

Introduction

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Modern climate change has serious consequences for the knowledge of our past. Eroding coasts in Scotland, rising sea levels in Australia, melting ice patches in Alaska, increasing temperatures in Norway and flooding in the Amazon: all threaten the preservation of natural and cultural sites. These and other damaging processes not only jeopardize the archaeological record, but also the living cultural practices of affected communities and their economic and social resilience. As the planet faces increasing global temperatures, the perils posed by rapid climate change will continue to be a major challenge for archaeology throughout the twenty-first century. The ARC's 32.2 edition, *On the Edge of the Anthropocene? Modern Climate Change and the Practice of Archaeology*, aimed to bring together contributions on this poignant issue.

Recognizing that climate change is a challenge for our generation, we particularly wanted to reach out to emerging scholars who are increasingly addressing the theoretical and practical approaches and solutions to this 'wicked' problem of climate change. We purposefully cast a wide net with our call for papers, hoping to capture many different sub-disciplines and specialties within archaeology and related fields and across disparate regions. Although the case studies here span Europe, North America, South America and Australia, we hope that future, comparable works will be more successful in including authors who work in or derive from less-represented parts of the world since climate

change truly is a global phenomenon. We would particularly like to see works concentrating on vulnerable societies, which are most likely to be impacted by climate change, as discussed by Fluck and Wiggins and Comberti in this edition.

With these aims in mind, we decided to go beyond co-editing a themed issue and facilitated a broader forum for engagement between scholars, practitioners and policy-makers by planning the inaugural Archaeological Review from Cambridge conference, ‘Modern Climate Change and the Practice of Archaeology’ in April of 2017.¹ While this is not a conference proceeding, many of the participants contributed papers to this issue. During the conference, it became evident that a key theoretical discussion would hinge around the topic of the ‘Anthropocene’. While some participants-cum-authors explicitly addressed the Anthropocene as an empirical geological epoch (such as Jackson et al.; Vestergaard and Riede), others implicitly considered the environmental and archaeological consequences of an epoch defined by human activity (such as Reckin). In the conference closing, keynote speaker Robert Van de Noort eloquently highlighted how the Anthropocene is a useful term because we no longer live in a world where landscapes are exempt from cultural impacts. We are therefore “on the edge” of an increasingly pressing discipline, where we also need to pioneer research in different environments, whether “on the edge” of coasts, ice-patches or glaciers, because that is where change is happening most rapidly.

So are we on the edge of the Anthropocene? The title of this issue intentionally poses this question, recognizing the ongoing debate around this controversial term. ‘Anthropocene’ was coined to demarcate the moment in time in which human activity became the predominant influence on the earth’s environment and physical geology (discussed in Vestergaard and Riede). While not formally recognized as a geological epoch, recent reports confirm that our impacts, especially from carbon dioxide emissions, on the environment are incontrovertible (for example, Barry and Muslin 2016; USGCRP 2017; Waters et al. 2016). We believe the term to be useful for critically thinking about humanity’s relationship to the places we inhabit. The Anthropocene also challenges us to engage and reconsider our own interactions with non-humans and nature and, conversely, how we are dependent on them in our daily lives (Haraway 2016). We

¹ To view the ARC’s ‘Modern Climate Change and the Practice of Archaeology’ conference video, visit: <https://www.youtube.com/watch?v=HxWeBspxjw>.

have reached a point where habitats are irrevocably changing for the worse, and flora and fauna are migrating, an issue Comberti addresses in her paper. By extension, our established connections to the land are deteriorating, and we are left to ponder how life and cultures on this planet can remain functional, resilient and sustainable. This edition draws out how remote and recent past interactions with climate change can help today's generation successfully address this pressing issue at personal, community and policy levels worldwide. Archaeology is an unparalleled, yet underappreciated, resource for understanding the long-term consequences of climatic change in the past and the socio-ecological and technological adaptations societies have made to adapt and persevere through it. Ultimately, we leave the question of the Anthropocene for readers to decide.

The papers in this volume overlap in many ways, but we classify them into four categories according to their main focus. The first two papers (Stewart; Vestergaard and Riede) expand on the theoretical horizons of work on modern climate change and its recursive impacts on human societies. Stewart's article suggests an 'archaeology of toxicity', one that focuses on toxins-as-subjects that intertwine the agency of objects, humans and non-humans alike in a given community. Since the industrial and post-industrial world is notably marked by the toxic remains of production, Stewart's work suggests a new way of thinking through and viewing those consequences. Further, the communities most affected by toxins tend to be socio-economically disadvantaged and under-recorded, so an archaeology of toxicity can help fulfill archaeology's democratizing mission to shed light on the lives of the subaltern and forgotten. In a similar vein, Vestergaard and Riede offer a refocusing of climate change narratives onto the 'mild apocalypses' in our own backyards. Using a Danish brown coal mine as their case study, they illustrate the devastating ecological consequences of unchecked industrialization through the mundane artefacts left behind. More importantly still, they argue, people are more likely to retain the messages of urgency and the need to adapt if they feel that these are personally relevant, 'nearby' problems; thus, museums can and should use such local examples of industry's negative environmental effects to encourage the most change among their stakeholders.

The next category (Knott et al.; Rankin et al.; Reckin) focuses on technological and methodological advances in archaeological research from the vantage point of modern climate change. Knott et al. introduce and reveal the results of a preliminary pilot for a new desk-based method of surveying archaeological sites at

risk. The province of New South Wales, Australia, holds a staggering amount of archaeological sites, far too many to visit and research in person. Knott et al. thus suggest using an algorithm based on various GIS and other data points to predict level of risk from climate change's effects at each site so that financial and human resources can be most efficiently utilized. Rankin et al. address a similar problem of limited resources and time available to protect an immense site, where different elements face different risks from climate change-related processes, with the case site of Klondike Gold Rush National Historical Park, Alaska, part of the United States National Park Service (NPS). Drawing on the NPS's policies for evaluating, identifying and mitigating these risks, they introduce a quantitative scale for ranking relative risk that can then be used to direct adaptation, mitigation, documentation and other responses. Finally, Reckin, studying the Greater Yellowstone Ecosystem, another a geographically vast and rugged area, uses historic and contemporary aerial photography and GIS methods to empirically evaluate the risks that climate change-induced melting poses to archaeological material held within ice patches in the central Rocky Mountains. Further, although such preserved organic artefacts can be deeply illuminating for archaeologists, Reckin points out that the environmental significance and behaviour of ice patches, which seem to have a surprising amount of resilience to warming and lessened precipitation, themselves remain understudied and poorly understood. The lessons they might hold for a broader understanding of human resilience and adaptation are only beginning to unfold.

The final set of papers (Comberti; Graham et al.; Martens) turn their focus to the primacy of interdisciplinarity and community collaboration in these studies. Comberti's work first turns a critical eye to the use of 'ancient' or 'Indigenous' knowledge in top-down, NGO- or government-funded climate change adaptation projects. Her paper contrasts such work with bottom-up approaches in which communities are able to themselves decide to use 'traditional' knowledge and technologies in ways that best fit their actual needs and lifestyles. Graham et al. again emphasize how crucial it is to involve community members as partners in any project that seeks to understand the true impact of climate change and to create workable, lasting mitigation or adaptation strategies. The Scottish Coastal Archaeology and the Problem of Erosion (SCAPE) project thus places a heavy emphasis on training community members to become full partners in the race to identify and protect cultural heritage remains on and just beyond

the Scottish coastline. Martens also suggests new ways to preserve Norwegian archaeological remains, which are often located very close to contemporary settlements and farms, using methods that can both mitigate the effects of climate change on the remains and still be as unobtrusive as possible to the surrounding community. However, her paper underlines the fact that communities will in many cases have to accept a certain amount of loss of archaeological material as well; the conversation about which resources to lose and how to document that loss will have to be ongoing between all stakeholders involved.

The final three papers (Fluck and Wiggins; Herrmann; Jackson et al.) turn to policy, a key tool through which the global community is attempting to face climate change and its consequences. Jackson et al. outline a 'social contract' that calls for archaeologists studying the effects of climate change on society to better engage with policymakers in three ways. First, they should aim to publish their work in the journals and other outlets that are most read by the people writing climate change policy; second, echoing the work of Vestergaard and Riede, discussed above, they should encourage museums to emphasize the key role that human activity plays and has historically played in climate change, in order to more directly influence the behaviour and attitude of museum-goers; and, third, they should more strongly encourage projects that bring together different academic disciplines and facilitate collaboration between academics, practitioners and policy-makers alike. Herrmann similarly stresses the need for climate change mitigation and adaptation policy to take into account both the necessity to protect or, if loss is inevitable, document crucial elements of cultural heritage and to view cultural heritage as a source of resilience for communities deeply affected by climate change. In the United States alone, there is a growing list of communities that will have to partially or fully relocate due to climate change's effects, but cultural heritage thus far remains a somewhat ignored aspect within the policy and guidelines around these moves; Herrmann calls for a fuller integration of community and heritage concerns into these processes. Finally, Fluck and Wiggins outline the current legislative and policy landscape surrounding cultural heritage in England before delving into how loss, maladaptation and resilience will affect England's cultural heritage. They point out that maladaptation especially illustrates how human responses to climate change can often be just as (or more) damaging than climate change itself; they also assert that climate change policy needs to look more

closely at historic and archaeological evidence of resilience to climate change's past effects as well as truly democratize the policy- and decision-making process.

We will not be the first ones to insist that archaeologists must leave the ivory tower and engage more fully with wider communities, however, these papers vividly and diversely illustrate how crucial it is for archaeologists to take into account community priorities, needs and meanings. As Comberti's paper shows, even a well-intentioned project will fail if there is no community buy-in—yet the stakes are too high in the face of climate change for hubris to close our ears to stakeholder voices. As Vestergaard and Riede argue, museums can play a key role in changing public minds and behaviours regarding climate change and its causes and effects. We hope that their papers and similar arguments will inspire seismic shifts in the way museums and archaeologists present this problem to broad audiences. Further, As Knott et al. and Reckin illustrate, we will have to harness existing and new technologies and methodologies to find cultural heritage 'at risk' and protect, adapt, mitigate or document it accordingly. On the policy level, too, archaeologists cannot wait for governmental officials to request information; as Herrmann and Jackson et al. argue, we need to proactively present our peer-reviewed work to policymakers in order to get a seat at the table.

The news about climate change's detrimental effects is incessant and growing worldwide. The human capacity to dramatically adapt and change our surroundings has led us to a true crisis point for all of humanity, but this capacity can also help bring us back from the brink of harmful and irreversible climate changes, if we correctly and creatively harness our past and contemporary knowledge and energy. We hope that the articles in this issue inspire readers to do just that and ignite the types of conversations and knowledge exchanges that all of us will need in order to adapt.

References

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