Built Heritage

INTRODUCTION

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Global Climate Change and Built Heritage

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1 Introduction

Climate change is having a profound impact on our practical, technical, and philosophical approaches to the conservation of built heritage. From mitigation and adaptation to managed loss, conservators are faced with increasingly challenging decisions for the future of our historic built environment. At the same time, it is recognised that many of these buildings offer important lessons from the pre-industrial age. Recent literature in sustainability studies has questioned the ethics and environmental justice of climate actions. Similarly, the critical turn of heritage studies brings to light the complexities behind many rescue missions in the built environment. These recent developments in the subject field call for further reflections on how we deal with these crises. This special issue collates new research into the complex relationship between climate change and built heritage. Contributions cover both technical and philosophical challenges under the following sub-themes.

2 The impact of the continued use of built heritage on climate change

Tackling the causes of climate change, referred to as 'mitigation', is perhaps the area where most research has been focused to date. Following the signing of the United Nations' Framework Convention on Climate Change (UNFCCC) Paris Agreement (UN 2015a), which aims to limit the increase in the global average temperature to well below 2 °C, international governments have set targets to reduce operational carbon emissions. In 2022, greenhouse gas emissions from buildings accounted for 37% of global emissions, including those arising from both construction and operation (UNEP 2024). The reduction in these emissions through the implementation of energy retrofit measures is therefore seen as a key mitigation strategy. Traditional and historic buildings comprise a considerable part of the existing world building stock and, as such, are under increasing pressure to improve their operational performance. Research has shown that the thermal efficiency of these buildings is often underestimated (Rye et al. 2012). Nevertheless, this can still be improved in many cases. Furthermore, for our historic built environment, we must balance the conservation of energy and heritage values whilst avoiding unintended consequences and unnecessary carbon emissions from short-sighted and inappropriate retrofits incorporating significant quantities of new materials (Agbota 2014). Research in this area, as showcased in this special issue, focuses on the performance of the existing built fabric, the effectiveness of material modifications aimed at reducing energy consumption whilst maximising thermal comfort, the application of passive and active low-carbon technologies, and measures to influence occupant behaviour.

Whilst international agreements and government policies continue to prioritise measures to reduce operational carbon emissions, the significant embodied carbon represented in our built heritage has been acknowledged (Historic England 2020). By maintaining these buildings in use, carbon emissions that would otherwise be released through new construction work can be avoided (Hurst 2019). In the UK, this issue has been brought to the fore by the public enquiry instigated by Save Britain's Heritage against Marks and Spencer regarding the demolition and replacement of their Marble Arch store in London. A key argument in favour of the buildings' retention was the greenhouse gas emissions resulting from the demolition and replacement, which were estimated to be equivalent to just under 40,000 tonnes of carbon

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dioxide (Sturgis 2022). Despite subsequently being overruled due to legal technicalities, the initial decision by the Secretary of State to refuse demolition was primarily influenced by this evidence (Gove 2023), marking a landmark in acknowledging the carbon embodied in our built heritage.

3 The impact of climate change on built heritage

There is a growing understanding (Hayles 2022) of the need for a holistic approach when implementing mitigation measures, considering at the same time those required for 'adaptation'. The escalation in the severity and frequency of extreme weather events such as flooding, high winds, forest fires, snow-loads, coastal erosion, and prolonged growing seasons require us to consider how our built heritage must adapt to address these challenges (Curtis and Hunnisett Snow 2016). This calls for increased proactive maintenance and conservation to ensure that built fabric is in the best condition to resist these phenomena. Alterations to the built fabric, such as increasing the size of rainwater goods or additional structural reinforcement, may be required. These changes can also impact the surrounding landscapes with, for example, flood attenuation measures or clearing fire belts. In extreme cases, relocation and, in the worst-case scenario, managed loss potentially become necessary.

Increasing global average temperatures, desertification, melting glaciers and ice caps, and resultant rising sea level are altering the context in which historic buildings are located and the environmental conditions to which they must respond. Buildings where the current focus is on maximising the efficiency of cold season heating are progressively requiring strategies to address overheating (Hayles 2022). This is not the first time that the built environment has been required to adapt to metrological changes. Previous examples of adaptation could potentially inform future strategies.

At the same time, political narratives around the causes of climate change and resulting decarbonisation policies are shaping our perceptions of built heritage. This is especially true for industrial heritage, where infrastructure that may once have been a symbol of national or regional pride, representing progress and development, is vilified and erased. Questions are raised over the necessity of retaining these as monuments to our mistakes for future generations. Overall, the need to adapt built heritage to the changing climate is a complex and multifaceted challenge, as reflected by a selection of the articles in this special issue.

4 Learning from the past

As we aim towards a low-carbon society, the pre-industrial past may offer solutions and clues on how we might break our dependency on fossil fuels. Across the globe, there exist buildings and urban landscapes that were designed to work with minimum energy input and enable living practices to be more attuned to the local environment. Whilst resisting the romanticisation of these examples and pre-carbon societies, there are undoubtedly many lessons to learn from them. Research included in this special issue has sought to quantify the impacts of passive measures historically and to provide case studies of resilience, for example, through understanding vernacular knowledge systems.

As a poet and socialist responding to the overwhelming visibility of 19th century industrialisation in England, William Morris championed the legacy of craftsmanship in lectures to the Society for the Protection of Ancient Buildings (SPAB) in 1884 and 1893 *Architecture and History & Westminster Abbey* (Morris 1900). This focus on the means of making, of working with materials at hand, by hand highlighted the potential fragility of generational gaps in communication. Yet despite 150 years of change, the sequence of events that distinguish man-made from machine-made construction is not absolute, as papers in this special issue bring to light. Indeed, the segregation of trades still underpins the specification of building work even against over a century of imperatives towards construction through an assembly line of component parts.

In 1964, Bernard Rudofsky's *Architecture Without Architects: A Short Introduction to Non-Pedigreed Architecture* highlighted in the context of emerging energy anxiety, vernacular buildings built to meet local, as opposed to global standards of comfort may often be understood to perform more specifically to the climatic challenges of their regions (Rudofsky 1964). Furthermore, the adoption and use of building materials sourced from nearby locations and worked without the use of energy-intensive industrial processes has a significant impact on the reduction of carbon accounted for transportation and manufacture.

As underlined by Banham in 1969 in *The Architecture of the Well-tempered Environment*, the establishment of modern universal standards of comfort in terms of temperature, humidity, ventilation, and illumination run counter to diurnal, seasonal and regional diversity (Banham 1969). Since the turn of the 20th century, international standards have been deployed to herd remote communities to meet datums and averages that eclipse tacit knowledge. Notwithstanding the accelerating challenges of climate change, we risk wasting traditional knowledge through top-down and globalised assumptions based on an industrialised building industry.

Paul Oliver's 1997 epic *Encyclopaedia of Vernacular Architecture of the World* endures as a benchmark soon to be updated (Oliver 1997). The coalescence of geographical examples serves as a key to observing the nuances of historic human adaptation to particular climatic conditions. The means by which buildings and materials are used to respond to seasonal fluctuations in temperature, humidity and daylight hours reveals lessons in resourcefulness as well as environmental delight.

These observations and critical positions, which have continued in a Western canon to inspire students of architecture throughout the burgeoning technological empires of the twentieth and twenty-first centuries, demonstrate resilience in themselves. In this special issue, we bring together local narratives from spatially and temporally diverse examples to illustrate the range of approaches drawn out of necessity, ingenuity, and pragmatism. With respect to climate change, these articles specifically emphasise the urgent need to observe the histories of technology and their resilience. Assembled as a representation of critically diverse approaches, they range from empirical studies at the scale of an apartment to that of a geographic region.

5 Built heritage, climate action, and environmental justice

The environmental aspect of sustainability is necessarily connected with other economic, social, cultural, and geopolitical issues, which are especially prominent when it comes to heritage. Solutions for tackling the climate crisis or the missions to rescue heritage in such a context may not always guarantee equity or justice in various geopolitical contexts. In the moment of a crisis, these solutions deserve critical scrutiny. Discussions on ethics and justice in climate actions and Sustainable Development (SD) relate to distributing the 'reduction of consumption' fairly (UN 1992). Even before the global initiative of the Sustainable Development Goals (SDGs) set out in the 2030 Agenda (UN 2015b), Banerjee (2003) warns of the risk of reinforcing colonial ideas on less developed countries while implementing SD strategies on a global scale, exacerbating the negative impact of colonialism or racism towards less advantaged groups. Similarly, Redclift (2002; 1987) expresses concerns over the possibility of such a global initiative to disenfranchise marginalised communities rather than reducing the inequity of the world. This uneasiness over the potential power imbalance in the global initiative's impact on the local levels draws a parallel with the concerns over the World Heritage programme emerging in heritage studies in recent decades (Cleere 2003; Brumann 2014; Zhu 2017).

While literature and research on these issues primarily come from sustainability studies related to climate actions, we nevertheless feel it crucial to include these aspects in the discussions intersecting climate change and built heritage. Critical accounts of built heritage's role in tackling the climate crisis through the lens of environmental justice and ethics are particularly pertinent in community regeneration in post-industrial societies. The loss of the fossil-fuelled industries, though inevitable and necessary for a low-carbon future, also leads to a loss of economic viability and community coherence in these ex-industrial communities and the potential loss of cultural identity commemorated through the built heritage of the carbon past, presenting challenges to the social, cultural, and economic aspects of sustainability. Paul James (2015) contends that for both heritage conservation and sustainability, a more future-oriented approach is needed where entities are allowed and encouraged to evolve, adapt, and develop vibrantly and dynamically instead of 'freezing' heritage by arresting change. Such an approach is useful for considering how climate actions or heritage conservation strategies might have an impact on the broader 'ecosystems' of the world, which are constantly dynamic and evolving.

A nuanced approach to 'values' in post-industrial heritage, considerations on vernacular knowledge systems, and economic burden to enhance the indoor air quality in vernacular dwellings, as demonstrated in this special issue. These contributions in the special issue have highlighted that any measures or approaches taken on climate change and built heritage conservation and management will need to be considered holistically and in a contextualised manner rather than a static and canonical model of operation dictated by conventional knowledge.

In conclusion, this special issue demonstrates the multifaceted nature of climate change's impact on built heritage and the holistic and nuanced research and practice required to address technical, philosophical, and ethical, and social dimensions. Balancing mitigation, adaptation, climate action and environmental justice against the complexities inherent in conserving heritage value is a challenge. It is a challenge that requires a collaborative, interdisciplinary approach that values inclusivity and contextualisation. By embracing diverse perspectives and engaging in informed decision-making, the varied case studies presented in this special issue demonstrate that we can navigate these complex issues whilst conserving the cultural and environmental legacy of our built heritage for future generations.

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