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abstract:

The paper is an attempt to reflect on the status of cultural heritage in the age of the Anthropocene in connection to new materialism theories. The questions that are posed concern the condition of material artifacts and monuments that are being transformed naturally and postnaturally, a character of those metamorphoses, as well as potential strategies for heritage threatened by the spectrum of destruction. Theses are illustrated within an example of intensified processes of (post)natural erosion at the archaeological site of Petra, Jordan. Considerations serve as a ground for reevaluation of the concept of material cultural heritage with an application of selected lens coming from new materialism (vitalistic materialism, agential realism and nomadic subjectivity). The reflection on the dynamism and biologism of heritage allows eventually to connect the new ontology of objects with the alternative ways of protection and care of the monuments.

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Nature as Curator: Cultural Heritage in the Anthropocene

> In order the read the rocks we must become conscious of geologic time, and of the layers of prehistoric material that is entombed in the Earth's crust.
>
> Robert Smithson[1]

Though they were written 50 years ago, the closing lines of Robert Smithson's essay heralding the birth of land art seem particularly relevant to the heated debates being waged in the humanities today. The awareness of the existence of non-human timescales and of geohistory,[2] a discipline that resists the categorical divisions of culture/human history and natural history, is a dominant feature in discussions centered on the Anthropocene,[3] the new era in the Earth's history that emphasizes humans' destructive influence on the planet.

Smithson writes that if we are to understand stone, we must simultaneously understand an inhuman timescale: the timescale of stone. The artist intertwines matter that he perceives as active and continuously transforming with time, understood as the inherent quality of every object (*temporality*). Read from today's perspective, his essay seems almost prophetic, as it correlates with many of the key issues addressed by contemporary thinkers associated with the geological turn,[4] the study of the Anthropocene,[5] and new materialism.[6]

In his work, Smithson probed the relationship between matter and time. In his 1970 piece *Partially Buried Woodshed*, the artist studied how matter behaves and transforms when left to its own devices. Abandoned to nature, the ruined woodshed gradually collapsed and was engulfed by foliage. Rather than simply point to the romantic trope of the ruin (*Ruinenlust*), however, Smithson demonstrated that every object experiences a life of its own and

is ultimately destined to annihilation.

I take Smithson's words and artworks as an inspiration and invitation to reflect critically on the status of heritage in the Anthropocene. In this essay, I investigate the post-natural character of cultural heritage, examining the inextricable link between culture and nature, one that manifests itself in the fabric of artifacts, thereby allowing us to consider heritage in terms of its non-human duration and material temporality. I draw on the theories proposed by new materialists: Jane Bennett (vital materialism), Karen Barad (agential realism), and Rosi Braidotti (the concept of the nomadic subject), and relate them to recent theories developed within the discipline of heritage studies, which have reshaped our approach to destruction, passage, and ruination (Holtorf, DeSilvey, Bailey). In my view, in this era of incessant artifact worship[7] and heritagization[8] – the increasingly bizarre practice of "preservation despite everything" – we would do well to pay particularly close attention to alternative approaches that draw the subject of nature into the debate over cultural heritage, thereby allowing us to accept the inevitable loss and irreversible changes that take place in the products of human activity; in fact, we may end up perceiving the affirmative and reflective potential of these changes. In this essay, I pose questions regarding the character of cultural heritage in a state of transformation: how does the ontological status of the artifact change in the light of (post-)natural processes of transformation? Can matter's internal life processes be permitted to "speak," and if so, how? Finally, can we accept the gradual destruction of objects that we care for and preserve – or wish to do so – and if so, how?

I illustrate this discussion with a case study of the accelerating deterioration of the historical complex of Petra in Jordan. This archaeological UNESCO World Heritage Site isn't just

a perfect depiction of the nuanced character of timescales and the relationship between time and matter; due to the progressing anthropogenic erosion taking place in Petra, it is also a powerful example of how nature – or perhaps even Anthropocenic post-nature – shapes objects that we traditionally associate with culture.

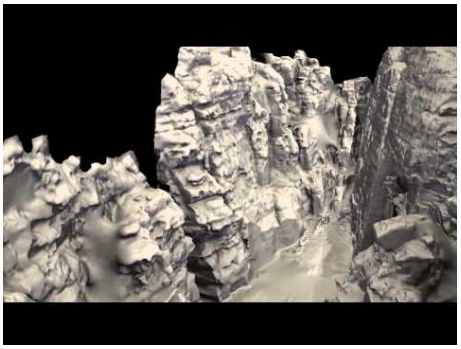
The geohistory of Petra

The urban complex at Petra dates back to the third century BCE. For centuries, it served as the capital of the Nabataean Kingdom, before it was conquered by the Romans in the second century CE. A large number of Petra's famous architectural objects – most of which are impressive religious and sepulchral buildings hewed into sandstone – date back to the Nabataean era, defined by its blend of Egyptian, Syrian, and Hellenic styles, while only a handful were reconstructed or built during Roman times.

The continued archaeological work at Petra, most of which has been uncovered, is intended to help plan an effective preservation and management strategy for this multicultural site. The researchers' main concern since the 1990s has been the progressive erosion of the architectural complex. The results of the first study of this subject were published in 1995 by Thomas R. Paradise, who observed the weathering of the sandstone in the Roman Theater in Petra.[9] Because the theater was build according to Vitruvian specifications, the researcher was able to calculate the rate and scale of the weathering and erosion by determining the theater's original dimensions. In the 1990s Paradise did not observe any factors accelerating the process of erosion, and while he noted that the construction material bore traces of the effects of climate change, he described them as "minor." A report released in 2013 revealed the significant intensification of erosion processes in Petra.[10] According to the latest data, the progressive erosion is the result of complex

processes involving mechanical, chemical, and anthropogenic factors.[11] While mechanical erosion had been observed as early as the 1990s, and was a natural process caused by thermal stress, temperature variations, and the build-up of desert sand, the most recent study is the first to mention chemical and anthropogenic changes among the factors accelerating the deterioration of Petra. The acid rain and elevated atmospheric sulfate levels contributing to the progressive erosion of this site are both directly associated with humankind's global activities.

Petra has, in recent years, been meticulously documented using the latest technology. One by one, each object in the complex is scanned and photographed, and regularly produced three-dimensional models allow us to track the extent of the damage and monitor its acceleration. In the case of one of the famous Djinn Blocks, scientists have observed the near-complete erosion of the decorative features on the monumental edifice.[12] To remedy this problem, researchers turned to the tools provided by cyber-archaeology,[13] creating an application that allowed them to project images depicting the artifacts with their ornaments intact onto the artifacts themselves. According to Thomas Levy, an archaeologist who studies sites threatened by terrorism and natural disasters, the ability to record artifacts in 3D at a time of widespread ruination allows scientists to continue their research on historical objects even after they have been completely destroyed.[14]



UNESCO Amman, Treasury 3D Model – Petra Siq Stability project 2013, December 3, 2013

The "petrification" of archaeological sites, or the arrest or even reversal of accelerating quasi-natural processes, is not possible with today's preservation tools and techniques; at best, digital complements serve a complementary function. Meanwhile, Petra

lives on, undergoing a material transformation spurred by mechanical, chemical, and anthropogenic factors, and becoming increasingly dissimilar to its documented depictions. The cultural heritage complex is subjected to pressures that are increasingly beyond human control. Nevertheless, it is worth noting the subversive character of the expected loss – that is, the transformation of Petra into a collection of shapeless stones devoid of their formerly impressive reliefs (Figure 1). I find this issue particularly interesting, especially in the context of discussions about cultural heritage vis-à-vis the Anthropocene condition.



Figure 1. The image depicts the erosion of the reliefs on the Djinn Blocks. Petra, Jordan. Photo: Dennis Jarvis. Creative Commons 3.0 License, https://commons.wikimedia.org/wiki/File:Jordan-18B-128.jpg
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According to the results of expert studies, erosion in Petra has drastically accelerated in recent years. Chemical and anthropogenic factors have intensified a process that has existed since the beginning of Petra's existence – not just as an ancient city, but as a stunning natural geological formation. Established on natural sedimentary rock (Figure 2), the cultural heritage site is undergoing a transformation driven by a series of intertwining post-natural phenomena. I borrow the term "post-nature" from Sverre Raffnsøe and Ewa Bińczyk, who define it as "the result of a highly complex interaction between humankind (culture, civilization, knowledge, technology) and nature,"[15] as a consequence of which it is becoming increasingly difficult to distinguish the human from the natural. In Ewa Bińczyk's view, the indistinguishability of these realms and the impossibility of returning to nature are results of human hyperagency. As the Polish scholar of the Anthropocene explains, "by modifying our own surroundings, we have distributed human agency across many aspects of these surroundings at a level

never seen before."[16]

I believe the example discussed here has much in common with the concept of post-nature: subjected to increasingly intense erosion, Petra is entering a post-natural state. Through greenhouse gas emissions, the climate catastrophe, and melting glaciers, dispersed human agency indirectly affects objects that seem remote or even invulnerable to ecosystemic threats. Michael Hall, Tim Baird, Michael James, and Yael Ram have signaled that anthropogenic threats to cultural heritage demand increasingly urgent reflection.[17] Having analyzed tourist travel patterns regarding Iceland and correlated that data with fuel consumption rates and airplane and automobile traffic, the researchers warn that if we do not start taking the Anthropocene and its global impact on heritage seriously, we may irretrievably lose sites that form our cultural capital.[18] They point out that while monitoring the effects of climate change on cultural artifacts has long been within the realm of heritage scholars' interests,[19] there are still no synergistic plans to protect and preserve deteriorating heritage sites. The authors propose the development of an integrated and unified approach to heritage preservation, along with the creation of a realistic timeline and planning strategy,[20] although they stop short of providing program guidelines for managing cultural heritage in the Anthropocene. In this regard, the authors' rallying cries align with Ewa Bińczyk's observation about the marasmus of the Anthropocene[21]: an impasse that results in the de facto

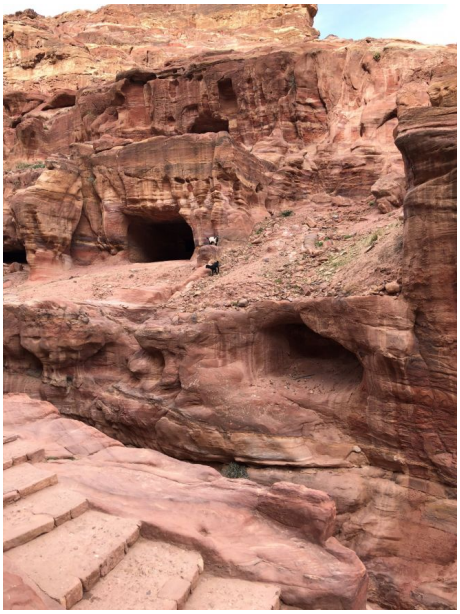

Figure 2. View of the geological plexus comprising natural rock and the architectural complex in Petra.Petra, Jordan. Photo: Joanna Weremijewicz, used with permission of the author.

abandonment of any efforts to counteract the mounting threats to the planet.

What action could feasibly be taken with regard to our example, Petra? What is a realistic strategy in the situation discussed here? The French scholar of the Anthropocene Christophe Bonneuil argues that the discourse about post-nature as a consequence of the Anthropocene urges us to "repair Frankenstein's monster"[22]; here, he refers directly to Bruno Latour's observations about the Anthropocene. According to Latour – as well as to Donna Haraway and Isabelle Stengers[23] – the current condition of the planet reveals an entanglement of nature-culture, relationality, and hybridity. Thus, the figure of Frankenstein's monster unites and metaphorises the Anthropocenic condition; if so, then to what extent is Petra – which is part of our global heritage, was established and built by humans, and is now being transformed by post-nature – becoming a Frankenstein's monster, the result of "the entanglement of nature, culture, and post-nature"?[24] Witnessing the increasingly rapid deterioration of the site, are we obliged to repair this post-natural construct? Or can we attempt to develop a realistic solution by redefining the ontological foundation of cultural heritage, now that it is being completely transformed in relation to Anthropocenic categories?

The natural-cultural character of heritage

The belief that scientists and conservators will invent a method to stop the progressive destruction of cultural heritage is close to what Ewa Bińczyk calls "techno-optimism."[25] She argues that "we are no longer capable of embracing solutions other than those already familiar to us: the technological imperative is a result of our belief in the benevolent consequences of unlimited scientific and technological development."[26] We believe, therefore, that the booming disciplines of conservation chemistry and biology[27] will produce newer, better, more effective means to

preserve cultural heritage. These hopes are essentially grounded in the ambition and desire to stop time, or even to "sterilize the past," in the words of the archaeological theorist Michael Shanks.[28]

He argues that the conservation of artifacts involves the "sanitization" and "sterilization of the past," thereby in a sense depriving these objects of their right to live.[29] According to Shanks, we therefore ought to reflect on the processes of decay – our only available source of insight into the essence of material heritage. I agree with his thesis that artifacts should be permitted to live out their life cycles, and that our task is to observe and draw conclusions. The accelerating processes of decay and destruction in the Anthropocene are creating the circumstances in which to reconsider, as Shanks suggests, the ontology of the material objects of our cultural heritage.

This stance is also encouraged by Ewa Domańska, who argues that the Anthropocene constitutes a useful intellectual platform on which to rethink concepts in heritage scholars' sphere of interest.[30] Accepting her invitation to reflect on these matters, I will attempt to approach the subject of cultural heritage in the Anthropocene from the perspective of new materialist philosophy. To shed an alternative light on the notion of cultural heritage in its material, tangible form,[31] I employ three concepts: Jane Bennett's idea of vital matter, Karen Barad's observations based on her re-reading of Niels Bohr's writing, and Rosi Braidotti's theory of the nomadic subject.

Jane Bennett introduced the theory of vital materialism with her thesis on vibrant matter, and then animated it by adding the categories of agency and independence from humans.[32] In my view, there is no theory of greater and more constitutive relevance to discussions of cultural heritage and its transformations in the Anthropocene. The matter and objects of cultural heritage described by Bennett are transformed over time by myriad biological and physico-chemical factors. In the case of the site discussed in this essay, Petra, the factors are

mechanical, chemical, and anthropological in nature; the artifacts are further affected by other factors resulting from more complex environmental issues.[33] Artifacts can also be transformed by plants and animals: earthworms, ants, and mites decompose matter, and additional damage is caused by the microbiological environment.[34] Faced with such far-reaching transformations, how can we believe that the heritage scholar – the archaeologist, historian, art historian, or conservator – works with a lifeless, static object? When exploring cultural and social meanings, we often forget that the objects we are studying constitute volatile, changeable, transforming entities.

The established image of the artifact is that of dead, instrumentalized matter with no potential to metamorphose.[35] As Bennett writes, we observe a constant and powerful tendency to understand all material changes as the results of human agency, a perspective spurred by cultural, linguistic, and historical constructivism, which compel us to perceive "thing-power" as an effect of culture, which is itself an oppressive gesture toward the effects of nature.[36] I believe that this constructivism is a crucial factor in the systematic suppression or even denial of the effects of nature on cultural relics, artifact complexes, and even minor artifacts, and their continued placement in the domain of culture. Scholars appear to focus on the epistemological values of heritage objects, often failing to perceive that the object of their study is not constant, but is constantly metamorphosing, and that it is only ostensibly petrified when it is preserved, a moment in its life is recorded, or when, to use Shanks' phrase, the past is "sterilized."[37] This observation has also been made by Tim Ingold, who argues that "despite the best efforts of curators and conservationists, no object lasts forever. Materials always and inevitably win out over materiality in the long term."[38]

In my view, the nature-culture binary could potentially be overcome through the non-human animation of cultural heritage

and by emphasizing the activity of matter, in the sense of its reactivity to external and internal factors. Bennett points to this approach as one possible avenue of development for vital materialism, arguing that in a world of living matter, we begin to be aware of the power of biochemical processes, which can develop in unexpected directions, ungoverned by deterministic causality.[39] I believe that the constructivism of nature and culture must be shattered in this manner and then reassembled in order for us to begin to understand more deeply the essence of artifacts as objects co-created by a series of non-human factors.

In presenting her project of agential realism, Karen Barad offers the following description of matter: "Matter is neither fixed and given nor the mere end result of different processes. Matter is produced and productive, generated and generative. Matter is agentive, not a fixed essence or property of things."[40] The example of Petra fits into this definition: stone is transformed by human action into a temple complex, and continues to change its form under the influence of external factors. These transformations are generative and agentive, because the familiar image of Petra is constantly drifting away from its material reality. As Barad writes, if we consider the dynamism of matter and its internal agency, we ought to think about tangible objects in terms of performativity rather than representationalism.[41] This remark is worth considering in regard to the abovementioned practice of digitizing Petra: the effort to recreate the "perfect state" of one of the Djinn Blocks and project it onto the eroded object is, in a sense, a gesture of coming to terms with the essence of metamorphosing matter.

This constant transformation, this state of an ongoing process, shares many features with the theory of the nomadic subject popularized by Rosi Braidotti. If we take as the subject a material object of cultural heritage that is transformed by creative, vital, transversal, and relational changes,[42] then we can also take volatility and multidimensionality as its ontological features.[43]

According to Braidotti, nomadic theory should encourage experimentation, fusion, and flows[44] – in this sense, I understand it to be a pretext to update certain concepts, including ones used in the discipline of heritage studies.

If, heeding the calls of new materialists, we include metamorphosis, transformation, biologicality, and dynamics in a new, broadened definition of the objects of cultural heritage, we will be able to cross the Rubicon that is the Cartesian dualism of nature and culture. As Kristin Asdal writes in regard to the project of environmental history, "This effort to incorporate 'the other' – nature – into our historical narrative and into history as a discipline is an important correction for a discipline that has for too long restricted its focus to assumed autonomous human actors in isolation from nature and the material world."[45] But why is this change in the way we think about artifacts urgent in the Anthropocene? Are we ready to accept a natural-cultural definition of artifacts and come to terms with the consequences of this alternative way of thinking?

Can we accept these changes?

Writing about the migrant, nomadic heritage of the Anthropocene, the British heritage scholar Rodney Harrison implores us to start considering artifacts in terms of instability, fluidity, openness, circulation, and assemblage,[46] as this will help update the concepts we use in the study, protection, and preservation of cultural heritage.[47] Harrison applies the principles of new materialism to contemporary global problems – the migrant crisis, the climate catastrophe, the specter of destruction and ruination – emphasizing that the terminology we use in heritage studies does not correspond to reality, which in turn compels us to redefine our dominant concepts and narratives. Indeed, the Anthropocene condition and its consequent threats to cultural heritage demand the development of new strategies of managing material objects

from the past.[48]

Cornelius Holtorf, holder of the UNESCO Chair on Heritage Futures, proposes that we prepare for mounting threats by adopting a stance of "fluid conservation."[49] His discussion of this concept is based on the assumption that we fail to appreciate threats, while simultaneously extending excessive care to cultural heritage (heritagization). Paradoxically, the scholar sees tragic and incidental events like the destruction of the statues at Bamiyan and Syrian archaeological sites as motivating opportunities to reconsider the repertoire of heritage we preserve for posterity. The practice of protecting artifacts "despite everything" and "at all costs," he writes, should be replaced with a project of "fluid conservation," understood as an autopoietic heritage that self-metamorphoses into a legacy, preparing future generations for changes and transformations. Holtorf argues that it is only when we face the loss or destruction of a heritage object that we assess its true value to the social imaginary.

Another project that entertains the possibility of the destruction and deterioration of cultural heritage objects is Caitlin DeSilvey's concept of "curated decay."[50] Starting from assumptions similar to Holtorf's, she determines that we are facing a "crisis of accumulation" – that is to say, we are living in an era of excessive care for every object of any historical, artistic, scientific, or social value.[51] DeSilvey observes seven cultural heritage objects that are gradually succumbing to the annihilating forces of nature. Her main interest is the process of destruction: its dynamics, stages, and consequences. She writes that we should let the materiality of objects speak for itself, and allow them to decay along non-human timelines.[52] Her interest in the entropy of heritage objects is a direct outcome of her reflections on the Anthropocene condition. As she explains: "The Anthropocene epiphany reminds us that we are deeply implicated in earth processes all the way down – in soil layers,

tree rings, rising tides, and swelling storm surges. It follows, perhaps, that we have a responsibility to the environments and entities that have been transformed by our actions."[53] In DeSilvey's view, entropy is worth observing because it helps us develop new values to ascribe to heritage.[54] Rather than thinking of it as "souvenirs from the past," the author encourages us to consider it in terms of "living heritage." In her view, this approach can help build continuity between the past and the present by pointing to the continuous, processual, and dynamic character of the material fabric of artifacts.

The American researcher Doug Bailey goes one step further than DeSilvey. In the book *Breaking the Surface: An Art/Archaeology of Prehistoric Architecture*,[55] he proposes that deliberate, considered, and planned acts of destruction can help us update the repertoire of terms we use in relation to heritage. The archaeologist destroys objects (original negatives and prints of photographs) with premeditation, in order to observe the process of destruction and learn what remains of matter. His aim is to understand the process of annihilation, believing that this will be useful in studying artifacts from the past.



Figure 3. One of many religious structures typical of the Sicilian baroque style. In an age defined by a surfeit of artifacts and a dearth of funding available for renovation, the building is gradually being covered by plants and falling into ruin (the tympanum, bell tower, and attic). As such, it is both a negative example (illustrating the negligence of conservators) and a positive one (demonstrating the impermanent, naturo-cultural character of heritage undergoing transformation). Buscemi, Sicily. Photo: Monika Stobiecka.

These bold proposals articulated by heritage scholars require commentary and critical reflection, especially in an age of progressing and all-encompassing

destruction caused directly or indirectly by human activity. All three scholars see the processes of destruction as refreshing alternatives and remedies to the "crisis of accumulation" or "surplus of things" (heritagization).[56] Their thinking in terms of destruction and degradation is, I believe, a direct response to the specter of the Anthropocene and various global crises. Holtorf accepts catastrophes that result in the destruction of cultural heritage; DeSilvey encourages us to observe the gradual annihilation of objects; Bailey intentionally destroys them. What is remarkable in the perspectives discussed above is their acceptance of the inevitable loss of material objects, resulting not in despair and mourning, but in affirmation. This unique approach of abandoning things, allowing them to be as they are (*Gelassenheit*),[57] allows us to grasp the essence of cultural heritage: a material, metamorphosing, bioactive fabric that transforms in time and has a temporality of its own, similar to that of Smithson's stones, discussed in the introduction. By conducting alternative readings of heritage that take into account not just its artistic, scholarly, social, or historical value, and by granting heritage the right to transformation and biological activity, we arrive at completely new perspectives not just in the humanities, but also in the practical planning of conservation strategies (Figure 3).

Conclusions

In the book *An Anthropology of Landscape: The Extraordinary in the Ordinary*, Christopher Tilley and Kate Cameron-Daum identify a rupture in the way we think about natural and cultural heritage, arguing that even modern heritage management models, in which natural and cultural elements are intertwined, are in reality far from comprehensive and synergistic solutions.[58] The anthropologist and archaeologist point out that, when thinking about heritage, we often erroneously separate cultural artifacts from natural objects. As is the case with Petra, it is

extraordinarily difficult to determine the nature of the process responsible for the current stage of an artifact: whether it is cultural (the result of human activity such as intense tourism), natural (the result of mechanical erosion), or post-natural (the sum effect of chemical and anthropogenic factors). For this reason, I believe that we need to rethink the concept of cultural heritage – its character, status, and the methods by which we conserve and care for it, especially now, in the Anthropocene, an era that has increased our awareness of destruction and global threats. Doing so will allow us to develop a realistic framework for managing cultural heritage in the face of crises and inevitable loss. Granting complete agency to monuments once believed to be constant and unchanging should become the starting point for future discussions about conservation and care. In discussions of alternative concepts of heritage, Petra would serve not as a monument at which to mourn losses, or an illustration of progressive deterioration, but as an inspiration to revise established practices.

As we have seen, material culture in a state of transformation is an active, vital material that has little in common with the constant, unchanging objects that – like imperturbable monuments – form the canon of artifacts. The metamorphoses occurring in historical matter are constitutive to the ontology of objects, ones no longer perceived in terms of binary oppositions (natural/cultural, permanent/impermanent, human/non-human), but through terms borrowed from the vocabularies of new materialists: fluidity, shift, biologicality, dynamics, agency, and generativity. As DeSilvey and Bailey in particular note, we must allow internal life processes to speak, observing them and drawing conclusions that will help us build a realistic framework with which to counteract heritagization and cope with the threats and losses facing heritage in the age of cataclysm and tragedy that is the Anthropocene. I believe that the knowledge we acquire by allowing matter to transform before our eyes,

according to its own biological materialism, vitalism, and timescales, may shape the new sensitivity and new values we attach to heritage in the future.

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2 Dipesh Chakrabarty, "The Climate of History: The Four Theses," *Critical Inquiry* 2 (2009), 197–222.

3 See: Paul J. Crutzen and Eugene F. Stoermer, "The 'Anthropocene'," *IGBP Newsletter* 41 (2000), 17–18; Paul J. Crutzen, "The Anthropocene: Geology of Mankind," *Nature* 415 (2002), 23–24.

4 See: Jeffrey J. Cohen, *Stone: An Ecology of the Inhuman* (Minneapolis–London: University of Minnesota Press, 2015); cf. "The Anthropocene Monument: On Relating Geological and Human Time," *European Journal of Social Theory* 20, no. 1 (February 2017), 111–131.

5 For further discussion of the study of heritage, art, and architecture vis-à-vis the Anthropocene, see, for example: Matthew Edgeworth et al., "Archaeology of the Anthropocene," *Journal of Contemporary Archaeology* 1, no. 1 (2014), 73–132; "Some Reflections on Heritage and Archaeology in the Anthropocene," *Norwegian Archaeological Review* 44, no. 1 (2011), 40–88;

Architecture in the Anthropocene: Encounters Among Design, Deep Time, Science and Philosophy, ed. Etienne Turpin (Ann Arbor: Open Humanities Press, 2013); *Art in the Anthropocene: Encounters Among Aesthetics, Politics, Environments and Epistemologies,* eds. Heather Davis and Etienne Turpin (London: Open Humanities Press, 2015); *Amplifikacja natury. Wyobraźnia planetarna architektury w epoce antropocenu*, ed. Anna Ptak (Warsaw: Wydawnictwo Zachęty Narodowej Galerii Sztuki, 2018). For an exhaustive discussion of the Anthropocene, see: Ewa Bińczyk, *Epoka człowieka. Retoryka i marazm antropocenu* (Warsaw: Wydawnictwo Naukowe PWN, 2018).

6 I refer here mainly to Karen Barad's re-reading of Niels Bohr's theories. See: Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham–London: Duke University Press, 2007).

7 Bronisław Szerszyński, "The Anthropocene Monument: On Relating Geological and Human Time," *European Journal of Social Theory* 20, no. 1 (February 2017), 111–131.

8 For a discussion of the phenomenon of heritagization, involving the intensification of conservation and care for artifacts and the accumulation of heritage-status objects, see: Rodney Harrison, "Beyond 'Natural' and 'Cultural' Heritage: Toward an Ontological Politics of Heritage in the Age of Anthropocene," *Heritage & Society* 8, no. 1 (2015), 24–42; see also: Dawid Kobiałka, "Let Heritage Die! The Ruins of Trams at Depot No. 5 in Wrocław, Poland," *Journal of Contemporary Archaeology* 2, no. 1 (2014), 351–368.

9 Thomas R. Paradise, "Sandstone Weathering Thresholds in Petra, Jordan," *Physical Geography* 16, no. 3 (1995), 205–222.

10 Giuseppe Delmonaco, Claudio Margottini, and Daniele Spizzichino, "Slope Dynamics, Monitoring and Geological Conservation of the Siq of Petra (Jordan)," in *Geotechnical Engineering for the Preservation of Monuments and Historic Sites*, eds. Alessandro Flora and Stefania Lirer (London: Taylor and Francis Group Press, 2013), 325–334.

11 The subject of transformation and its differentiation in archaeology was most famously studied by Michael B. Schiffer, who concentrated on archaeological findings that were subjected to cultural (*C-transforms*) and non-cultural (*N-transforms*) factors during their use, deposit, and discovery. See: Michael Schiffer, *Behavioral Archaeology* (New York: Academic Press, 1976). In Polish literature, Schiffer's theory has been discussed by Przemysław Urbańczyk. See: "O możliwościach poznawczych archeologii," *Przegląd Archeologiczny* 29 (1981), 5–51.

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13 Maurizio Forte, "Introduction to Cyber-Archaeology," in *Cyber-Archaeology*, ed. Maurizio Forte (Oxford: Oxford University Press, 2010), 9–14; *Cyber-Archaeology and Grand Narratives*, op. cit.; Monika Stobiecka, "Archeologia Antropocenu i Cyfrowe Krajobrazy," *Prace Kulturoznawcze* 22 (2018), 145–163.

14 Andy Murdock, "Cyber-Archaeology, Big Data and the Race to Save Cultural Heritage Sites," February 16, 2016, http://qi.ucsd.edu/news-article.php?id=2662.

15 Sverre Raffnsøe, *Philosophy of the Anthropocene: The Human Turn* (Hampshire–New York: Palgrave Macmillan, 2016).

16 Bińczyk, *Epoka człowieka,* 16.

17 C. Michael Hall et al., "Climate Change and Cultural Heritage: Conservation and Heritage Tourism in the Anthropocene," *Journal of Heritage Tourism* 11, no. 1 (2016), 10–24.

18 Ibid.

19 Among the main scholars currently researching this subject is Alessandra Bonazza. See: Bonazza et al., "Mapping the Impact of Climate Change on Surface Recession of Carbonate Buildings in Europe," *Science of the Total Environment* 407 (2009), 2039–2050.

20 Hall et al., "Climate Change and Cultural Heritage," 14, 18.

21 Ewa Bińczyk, "Epoka człowieka; Inżynieria klimatu a inżynieria człowieka. Dyskursy na temat środowiska w epoce antropocenu," *Ethos* 111, no. 3 (2015), 153–175.

22 Christophe Bonneuil, "The Geological Turn: The Narratives of the Anthropocene," in *The Anthropocene and the Global Environmental Crisis: Rethinking Modernity in a New Epoch*, eds. Clive Hamilton, Christophe Bonneuil, and François Gemenne (London–New York: Routledge, 2015), 23.

23 Ibid., 26.

24 Ibid.

25 Bińczyk, "Epoka człowieka" (2015); *Epoka człowieka* (2018), 241–280; "Ostudzenie entuzjazmu wobec nowych mediów," in *Interfejsy, kody, symbole. Przyszłość komunikowania*, ed. Ewa Drygalska (Wrocław: Laboratorium, 2016), 70–78.

26 Bińczyk, "Epoka człowieka" (2015); *Epoka człowieka* (2018), 258.

27 See: Alicja B. Strzelczyk and Joanna Karbowska-Berent, *Drobnoustroje i owady niszczące zabytki i ich zwalczanie* (Toruń: Wydawnictwo Uniwersytetu Mikołaja Kopernika, 2004); *Nauka i zabytki. Nauki ścisłe w służbie archeologii, ochronie zabytków oraz historii*, ed. Władysław Weker (Warsaw: Państwowe Muzeum Archeologiczne, 2008).

28 Michael Shanks, "The Life of an Artifact in an Interpretive Archaeology," *Fennoscandia Archaeologica* 15 (1998), 17.

29 Ibid.

30 Ewa Domańska's response is found in the article: Edgeworth et al., "Archaeology of the Anthropocene," 100.

31 In this article I am concerned solely with material heritage.

32 Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham–London: Duke University Press, 2009).

33 Anna Drążkowska and Małgorzata Grupa, "Ogólne zasady udzielania pierwszej pomocy zabytkom archeologicznym podczas wykopalisk," in *Pierwsza pomoc dla zabytków archeologicznych*, ed. Zbigniew Kobyliński (Warsaw: SNAP–Oddział Warszawski, 1998), 15.

34 Ibid.

35 Bennett, *Vibrant Matter*, ix.

36 Ibid., 17.

37 Shanks, *The Life of an Artifact*, 17.

38 Tim Ingold, *Being Alive: Essays on Movement, Knowledge and Description* (London–New York: Routledge, 2011), 27.

39 Bennett, *Vibrant Matter*, 112.

40 Barad, *Meeting the Universe Halfway*, 137.

41 Ibid., 135.

42 Rosi Braidotti, *The Posthuman* (Cambridge: Polity Press, 2017); *Nomadic Subjects: Embodiment and Sexual Difference in Contemporary Feminist Theory* (New York: Columbia University Press, 2011).

43 Braidotti, *The Posthuman*.

44 Ibid.

45 Kristin Asdal, "The Problematic Nature of Nature: The Post-Constructivist Challenge to Environmental History," *History and Theory* 42, no. 4, (2003), 61.

46 Rodney Harrison et al., "Belonging and Belongings: On Migrant and Nomadic Heritages in and for the Anthropocene," in *The New Nomadic Age: Archaeologies of Forced and Undocumented Migration*, ed. Yannis Hamilakis (Sheffield: Equinox Publishing, 2018), 209.

47 Ibid., 214.

48 Cf. Alfredo González-Ruibal, *An Archaeology of the Contemporary Era* (Abingdon–Oxon–New York: Routledge, 2019); "Beyond the Anthropocene: Defining the Age of Destruction," *Norwegian Archaeological Review* 51, nos. 1–2 (2018), 10–21.

49 Cornelius Holtorf, "Why Cultural Heritage is not 'At Risk' (In Syria or Anywhere)," https://heritagefortransformation.wordpress.com/2016/04/04/why-cultural-heritage-is-not-at-risk-in-syria-or-anywhere/.

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51 Ibid., 5.

52 Ibid., 9–20.

53 Ibid., 166.

54 Ibid., 184.

55 Doug Bailey, *Breaking the Surface: An Art/Archaeology of Prehistoric Architecture* (Oxford: Oxford University Press, 2018).

56 González-Ruibal, *An Archaeology of the Contemporary Era*, 4.

57 Dag T. Andersson, "Trusted Vagueness: The Language of Things and the Order of Incompleteness," in *Ruin Memories: Materiality, Aesthetics and the Archaeology of the Recent Past*, eds. Bjørnar Olsen and Þóra Pétursdóttir (London–New York: Routledge, 2014), 39.

58 Christopher Tilley and Kate Cameron-Daum, *An Anthropology of Landscape: The Extraordinary in the Ordinary* (London: UCL Press, 2017).

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