika*', in C. Schliephake, N. Sojc and G. Weber (eds), *Nachhaltigkeit in der Antike. Diskurse, Praktiken, Perspektiven* (Stuttgart) 163–78
- Weiberg, E. (2012) 'What can resilience theory do for (Aegean) archaeology?', in M. Burström and F. Fahlander (eds), *Matters of Scale: Processes and Courses of Events in Archaeology and Cultural History* (Stockholm) 146–65
- Weiberg, E. and Finné, M. (2018) 'Resilience and persistence of ancient societies in the face of climate change: a case study from Late Bronze Age Peloponnese', *World Archaeology* 50.4, 584–602
- (2021) 'Vulnerability to climate change in Late Bronze Age Peloponnese (Greece)', in P. Erdkamp, J.G. Manning and K. Verboven (eds), *Climate Change and Ancient Societies in Europe and the Near East: Diversity in Collapse and Resilience* (Cham) 215–42
- White, L., Jr. (1967) 'The historical roots of our ecologic crisis', *Science* 155.3767, 1203–7
- Whitney, J. (2015) 'Lynn White Jr.'s "The historical roots of our ecologic crisis" after 50 years', *History Compass* 13.8, 396–410
- Wildberger, J. (2019) 'Cosmic beauty in stoicism: a foundation for an environmental ethic as love of the other?', in A. Hunt and H. Marlow (eds), *Ecology and Theology in the Ancient World* (London) 63–74
- Williams, M., Zalasiewicz, J., Haywood, A. and Ellis, M. (2011) 'The Anthropocene: a new epoch of geological time?', *Philosophical Transactions of The Royal Society A: Mathematical, Physical, and Engineering Sciences* 369.1938, 835–41
- Zalasiewicz, J., Waters, C.N., Williams, M. and Summerhayes, C.P. (2019) *The Anthropocene as a Geological Time Unit: A Guide to the Scientific Evidence and Current Debate* (Cambridge)