Introduction: H_2Oxford. Water flowing through archaeology

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"H_2O Oxford: Water flowing through archaeology" was the title of the 2023 GAO Conference, during which we, as organisers, sought to explore the role of water and the archaeological evidence of human interactions with and through this essential element of life.

Water, as the primary constituent of the Earth's hydrosphere and the fluids of all living organisms, is undeniably fundamental to all forms of life, past and present. From an archaeological perspective, water has served as a crucial resource for human communities, underpinning their development in diverse ways, including drinking, storage, production, technology, energy generation, transportation, and defence, as well as sanitation, healing processes, and ritual or funerary symbolism. Beyond its practical uses, water has always held a special significance as a mysterious and essential element in ancient societies, being one of the fundamental components of the seasonal cycle of life itself (see Davis 2008; Flemming 2021).

This significance has drawn scholarly interest to the management of water in ancient communities, particularly the relationship between water availability, water management, and the rise of civilisation, or, more broadly, the emergence of social complexity. For example, the "Oasis Theory", first proposed by Raphael Pumpelly in 1908 and later developed by V. Gordon Childe in 1928, suggested that a period of aridity following the last Ice Age in the Near East forced humans, animals, and plants to cluster around oases, ultimately leading to domestication. Although this specific proposition is no longer widely accepted, changes in the quantity and annual distribution of precipitation between the Late Pleistocene and Early Holocene periods remain central to discussions about the origins of farming across the globe (Mithen 2003).

Subsequent theories also emphasised water management as a key factor in the transition from small-scale farming communities to cities and state societies. Julian Steward's 1955 volume, *Irrigation civilizations: a comparative study*, argued that irrigation acted as a catalyst for state formation. Similarly, Karl August Wittfogel's 1957 work, *Oriental despotism: a comparative study of total power*, advanced the "hydraulic hypothesis", which suggested that large-scale irrigation projects in Asia necessitated forced labour and a complex bureaucracy, thus fostering "despotic" rule.

Attempts to test Wittfogel's hypothesis yielded contrasting results. For instance, Robert McCormick Adams' studies of Mesopotamian civilisation (Adams 1966; 1978) demonstrated that complex canal and irrigation systems appeared after the emergence of cities and state bureaucracies, contradicting Wittfogel's timeline. Similarly, studies of Mesoamerican archaic states (Scarborough 2003) revealed that while societies developed highly advanced techniques of water management, these did not necessarily lead to state formation. Indeed, some of the most intricate systems, such as reservoir management, were not associated with irrigation at all.

These findings have led to modern theories that acknowledge a more intricate and interconnected range of factors than earlier models considered, rendering grand unifying theories like the "hydraulic hypothesis" insufficient. It has now been emphasised how the diversity of water management strategies has shaped the equally varied relationships between land, labour, and power (Mithen and Black 2011). Such approaches provide a nuanced understanding of the complex interplay between water availability, management, and the development of social complexity.

Turning now to the choice of this broad theme, it is directly tied to the complex challenges currently faced by modern-day human communities. Our planet is increasingly grappling with a range of critical challenges, including climate change, water scarcity, rising circumstances of flooding and catastrophic events, pollution of drinking water, rapid and extensive exploitation of water sources for industrial and agricultural purposes, heavily trafficked seas and rivers, and the wasteful use of water in agriculture, industry, and urban settlements. Since, these issues are escalating at an exponential rate, the Intergovernmental Panel on Climate Change (IPCC Core Writing Team *et al*. 2007) projected that global temperatures could rise between 1.1–2.9 K and 2.0–5.4 K by 2100, depending on future emission scenarios. These temperature increases are expected to have profound effects on human communities by reducing water availability in vulnerable regions or implementing the action of frequent floods and droughts with severe consequences for ecosystems and societies alike. These are the results of a heightened frequency of extreme weather events involving intense precipitation and temperature anomalies predicted by climate models (see Seneviratne *et al*. 2021).

Given that these issues, as just discussed, are pressing on a planet that is increasingly overpopulated and consuming

its resources at an unsustainable rate, looking back to the past and examining how water and its management was approached in different places and periods seemed an appropriate focus for this conference and, consequently, this volume.

The 2023 Graduate Archaeology at Oxford Conference was held at the Stelios Ioannou Centre for Classical and Byzantine Studies from the 27th to the 29th of March 2023. In addition to the two keynote presentations given by Dr Andrea Camilli and Dr Damian Robinson, there were a total of 34 papers and 5 posters presented by graduate students and early career professionals representing a multitude of academic and professional institutions.

The three days of the conference were organised into a number of thematic sessions with Monday being centred on discussions of "Prehistory and Protohistory" in the morning and "Water Management" in the afternoon. Tuesday discussions included those pertaining to "Maritime Archaeology" and "Landscapes, rivers, and coastal changes". Wednesday, the final day of the event, focused upon papers concerning "Middle Ages and Modern times", "Outside Europe", and concluded with a session dedicated to "Methodology and Theory".

Following these themes, 18 papers were collected in this volume, starting with those on "Maritime Archaeology". Here Angela Falezza with *Mediterranean ports of interactions: Aegean and Southern Italy in the Late Bronze Age* and Joel Bellviure, *Sea as a barrier, not a bridge. The Third Punic War and the end of the Punic "colonisation" of Mallorca*, explore, in two different contexts and historical periods, access to the sea and the interrelation of the peoples living around it. After these, *Meandering to the Mediterranean: how did the Romans transport Pavonazzetto Marble from the quarry of Dokimeion to the sea?* by Sean Silvia revolves around transportation using both rivers and sea.

Continuing with maritime archaeology, but with a more methodological perspective, *Non-intrusive methodology for the documentation of Underwater Cultural Heritage: practical implementation on El Anclote, a shipwreck from the 2nd century AD in the bay of Algeciras (Spain)* by Soledad Solana Rubio, Felipe Cerezo Andreo, and Raúl González Gallero and the paper of Jordy Moies, Samuel Deleu, and Kalliopi Baika, called *Monitoring shipwreck sites in the North Sea, using Multibeam echosounders*, focus on shipwrecks and new exploratory methods.

The theme of water management is also at the forefront of the papers included in this volume. Authored by Christina Monroe and Julián Aponte-Henao respectively, two papers, entitled *Results of preliminary research on cuniculi (shaft-and-tunnel water systems) in Ancient Italy* and *Hydraulic structures in the Roman buildings for spectacles in Hispania. Balance of findings and references*, discuss examples of the forms and means by which past peoples manipulated the movement of water for a variety of social purposes.

The use of water by people also necessitates the adaptation of material culture, in this regard Elisabetta di Virgilio's paper, *Practical usage of water at sanctuaries: sacred meals and cooking methods at the Fondo Patturelli sanctuary in ancient Capua (Italy)*, contemplates the material culture surrounding water usage in service to those most basic human needs of eating and drinking. Sharing a new methodological approach to the study of similar materials associated with the transportation and storage of water and other food supplies is Savannah Ulalian Bishop's paper entitled *From confiscation to context and conservation: a new integrated 3D technology methodology for the Amalfi seabed amphorae*.

Human interaction with water can have a profound impact upon social traditions, history, and material cultures. This is considered in Erin Migneco's work entitled *'Blood Red Prows': exploring identity, distinction, and re-use of materials in the context of Viking Age ship vanes*. The role of water in the human psyche and its ability to communicate ideas and values through its depiction in art is then explored in Guo Peng Chen's work *Rejuvenation, sexuality, and speech act: "Fountain of Youth" motif on ivory materials in 14–15th century Europe*.

This volume concludes with a collection of seven papers addressing topics pertaining to landscapes and water environments. Two papers, entitled *On the role of Roman education and numerology for the descriptions of river deltas: a case study in Roman cosmography* and *Shellfish consumption on Iona, Scotland: a re-interpretation of marine mollusc harvesting in an Early Medieval seascape* authored by Pascal Hoffman and John Angus Macauley, respectively, took historical or textual approaches to their studies of Roman cosmography and medieval coastal dietary habits. Considerations of coastal environments, wetlands, river systems, and cenotes feature in the papers of Chris Dwan (*Memory and landscape stability on the Welsh Severn Estuary: Prehistoric landscape use in a dynamic coastal environment*), Tjaark Siemssen (*Wet Feet. Funnel Beaker monuments and waterscape entanglement in the Elbe-Weser Triangle, Germany*), Deanna Cunningham (*Rituals, rivers, and the Romans: deconstructing the significance of rivers in Roman Britain*), and Leah Tavasi (*Karstic geography and political ecology in the Yucatan: liminal traditions within the ritual, political, and spiritual landscape of Maya cenotes*). Each of these works contemplate how past peoples interacted with landscapes in ways linked to memory, social practices, ritual landscapes, and past experiences. The final paper of the volume is Ella Speckeen's work *'The Graveyard of ships': the maritime archaeology of the West Coast Trail*, a work focused upon 20th century interactions surrounding a specific maritime

cultural landscape whilst also revealing the enduring impact and legacy of colonialism.

This volume represents the coalescence of a diverse range of scholarly works whose authors expertly examine the omnipresence of water and its impact upon past human existence. The following works each address and provide unique perspectives on the essential relationship between humanity and water and how it can be found flowing through all aspects of the past.

List of citations

Adams, R. 1966. *The evolution of urban society: Early Mesopotamia and Prehistoric Mexico*. Chicago: Aldine.

Adams, R. 1978. "Strategies of maximization, stability and resilience in Mesopotamian society, settlement and agriculture." *Proceedings of the American Philosophical Society* 122: 329–335.

Childe, V. G. 1928. *The most ancient Near East*. London: Norton Company.

Davies, H. C. 2008. *The archaeology of water*. Stroud: History.

Flemming, N. C. 2021. *Apollonia on my mind: the memoir of a paraplegic ocean scientist*. 1st ed. Leiden: Sidestone Press.

IPCC Core Writing Team, Pachauri R. K., and A. Reisinger A. 2007. "Summary for Policymakers." In *IPCC, 2007: Climate Change 2007: synthesis report. Contribution of working groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Geneva: IPCC.

Mithen, S. J. 2003. *After the ice: a global human history, 20,000–5000 BC*. London: Weidenfeld and Nicolson.

Mithen, S., and Black, E. 2011. *Water, life and civilisation: climate, environment and society in the Jordan Valley*. 1st ed. Cambridge: Cambridge University Press.

Scarborough, V. L. 2003. *The flow of power: ancient water systems and landscapes*. Santa Fe NM: SAR Press.

Seneviratne, S.I., Zhang X., Adnan M., Badi W., Dereczynski C., Di Luca A., Ghosh S., Iskandar I., Kossin J., Lewis S., Otto F., Pinto I., Satoh M., Vicente-Serrano S.M., Wehner M., and Zhou, B. 2021. "Weather and climate extreme events in a changing climate." In *Climate Change 2021: the physical science basis. Contribution of working group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* edited by V. Masson-Delmotte, P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou: 1513–1766- Cambridge: Cambridge University Press.

Steward, J. H. 1955. *Irrigation civilization: a comparative study*. Washington DC: Pan American Union.

Wittfogel, K. A. 1957. *Oriental despotism: a comparative study of total power*. New Haven CT: Yale University Press.

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