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Abstract

The emerging Anthropocene concept contains two conceptual challenges: its developing narrative tends to present a teleological view of history as linear and deterministic, which is at odds with evidence of evolutionary and historical contingency; and the species category at its core sits uneasily with both the causal details of historical changes and the complexity of conceptualizing human–nature relations. We can learn from the ways similar challenges have been dealt with in the long debate over the origins of agriculture. A body of critical and empirical scholarship now conceptualizes agriculture in more dynamic, contingent terms, but has dealt less well with the second, more difficult, challenge. To realize the Anthropocene's potential to suggest restorative and less fatalistic approaches to the future, we need to work as hard on the concepts as on their constitutive empirical evidence.

Keywords

archaeology, capitalism, contingency, dualism, historical process, hunter-gatherer, more-than-human, origins of agriculture

Introduction

The emerging concept of the Anthropocene challenges us to think differently about many things. It challenges the ideal of economic growth that helped propel it, particularly its manifestation over the second half of the 20th century (Steffen et al., 2011: 862). If human impact on the Earth can be translated into human responsibility for the Earth, the concept may help stimulate appropriate societal responses and/or invoke appropriate planetary stewardship (DeFries et al., 2012; Ellis, 2011). Even so, while the concept has emerged out of palaeoecological, archaeological and historical perspectives on Earth systems, there is great uncertainty about the future, and how we can apply any lessons of the past, since 'Earth is currently operating in a no-analogue state' (Crutzen and Steffen, 2003: 253). The evidence of the Anthropocene requires us to rebuild its own conceptual

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scaffolding in order to imagine and enact the world differently (Sayre, 2012). This will be a long-term project.

In this paper I aim to contribute constructively to that project by addressing two connected challenges that hamper the potential of the Anthropocene, as concept, to help us think differently in the necessary ways:

(1) The emerging narrative tends to present human history in a linear, deterministic and teleological frame at odds with both scientific and social scientific understandings of evolutionary and historical contingency. This may be an inadvertent by-product of the geological conversation in which the concept is often discussed, rather than a deliberate strategy, but it needs to be addressed.
(2) The *anthropos* at the core is a slippery concept. On one hand the human is understood as an increasingly dominant force: 'our own species, has become so large and active that it now rivals some of the great forces of Nature' (Steffen et al., 2011: 43). On the other, 'the ancient dichotomy of humans and nature is now empirically false at the global scale' (Sayre, 2012: 63). Is the *anthropos* a separate and definable actor, or a variable force in an assemblage with others, or both? As others have recognized (Malm and Hornborg, 2014), we have conceptualized the Anthropocene with an undifferentiated human, again contrary to the abundant evidence of spatial and temporal differences in influences below the species level. Further, the Anthropocene is depicted as an outcome of human power, yet the assemblage thus created is characterized by surprise, uncertainty and lack of control (G Harris, 2007).

This paper identifies and discusses the insights that the Anthropocene debate might gain from the question of agricultural origins. Much recent Anthropocene debate is reminiscent of earlier discussions over the Neolithic Revolution. When and where did it start? What were the drivers, what were the responses and what are the reliable empirical indicators? In the last two decades such questions have been reframed in new approaches seeking to 'rethink the Neolithic' (Thomas, 1991) – famously as neither Neolithic nor Revolution (e.g. Gamble, in Bellwood et al., 2007). In an ongoing careful exercise, scholars take issue with the questions, examine the empirical evidence more carefully and pay attention to the embedded concepts. I am not arguing that the Anthropocene and the Neolithic are similar, or even equivalent, phases of human history. I am arguing that they both represent pivotal changes in the way we understand and conceptualize human relations with the non-human world. Each discourse has its own distinctive politics, requiring us to consider whose voice counts. There are things to be learned, therefore, if the incipient intellectual community around the Anthropocene reflects on how the transition to agriculture has been debated over recent decades.

The evolution of agriculture has been consistently understood as a threshold moment in human history. It has its own sweeping narrative arc. Agriculture significantly increased the availability of calories per unit of land and labour invested. The storage and trade of significant food surplus paved the way for a transition from hunter-gatherer society to sedentism, in turn providing the necessary population growth for cities and the emergence of civilization. Agriculture led to widespread transformation of the face of the Earth through the processes of land clearing and other ecological changes. Indeed, the early agricultural period is one candidate date for the onset of the Anthropocene (Ruddiman, 2003).

This story is often told in a linear and determinist way that seems to emphasize the inevitability and superiority of agriculture sweeping across human history. However, evidence from the archaeological record over the last several decades, summarized later in the paper, has documented enough

spatial and temporal variability in this process to challenge the coherence of the cultural and economic package glossed as 'agriculture'. I particularly draw attention to a set of more critical approaches which have engaged with the implications of this empirical evidence for the concept of agriculture, and its companion concepts (hunter-gatherers, sedentism, civilization, to name a few).

Several authors have argued that the emergence of the Anthropocene concept is also a moment of convergence between 'Earth System natural science and post-Cartesian social science' (Malm and Hornborg, 2014: 1; see also Lorimer, 2012; Oldfield et al., 2014). This convergence is characterized by: seeing outcomes as contingent, acknowledging the demise of nature as a realm separable from culture, emphasizing non-linear changes and uncertainties, and attending to the material basis of interspecies interactions including those within and between humans and others. The convergence thus provides a historical opportunity to challenge the modernist framing of humans as separate from and superior to nature, and of human history as a progress of continuous improvement. In order to make the most of this moment, it is necessary to forestall two attendant risks. The first is abandoning contingency to teleology and essentialism. And second, an Anthropocene that becomes too quickly reified as just another phase in human history will not only be historically inaccurate, but also have limited potential to mobilize the kinds of political action that its constituent evidence demands. It is more likely to lead to fatalistic responses. I argue that we should use the period when the Anthropocene concept is still emergent in the public consciousness, and informal as a geological epoch, to craft an articulation that is more consistent with contingent understandings of history and science, attuned to variability and (as it happens, in the process) generative of political possibility. Understanding causation and more importantly fixing problems requires differentiation along a number of lines instead of, or in addition to, the species level.

The structure of the rest of the paper proceeds as follows. In the following section I briefly review the Anthropocene narrative as expressed in some of its foundational documents, with particular attention to themes of teleology, determinism, dualisms and treatment of the human. Second I show how contingent approaches to the history of agriculture have creatively revised previous deterministic narratives of the early Holocene. I then draw out some 'lessons' from agricultural debates and also identify a set of ways the Anthropocene is new. Some of the lessons can be learned from concepts that remain intractable in archaeological debates over agricultural origins. New approaches to agricultural origins deal well with issues of contingency but less well, I will argue, with the nature/culture dualism and the question of the problematic human category (Head, 2007). Although it is widely argued that the Anthropocene proclaims the death of the Enlightenment human–nature dualism, the modernist vision of nature is in other ways remarkably persistent, for good reasons (Castree, 2014). Anthropocene science scholarship can benefit from greater engagement with critical social sciences scholarship on these questions.

As a caveat, note that I am not primarily concerned here with whether the Anthropocene is named as a geological epoch, nor whether an early (8000 BP), middle (1800 CE) or late (1950 CE) timing is chosen. But, as my argument will show, I am interested in how the debate over when and where the Anthropocene started provides clues to bigger issues and embedded assumptions.

The Anthropocene narrative

To the question, 'what characterizes the Anthropocene?', Zalasiewicz et al. (2011a: 836) start their answer in the deep time of human prehistory:

> The use of tools was once thought to distinguish humans from all other animals, and among the earliest people who lived at 2Ma in Africa were *Homo habilis*, the 'handy man'. From that time, people have been

> modifying the Earth. For much of that human story, these changes were achieved by muscle and sinew, supplemented first by primitive tools, largely for hunting, and later by fire. Traces of humans in the Pleistocene rock record are rare, and stay rare until the Holocene.

For the *anthropos* to hold at a species level, it has to encompass all of the relevant time and space of *Homo sapiens*. This it demonstrably does not do – despite widespread recognition of human influences on fire and fauna in the Pleistocene, there is not a serious suggestion that the Anthropocene is a Late Pleistocene phenomenon (although note Foley et al.'s (2013) argument for a Palaeoanthropocene). Nevertheless. Zalasiewicz et al. in the quote above hark back even further, and to a genus level.

As Malm and Hornborg (2014) have shown, the long evolutionary path is a common trope in the standard Anthropocene narrative. A key component is the manipulation of fire. Even for the most common Anthropocene chronology, attached to James Watt's 18th-century mobilization of the steam engine, the evolutionary precursor of fire is framed as the ultimate cause because the transition to fossil fuels in the Industrial Revolution needs to be

> deduced from human nature. If the dynamics were of a more contingent character, the narrative of an entire species – the *anthropos* as such – ascending to biospheric supremacy would be difficult to uphold: 'the geology of mankind' must have its roots in the properties of that being. (Malm and Hornborg, 2014: 2)

This essentialist view of the human as a fossil-fuel wielding species is for Malm and Hornborg impossible to reconcile with the huge historical and contemporary differentials in access to such resources. Indeed, they argue,

> uneven distribution is a condition for *the very existence* of modern, fossil-fuel technology … The affluence of high-tech modernity cannot possibly be universalized – become an asset of the species – because it is predicated on a global division of labour that is geared precisely to abysmal price and wage differences between populations. (Malm and Hornborg, 2014: 3)

In other words the species is a category mistake in conceptualization of the Anthropocene, and a recipe for political paralysis. Other differentiations that similarly draw attention to more particular social and political drivers include the Capitalocene (Huber, 2008; Malm, 2013; Moore, 2013) and the Econocene (Norgaard, 2013).

Consider the *cene* as well as the anthropos. In the narratives referred to above, the Anthropocene origin is located not only with a human ancestor, but also very deep in time. I agree with Malm and Hornborg that this is more by default than design. The linear view of history and prehistory is inadvertently embedded within the dominant modes of visual representation – timelines and stratigraphic diagrams (Head, 2000). But the result is a teleological view of human history in which the (negative) outcome is inevitable, a visual trajectory further reinforced by the many exponential curves that characterize the Anthropocene (e.g. Steffen et al., 2011: Figure 1).

Many if not most of these foundational documents contain within them the evidence of spatial and temporal variability, for example, in the first articulation of the 'Anthropocene' (Crutzen and Stoermer, 2000), and in the aforementioned exponential curves. Even Ruddiman (2013) – in the process of proposing an agricultural package, and an early Anthropocene – demonstrates how spatially and temporally variable it was. Zalasiewicz et al. (2011b) discuss many variables as a way of working out whether there is a single stratigraphic boundary. But as Sayre (2012: 66) argues, it is precisely this variability that makes the anthropogenic 'too abstract a category'.

Contesting teleology and linear ideas of progress is especially important given that much of the opposition to climate change science, and much of the difficulty people have grasping the complexity of change, stems from public discourses in which humans are understood as separate from the rest of nature, sometimes with status over and above the rest of nature. Further, we have built teleological ideas of destiny and progress into the many national narratives that drive economic growth (Jackson, 2009). Issues of linear time, determinism and dualisms are entwined in complex ways, as are non-linearity, contingency, emergence and relationality (G Harris, 2007).

The evidence of humans and their processes being embedded into Earth systems at all scales is widely understood to represent 'a very public challenge to the modern understanding of Nature as a pure, singular and stable domain' (Lorimer, 2012: 593), separable and separated from humanity (Oldfield et al., 2014). Despite the claims, it seems that such a view of Nature is only half dead since, as Proctor (2013: 90) argues, Nature survives in most invocations of the Anthropocene: 'It appears typical, when confronted with the complexities that are the Anthropocene, to sharpen the conceptual boundary separating these domains [nature and culture] so as to render this complexity understandable'. Robbins and Moore (2012) go so far as to name the scientific anxiety involved as a disorder. The notion of socio-ecological systems, in which the two separate domains are now mixed, is another example of reinforcing rather than rethinking the dualism (Head, 2012). It is not surprising that the human–nature dualism is so deeply embedded in the narrative, given its deep historical roots in Western thought (Glacken, 1967; Sayre, 2012), embedding of the associated concept of nature in contemporary life (Castree, 2014), and the fact that industrial capitalism is itself partly constitutive of both the dualisms that we now wrestle with and the Anthropocene itself (Malm and Hornborg, 2014; Sayre, 2012).

There are insights to be gained here from the collection of social sciences approaches referred to as post-humanist. These contest persistent human exceptionalism by tracing

> the materialities of interspecies interaction – including genetic, microbial, haptic, digestive and ecological connections – to demonstrate the ontological impossibility of extracting a human body, let alone intentional mind, from the messy relations of the world. (Lorimer, 2012: 585, in Haraway, 2008)

As Gibson and I (Head and Gibson, 2012) have argued at greater length, there are both opportunities and challenges here. There is a major and ongoing challenge in elaborating human and non-human continuities and differences (part of which, following Lulka (2009) is to resist homogenizing the non-human). As scholars we need to be eternally vigilant in applying the analytical impulse to questions of human difference and power, and the ways they are conceptualized in climate change debates. Plumwood's (1993) analysis of the deep structures of mastery buried in our intellectual frameworks is still apposite, and her theory of mutuality, which acknowledges both continuity and (non-hierarchical) difference between humans and non-humans, continues to be helpful here. And of course it is in some ways an inescapable dilemma; 'Our life condition appears to be "both/and" rather than "either/or", obliging us to use the contradictory ideas of nature as "external" and "universal" when discussing ourselves' (Castree, 2014: 29). A key point is that these debates and tensions are a fundamental aspect of how and whether we conceptualize the Anthropocene, not concerns to be sidelined as a simple definitional footnote.

Rethinking the origins of agriculture

Archaeologists have been debating the origins of agriculture for a long time, with a fundamental rethink of the Neolithic Revolution, and its Near East centre of origin, in the last few decades (Thomas, 1991). Evidence increasingly showed that the various parts of the Neolithic 'package'

did not all occur together, nor necessarily always in the same order. Sedentism sometimes preceded, sometimes followed agriculture. These debates are relevant to the Anthropocene, not so much as part of defining the latter's temporal boundaries, as per Ruddiman, but rather because of the assumptions embedded in the conceptualization of any period of human history. Nor am I concerned here with the specifics of the (considerable) methodological or empirical disagreements in those debates, except insofar as they throw broader interpretive questions into relief. For examples of the broad range of views on both concept and method, see Bellwood et al. (2007).

Phases of pre/history

A central consideration is the concept of phases or periods of history, whether in deep archaeological or more recent historical time. Are these – including the Anthropocene – understood as a convenient shorthand for capturing big picture, long-term change, or do they impose boundaries so strong that they delimit not only time but also our thinking? Gamble et al. (2005), for example, critiqued 'agricultural thinking' because of its in-built assumptions about origins, history and the processes of change.

As the discussion below will show, our understandings of historical 'stages' and phases are themselves influenced by historical processes, and defined contingently in relation to one another. Depending how they are thought about, historical phases can replace one another, transition from one to another (Biermann, 2014), be mutually embedded or just generally be messy. There are many different examples in current debates. For example as Ruddiman (2013) argues, his early Anthropocene model has the additional awkward characteristic of swallowing most of the Holocene. And industrial capitalism is in large part an agricultural enterprise; like the anthropos, agriculture may be too big a category to have much explanatory traction.

Let us focus then on debates about how agriculture came to be a dominant mode of life across much of the planet in the early to mid Holocene. In particular I highlight those aspects of contingent and non-linear approaches (Terrell et al., 2003) – and their critique of grand syntheses and metanarratives – that will assist thinking about the conceptualization of the Anthropocene. Evidence has long shown agriculture to be a contingent emergence in a number of different ways (Davidson, 1989). The literature is much bigger than I can deal with here and this is not a comprehensive review. Such understandings have come not only from rethinking the agricultural part of the equation, but also unravelling the monolithic concept of the 'precursor' hunter-gatherer phases. In the Australian context, for example, both Pleistocene and Holocene archaeological evidence suggest a 'past comprising a mosaic of independent cultural trajectories based on continuous adjustments' (Ulm, 2013: 189) to local physical and social conditions (Hiscock, 2008).

Many agricultural practices existed in so-called hunter-gatherer societies

This example draws attention to the fact that boundaries between historical periods may be more complicated than often recognized. Expanding ethnographic and ethnohistoric research into hunter-gatherer lifeways in the second half of the 20th century revealed many examples of practices previously associated only with agriculture, gardens and cultivation. Australian Aboriginal examples include the encouragement of fruit seed germination on the edge of campsites (Jones, 1975: 24), both extensive and small-scale sites of yam cultivation (Hallam, 1989), and many descriptions of tilling the soil to enhance the flourishing of tuberous food sources (Gott, 1982). A series of influential papers examined subsistence strategies across the boundary zone of Torres Strait, using it as a transect between the hunter-gatherer groups of northern Australia and

the agriculturalists of New Guinea (Harris, 1977). Harris expressed this spatial variability as a continuum of human–plant relations (D Harris, 1989, 2007), whereby domesticated species could be important to a greater or lesser extent.

Conversely, stone technologies previously understood to be Neolithic, such as grinding stones, occur both much earlier in time than agriculture, and persist in places where agriculture never appeared (Fullagar, 2006; Fullagar and Field, 1997; Van Peer et al., 2003).

Empirical evidence of hunter-gatherer cultivation processes was often ignored or rendered invisible in the complex process of colonization

This example draws attention to the fact that boundary-making is itself a political process. Influential 18th and 19th century conceptualizations of agriculture arose in the specific historical context of colonialism. The taking of lands was partly justified to the colonizers by framing colonized peoples as those who lacked purchase on the land (Head, 2000). Both Knobloch (1996) and Anderson (1997) point to the ways that 'hunter-gatherer' and 'agriculturalist' were raced and gendered ideas from the beginning. Invisibility of planting and soil practices was partly to do with their gendered nature; the descriptions are overwhelmingly of women's work (Gott, 1982, 1983). In a number of New World contexts, the agricultural metaphor was central to the colonizing culture's vision of itself and its civilizing presence. 'Improvement' of the land was related to the transforming hand of civilized man in the form of land clearing, followed by the plough, the herd and the fence. A process of conceptual dispossession attended the physical dispossession (Anderson, 2003; Head, 2000). Indeed the agricultural package is so variable that it 'is unlikely to have hung together as a concept without the central notion of separating humans/culture/civilization out from nature' (Saltzman et al., 2011: 56). The politics of the Anthropocene are very different in their specifics, but it is important that we are alert to the fact that they exist (Malm and Hornborg, 2014).

Archaeological evidence shows that agriculture emerged differently in different spaces and times

Processes that may or may not coalesce into global patterns start as locally variable ones. Agriculture emerged independently, in different configurations, in different parts of the world. Evidence from yams, taros and bananas, for example (Denham, 2007a, 2007b; Vrydaghs and Denham, 2007), challenged the dominant Near Eastern 'cereal-centric' models. Jones and Brown (2007) show in detail how the morphological changes to plants and animals, and the set of practices documented from the Near East, have come to dominate thinking about the origins of agriculture, arguing that that area has defined the tests for both empirical evidence and the frameworks for thinking about subsistence and food production. For example, the specific morphological changes seen in domesticated plants, particularly gigantism and dehiscence (the spontaneous opening at maturity of a plant structure, such as a fruit, anther or sporangium, to release its contents) in wheat and other cereals, characterize expectations of how domesticated plants could be visibly (and genetically) distinct and different to their wild counterparts. The focus on Eurasian cereal agriculture, which includes the story of the domestication of wheat, is argued to fetishize the significance of morphological changes, at the risk of ignoring or underplaying more significant social and ecological change (Denham, 2007a; Denham and White, 2007; Vrydaghs and Denham, 2007). More nuanced and varied conceptualizations of domestication, as a social and cultural process of relations rather than simply a rearrangement of genes (Barton and Denham, 2011; Denham, 2007a, 2007b; Hodder,

2007; Terrell et al., 2003; Zeder et al., 2006) have been advanced. Plants that reproduce vegetatively can be just as significant as cereals, albeit less materially transformed[1] and hence less archaeologically visible, partners in the socio-ecological processes that Barton and Denham (2011) call 'vegecultures'.

Further, morphological change is an 'artificial' moment in time – a point only along the line of evolving relationships, in this example between the humans and plants. Some relationships might be quick and dramatic; others slow and evolving; some intense or indeed with little commitment from either human or plant partner (Zeder, 2006). Denham et al. (2009) conceptualized human–plant relations over archaeological timescales as constituted by 'bundles of practices', reminding us that close empirical attention to variation in space and time reveals very different patterns to the imposition of pre-constituted categories.

The history of agriculture (and its mirror concept hunting/gathering) bears all the hallmarks of De Landa's (1997) non-linear history, in which humanity 'liquifies' and 'solidifies' in different forms:

> if the different 'stages' of human history were indeed brought about by phase transitions, then they are not 'stages' at all – that is, progressive developmental steps, each better than the previous one, and indeed leaving the previous one behind. On the contrary, much as water's solid, liquid, and gas phases may coexist, so each new human phase simply added itself to the other ones, coexisting and interacting with them without leaving them in the past … at each bifurcation alternative stable states were possible, and once actualized, they coexisted and interacted with one another. (De Landa, 1997: 15–16)

This applies not only to the variable onset of agriculture but also to its later manifestations. For example, Roberts et al. (2011) argue that major transitions within the agricultural Holocene were complex, contingent and non-deterministic.

Conceptual critique of the concept of agriculture

While the archaeological examples above show the complex and appropriate interplay between empirical evidence and conceptual framing, it is useful to draw attention to critiques from outside archaeology that also have implications for understandings of long-term change. Conceptual critiques of the hunter-gatherer/agricultural dichotomy came from anthropology, with Ingold's (2000) articulation of 'dwelling', and from geography with Anderson's (1997) critique of animal domestication. Building on examples of how 'others' conceive of their relationship with plants, Ingold reconceptualized human–non-human relations as being the 'relative scope of human involvement in establishing the conditions for growth' (Ingold, 2000: 86), without making distinctions between the natural and social worlds. Anderson synthesized an 'appeal' to relax rigid oppositions and reframe 'and re-imagine more animal-inclusive models of social relations' (Anderson, 1997: 463). She argued that the 'underpinning moralities and contradictory manifest forms' of domestication are open to 'rupture and reversal' (Anderson, 1997: 481). Scholars across a range of social science and humanities disciplines have taken up this challenge, producing new accounts of human–animal relations in which the boundaries previously drawn are not so distinct, and in which the human cannot be privileged in quite the same way (see, for example, Cassidy and Mullin, 2007). Implications are being explored in a number of areas of natural resource management and biodiversity conservation, in conversation with the ecological sciences (Hobbs et al., 2013; Lorimer, 2012; Ogden et al., 2013; Robbins and Moore, 2012).

Lessons for the Anthropocene

So, what can we learn from all this for thinking about the Anthropocene? I wish to draw here on approaches in both the natural and social sciences that seek contingent, relational, materialist approaches to the relations between human and non-human worlds. These approaches are neither essentialist nor teleological, they are attuned to heterarchical rather than hierarchical difference and they also attend to power. I see three particular implications from the agricultural discussion.

(1) It is a *long-term scholarly enterprise* to classify periods of history in this way, to rework them, to debate their meaning and boundaries. It is not a simple question of definition, to be skipped over to get to core business. We need to be prepared to analyse the process (using appropriate disciplinary tools) rather than impose categories from above, or assume that the question of the Anthropocene is only a geological question. In the process we must be alert to the concepts even as they are becoming embedded, and be conscious of the cultural specificity of the discourse, as well as the cultural specificity of the changes being analysed. As Robin argues in a different context (2013: 332), 'Anthropocene origin stories follow the deep wheel ruts of northern hemisphere history'. There are of course differences between critique of the Neolithic concept and the pace and scale of scholarship around the Anthropocene. The latter has a virtually global multidisciplinary reach and it has been framed in a particular way by the physical sciences.

(2) It is important to be alert to *spatial and temporal variability*, and what it means for phases of history. The process by and rates at which both agriculture and the Anthropocene became global in scale are clearly matters for ongoing empirical analysis. The point is that detailed analysis of such change is important for understanding causal processes, in disentangling drivers and effects, and imagining how and where to intervene. For example Steffen et al.'s (2011) demonstration that the post-1950 Great Acceleration 'was disproportionately driven by consumption patterns in the Global North, *even* in the context of increased population growth throughout the rest of the world' (Ogden et al., 2013: 342) invites interventions around consumption rather than population per se. It is particular groups of humans doing particular things that generate particular historical processes, in assemblage or constellation (Ogden et al., 2013) with many non-human others, whether we are talking about Pleistocene fire and megafaunal hunting, methane emissions from rice agriculture in China, Watt's steam engine and the parallel engines of industrialization and colonization, or the post-Second World War great acceleration.

(3) We need to be careful with *the category human.* This is really a lesson from what the agricultural origins debate has never quite done, and there is considerable scope to draw the post-humanist social sciences into further conversation with the natural sciences. But it is also the case that this challenge is the most difficult one. It is no accident that related origin stories and conceptualizations of human–nature relations have emerged as part of two key constituent phases of the Anthropocene, agriculture and industrial capitalism. 'The demise of the human–nature dualism and the tenacious hold it nonetheless maintains are both strongly linked to industrial capitalism' (Sayre, 2012: 58), in that ideals of pristine nature somewhere else were strengthened during the brutal urban expressions of the Industrial Revolution. Similar arguments have often been made about colonialism, with the noble savage standing in and for nature (Anderson, 1997, 2003). If the Anthropocene is to fulfil its promise to do things differently, a lot of conceptual labour will be needed.

Let me be clear – this is not an argument to get rid of the concept of the human, but to consider more carefully differentiations of concept and practice both within this category, and between it and others. We have to think differently about how human and other life and materials are mutually embedded, while at the same time accounting for clear evidence of different power relations within such assemblages (Head and Gibson, 2012). Archaeological investigations into the constitution of modern human behaviour are also relevant here. Evidence indicates that there is no set package of human traits, and they are not patterned in predictable ways; if anything 'flexibility' is the characteristic of modern humans (Balme et al., 2009; Davidson, 2013).

Conclusions: Generating political possibility

This paper has sought to address two significant conceptual challenges in the way the Anthropocene is emerging. First, that linear, deterministic and teleological conceptualizations will prevail over the empirical evidence of historical contingency, and second that an unexamined *anthropos* is too large and slippery a concept to be at the heart. The paper has drawn on debates over the origins of agriculture to show how similar challenges have been grappled with over more than two decades. Discussions of agricultural prehistory have dealt well with the first challenge, a variety of alternative conceptualizations emerging that more realistically accommodate spatial and temporal variability, and resist the imposition of totalizing labels. To my mind the same debates have dealt less well with the second challenge, perhaps partly because the *anthropos* remains a key constitutive concept of both archaeology and anthropology. Preparedness to rethink the human has been rather more evident in geography (e.g. Lorimer, 2012), a discipline which has always had to address human–nature relations.

The Anthropocene also poses new and different challenges. We are living in it as we work on it. We necessarily have to work all this out as we go along, only partially with hindsight. We are discussing a category, built out of a body of evidence, that demands that we also engineer political, social and economic change. As it happens, a contingent, messy, non-linear view will likely serve us better politically, given the failure so far of large governance categories such as nation states and intergovernmental agreements to curb emissions.

The Anthropocene concept already has a number of different lives, not all of which scholars will control, but all of which should be monitored. We do not yet know whether Anthropocene will become a culturally embedded key word (like nature) rather than an ephemeral buzzword (like post-modernism). Castree (2014: 9) draws on Williams' (1976) argument that keywords have three characteristics; they are ordinary, enduring and have social force. This outcome will not be in scholarly control, but we need to be alert to and participative in the process. Cultural studies scholars and others who focus on text and discourse will make very important contributions.

Finally, consider the implications of my argument in the context of the future orientation of this journal (Oldfield et al., 2014). As scholars we are in and of this history, and need to attend to the processes of category and thought construction just as much as the historical evidence of concern. A more contingent understanding of the Anthropocene is not only more historically accurate, it also provides more realistic and less fatalistic pathways to the future. If we are assuming humans will be part of the future, how can we articulate and enact the necessary creative human interventions – the creative destruction of dismantling the fossil-fuel economy, and a variety of restoration and repair activities? It may be out of the practice of these interventions that new concepts of the *anthropos* emerge.

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Note

1. That is, unless and until new techniques (e.g. genetics and residue analysis) tell us more about the specifics of hunter-gatherer interaction with and transformation of species.

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