

Process Archaeology

EDITORIAL for WA

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I.

Here we sketch out the main provocations of process archaeology, drawing on the original postulates developed by Gosden and Malafouris in a ‘Debates’ issue of *World Archaeology* (2015). Process archaeology asks: what does it mean and what does it take to see process as the fundamental quality of existence? Furthermore, how does the primacy of becoming change our perception of the archaeological record and the meaning of archaeological practice?

Our main inspiration is the later philosophy of Alfred North Whitehead, whose work and concepts we adapt and redefine from an archaeological and anthropological perspective. We are also influenced from other process philosophers like H. L. Bergson, C. S. Peirce, and pragmatist J. Dewey, who also argue for the primacy of becoming over being. We highlight some of the major commitments, consequences and possibilities that process archaeology entails. Above all, we raise the question of basic method and propose some key areas of archaeological research that could offer fertile ground for such considerations.

Process archaeology invites us to think differently about *change* by fundamentally altering its meaning into *continuous change*, i.e., *becoming*. Process archaeology carries a commitment to focus on the ‘how’ of becoming or, to borrow Whitehead’s original credo, ‘*how* an actual

entity *becomes* constitutes *what* that actual entity *is*' (Whitehead, 1978: 23; emphasis in original). This is no doubt a difficult task. It is one thing to argue for the value and need to avoid essentialism by prioritizing becoming over being; it is indeed another to actually practice an archaeology of becoming. Taking seriously the notion of 'process' has some strong commitments and radical implications about the nature of change and the relation of mind and matter that will take us beyond simple conceptions of the past, present and future.

We cannot conceive of anything that is not in motion. From the moment of the Big Bang which started the expansion of the universe to the hyper-mobile world of the smallest of sub-atomic particles all aspects of reality, big and small, are moving. When something appears static this is an illusion produced by a particularity of timescale – tectonic plates are moving, even though we cannot perceive that motion. The contrast between things that are in motion and things at rest cannot be made. Furthermore, entities do not exist first and then are put into motion. It is inherent in the nature of the universe that it is expanding. Sub-atomic particles may be conceived as either waves or particles, but in either case they are defined by mobility. Any living thing is somewhere on its path to death. Furthermore, in moving and changing things do not stay discrete and separate, they combine and recombine, sometimes to separate again, like metals being alloyed and then recycled, changing their ontological status in the process. There is no being that is not becoming.

The longest-term history of humans, stretching perhaps over seven million years, sees a series of species shifting bodily shape and technical and cultural capabilities as part of dynamic earth processes, with constantly changing climate, ecology and social dynamics. A crucial element in all becoming can be glossed variously as cognition, understanding, knowledge or sentience. For Whitehead the whole universe was sentient, so that any coming together of entities, be they living or not, was the meeting and combination of forms of sentience. Like Whitehead we are trying to physicalize sentience or cognition, so that in living things understanding arises in the body through its dynamic interchanges with its material surroundings. The mind is no abstract space, but is radically distributed across the universe to manifest itself variously through materials, perhaps unfolding in various timescales from the effervescent sentience of quarks or protons to the slow, weighty influence of gravity on planetary bodies, but also on time itself.

To engage with Whitehead is exciting and disconcerting. An older archaeology of periods and types becomes unsustainable: we become interested in shape-shifting and complex forms

of temporality. The process approach allows us new ways of thinking through time in archaeology, overcoming the traditional opposition between time as a linear historical sequence and time as overlapping co-presents and embracing temporal multiplicity (**Harris**, this volume;; Lucas 2021; Bradley 2020; Bailey 2007; Gosden1994; Ingold 1993; Olivier 2004; 2015). Looking at the empirical detail supplied by archaeology on long-term history makes it much less possible to sustain a notion of direction to history, much less one of progress. The old progressive view structured around the cognitive, agricultural, urban and industrial revolutions no longer works. Rather we can see that things come together in various ways, with unpredictable causes and consequences. A less directional view of history beckons, with Whitehead's notions of concrescence and actual entities potentially helpful. What precisely are we digging up when we dig up the past? The philosopher **Shaun Gallagher** (this volume) blending an enactive analysis with process philosophy suggests that we should think of archaeology as digging up 'concretions', that is, dynamical processes never reducible to a determinate 'concretum'.

The other question with Whitehead is – what did he mean? As no one has ever been quite sure, books like *Process and Reality* ([1929] 1978) present us with ideas to wrestle with and try to make our own, without supplying any easy answers, or indeed any real answers at all. Whitehead does cause us to confront the big issues of time, space, causality and sentience. We, and the other authors in this issue, travel with Whitehead without any notion of a final destination, but rather in the hope that we can take the rather static structures we once had and, by putting them in motion, see humans and the universe in which we live in a more lively, engaged and sentient light.

II.



FIGURE 1: *Kavoula* (καβούλα) from Sifnos.

Process is expressed in many ways and modes of becoming. We begin with a ball of clay: ‘kavoula’ (καβούλα) as it is called in the island of Sifnos (Greece) where this picture was taken (FIGURE 1). We choose this example for two reasons. First, it allows us, right from the start, to join forces with matter. Joining forces with matter increases our chances to grasp the meaning of temporality which is essential for making sense of process. Second, *kavoula* captures, in its own unique ways, what Alfred North Whitehead would call an ‘actual occasion’ i.e., the being of becoming. That is, *kavoula*, seen here as an occurrence of clay on its way to find form and become an enduring ceramic object, affords a concrete standpoint to begin thinking about the primacy of process. What sort of ‘occasion’ is that? How should we describe its mode of existence? How do we account for its transformation and affordances (we shall be using this term in the ecological Gibsonian sense (1977, 1979) of interactive relational possibilities)? Simply raising these questions will help us understand the main issues we seek to articulate by means of process archaeology. Below we will see why this is so. First it is important to note that these questions are observer-dependent. This takes us to the question of how understanding is generated through unfolding actions with and on matter.

We distinguish here between observers of two general kinds: concerned and unconcerned. From a process-perspective there is no such a thing as a detached observer. All observation is situated and, thus, attached to bodies and things alike. If objectivity is a matter of detachment

then objectivity is an illusion. Attachment, however, does not mean subjectivity either. Concerned observation is not a form of phenomenal first person perspective. The notion of ‘concern’ refers specifically to a participatory mode of observation where the world becomes part of the observed, just as the observed is part of the world. Concern denotes a commitment (thus, attachment) to an attentive mode of engagement with the world.

To use the example of *kavoula*, it is the participatory and attentive fusion with clay that effectively renders concerned observation possible. What differentiates ‘concerned’ from ‘unconcerned’ observers is not their respective placement within an epistemic community of practice (science or craft) but their willingness, and ability to overcome the distinction between a knowing subject and an object of knowledge, or else, what Whitehead calls the ‘bifurcation of nature’ ([1920]2004; [1929] 1978). A concerned observer is one that participates knowingly and willingly in the temporality of things. Clay, returning to our example, goes through a series of radical transformations that are usually perceived (unconcerned observation) as a succession of discrete instants, moving *from* a source *to* an end. However, concerned observation, based on attentive material engagement with clay has the power to disrupt this ‘common-sense’ ‘directional’ understanding of the flow of time as a succession of instants. For the concerned observer the time of clay is non-directional and non-chronological, what Bergson ([1911] 1998; [1922] 1965) would call *duration (la durée)*. *Kavoula* will help us to illustrate the major differences. What is this ball of clay ‘actually’ made of? What does it do?

Let us begin with the obvious: *kavoula* is essentially a malleable paste of clay that rests on the wheel’s hard metal surface. For the unconcerned observer, the ball of clay is a fixed and definite configuration of matter: a self-contained material entity with specific qualities (such as shape, mass, colour, etc.). Concerned observers, however, would have a different feel for the various processes (natural and technical) entangled with and captured in this situated material creature. For instance, both observers (concerned and unconcerned) will recognise that *kavoula* is malleable. Clay is well-known for its plasticity and motion capture capabilities. As material, it is both responsive and resistant, which makes for a good creative ecology. However, only the concerned observer will be able to see that clay turns kinetic energy into memory and creative labour. For the unconcerned observer, clay passively receives form through the agency of the potter’s hand. For the concerned observer, *kavoula* actively anticipates form, guides the hand and even enacts the potter’s imagination

(Malafouris 2008a; 2014; 2020; Koukouti and Malafouris 2020). Touching it, the hand is drawn into this creative dialogue.

Kavoula puts both clay and the hand into the service of creativity. Movement becomes creative gesture; manual labour becomes skill. For the unconcerned observer the *kavoula* is objectively accessible but meaningless: an agglomeration of inert matter. For the concerned observer, *kavoula* is already in motion: both moving and being moved. For the unconcerned observer *kavoula* is a thing-in-itself. For the concerned observer, *kavoula* is a thing-in-the-world, a flowing relational creature *about to become*. It is affecting and being affected both by the potter's intention, perception and action, and by the climatic conditions and environmental forces that shaped the affordances (i.e., interactive possibilities) of clay. The unconcerned observer will account for *kavoula*'s capacities in terms of porosity and plasticity. Concerned observers would prefer memory. *Kavoula*'s past is remembered in its current positioning and will be actualised through further acts of remembering. This form of material memory or consciousness also helps us to explain how the potter's body remembers its skills (Malafouris and Koukouti 2018). For the unconcerned observer *kavoula* signifies the beginning: the amorphous stuff from which form will originate following the commands of the potter. For the concerned observer this ball of clay is both a beginning and an end: the product of a long process of transformation. Clay had to be locally extracted, tempered and carefully prepared before its placement on the wheel. *Kavoula* is also the start of a new creation: a redistribution of creative labour. Its current placing on the wheel is simply an instance (resting point) in a current of movement (both synchronic and diachronic) wherein forms are generated. *Kavoula* objectifies one of these transformational events in this creative morphogenetic process. *Kavoula* finds its meaning in temporality.

Imagine that *kavoula* is all there is. If our perception of the degree of change or stability is a matter of concern, rather than of objective measure, how do we get to choose what to see as the fundamental condition of reality? This problem comes into sharpest focus if we keep in mind that *kavoula* as a manifold, variable and transitory thing does not fully exist, *it is* and *it is not*. All questions in the field of process archaeology resolve themselves into this antinomy or multiplicity of *being* and *becoming*. If we choose stability as the primary condition then change must be an appearance. Understanding the underlying undifferentiated and unchangeable essence of things is all that matters. If change is the primary condition, stability is the illusion and understanding the becoming of things (their differentiation or occurrence) is what really matters. Nostradamus said that the more things change, the more they stay the

same. Whitehead, by contrast, subjects ideas of constancy and change to critique, seeing them not as contrasts or opposites, but in some sense sameness and becoming are entailed in each other.

III.

Western metaphysics started with the process ontology of the pre-Socratic tradition, where flux was a crucial quality, but came to show a dominant preference for the static view of reality known as ‘substance metaphysics’. Archaeology was built on substance metaphysics. This deeply entrenched tendency to analyse the world in terms of essences and static categories persists. Even though we constantly critique essential categories, they still haunt archaeological and anthropological thinking: nature and culture, mind and matter, society and individual, subject and object. Whitehead calls out ‘the fallacy of misplaced concreteness’: ‘neglecting the degree of abstraction involved when an actual entity is considered merely so far as it exemplifies certain categories of thought’ (Whitehead, 1929, 11). Of course, sometimes abstractions are bound to the phenomenon they express (think for instance of the experience of weight and the concept of weight). However, it is also the case that abstractions can also be nothing but abstractions, that is, they are words we devise to capture or represent what otherwise remains elusive. If we take such abstractions to be real, they can overwhelm our sense of what the world is and how it changes.

Process philosophy exposes the problems of abstract categories by inventing a new processual language for thinking about change. Whitehead and others have tried to develop a new vocabulary undermining essentialized categories, bringing with it a radical re-conceptualisation of nature-experience. Fortunately, archaeology has a unique advantage here: the processual nature of the archaeological record. From human origins, to the formation, deposition, erosion and degradation of soil, to the reduction sequences of stone tools, to the emergence of agriculture, the processual character of existence has been a defining feature of archaeological reality. Archaeological research makes little sense outside of a processual framework of change and evolution. Change is inherent in the phenomena archaeologists observe. Yet, despite this genuine archaeological feel for process, not to mention a long controversial tradition of processual and post-processual thinking, a general philosophy of ‘process’ that could unify archaeological theory and practice is still lacking (Gosden and Malafouris 2015; Malafouris and Gosden 2020). Archaeological thought never committed fully to the ontological priority of ‘process’. Notwithstanding some noticeable

attempts to problematize their meaning (Fowler 2013; Hamilakis 2013; Hamilakis and Jones 2017; Harris 2017; Hodder 2012; Knappett 2011; 2016; Coupaye 2018; Conneller 2011; Lucas 2021; Olivier 2004; Olsen et al., 2012; Webmoor and Witmore 2008; Govier 2019; Gosden 2005, 2008), the notions of ‘process’ and ‘becoming’ are often taken for granted. Unfortunately and ironically, in their common sense use they often come to denote the opposite of what they mean to articulate in the context of process ontology, further impeding our understanding (see for instance Malafouris discussion of human becoming this volume).

So how do we put the ‘process’ into ‘process archaeology’? Process archaeology argues for the primacy of becoming over being. There is no underlying primary substance or essence (biological, mental or physical) that endures (as the unchanging subject of change); there are only ‘processes’, that is, dynamic relationships among Whiteheadian occurrences. What does this mean? Process ontology reveals its true significance only when that which previously appeared to be static and inert suddenly becomes alive, dependent, and situated, such as in our running example of the *kavoula*. Our closed categories and purified abstractions are temporarily suspended or lose their power over us, the moment we touch a sherd, follow the trace of a line, feel the edge of cutting tool or the smoothed surface of a burnished pot. They lose significance not because they suddenly disappear but because during those moments of material engagement we come up against our abstract concepts, put at risk by bodily engagement with the material. Here it is possible that Whitehead’s major concepts, such as *actual entities*, *concrecence*, *prehension*, *experience*, *superject* and *bifurcation*, are helpful. We also need to think with Whitehead what are the appropriate questions, scales and units of analysis for the archaeological study of becoming? We take Whitehead’s words first.

IV.

Perhaps Whitehead was an archaeologist and not a philosopher. What different questions might he then have asked, and what examples might he be using to express the becoming of ‘actual occasions’ or the being of becoming? We can only guess. We suggest that *kavoula*, the lump of clay in a Greek potter’s workshop. would be a good candidate for the job.

Kavoula provides a window into Whitehead’s concept of an ‘actual occasion’ and how this helps us see the varieties of consciousness and temporality that emerge once we abandon the knower/known distinction. What Whitehead describes as ‘actual occasions’, also termed ‘actual entities’, are not what we call objects in everyday life. Actual entities turn into objects

when they perish, when they stop becoming (see also Gallagher this volume). Most often objects are the beginning for new actual occasions: becoming never ends. Instead ‘actual entities’ are gatherings (cf. Heidegger), or to use Whitehead’s lexicon ‘concrecence’ of other parts. Actual entities gather the processes of material formation out of which objects are made. Actual entities are always parts of a complex material ecology. *Kavoula* exemplifies this coming together of heterogeneous material forces (organic and nonorganic) and is an actuality so far as the processes of selecting, sourcing, handling, tempering and kneading clay are concerned. It is a potentiality so far as the throwing, shaping, smoothing, burnishing, drying, firing and glazing of the final form is concerned. Each activity unfolds on multiple timescales within a nested hierarchy of temporal ranges. When *kavoula* becomes a pot, it will generate its own gatherings, starting a new actual occasion. To use another key term of Whitehead’s lexicon, *kavoula* as an actual entity is ‘prehensive’ of other occasions; it provides the conditions for something new to be produced. ‘Prehension’ is the term used by Whitehead to describe the creative nexus and connective force behind actual entities: “I have adopted the term ‘prehension,’ to express the activity whereby an actual entity effects its own concretion of other things” ([1929] 1978, 52).

Activities or processes are relational, open, dynamic, historical and creative; processes are constitutive of the material world, rather than representing the world. Analogous descriptions of those processes can be found in the work of many more recent thinkers influenced by Whitehead. From Simondon’s work ([1958] 2017) on the mode of existence of ‘technical objects’, to the Deleuzian ‘agencement’ (Deleuze and Guattari 1987), to the ‘assemblage thinking’ of new materialists like DeLanda (2016) and Bennett (2010), to Barad’s agential realism (2003, 2007) and Latour’s ‘actants’(1999), to Ingold’s meshworks and correspondences (2007, 2012, 2013, 2017), there is a wealth of relational perspectives seeking to implement or to re-invent process ontology (for some archaeological applications see Fowler 2013; Hamilakis 2013; Hamilakis and Jones 2017; Harris 2014, 2017; Hodder 2012; Lucas 2021; Olivier 2004; Olsen et al., 2012; Webmoor and Witmore 2008; Jervis 2018; Govier 2019; Marshall and Alberti 2014).

From the perspective of process archaeology we propose to see actual occasions as self-bounding relations, relations best described as currents of material consciousness that operate on different levels and scales of self-specification or becoming. Material consciousness here has the ‘durational’ sense, familiar from Bergson, that is, it is both memory of the past in the present *and* anticipation of the future. If the notion of material consciousness sounds curious,

perhaps even mystical, it is because of our modernist intellectual habit of associating ‘consciousness’ with human subjects alone. But many process philosophers, and concerned observers alike, have been trying to expose this distinction as fundamentally flawed. Whitehead proposed that subject and object are relative terms in the unity of an actual occasion: “the occasion as subject has a ‘concern’ for the object. And the ‘concern’ at once places the object as a component in the experience of the subject, with an affective tone drawn from this object and directed towards it” (Whitehead, 1933/1935, 226). Note that Whitehead is not denying the subject–object relation; rather, he radically transforms the meaning of this relation from a force of opposition to a force of unification. Subjectivity is no longer the property of a human subject; subjectivity now becomes the property of ‘actual occasions’. We should explain that although terms like ‘subject’ or ‘experience’ are retained in Whitehead’s ontology they have a very different meaning from that in ordinary use. Whitehead ([1929] 1978, p. 222) introduced the term ‘superject’ to denote the relational conception of subjectivity as the emergent product of material engagement.

It is important to clarify that, when we say *kavoula* is an ‘actual occasion’, we are not referring either to the material properties of clay – as perceived and measured by an ‘unconcerned’ objective observer – or to the experiential effects those properties may have on the potter’s body – as perceived by an ‘unconcerned’ subjective or phenomenal observer. Instead, we primarily refer to the way *kavoula* expresses the fusion of subject and object (knower and the known) in the unified experience of form and flow that occurs by means of ‘prehension’. What makes *kavoula* a good example of an actual occasion is the way it gathers its main constituents, i.e., form and flow in an obvious manner, rendering them visible to the ‘concerned’ participant observer. *Kavoula* is allowing us to see what usually remains concealed: it reveals its mode of existence as becoming, specifically, the manner by which it encourages the potter to move it. *Kavoula* brings forth material conditions in which the clay and the potter’s body (muscles and neurons) come together. This particular concrescence allows them to move in concert with one another, participating in and co-constituting each other’s being. This is where the ‘superject’ comes to the fore. *Kavoula* embodies the series or nexus of ‘prehensions’ that form this particular concrescence. *Kavoula*, like the potter’s body, is made *of* and *for* movement. This movement is related to the kind of kinetic creativity that **Sheets-Johnstone (this volume)** sees at the core of tool making and tool using and which is intimately associated with the basic capabilities of animate life for thinking in movement and kinesthetic memory. Animate beings think in movement. The making of a tool is essentially

the orchestration of a bodily-kinetic-process. In the case of *kavoula* its motion is that of plasticity. *Kavoula* comes to be and will cease to be on the basis of that principle. Material consciousness is the product of that interweaving of materials in movement, or thinking *in* movement (Sheets-Johnstone 1998; this volume) or what Malafouris calls creative *thinging* (thinking *with* and *through* clay) (Malafouris 2019; 2020). *Kavoula* then is made from the relational movements it allows and in which it participates. *Kavoula* presents us with something which may be described as a fusion of consciousness, or what Whitehead call a ‘superject’ (feeling and being felt), and at another, larger time scale a fusion of plasticities, that we may call metaplasticity (Malafouris 2013; 2015). *Kavoula* is a passage point where forces with very different time scales (kinetic, kinaesthetic, social, climatic and environmental) mesh together in the current moment to constraint/prehend the emergence of material form. What does this mean for time?

Time is generally viewed in archaeology as a uniform linear progression. This linear understanding of time is intimately linked with a linear understanding of causality and change as a sequence of movements between discrete states. Two entities or processes shown to inhabit the same segment of time and space can be considered contemporary. In a process ontology any two actual entities, (a) may not be contemporaries even if they inhabit the same time and place, and (b), may be seen as inhabiting differing spatial and temporal systems concurrently. Actual occasions are made up of their own spatio-temporal systems and different occasions may temporarily become partially connected with one another, but they can also be separate. For instance, during the morphogenetic process depicted and predicted in FIGURE 1 the potter’s hand, *kavoula* and the wheel co-exist as contemporaries. It is expected that, as the vessel is being thrown, rotational kinetic energy from the wheel and manual pressure from the potter’s hand will be exchanged.

However, the mode of exchange will be different. For *kavoula* motion equates with change: its mode of existence depends on its ability to follow and respond to the pressure exerted by the potter, but also to constrain and guide the potter’s movements. The wheel relates to motion in a different manner: its mode of existence depends on its ability to resist the potter’s movement while he/she pulls up the vessel, and to remain unaltered while changes in speed of rotation and direction of movement occur. Under no circumstances should the clay blend with the metal or change the dimensions and morphology of the wheel. Water poured on the wheel will not change it, but will wet the clay. Importantly, the stability of the wheel (its resistance to change) is the condition for the formation of clay (its openness to change). In

other words, their modes of being and becoming are entangled (or disentangled) following the needs of creative material engagement already at the most basic level of material affordances. The creative process is self-bounding, so that boundaries constantly shift following the dynamics of action as the potter pulls up the clay or is pushing inward or outward with her/his hands seeking to actualise a form. These boundaries vary at different points of contact, so that the boundary between the clay and the potter's hand is different from the boundary between the clay and the wheel.

Given that pottery making is a relatively recent invention in the history of our species, we have the tendency to assume that the human hand comes fully formed to this process. This is a rather simplistic view of human evolution and where the potter's hand touches the clay timescales conflate. Hands are slowly formed through all the actions they perform, so that the six thousand-year history of the potter's wheel opens a new dimension in the shaping of the hand.

Skills are creative habits. Techniques will transform the bodies that carry them, forms will flow in their changing styles. Along the way new tools will be invented, used and moved by the human hand but also using and moving the human hand in new directions (Malafouris 2021a,b; this volume; Gosden 2005). The potter's wheel is one such invention. Thinking of the wheel as an abstraction we can say that the potter's wheel is essentially a material device that allows rotational kinetic energy and manual force to be combined so that forms can be produced fast out of clay. Thinking of the wheel as a unique 'occurrence' we also realise that every wheel offers a unique perspective into the world; a unique entanglement of specific bodies, skills, materials and forms.

For these reasons and others, *kavoula* is multiscalar. Look again at FIGURE 1, there is no dispute that the exact event depicted can be dated or measured with precision once we agree to set specific margins to mark its beginning and ending. Once we set those arbitrary margins we can know exactly when the event happened and approximately how long it lasted, as a sequential metamorphoses of clay in time. However, as an actual occasion, *kavoula* is situated in multiple timescales ranging the full temporal range of macro, meso and micro processes (Knappett 2011), ranging between the slow chemical weathering of silicate minerals to the shaping of the human body to the fast sensorimotor attunement between the potter's bodily skills and the affordances of clay, to the embodiment level of shorter durations up to a few seconds - what is referred to as the "subjective present" or "3-second window"

(Pöppel, 2009, 2004). The question of what each timescale contributes to *kavoula*'s duration is observer-dependent. Archaeology is usually concerned with the study of long-term change and with distinguishing what came 'before' and 'after' which is essential for making sense of causality and for understanding the temporality of different events. However, time is not just a quantity that can be measured but also importantly a quality produced and embodied in social interaction and material engagement. Time makes better sense in terms of participation rather than detached (unconcerned) observation, the constitutive intertwining of mind and matter. *Kavoula* provides a point of intersection for at least three interconnected time-scales: evolution, development, and situated action. In particular, it binds the temporality of neural, bodily and material action to that of the 'longue durée' of history and evolution. If "human time flows on a number of levels" (Gosden 1994, 17) and operates at different speeds, one important question for process archaeology concerns the nature of the relation connecting the varieties of phenomenal consciousness and the varieties of historical consciousness operating over different scales, durations and rhythms. We propose that the engagement of mind with the material world helps us to move and think across the scales of time (Malafouris 2013, 246-7).

The latter processual vision of temporality drastically extends the comparative possibilities of archaeology, allowing correspondences and conversation among various forms of archaeological evidence traditionally kept apart, or seen as opposed. For instance, phenomena observable in studying microstructure employing thin-section microscopy can be now related to phenomena associated with the plastic deformation of clay through the motor and kinaesthetic skills required for mastering a technique or neural activation patterns required for its performance. All these new potential correspondences among timescales and analytical units change the meaning of continuity and discontinuity. The decision to emphasise one over the other is analytical and epistemological rather than ontological. *Kavoula* is one and manifold at the same time.

V. Towards a Process Archaeology

We feel that there are three major areas of archaeological research where a process ontology has been successfully deployed and can be further developed.

a) *Process archaeology can help us to understand better processes of change and evolution.* As mentioned archaeology opens up a unique way to study long term change and transformation. It has been bound to the notion of 'process' trying to understand the varieties

of transformations we see in the material record and at different scales, whether that refers to the long-term history of hominin and eventually human species or to more recent transformations associated with farming, urbanism and industrialization. This natural inclination that archaeology has for the study of transformational processes at different micro- and macro-scales of human and non-human life also raises a major challenge: How can we understand the concreteness of actual entities within this constant coming to be and passing away of reality? Several papers in this volume set out to meet this challenge. For instance, **Monica Smith** (this volume) enables us to envision how a process ontology focusing on the dynamics of growth, integration and change among sites can help us analyze the development of ancient states beyond site-size hierarchies and other traditional interpretations. Similarly, Michael Leadbetter (this volume) looks at ‘urbanism as process’ and explores how humans and things come together to create cities that may seem static, but are in fact always in motion. Last, **Rosemary Joyce** (this volume) using a case study from Honduras addresses the question of how a “site” comes together as eventful becoming through flows of materials. She draws on Barad’s agential realism that shares with process archaeology the emphasis on modes of becoming seeing sites as a dynamic assemblage of intra-actions characterised by the presence of overlapping temporalities.

b) *Process archaeology promotes a radical rethinking of ecological relations across the social and cognitive sciences, incorporating dimensions of sentience and cognition.* It achieves this rethinking by questioning by questioning distinctions between nature and culture, and by providing a better framework to highlight the long and changing history of mutual dependency between people and plant species, as well as the meaning of domestication. **Amy Bogaard et al.** (this volume) explore the potential of process archaeology for domestication studies, drawing attention to the variable pace and relational nature of the domestication process, within and across taxa, as well as emphasising the significance of non-human agencies and the problems with simplistic wild/domestic dichotomies. The concept of landscape and its temporality (Ingold 1993) is central to our notion of relational ecology, and a process ontology provides new tools for dealing with the dynamism of the relations of plants, animals and people with topography, soil and climate.

c) *A process archaeology can recast material relations in terms of flow and form.* We introduced the terms form and flow in Gosden and Malafouris (2015) and a brief recap might be useful. Matter takes on form through the forces working on it, some of which are human forces. Archaeology is familiar with form: a handaxe, a Roman amphora, a domesticated rice

plant are all known and discussed forms, that is matter with particular qualities of mass, shape, growth potentials or possibilities of use. Form, while it may last a long time – the handaxe could be 1 million years old – is always temporary, having a tendency to transform into other forms. Flow, the flux of energies through the world, is permanent as a condition, but changing in when, where and how flows occur. Form could not exist without flow, as energies of various types move through time and space. Flows have a tendency to congeal into forms, either of living things, forms of landscape or of artefacts. For instance, domestication although often labelled as a process has been analysed archaeologically as the appearance of new forms with their characteristics: wheat with a brittle rachis, a smaller, more meaty, but tractable species of cattle etc. New views of domestication emphasize process and flow more fundamentally. A network of ecological relations provides a set of pathways through which energies flow. Where humans are a part of such a network they are not in control of all the pathways and their energies, even when they think they are. Changes in the characteristics of plants and animals, including those we label domestication, come about through flows of energies and genes across time and space, with new forms (species, breeds, landraces) emerging from the totality of these flows. It is hard to see domestication as a process under human control, still less is it useful to see domestication as a series of steps along a line of forms, ignoring the complexities and manifold nature of flows (see **Bogaard et al.**, this volume).

For process archaeology terms like ‘things’, ‘materials’, ‘artefacts’ and ‘objects’ should be understood in this open and dynamical relational sense of occurrences in space and time. They should also be understood as having aesthetic and affective significance in human becoming. As **Carl Knappett** points out (this volume) the emergence of new technologies like metallurgy, writing, and the wheel cannot be accounted for in terms of their technological efficiencies but demand attention to the aesthetic qualities of skilled technical action or what he calls aesthetic of wonder. Moreover, **Alex Aston’s** article (this volume) illustrates the potential of process archaeology for understanding the emergent, self-organising dynamics focusing on contemporary American automotive culture as a robust example of how forms emerge from and transform flows of energy-matter across multiple dynamic scales. Within process archaeology, notions of creative *thinging* (Malafouris 2014:), ‘metaplasticity’ (Malafouris 2015) and ‘social ontology’ (Gosden 2008) can be used to exemplify the recursive relationship between brains, bodies and things and to provide new

relational ways of thinking about the flow and experience of time among brain–body–world (Malafouris and Gosden 2020).

VI.

To recap: We have argued that archaeology opens up a unique way to study the meaning of ‘process’. However, at present a unified archaeological theory of ‘process’ is lacking (Gosden and Malafouris 2015). Our aim in this special issue is to promote the development of such a ‘process’ archaeology fully committed to understand what the ontological primacy of process over being implies, what are the implications for archaeological practice as well as how precisely processes relate to our distinctive spatio-temporal frameworks. How different processes combine or relate with each other? We want to provide the foundation for a unified archaeological theory of ‘process’.

Speaking of a unified theory of process we do not mean to imply that there is a ready-made process philosophy which we could simply borrow and operationalize within archaeology. Our aim is simply to identify those patterns that connect selective aspects of process philosophy to contemporary archaeological discourse and understandings of the archaeological record. We are not passively adopting concepts; rather we are creatively adapting and abducting. In fact, it would be a mistake to think that one could simply transfer Whitehead’s concepts directly into the realm of archaeological thought. One of the major contributions that Whitehead’s work can make to contemporary archaeological theory and practice is to be found in his insistence that creativity is immanent/ integral to the process of *concrecence*. For instance, Whitehead’s speculative ontology expressed in the language of “actual occasions” and experience-like “happenings” as the basic realities of nature that come into being and then perish should not be treated as a static conceptualisation but as an evolving framework that affords new insights in light of new accumulated knowledge in archaeology. Our approach to process philosophy is not scholastic but critical and dialectical. We believe there is huge analytical potential but it can only be realised through careful critical re-contextualisation. The aim of our project is a creative synthesis of processual thinking around several key archaeological themes that seem to converge on questions such as: What role does the concrete physicality of material forms play in this dynamical universe of continual process? What is the place of creativity in human evolution? How do we account for the constant creation and transformation of forms? How and why do societies change?

Process archaeology is not pretending to answer those questions, or to solve the problem of change. Nonetheless, it does provide a fresh way of engaging and of making sense of the problem. Making sense of this problem will help us in turn to reconfigure the nature of the archaeological record as well as the scope and prospect of archaeological thought (theory and practice). Process archaeology focusing on the modes of becoming invites us to think differently about the meaning of stability and change in archaeology.

Should archaeology attempt to answer such ultimate questions? That depends on how we perceive the scope and limits of archaeological discipline. It also depends on how we perceive the ongoing struggle to attain new levels of disciplinary consciousness, or Clarke's (1973) *critical self consciousness*. We prefer to see archaeology as a dynamical discipline. It is dynamical in the sense of having as the subject matter of its study relational temporal processes. Archaeology is also a soft discipline. It is soft not in the sense of lacking epistemic rigour or empirical grounding; rather, it is soft because of the emergentist character (unpredictable from the interactions of its components) of the archaeological record which is best described as a dynamic assembly of physical, organic, social, and cognitive processes. We also think that archaeological studies are at their most significant when, in direct opposition to the rigid boundaries that inherited disciplinary structures impose on us, on our ways of thinking and doing things, they remain *undisciplined* and thus free to question what often very conveniently is taken for granted. The loss of innocence, which Clarke envisaged, is never ending and often necessitates the loss of disciplinary consciousness in the same way that the hand of the artist often necessitates the loss of self-consciousness to move freely and improvise. This freedom will hopefully allow us to raise new questions that in turn will enable us to see the archaeological record in a new light. An important challenge here is how to frame new archaeological questions that, on the one hand, escape the confines of old archaeological questions grounded in the substance ontology/mechanistic view of science, but which, on the other hand, remain dedicated to the production and advancement of distinctive archaeological knowledge.

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