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Introduction

The scales of experience: Introduction to the special issue *Experiencing the global environment*[☆]

A B S T R A C T

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The Scales of Experience introduces the special issue *Experiencing the Global Environment* by focusing on three dimensions of the theme that are reflected to various degrees in the constitutive essays. First, the introduction highlights the links between the epistemological and political contexts of the historical constitution and development of the global environment (or global environments) in the earth and environmental sciences from the late nineteenth century to today. Second, it argues for a historical approach to the complex concept of scientific experience, whose mutable and contingent qualities are demonstrated by the contributions to the special volume. Lastly, the introduction presents one of the central issues to be tackled by the essays to follow: the development – and, at times, the failure – of strategies and technologies to bridge the seemingly incommensurate gulf between individual, localized experience and the all-encompassing scale of the global environment.

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If we imagine ourselves in the Apollo 17 spacecraft, looking out through the porthole onto the sun-soaked Blue Marble floating in the far distance, we may begin to have a notion of what the global environment is: the whole assembly of oceans, continents, ice sheets, lakes, mountain ranges, and river deltas buffered by the atmosphere from the vastness of space surrounding the planet (Cosgrove, 1994; Lazier, 2011; Poole, 2010; Höhler, 2015; Grevsmühl, 2014; Grevsmühl, 2016). Upon our return to the surface of that very planet, we may have a more difficult time experiencing the globality of the environment. What seemed connected from afar dissolves into fragments and particularities from our vantage point as one minuscule part of the all-encompassing ecological system surrounding us. And yet, while we can only directly experience some of the *local* effects of global phenomena like anthropogenic climate change, most of us would readily agree that global warming is a material process with effects on a planetary scale. This awareness of the global scale of the environment is not based on the direct observation of phenomena, but rather on the analysis of data from around the world collected by earth and environmental scientists and their instruments, tools, and sensors. To make sense of this data, scientists have developed what we could call

“experiential strategies,” such as interfaces to visualize data, and models and simulations to understand and explain temporal developments (Edwards, 2010; Gelfert, 2011; Wise, 2017).

Like the view from above, however, these experiential strategies require a certain detachment from our immediate surroundings, or our immediate environment. This poses an etymological conundrum, as the environment is, at least in its most literal meaning, what *surrounds*. In its earliest scientific uses, the thing thus surrounded was the single organism.¹ In the early twentieth century, biologist-turned-philosopher Jakob von Uexküll defined the *Umwelt* at the level of the individual and theorized how different animal species would experience their respective environments according to the physiology of their sensory organs (Uexküll, 1909, p. Uexküll, 1957 [1934]). By contrast, referring to *the* environment as a singular and global entity demands going beyond the particular setting and circumstances of any given organism. The phrase “the global environment” is thus not only of relatively recent coinage, but it is also at its root a somewhat paradoxical term (Ingold, 2000; Camprubí, 2016; Latour, 2017; Beck, Forsyth, Kohler, Lahsen, & Mahony, 2017).

The articles in this special issue seek to historicize, map, and ultimately bridge the apparent disjuncture between bodily surroundings and the global environment by investigating the various gradations of scale in which environments were perceived and measured: the papers here look at organisms (human and

[☆] The essays in this special issue represent the final product of discussions at two workshops convened by the working group “Experiencing the Global Environment” at the Max Planck Institute for the History of Science in Berlin in 2016. We would like to thank all participants and extend special words of gratitude to Lorraine Daston and Hans-Jörg Rheinberger for providing both material and intellectual support for the working group; to Debora Coen for her insightful input during the authors’ workshop; and to Angela Creager and Etienne Benson for their perceptive comments and suggestions on this introduction.

¹ For a more nuanced and in-depth examination of the linguistic, historical, and philosophical dimensions of the “environment,” see: Canguilhem, 2001 [1952]; Dutreuil & Pocheville, 2016.

otherwise), fields, forests, colonies, continents, oceans, and tectonic plates, as well as at the whole earth. They show that the earth and environmental sciences, from ecology to Earth System Sciences, have operated in and with a number of intermediate geographical and temporal scales, while the globe, or the entirety of the world's various environments combined, became an important reference point for practitioners in a variety of scientific fields. The authors thus explore how experiences were produced, shared, overcome, lost, or transformed in the emergence of the global environment as a modern concept in the earth and environmental sciences. The various experiences studied in this issue go well beyond the usual suspects of visual models and simulations to include instrument readings, laboratory findings, and human and non-human sensory perception. Geographically and temporally, we also seek to unsettle established narratives often too focused on US Cold War science. Without losing sight of the importance of this period and its unique geography for the emergence of the global environment and the politics, science, and aesthetics associated with it, we bring globality back to the 19th century (and at times even further than that), including a diverse, if certainly not exhaustive assembly of views from America, Europe, China and Africa.

1. The stakes

The urgency of the topic is simultaneously epistemological and political. Activists often stress the difficulties of mobilizing people to take costly steps in the name of distant or large-scale environmental problems removed from their daily experiences. For instance, global warming is, by definition, a planetary phenomenon, but – as Paul Edwards reminds us – “no one lives in a ‘global’ climate” (Edwards, 2010, p. 4). And yet, humans everywhere on the planet are confronted by at least some of the local effects of global climate change and have to take the environmental, socio-cultural, and political specificities of their own place into consideration when trying to become active in counter-measures to the warming of the atmosphere. To overcome this rift between the global threat and the local context of each individual or group, it is common to underline the local effects of global developments, seeking to speak directly to the lived experience of targeted audiences (Dunaway, 2009; Jassanoff & Martello, 2004; Morton, 2013; Russill, 2016; Slovic, 2015). Two recent films directed by Jeff Orlowski, *Chasing Ice* and *Chasing Coral* make this argument explicitly and use tools like time-lapse photography and other techniques to help audiences experience global change and its consequences by visual proxy.

Of course, experiencing environmental degradation of planetary dimensions, and even fearing it as a danger, is not enough to trigger action to counter it. To a large degree, this is due to the unequal distribution of environmental impacts: the poor will more directly feel the effects of environmental degradation than the rich. But governments of poor (or relatively impoverished) countries might also favor short-term policies directed at alleviating local energy poverty, unemployment, or other social urgencies (Agarwal & Narain, 1991; Miller, 2004; Navroz, 2013). Those better off, even if well informed, might not be willing to lower their consumerist standards in favor of the greater good. Still others might feel that they can even obtain short-term benefits from rapidly changing environmental conditions: global warming, for instance, may result in new agricultural and thus economic possibilities in Greenland and Siberia, as well as in the opening of new trading routes through polar regions (Kennel & Victor, 2012). Global environmental change seems to play the same role in the world political order as the evercoming winter in the series *Game of Thrones*: a constantly present threat which will destroy the inhabited world and which is

nonetheless too distant to bring together the different players who are busy fighting each other over that doomed world.

The mismatch between the local and the global scale is nevertheless more than a matter of education or self-interest. Ways of experiencing the global, by visual or other means, are by necessity always produced locally. There is neither a “view from nowhere” nor a “view from everywhere,” and each attempt to see the global incorporates the particular local conditions and circumstances of the particular observer or practitioner. Again, this is true both epistemologically and politically. The development of the earth and environmental sciences is bound to particular knowledge practices and imperial backgrounds that at least partly account for the globality of their findings. This is not to denigrate – and even less to censure – the value and significance of these disciplines and their experiential strategies, but to acknowledge that the scales of their analyses are historically produced and contingent on their context. Deborah Coen has recently called for a history of “scaling” attentive to the work behind applying different levels of analysis and making them commensurable (Coen, 2016; see also; Reid, Berkes, Wilbanks, & Capistrano, 2006; Beck, Esguerra, and Görg, 2014; Oreskes, 2014). We thus have to examine each formulation of the global environment in its own context and allow for a complex and non-linear narrative of the scaling up (and often of the scaling back down) of the scientific vision (Fleming, Jankovic, & Coen, 2006). It is, however, also this historical complexity that enables us to analyze the formulations of globality as political processes. Just as there is not a single globalization, but multiple and often competing globalizations, there are also multiple global environments, produced by a variety of mediated experiences.

2. Varieties of experience

With this agenda in mind, this special issue uses historical case studies to elucidate the epistemological developments behind the rise of the global environment as a commonly used concept from the late nineteenth to the early twenty-first century. The common goal of the papers is to explore how far the global environment has exceeded the limits of our personal experience, but also how practitioners have attempted to overcome conflicts between scales in both material and conceptual terms. In order to further explore these questions, we first have to break them down into their constituent parts: what do we mean, on the one hand, by “experience” and its distinct varieties, and, on the other hand, by environment, globality, and *the* global environment?

Even just the attempt to define experience could already lead us down long and winding paths through the history of philosophy. Experience has been one of the key terms of epistemology, reaching back to Aristotle and, subsequently, the late medieval philosophers. John Locke's formulation of the role of experience stands as the basis for the empiricists' program: “Whence has it [the mind] all the materials of reason and knowledge? To this I answer, in one word, from *experience*” (Locke, 1690). Even philosophers opposing Locke's view defined themselves around this pivotal concept – whether they were transcendental philosophers, neo-positivists, or phenomenologists, all had strong views on experience as the interface between minds (or bodies) and the world. They explored with subtlety the distinction and interdependence of two meanings of experience: as sense-experience (Russell, 1921) and as lived-experience (Bergson, 1922; Merleau-Ponty, 1945). When modern scientists spoke about their experiences of nature they referred to their sensations and observations, but also to their affects, to experiments, and to expertise (Daston & Lunbeck, 2011; Dear, 2006; Shapin and Schaffer, 1985). Historians, STS scholars, and philosophers are not alone in the exploration of perceptions and bodily experiences of nature. Psychologists (Bechtel & Churchman, 2002; Kaplan &

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