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RESEARCH ARTICLE

Civilisation and Human Niche Construction

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This short paper introduces the special section of three articles under the general heading of 'Civilisation and the Construction of the Human Niche', organised by the 'Domestication, Niche Construction and the Anthropocene' research network at the UCL Institute of Archaeology.

> It is impossible to avoid the conclusion that organisms construct every aspect of their environment themselves. They are not the passive objects of external forces, but the creators and modulators of these forces. The metaphor of adaptation must therefore be replaced by one of construction, a metaphor that has implications for the form of evolutionary theory (Levins and Lewontin 1985: 104).

Ecologists regard many species as effective engineers that modify, maintain, and/or create novel habitats (Jones, Lawton and Shachak 1994; 1997) – classic examples include birds and their nests, spiders and their webs, and a host of burrower species and their burrows. These examples are seized on by Niche Construction Theory, a body of evolutionary thinking that stresses how organism-induced environmental modifications can outlive organisms' lifespans and thus shape the selective forces of future generations (Laland, Odling-Smee and Feldman 2000; Odling-Smee 1988). Niche Construction Theory may be regarded as a Darwinian, Neo-Darwinian, or even a post-Darwinian development in evolutionary theory (see also Wray et al. 2014): it aspires to develop an extended evolutionary synthesis that conceives 'organisms [as] constructed in development, not simply "programmed" to develop by genes. Living things do not evolve to fit into pre-existing environments, but co-construct and coevolve with their environments, in the process changing the structure of ecosystems.' (Laland et al. 2014: 162).

Niche Construction theorists agree that the human species is the ultimate ecosystem engineer or niche constructor (Smith 2007b), one that over time has 'self-imposed' a sliding range of selection pressures through migration, dispersal, habitat selection, and environmental alteration (Laland, Odling-Smee and Myles 2010). Thus, Niche Construction Theory has significant potential to develop bridges with and beyond the 'broad church' of evolutionary thinking in archaeology. Some examples of archaeological research employing niche construction theory involve discussions about the subsistence habitats of human foragers (Rowley-Conwy and Layton 2011), processes of plant and animal domestication (Smith 2007a; Zeder 2016),

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the relevance of food processing techniques (Wollstonecroft 2011), the consequences of selection of particular digestive enzymes (Gerbault et al. 2011), the evolution of technology in small-scale societies (Collard et al. 2011), and the emergence of specific social institutions (Shennan 2011). More recently, some have suggested that the Anthropocene can be regarded as an outcome of increasingly more intensive and complex human niche construction (Boivin et al. 2016).

The research network 'Domestication, Niche Construction and the Anthropocene' has been recently established at the UCL Institute of Archaeology with the aim of investigating how these and other examples of niche construction can illuminate important pathways for archaeological thinking as a whole. With the support of the UCL Centre for Research on the Dynamics of Civilisations (CREDOC), the group held the workshop 'Civilisation and construction of the Human Niche' in September 2016. Rather than playing up ruination processes (Stoler 2013), the workshop emphasised an understanding of Civilisation rooted in the early work of Marcel Mauss (2006), that is, one that emphasises how broader social networks transcend the permeable boundaries which theoretically define societies or ethnic groups (Barth 1989). Professor Kevin Laland (University of St Andrews) was invited to offer a keynote lecture on Niche Construction theory and his overview was followed by pointed discussion – led by Professor Stephen Shennan (UCL) – about the relevance, challenges, and misconceptions surrounding Niche Construction Theory in archaeology. A number of participants then provided presentations discussing Niche Construction Theory from the perspective of archaeological and anthropological evidence.

The papers included in this special section of *Archaeology International* are informed by some of the presentations offered at the workshop. Their common focus is on the construction of human niches and how the latter have affected different facets of human civilisation, broadly defined. We believe these contributions help to fill the gap that some ecologists (Ellis et al. 2016) have argued characterise archaeological applications of niche construction theory. They converge on intersecting topics that include inter- and intra-specific predator-prey relations, the construction and long-term reproduction of anthropic ecosystems as ecological inheritance, and the way institutional configurations appear from the perspective of niche construction theory. In this vein, Fuller & Stevens examine the evolution of parasitic species (weeds, mice) that prosper at the expense of domesticates and humans in contexts where cultivation and storage practices have developed. The authors argue that alongside human agents and target domesticates, the inception of the Neolithic agricultural niche and attendant storage solutions permitted the evolution of these uninvited 'parasitic domesticoids'. Arroyo-Kalin, in turn, shows how different forms of anthropogenic landscape transformations in Amazonia can be regarded as human-constructed niches that served as important ecological inheritance for subsequent inhabitants of the same locales. Juxtaposing this evidence with demographic proxy data for the late Holocene, his contribution explores how these altered environments may have served as substrates for productive intensification practices and helped modulate distinct trajectories of cultural diversification. Finally, Wengrow's contribution examines how human niche construction develops within the context of state formations. Wengrow argues that the *subak* system, which schedules rice paddy field irrigation through ritual practice in Balinese temples, should not be regarded exclusively as a form of agro-ecosystem management. He points out that in addition to preventing invasive predatory pests from fields, the *subak* system also plays a crucial role in warding off the extractive, parasitical, and predatory interests of the Balinese state – an interlocking niche where the pest is the king/government itself.

This collection of short papers underscores how a niche construction perspective

bridges the divide between ecological and anthropological thinking within archaeology: niche construction theory grasps something akin to emergent configurations (be they ecosystems or institutions) that are reproduced and affect societal trajectories (as ecological or institutional inheritance) over the long term. These configurations are multifaceted: they are borne out of exchange between multiple agents, they are reproduced through dynamics that defy simple equilibria, and they produce persistent effects that well exceed their original affectations – all of which are dimensions worthy of renewed attention in thinking about time-deep human history.

Competing Interests

The authors have no competing interests to declare.

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