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The Climate Crisis, Cultural Heritage, and the Future of Middle Eastern Archaeology

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Abstract

Climate scientists project that rising global temperatures will substantially transform the Middle East during the remaining decades of the century. These changes will also impact the region's cultural heritage, particularly its documentation and management. This article reflects on how archaeologists can respond to these changes now and in the near future.

Author Bio

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Climate scientists widely concur that concentrations of carbon dioxide in the Earth's atmosphere are greater than at any other time in the last 800,000 years. The presence of such large amounts of greenhouse gases in the atmosphere has brought about several measurable changes. The Earth's atmosphere and oceans are warming, sea levels are rising, and snow and ice levels are declining (Intergovernmental Panel on Climate Change 2014). Since 1880, global temperatures have increased by 1 degree Celsius. If greenhouse gases continue to be issued into the atmosphere at the current rate, scientists forecast a global temperature increase of between 2 and 4 degrees Celsius before 2100 and even possibly by 2050. The consequences of these temperature changes will include more frequent and higher intensity heat waves and precipitation events; warmer and acidified oceans; and the inundation of coastlines due to a rise in sea levels. The Middle East will certainly not be immune to these changes. Scientists have warned, in fact, that it will likely be one of the hardest hit regions in the world, posing significant challenges to the millions of people who will live there in the decades to come (Pal and Eltahir 2016; Waha et al. 2017).

The fact that the Middle East is sitting on the precipice of — or perhaps already in the midst of — a dramatic climate crisis may not necessarily alarm scholars familiar with the region's deep history. Archaeologists and historians have long documented the role that changes in climate have — and have not — impacted the region's past societies, whether it was the Neolithic Era's Younger Dryas (Bar-Yosef 2011) or briefer episodes of change (e.g., Langgut et al 2014; Kaniewski, Guiot, and Van Campo 2015; Raphael 2013). Today, archaeologists have an unprecedented, but admittedly still partial, grasp of the Middle East's environmental record thanks to scientific tools and techniques available to collect environmental proxy data (e.g., palynology, speleothems). Research during the second half of the twentieth century often over-

interpreted the impact that climate change had on the region's ancient societies, seeing settlement abandonment and human migration as signs of collapse. A balance has been struck in more recent scholarship that recognizes the human capacity to not only stand resilient in the face of climate change (e.g., Porter 2013; Wilkinson et al. 2007), but to also play a significant role in instigating such changes (Cardova 2007; Rosen 2007). Scholars now understand that Middle Eastern societies and natural phenomena often play equally powerful roles in co-creating the environment.

Given Middle Eastern societies' documented resilience in the face of climate change, it may therefore appear to be an act of crying wolf when sounding the alarm amid a growing body of evidence pointing to the emerging climate crisis toward which the entire planet — and the Middle East in particular — is headed. The coming climate crisis will certainly not spell the end of Middle Eastern society, but it will substantially transform where, when, and how people live in the region. Climate scientists, policy makers, and social scientists are in the early stages of planning how governments and societies should respond to these changes.

Not to be forgotten is the impact that the climate crisis will have on the Middle East's cultural heritage and the various stakeholders who value and manage it. Most cultural heritage is a non-renewable resource that is not only a wellspring from which communities can materialize their identities but is also an important archive documenting the Middle East's contributions to human history. Yet for those objects, practices, and places that come to be semiotically defined within the category of 'heritage,' they are often entangled in contested political, economic, and cultural conflicts, both subtle and public. In this essay, I summarize and reflect on the challenges that lie ahead for practices surrounding cultural heritage in the Middle East, including archaeology, historic preservation, museums, and collections repositories. An overview of the

most recent climate change projections for the region is presented as well as the likely human responses to these new conditions. Following this is a discussion on climate change impacts on cultural heritage resources and practices. The essay concludes with a reflection on the implications for the practices and policies of archaeological research, and how adaptations may be planned in light of the coming crisis.

The Middle East's Climate Crisis

The current climate of the Middle East¹ ranges from mostly temperate in its northern half to extremely arid in its southern half. Precipitation falls mainly November through April, the most abundant amounts falling in the region's northern half. May through October sees substantially less or no precipitation throughout the entire region. These environmental conditions, especially the timing and abundance of precipitation plays a key role in the region's economies, whether it is industry, tourism, or perhaps most importantly, agriculture. The extent to which countries depend on agriculture for food and jobs varies across the region and is contingent on the availability of arable land, labor forces, and proximity to markets. Under currently constrained conditions, large amounts of foodstuffs are already imported, including wheat, barley, rice, and corn to meet consumer demands (Verner 2012). Naturally available resources and the industries organized around them play a significant role in each country's per capita annual gross domestic product (GDP), which varies substantially across the region. In 2018, Gulf countries such as Saudi Arabia and the United Arab Emirates were 18 and 53, respectively, in World Bank GDP

¹North Africa is excluded from this review due to space constraints, although the region shares many challenges in common with the Middle East.

rankings by country while Jordan and Yemen were listed at 91 and 104 out of 205 countries and territories (World Bank 2018). These disparities in wealth will play a key role in countries' abilities to build or adapt infrastructure to climate risks (Waha et al. 2017). Exacerbating the current economic situation even more is the region's relatively high unemployment and underemployment levels coupled with the destabilizing events of the past decade, including international wars, civil wars, and the Arab Spring that have introduced volatility and uncertainty into local and national governance.

Models developed in the last decade that consider a 2 degree and 4 degree increase in global temperature levels before 2050 together project substantial changes in global and regional climate patterns (Lelieveld et al. 2012).² These changes will impact the Middle East's environment in several ways, only some of which can be described here. Annual summer temperatures will increase and episodes of intense heat will become more common. Winter precipitation levels will also become more erratic; while the southern half of the region will see decreased levels, the northern half may experience extreme unpredictable storms that could cause flooding. High altitude snowpack in the northern mountain zones that supply major river systems (e.g., the Euphrates, Tigris, Orontes) will have reduced input, leading to downstream supply being reduced. Sub-surface aquifers that supply fresh-water springs and oases will not be as fully recharged. At the same time, sea levels will rise, inundating coastlines and the fresh-water river systems that drain into the Mediterranean Sea, the Red Sea, and the Persian/Arabian

² For the latest scientific results, see *Climate Change 2021: The Physical Science Basis*.

Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change at <https://www.ipcc.ch/report/ar6/wg1/#FAQ>. Consult the regional fact sheets for Europe and Asia for summaries of the Middle East and Mediterranean Basin.

Gulf. Unpredictable extreme weather events will further stress the region, such as spikes in summer temperatures and sudden winter rainfalls.

Studies considering global climate change impacts on human populations often point out that the Middle East will be among the hardest hit regions in the world, regardless of whether a 2, 4, or greater degree change is achieved (Jobbins and Giles 2015; Pal and Eltahir 2016; Waha et al. 2017). These drying conditions will stress the region's rural agricultural industries, mainly based on crop and livestock production. A 2015 World Food Report anticipates that heat extremes and droughts will exacerbate food insecurities, stymieing farmers' capacities to grow food (Jobbins and Giles 2015: 4). As arid conditions increase, demand for water will increase, causing growers to compete for water that is government rationed, or deplete naturally available ground water resources. Safe and efficient food delivery systems to consumers will be disrupted, requiring countries to depend more on food imports to meet consumers' basic needs. The agricultural sector's decline, the 2015 World Food Report projects, will reduce the most important employment sector in rural areas and will lower landowners' property values. The lagging economic conditions will encourage families to move to urban centers in search of new employment opportunities. This migration to urban and exurban spaces will increase the overall size and residential density of the region's cities, some of which currently face housing and infrastructure crises. To add to these health and wellness challenges, chronic and contagious diseases, especially those that thrive in arid environments are predicted to increase, in part due to longer and warmer summers.

These economic and demographic projections are no doubt dire for the region, especially when considering that the Middle East's population is anticipated to dramatically increase by 2050 (United Nations, Department of Economic and Social Affairs, Population Division 2019),

with some countries possibly experiencing a doubling in population. Planners emphasize that strong and transparent governance is key to successfully mitigating climate change. Local and national governing institutions, international aid organizations, and non-government organizations will have various degrees of strength to mitigate these changes. However, some, but not all, scholars have projected that climate change will catalyze political strife within and between countries in the region. A 2009 International Institute for Sustainable Development report focused on the Levant identified a half-dozen threats to regional security that include competition for scarce water resources, increased tensions over occupied lands and refugee communities, and the militarization of natural resources (IISD 2009). Conflict within countries is also projected, whether it is between regions, between urban and rural divisions, or between sectarian groups. Observers of the Syrian Civil War, now in its ninth year at the time of this writing (and considered by most observers to be on the wane), debate the extent to which climate change instigated this dramatic war. Those seeing a correlation point to a substantial five-year drought, one of the worst on record that began in 2007. The crisis pushed rural populations into cities where they faced overcrowding and under employment, all of which fanned the flames of conflict (e.g., Kelley et al. 2015). But others caution that the correlation of such patterns does not necessarily mean climate change was the principal instigator of the civil war. Rather, the timing of the drought's beginning with the Syrian government's economic liberalization initiatives that saw the end of subsidies for rural communities exacerbated what was already going to be a painful transition (Selby and Hulme 2015; el-Showk 2019). While this debate is a cautionary tale in using climate change to explain political and social upheaval in the coming decades, one can observe how the degraded conditions can be a force multiplier alongside other economic and cultural factors that create the context for violence and conflict.

Repeated World Bank reports express a frustration with countries' slow GDP growth and call for an increase in government transparency. Indeed, many governments and national economies are expected to remain in a fragile state during the next two decades unless job sectors are opened for the relatively well-educated population, the majority of which in most countries are now people under thirty years of age. Ironically, global efforts to mitigate climate change by transitioning from non-renewable to renewable sources of energy also threaten Middle Eastern economies that over-depend on fossil fuels production. The global 2020 COVID-19 virus outbreak which saw a cessation of travel activities and, hence, a reduction in the demand for carbon-based fuels, revealed how vulnerable this over-dependence is during periods of global crisis. A stable, if not growing, economy is key for mitigating climate change. Currently, only the region's wealthiest countries (e.g., the State of Israel, Saudi Arabia and some Gulf states) have the capacity to build and scale adaptive infrastructure that will sustain basic utilities for a challenged population, although many countries are developing implementation plans (IRENA 2020). Saudi Arabia, Israel, and some Gulf States are investing in renewable energy alternatives, particularly solar, wind, and hydroelectricity. These countries are also scaling desalination facilities that will provide clean water to make up for what can no longer be captured from precipitation.³ Less wealthy countries are not investing in adaptive infrastructure, and are instead maintaining their dependency on fossil fuels or tapping into groundwater aquifers that will see lower levels of recharging as arid conditions increase. In some instances, these countries are in the planning phases or are working with the international community to gain the expertise and

³ It should be noted, however, that current desalination technologies require carbon energies to operate, although efforts are being made to reduce emissions. They also generate a high degree of waste products that are not easily recycled.

funding to carry out these adaptive projects.

Climate Change Impacts on Cultural Heritage

At first glance, it may appear insensitive and rather self-serving to reflect on the future of cultural heritage in the Middle East given the severe impacts the climate crisis will have on the region's peoples. However arbitrary the constructed category of cultural heritage may be (Jacobs and Porter 2009: 72-73), the objects, places, and, at times, practices that constitute it are nonetheless non-renewable resources that play an important role in the quality of life in the Middle East. Many cultural heritage sites serve as the basis for cultural, religious, and national identities leading countries and their international partners to make significant investments in maintaining them. Despite its deep and sometimes unfortunate entanglements with politics, cultural heritage is, ultimately, maintained by institutions and individuals existing in webs of often-problematic relationships, large and small, a point that Meskell has illustrated in her rigorous treatment of UNESCO (Meskell 2018).

Cultural heritage has and continues to serve as a key economic resource in the Middle East. The United Nations World Tourism Organization's report on the Middle East and North Africa (MENA) region recorded a ten-percent growth from the previous year's level in international tourist arrivals in the region (UNWTO 2019). This growth during the past few years signaled the region's recovery from internal conflicts and economic decline during the past decade as well as the robust economies of developed nations with people with spending power to visit the region. Cultural heritage landmarks, including archaeological sites and museums, are among the most popular destinations for international and domestic visitors. Observers were

predicting another seven to ten-percent growth in the MENA region's tourism and travel sector before the outbreak of the COVID-19 pandemic brought international travel to a near standstill (World Tourism Organization 2019). While this recovery was good news for the overall industry, it would not have eased the tension between Middle East tourism's capacity to, on one hand, exacerbate inequities and create dependencies, while on the other hand stimulate entrepreneurship at all levels of society and create public and private sector jobs. The practices surrounding tourism also currently contribute to the region's climate crisis, especially the use of long-haul transportation technologies — airplanes, buses, and cars — that still largely depend on carbon fuels. The hospitality industry uses above average amounts of water to provide clean drinking water, showers, and swimming pools. Efforts to promote carbon-neutral 'green' tourism in the region are only in their infancy and are being implemented by the region's wealthier countries that are investing in more energy efficient infrastructure for airports and hotels.

There is a broad but largely tacit consensus currently that much of the Middle East's cultural heritage is already under threat regardless of the emerging climate crisis. Damage done to sites during armed conflict is the most visible examples and receives heightened attention from the media and researchers (Emberling and Hanson 2008). The availability of free or inexpensive satellite imagery and remote sensing software have produced multiple studies demonstrating armed conflict's impact on archaeological sites during the Iraq War and the Syrian Civil War (Casana and Laugier 2017; Danti 2015). These well-documented instances of destruction during periods of conflict, however, distract from the everyday iterative threats that archaeological sites face. The region's dramatic and largely unplanned growth in population during the past two decades has created new demands for land and housing. Suburban growth that extends into the rural countryside have brought populations into greater contact with sites

that were once relatively well protected due to their remote locations (Glausiusz 2020). Building construction can inadvertently lead to the destruction of cultural heritage in the private and public's sector haste to accommodate this growth. The increased value of private land is also introducing conflicts between governments and landowners over the extent to which antiquities on private lands should be managed by the government. Add to this the ongoing challenges around looting that destroys sites for the sake of extracting objects for sale in tourism and antiquity markets within the region or further afield (Kersel 2007). Animal grazing and the harvesting of building materials and agricultural soils from archaeological sites are additional activities on what is already a growing list of negative impacts. The first line of defense in mitigating these impacts is the national government agencies — ministries and departments of antiquities, cultural heritage, and tourism — who are often well trained and passionate about what is a challenging mission. However, such agencies are chronically underfunded by their governments and will likely continue to be so in the future. Support and staffing for basic activities, such as site monitoring and guarding, and for infrastructure such as fences and signs, are usually constrained at most sites, aside from the select number that draw large amounts of revenue from tourists.

Because climate change is a threat multiplier, the challenges facing cultural heritage in the Middle East will only be exacerbated in the decades to come as the climate crisis grows more acute. A 2016 study drew attention to the global challenges that climate change presents to destinations that have been granted UNESCO world heritage status (Markham et al. 2016). Changes in sea level, temperature, and precipitation will directly threaten the architectural integrity of some sites and pose unique challenges to their preservation and management. The Middle East, where nearly 100 UNESCO World Heritage sites are currently listed, is posed to be

one of the hardest hit regions in the world. Many of the region's archaeological sites are located in rural agricultural areas that are predicted to decrease in population as agriculture becomes a less viable income source and families move to urban areas to pursue new livelihoods. Some areas of the Middle East, especially those now in arid and semi-arid zones, will become even more inaccessible as daytime temperatures climb and populations withdraw. With rural populations depleted, some impacts on sites, ironically, could be reduced, such as animal grazing and building material harvesting. However, the protection afforded by those communities that do exercise even a casual level of stewardship over sites in their vicinity may be reduced. Increased aridity in areas with arable lands will see a decline in arable soil quality and abundance, leading farmers to mine nutrient rich aerosols from archaeological sites to fertilize fields. Museums and collection facilities that care for archaeological objects will also face challenges in the climate crisis. While new museums have recently opened, or are scheduled to in the near future, in the wealthiest of the region's countries, such as the Louvre Abu Dhabi, other national and regional museums remain chronically underfunded and often lack sufficient infrastructure and staffing. Even before the COVID-19 pandemic that disrupted international tourism (Gössling, Scott, and Hall 2020; Lew et al 2020), forecasters were predicting a steady decline in all tourism sectors as warmer conditions set in, crippling the hospitality industry. For better or worse, Middle Eastern governments and non-profit organizations make decisions about the management of cultural heritage based on the revenue they earn from tourism. Declines in investment from the public and private sectors could see an overall reduction in cultural heritage management.

Archaeology and the Middle East's Climate Crisis

The fields that support the cultural heritage sector in the Middle East will need to confront the challenges of the global climate crisis in the coming decades. The most important question to consider is what steps should be taken now to prepare for these changes. While fields such as tourism and hospitality studies (e.g., Dubois and Ceron 2006; Kaján and Saarinen 2013) and historic preservation (e.g., Veerkamp 2015; Xiao et al. 2019) began this conversation in their respective communities of research and practice more than a decade ago, archaeology is only beginning this important discussion. Two recent collections of studies authored by archaeologists demonstrate a growing awareness of the situation, especially as it pertains to coastal and inland river flooding's impact on cultural heritage sites (Dawson et al., 2017; Meharry, Haboucha and Comer 2017). Collectively, the authors stress the need to work with various publics, from government policy makers to community stewards and stakeholders, to mitigate the emerging crisis. Nearly all of these studies are based in the so-called developed world — North America, Europe, Japan, and Australia — and, notably, none are concerned with the Middle East.

How then should one begin to think about the practice of Middle Eastern archaeology within the context of the region's climate crisis? Rather than begin with the discipline's instinct to “preserve” and “protect” the archaeological record, we must instead start by recognizing the now settled fact and uncomfortable truth that Middle Eastern archaeology's nineteenth century foundation and early twentieth century development was entangled in European imperialism and, later, colonialism (Porter 2010). Since World War Two, archaeology has continuously benefited from European, North American, and, now East Asian interests in the Middle East's carbon resources. Critics continue to describe Middle Eastern archaeology as a neo-colonialist enterprise

that extracts evidence for Western research priorities under the guise of ethical ‘salvaging’ of global cultural heritage (Meskell 2020). This critique is not entirely fair, of course — some of archaeology’s most important contributions to the governments that host their research is the discovery and documentation of monuments on which national cultural heritage and tourism destinations are based. However, even if these contributions are viewed positively, they also serve as reminders that Middle Eastern archaeology is and has never been a neutral bystander in the region’s local and national politics (Meskell 1998).

Invoking archaeology’s historical legacy while reflecting on the climate crisis is important because it situates archaeological practice, regardless of the position of its practitioners, within a systemic regime that has already proved harmful to Middle Eastern societies. Setting aside the visible well-documented examples of archaeologists who contributed their research to the region’s ethno-national narratives, archaeological practice can create tacit inequities despite the well-intentioned motives of researchers. For instance, local communities that live adjacent to cultural heritage sites often receive very limited benefits beyond seasonal labor and small business patronage despite their participation in the research and site interpretation process (Mickel 2021). In some instances, in fact, archaeological research and site development projects have displaced entire communities in the name of preservation and security, such as the relocation of families living in or alongside the archaeological sites of Umm Qais (Brand 2001) and Petra (Comer 2012), in northern and southern Jordan, respectively.

Growing awareness of the negative impacts that Middle Eastern communities can experience have led archaeologists to develop more ethically engaged sensibilities and practices in their research programs. To do so, they have drawn on community archaeology models that consider local groups as stakeholders in the documentation and interpretation of cultural

heritage. Indeed, these collaborative programs have grown common in archaeological practice around the world, especially in North American and Australian projects that bring indigenous communities together with archaeologists to achieve shared goals (e.g., Silliman 2008; Smith and Wobst 2005). Over the past two decades in the Middle East, archaeologists have adopted community archaeology as a framework that can potentially reverse the discipline's imperialist and colonialist legacy. Despite early enthusiasm for the approach, collaborative and community archaeology programs have not been widely adopted. Only a handful of projects have risen in visibility, such as the largely privately funded Umm al-Jimal Project in northern Jordan and the USAID-funded Sustainable Cultural Heritage Through Engagement of Local Communities Project, or SCHEP. Both projects have so far been successful in collaborating with local stakeholders in site development, interpretation, and educational programs. While the reasons that prevented the widespread adoption of these practices among other projects — lack of sustained funding, internal and international conflicts, failed partnerships — require examination elsewhere, they nevertheless speak to the challenges that archaeologists face in building and sustaining community partnerships in the early decades of the twenty-first century. If these initiatives cannot be forged during these early years of the climate crisis, how can they be possibly developed under the more dire conditions to come?

This brief autopsy on community archaeology in the Middle East is key because it is likely the local rural and suburban communities that live alongside archaeological sites that stand to be the most affected by changing climate conditions. As described earlier, rural communities who are responsible for supplying a significant portion of the region's food supply will be stressed by warming conditions, erratic winter weather patterns, and increased erosion of valuable soils. Archaeological projects, regardless of the extent to which they collaborate with

host communities in their research, remain dependent on communities and their businesses for basic services. As these services grow scarce, will archaeological projects place an undue burden on these communities struggling for survival? A conversation regarding the ethics of working in resource-taxed areas near communities experiencing trauma and upheaval is necessary.

Middle Eastern archaeology already contributes to the climate crisis and, at times, the destruction of cultural heritage sites. Before active research even begins, participants often expend significant amounts of carbon fuels flying and driving long distances to reach their field sites. While in residence, research teams can generate large amounts of waste, much of which cannot be recycled due to the underdevelopment of recycling programs in the Middle East ('Waste Management in the Arab Region: Recycling on Trial' 2019). Field research also has potentially negative impacts directly on archaeological sites. Many ancient Middle Eastern societies modified, and in some instances, desiccated the environments around their settlements through agriculture, quarrying, and other land-intensive activities. Anthrosols that ancient settlements created through their everyday activities now offer habitats for animal and plant species that are attracted to the soils' nutrient levels. Upon excavating these deposits, archaeologists often disturb these plant and animal communities. Archaeologists also have an unfortunate habit of leaving their research sites in disarray. Excavation activities create spoil heaps and rock piles that make follow-on site management projects challenging. Trenches collapse if they are not backfilled after excavation, leading to the erosion of intact cultural deposits. One immediate step archaeologists can take is to design and carry out sensible site management practices in the course of field research rather than waiting until active excavation is completed to 'clean up' a site for visitor interpretation projects. Such steps are relatively inexpensive and reversible, such as backfilling excavation trenches, building terraces and walls

from unused soils and stone, and, when appropriate, planting drought resistant native plants to reduce erosion.

Even with proper site management strategies in place, many archaeological sites will become inaccessible to researchers in the coming decades. Increased daytime temperatures and unpredictable severe weather events will make sustained archaeological research impossible in some regions, especially in arid zones. Likewise, as sea levels rise, sites preserved along coastlines and next to interior rivers will become submerged. Sites on the edges of major population centers will likely see destruction as cities expand to accommodate new communities. Populations living in these regions will have no choice but to move to larger urban centers with better employment and services, or leave the Middle East altogether. National government agencies should consider whether or not documenting sites in these at-risk regions is a priority. If so, domestic and foreign archaeological teams can carry out salvage operations, much as they have done ahead of major dam construction projects (Dissard 2011). Of course, how these projects are carried out must take into consideration whatever impacts research could have on local communities.

As the region's cultural heritage is destroyed or rendered inaccessible, previously excavated collections and its associated information will soon be all that exists as a testimony to the past societies of the Middle East. Scholars will come to depend on this evidence to conduct their research. Properly managed archaeological collection facilities where evidence can be curated and made available for research and teaching will be essential. Currently, facilities that care for Middle Eastern collections already exist around the world in museums, research universities, and government agencies. However, no matter where they are located, collections facilities are chronically underfunded and understaffed, and often lack the physical infrastructure

and technologies to properly care for collections. Likewise, the information associated with these collections requires careful curation. Today, field notes, maps, architectural plans, object descriptions, and other documents containing information about archaeological sites and associated collections are curated even more diffusely than physical collections (Kansa and Kansa 2014). Even when this information is well cared for in physical archives, its discoverability is limited and often disassociated with the physical collections they describe. Successful and sustainable online searchable databases such as Open Context and The Digital Archaeological Record (tDAR) have been established in recent decades to address archaeology's information crisis.⁴ Both physical and digital data information repositories are fast becoming essential research infrastructure for archaeology around the world. Like archaeological collections facilities, they require sustainability plans to ensure these resources are available in the coming decades. Granting agencies already require applicants to describe data management and archiving plans for their projects, but more investment in physical and digital repositories are required to sustain them into the future.

Disciplinary Adaptations

These acknowledgements call out for a careful rethinking of Middle Eastern archaeology, hopefully ahead of the anticipated changes that climate change will bring. The question that arises, then, is what should these adaptations be in light of Middle Eastern Archaeology's duty-of-care to both the people and the cultural heritage in the countries that host their research? For ideas, consider two ambitious and largely opposing political and economic paradigms that

⁴ Visit Open Context at <https://opencontext.org/> and The Digital Archaeological Record (tDAR) at <https://core.tdar.org/>.

currently dominate planning conversations around the climate crisis. Although neither paradigm offers satisfying off-the-shelf solutions, they are nevertheless worth considering as both provide glimpses into how global economies might change over the next century. The first paradigm, known throughout the developed world by the moniker “green growth” argues that the climate crisis can be managed through public- and private-sector investments that will retire carbon-based energy technologies and replace them with renewable energy technologies based on wind, solar, hydropower, and more.⁵ Building and maintaining these new technologies will create a large number of jobs that will employ people who would otherwise be working in carbon-based sectors (e.g., mining, oil refineries, pipeline construction). De-carbonized economies, green growth advocates argue, will transform the everyday lives of people, from how they travel to their workplace to how they prepare their food, concomitantly reducing greenhouse gases in the atmosphere (to the extent possible), restoring biodiversity, and sustaining standards-of-living during the process.

It is in this last point — the claim that societies will continue to enjoy the same levels of wealth and opportunity that they did in a carbonized economy — where proponents of the degrowth paradigm disagree with green growth proposals. Noting green growth programs’ emphasis on economic growth as a principal solution to de-carbonizing society, degrowth advocates argue that the plan still does not eliminate the neoliberal capitalist basis of the economy whose growth, they believe, created the now multi-century devastation of the planet’s natural resources. Nor do green growth programs offer reasonable pathways for countries with

⁵ Green growth legislation is now often known as “Green Deal,” or, sometimes, “Green New Deal,” programs (Green New Deal Group 2008). Other national governments, think tanks, and non-governmental organizations have developed and continue to develop their own documents.

still-developing economies to make these transitions to de-carbonized economies, especially those who depend on the extraction and export of non-renewable resources to developed countries who will, purportedly, be transitioning to home-grown renewable energy sources. Green growth programs, in other words, will continue to hold back the economies of developing economies, increase global poverty levels, and promote the structural inequalities that have been attributed to global capitalism's rise over the past two centuries.⁶

Degrowth advocates instead focus on the consequences that economic growth has had on the climate, especially since the middle of the twentieth century. The extraction and consumption of non-renewable energy sources has largely supported this growth, beginning with coal in the nineteenth century and continuing with oil and natural gas in the twentieth century. Degrowth models predict that this economic growth experienced by much of the developed world will eventually subside while those in developing countries will see their standards of living rise to match the new reduced levels of the developed world.⁷ As wealth and resources are more

⁶ It should be noted that green growth plans often include foreign aid to developing countries to encourage these adaptations toward clean energy economies. Some understand this foreign aid as reparations for the environmental harms that industrialized countries have had on the less economically developed Global South that are disproportionately experiencing climate change effects.

⁷ Before, during and following the COVID-19 epidemic, sustained conversations about the degrowth of multiple industries have occurred. Most relevant for our purposes here are discussions about the future of tourism, especially as the global industry saw a significant downturn during 2020. See the 2019 issue (v. 27, no. 12) of the *Journal of Sustainable Tourism* for a collection of articles addressing the topic.

equitably distributed across the planet, a significant transformation in the organization of labor will occur, with people dedicating their time and energy to meet the needs of their immediate communities. So too will the organization of leisure activities such as tourism change to focus on affordable and sustainable practices.⁸

These are admittedly thumbnail sketches of what are complex political, economic, and philosophical programs; there is no space here to provide anything more than cursory overviews.⁹ Worth noting for present purposes is how cultural heritage research and management are implicated in both programs. Cultural resource management firms already support private and public development projects, including those in non-renewable energy sectors. Green growth legislation promises to fund or stimulate the construction of large renewable energy infrastructure projects that will require the participation of cultural resource management firms. Archaeologists will continue to find employment in government and private sectors in countries with cultural heritage preservation laws. Critics, however, have argued that archaeological firms have too eagerly supported the neoliberal capitalist projects that have brought on the climate crisis, the construction of oil pipelines in North America being but one example. Time and again, critics argue, archaeologists were paid low wages for exhausting, sometimes dangerous, work. Worried that green growth infrastructure projects will continue to exploit professional

⁸ Degrowth scholarship is growing in prominence despite its foundational ideas dating to the late twentieth century. See D'Alisa et al. 2014; Kallis 2018, Kallis et al. 2020; and Latouche 2009 for overviews.

⁹ Likewise, this characterization of green growth and degrowth paradigms as diametrically opposed to each other is also misleading. There are areas of overlap, of course. Readers are encouraged to explore the programs should look to this publication's bibliography.

archaeologists, the conversation has turned recently to what degrowth paradigms can offer professionals in terms of collective resistance toward what they argue will otherwise be business as usual.¹⁰

Clues as to how archaeologists might participate in renewable energy development projects in the Middle East, if indeed they are invited to participate, can be garnered from their participation in the dam projects that took place in the second half of the twentieth century. Although opinions are today divided on whether or not the benefits that large dam projects are worth the negative impacts on the surrounding environment, dams were mostly well regarded throughout the twentieth century as civil engineering technologies that provided hydroelectric power, large-scale fresh water storage, and flood control, all of which are today considered desirable in a decarbonized future in the coming climate crisis. Egypt, Iraq, Jordan, Syria, Turkey, and other neighboring countries have constructed dams of various sizes on major rivers such as the Nile and Euphrates and Tigris Rivers as well as smaller drainages (e.g., the Wadi al-Mujib in Jordan). Middle Eastern countries carried out these projects, sometimes with international aid, to increase their energy independence, exercising their sovereign right to develop resources within their territorial borders. Because the large lakes that accumulate behind dams inadvertently submerge cultural heritage (as well as displace communities and destroy species habitats), domestic and foreign archaeologists have been employed to conduct multi-year surveys and emergency excavations. Their work also recovered enormous amounts of evidence, of course, that contributed to the discipline's knowledge of the region's past. Only in some

¹⁰ See Flexner 2020 as well as Zorzin 2021 (and various responses in the same journal issue) for thoughtful discussions on the role of the professional archaeologist in green growth and degrowth movements.

instances were efforts made to preserve cultural heritage sites, notably the dramatic move of Egypt's New Kingdom Abu Simbel temple complex in the mid-1960s. More often, cultural heritage sites were and continue to be destroyed.¹¹ Whether or not archaeologists will be called upon to conduct cultural resource management projects in support of upcoming green growth projects is difficult to predict. Instead of documenting sites in danger of flooding, archaeologists could be conducting salvage work ahead of the construction of photovoltaic power stations (i.e., solar farms), desalinization facilities, or even nuclear power plants.

Similarly, pathways of degrowth in Middle Eastern archaeological research can be envisioned by recalling the episodic periods of unplanned disruptions during the past century. Following the 1979 Islamic Revolution in Iran, nearly all foreign research activities in the country were suspended, with only archaeologists from countries with diplomatic relationships being allowed to return eventually. In the United States, an entire generation of archaeologists who had worked in the country for decades saw their research activities abruptly end. The ensuing Iraq-Iran War between 1980 and 1988, the subsequent wars between Iraq and the United States and their allies in 1991 and again in 2003 (with an occupation lasting until 2011) also saw the disruption of research activities. The Lebanon Civil War between 1975 and 1990, and the more recent Syrian Civil War that began in 2011, likewise saw the near-complete cessation of research activities. Archaeologists have become deft at navigating these conflicts, moving their research from one area to another (and back again), such as the noticeable shift of Mesopotamian specialists from Iraq and Iran to Syria and Turkey during the 1980s and 1990s, and then, quite abruptly, back to Iraq a few years after the 2003 conflict subsided. As the climate crisis unfolds,

¹¹ See Dissard 2011 and Luke 2018 for two extensive studies on the economic and cultural impacts that resource extraction has had on either end of Turkey.

archaeologists may continue to follow this hopscotching pattern across the region as conditions in specific regions shift between hospitable and inhospitable. This lurching between projects often has negative effects on research, with excavation and development projects placed on hiatus or going unfinished, and accumulated evidence stored near research sites going unstudied and often lost. Unplanned degrowth also has direct negative impacts on cultural heritage sites, and, most importantly, the civil servants that manage them and the communities that live near them. The looting, site destruction, and even murder of site stewards during the Syrian Civil War, for instance, offers a grim prediction of what could happen in the future.

These observations about the recent past, of course, offer imperfect lessons that nevertheless remind one of archaeology's entanglements with Middle Eastern societies and their governments and economies, as critics who characterize the discipline's practices as extractive remind us (Meskell 2020). As much as one may argue that foreign-led research activities should cease in light of these political entanglements and, now, the climate crisis, it is unlikely that the discipline will suddenly come to a complete halt. Rather, those who actually conduct archaeological research in the region should think carefully about how the discipline can make thoughtful ethically informed adaptations. One need not entirely subscribe to either green growth or degrowth programs to gather ideas for the discipline's future. The network of institutions that are involved in the investigation and management of the region's cultural heritage -- Middle Eastern government agencies and universities, overseas research centers, funding agencies, museums, and non-government institutions -- must play a leading role in shaping policies. European and North American professional societies, in particular, can set carbon-neutral level goals. In-person conferences can be scheduled less frequently while intellectual exchanges can be scheduled through digital remote platforms. Organizations with publication programs can

adopt green, and, ideally, gold open access models that makes knowledge about the Middle East more freely available to scholars and public stakeholders. Publishers can also offer print-on-demand paper subscriptions to decrease paper consumption and carbon fuels required for shipping. Professional societies can also develop new curricula for the next generation of professionals that includes training in heritage site management, and collections management and information management, all of which will be increasingly valuable in the coming decades.

Conclusion

This brief essay paints an admittedly bleak picture of cultural heritage's future in the Middle East. Rest assured that it is more likely than not that professional disciplines dedicated to investigating the region's past will likely always exist in one form or another. Nevertheless, in 2021, archaeologists in particular find themselves at an inflection point, although they may only come to recognize it in hindsight. The decision to adapt key practices must be made soon, or the discipline will proceed down an unplanned and uncontrolled path that will likely see the field crippled beyond recognition. Can archaeologists instead envision sensible plans that will sustain the production of new knowledge about the past and, at the same time, guide it toward a more ethical horizon? This is a difficult question to ask, admittedly, as so many of the institutions that support cultural heritage research count on growth models for their financial sustainability and are therefore guided by profit when making decisions about the future. Funding agencies and private foundations that reward scholars carrying out ambitious research programs show little concern for archaeology's disciplinary legacy as well as the coming climate crisis. Middle Eastern archaeology is resultantly embedded in the modern capitalist enterprise that values growth and the accumulation of capital, even if that capital comes in the form of new knowledge about the ancient world. Whether or not archaeologists can envision thoughtful and responsible

adaptations to mitigate the sharp abatement of research activities in the coming decades remains to be seen.

If by some impossibly good fortune that the climate projections for the Middle East are inaccurate, that global temperatures will not ultimately exceed even 2 degrees Celsius, will archaeologists have wasted their time adapting to what was, in fact, a false alarm? Certainly not. In fact, by making these changes, archaeologists will have become better stewards of cultural heritage resources and the communities that live around, and draw inspiration from, them. They will also have become better stewards of archaeological evidence and their associated information. If there is a silver lining to be salvaged from the dread that the climate crisis promises, it is the possibility of a more accountable and ethically engaged discipline. Clarion calls for these changes in practice have existed since the 1990s, well before climate scientists forecasted the future of the Middle East. Ironically and, perhaps, sadly, it may be the discipline's self-interested attempts to preserve itself that motivates Middle Eastern archaeologists to commit themselves finally to these ethical practices. The likelihood that global climate projections are somehow in error is, ultimately, the stuff of magical thinking to preoccupy one's mind while digging on borrowed time.

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