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## The Conceptual and Ethical Normativity of Intra-active Phenomena

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### Abstract

This essay addresses three aspects of Barad's views about meaning and normativity: her 'post-humanist' insistence that the agential cuts that constitute phenomena need not incorporate human beings as observers, measurers, speakers, or concept-*users*; her alternative account of the objectivity of measurement, which also specifies the meaning of what she calls 'theoretical' concepts; and her claim that agential participation in phenomena entails ethical accountability for the real consequences of the intra-actions and associated exclusions in which we participate. The aim is to show why Barad's post-humanism should still recognize significant differences between human and other agencies, which simultaneously constitute both 'theoretical' conceptual articulation and the ethical responsibilities that are entangled with such theoretical understanding, and to explain why appropriate recognition of this difference does not reinstate in new guise the humanism she objects to.

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[1] In this essay, I consider the relations between three aspects of Karen Barad's views about meaning and normativity. First, Barad's account of agency is 'post-humanist', in the sense that the agential cuts that constitute phenomena need not incorporate human beings as observers, measurers, speakers, or concept-*users*. Second, Barad takes her agential realism to provide an alternative account of the objectivity of measurement, which also specifies the meaning of what she calls 'theoretical' concepts. Third, agential participation in phenomena entails ethical accountability for the real consequences of the intra-actions and associated exclusions in which we participate.

[2] My aim in this consideration is to show why Barad's post-humanism should still recognize significant differences between human and other agencies, which simultaneously constitute both 'theoretical' conceptual articulation and the ethical responsibilities that are entangled with such theoretical understanding. This difference nevertheless does not reinstate in new guise the humanism she objects to, for two reasons. First, the 'human' in this sense is not just people in isolation, but the larger worldly phenomena to which we humans belong and with which 'we' (in the narrower sense that just refers to human bodies) are interdependent. Second, the difference between humans and other organisms is non-hierarchical: theoretical understanding and ethical accountability are not something that non-human organisms or other agential patterns 'lack' as a deficiency.

[3] I will first review several features of Barad's metaphysics that are needed for the remainder of my

discussion.<sup>[1]</sup> Barad argues for a metaphysics of phenomena:

The primary [metaphysical] unit is not independent objects with independently determinate boundaries, but rather ... 'phenomena'. In my agential realist elaboration, phenomena do not merely mark the epistemological inseparability of observer and observed, or the results of measurements; rather, *phenomena* are the *ontological* inseparability of agentially intra-acting components.<sup>[2]</sup> (*Meeting* 33, original emphasis)

[4] This approach is thoroughly naturalistic, albeit in a sense that eschews naturalism's usual associations with scientism and representationalism.<sup>[3]</sup> Barad seeks to account for semantic/epistemic and ethical normativity as materially enacted within naturalcultural phenomena.<sup>[4]</sup> Object-boundaries, conceptual contents, and their objective accountability are enacted within phenomena. In place of representational/signifying relations between words and things or sentences and states of affairs, she insists upon

*a relationality between specific material (re)configurings of the world through which boundaries, properties, and meanings are differentially enacted (i.e., discursive practices, in my posthumanist sense) and specific material phenomena (i.e., differentiating patterns of mattering).* (*Meeting* 139, original emphasis)

[5] This insistence is constitutive of the sense in which Barad is a naturalist. Inherent boundaries between objects, or representational contents that are not determined within an intra-action with what they are 'about', are what Donna Haraway (*Simians* ch. 9) calls 'god-tricks', impossible (and thus, merely apparent) erasures of agency and intra-active involvement in the world. Conceptual content is not a representation of an object, but a material articulation of a phenomenon, which encompasses both meaning and what is meant.

[6] The most basic, constitutive articulation of boundaries within any phenomenon is a 'cut' between a defined, measured object and what Barad (*Meeting* ch. 3) calls the 'agencies of observation'. Both objects and the agencies of observation are materially *marked* by their intra-action (Barad talks about 'marks on bodies'). Here Barad's account partially overlaps with Wesley Salmon's 'causal mechanical' account of causal interactions:

When there is an intersection between two processes in which both are modified, and the modifications persist beyond the place of intersection, this intersection qualifies as a causal interaction. One uses a causal interaction to produce a mark in a process. (Salmon, *Causality* 17)

[7] Their differences are nevertheless instructive; Salmon's account broke down precisely because it presupposed several problematic 'god-tricks'. First, the assumed spatiotemporal isolation of two separate but intersecting 'processes' illegitimately erased their other causally intra-active entanglements (causal isolation doesn't happen magically, but requires further apparatus within the agencies of observation; this erasure exposed Salmon's model to notorious, devastating counter-examples). Second, Salmon took a spatiotemporal framework as given, rather than itself configured within the phenomenon. This presumption then required the interacting processes to be identified by spatiotemporally continuous

trajectories, with the embarrassing consequence that quantum mechanical interactions were interpreted as mysteriously acausal. Finally, the apparent symmetry between two causally interactive processes arose in his model because Salmon implicitly presumed the registration of the constitutive marks on bodies from a gods-eye standpoint that required no further measurement intra-action. He thereby erased what constitutes one side of any intra-action as the 'agencies of observation', along with the asymmetry between causes (objects-in-phenomena) and effects (marks on bodies in an apparatus). This third assumption would also violate quantum mechanics, by allowing all properties of a system to be fully determinate within the same material arrangement.

[8] These differences between Barad and Salmon also highlight one further crucial point. Phenomena are not just more complicated, articulated *objects* that contain an internal 'cut' between their agential and objective components, in addition to a boundary that demarcates one phenomenon as distinct from others. Phenomena have no such defining boundary, no 'outside boundary' in Barad's terms (*Meeting* 142-145). They are not objects within the world, but articulations of the world from within. A phenomenon is focused by/around the agential cut, such that its various worldly components matter differently within that phenomenon (Barad, "Posthumanist Performativity" 817). Like a power series whose later terms make relatively insignificant but non-vanishing contributions to the whole series, the more 'distant' (in terms of how they matter rather than spatiotemporal distance) entanglements within a phenomenon are relatively insignificant, but not thereby disconnected.<sup>[5]</sup>

[9] Turning now to Barad's anti-humanism in terms of intentionality and meaning, the phenomenon of the brittlestar exemplifies this aspect of her conception:

The brittlestar is a visualizing system that is constantly changing its geometry and its topology—autonomizing and regenerating its optics in an ongoing reworking of its bodily boundaries. Its *discursive practices*—the boundary-drawing practices by which it differentiates itself from the environment with which it intra-acts, and by which it makes sense of its world, enabling it to discern a predator, for example—are *materiality enacted*. (*Meeting* 375)

[10] The brittlestar does not *have* a visual system—it *is* one. It has no 'central processor' where representations could intervene between perceptual uptake and practical response, which are mutually entangled all the way down. The brittlestar's optics is also thoroughly diffractive (and hence materially intra-active with enviroing photons rather than geometrically reflective of abstract 'rays' of light). It lacks all the markers of humanist subjectivity, and yet in its very being is an intentional directedness toward relevant features of its environment, in ways that are ineliminably normatively accountable: "A brittlestar is not some ideal Cartesian subject, but through specific practices of intra-active engagement, it differentially responds in ways that matter [with] life-and-death stakes in getting it wrong" (Barad, *Meeting* 380).

[11] To whom or what do these ways of getting something right or wrong matter? Clearly, to the brittlestar. But what (or who) is that? The 'brittlestar' ambiguously names both an entity and the iteratively enfolded phenomena that constitute it as the entity it is, an organism. It (the phenomenon) continuously enacts an 'internal' differentiation between the organism, and what thereby becomes its environment or 'outside',

but neither side of that difference can be specified non-relationally. Brittlestars *are* a process of *making* a living in responsive intra-action with what is thereby differentiated from it, doing so for example by "changing its geometry and its topology" (Barad 2007, 375) in ways that also seek, discern, and respond to surrounding threats or opportunities. But its surroundings only become an environment, a field of possible threats, opportunities, and indifferences, in relation to the way of life they enable, threaten, or indifferently pass by.<sup>[6]</sup> The cut between organism and environment is thus not a separation, but an iterative entanglement. The organism as phenomenon constantly traffics across the boundary it constitutes, taking in energy and other resources, exporting entropy and 'waste' products, which, of course are also iteratively entangled in different ways within other phenomena. An organism's way of life is 'agential' precisely in the sense that it is a material system that functions as a whole in a way that is differentially responsive to changing circumstances so as to maintain that very pattern of differential responsiveness.<sup>[7]</sup>

[12] This active differential 'self-maintaining responsiveness to changing circumstances crucially differentiates 'autopoietic' phenomena that constitute an organism/environment boundary from such otherwise comparable material patterns as convection currents.<sup>[8]</sup> If the thermohaline circulation in the North Atlantic once again disappears, as it did recently in geological time, its disappearance will not matter to the current or the water (it would, of course, matter enormously to the many organisms for whom that current is integral to *their* environments). Currents stop rather than die. That is because the current as such does nothing to sustain itself, as differentiated from its enabling or threatening conditions. Like an organism, the current is constitutively and more or less robustly interdependent with its circumstances, notably the temperature and salinity of the surrounding water, and as it turns out, the concentration of heat-trapping molecules in the atmosphere above it, but unlike the organism, it couldn't care less (or more). 'Caring' here is not to be understood in terms of anything like conscious states (or any other kind of *state*), but instead as more complex patterns of response to perturbations of the pattern of a phenomenon (what Barad calls "normative differential responsiveness" (*Meeting* 380), or a "stabilizing and destabilizing process of iterative intra-activity" ("Posthumanist Performativity" 822)). Organisms *are robust patterns of self-maintaining differentiation from what thereby become their 'environments'*.<sup>[9]</sup>

[13] If brittlestars are thus non-humanist intentional systems, what are they directed toward and responsive to? On first inclination, we might say 'things' in their surroundings, e.g., potential predators, food, and the like, but that is not quite right. Kathleen Akins points out that organisms' sensory systems do not indicate independently definable properties of its surroundings, but instead 'narcissistically' detect differences that matter to the organism's physiological or behavioral responsiveness to those conditions. In Akins's primary example, animals' thermal detection systems do not register continuous changes in the ambient temperature, but only discontinuous thresholds for various behavioral or physiological responses to high or low, and increasing or decreasing temperature:

This [complex interrelation of static and dynamic thermoreceptor response properties] seems somewhat strange on the traditional view of sensory processing, of thermoreception as a system that disinterestedly records temperature facts. Just how

inept could this system be? Viewed as narcissistic, however, the system makes perfect sense. What the organism is worried about, in the best of narcissistic traditions, is its own comfort. The system is not asking, 'What is it like out there'?—a question about the objective temperature states of the body's skin. Rather, it is *doing* something—informing the brain about the presence of any relevant thermal events. Relevant, of course, to itself. (Akins, "Of Sensory Systems" 348-349)

[14] The brittlestar is an especially instructive example precisely because its responsiveness to its surroundings clearly involves the entire organism, as it both reconfigures its skeletal/visual system, and also moves toward or away from particular arrays of ambient light. When its surroundings present multiple cues that would lead to opposing responses if encountered in isolation, the brittlestar can only make a single integrated response, however multi-dimensionally cued. What it responds to is not this or that entity within its environment, but an overall configuration of the environment as a whole. For the reasons Akins indicated, however, the 'environment' in this sense does not consist of independently identifiable objects. Richard Lewontin uses a different example in incisively capturing this constitutive entanglement of organisms, as ways of life, and their environments, as settings for and of those ways of life:

Every element in [an ornithologist's] specification of the environment [of a bird species] is a description of activities of the bird. As a consequence of the properties of an animal's sense organs, nervous system, metabolism, and shape, there is a spatial and temporal juxtaposition of bits and pieces of the world that produces a surrounding for the organism that is relevant to it. ... It is, in general, not possible to understand the geographical and temporal distribution of species if the environment is characterized as a property of the physical region, rather than of the space defined by the activities of the organism itself. (Lewontin, *Triple Helix* 52-53)

[15] The same point applies in reverse, however. One cannot ascribe biologically meaningful traits or properties to the organism, except as integral to ongoing intra-action with its environment.

[16] With these considerations in hand about how organisms and other robust physical patterns are differently responsive to relevant changes in their surrounding conditions, we now shift gears to consider Barad's account of theoretical concepts and their relation to possible measurements. Barad takes from Niels Bohr the claim that "*theoretical concepts* (e.g., position and momentum) are not ideational in character but rather *specific physical arrangements*" (*Meeting* 139). In the case of position and momentum, which together would fully specify a state description in classical physics, these two concepts are defined by mutually exclusive physical arrangements: position is specifiable by an apparatus with a fixed detector, whereas momentum requires a movable detector. In each physical arrangement, the complementary concept is then indeterminate (a semi-rigid detector would leave each concept partially indeterminate).

[17] To understand *why* concepts require specific physical arrangements, we need to understand Barad's account of conceptual objectivity. 'Objectivity' is more familiar as an epistemic norm, governing what differentiates correct from incorrect judgments or claims. Barad is more concerned with the specification of conceptual content, however: how an intra-action is a measurement *of* one object rather than another,

in some particular *respect* (e.g., a measurement of an object's 'position'), and thus of what that 'respect' *is*.<sup>[10]</sup> Einstein had insisted against Bohr that the spatial separability of discrete objects plays an essential role here; in denying that objects have inherent boundaries, Barad forecloses that option. Following Bohr, she argues for a three-fold criterion of reproducible, communicable marks on bodies. Marks on bodies are required in the sense that the correctness or incorrectness of the applicability of the concept must make a difference in the world. Communicability implies that the difference must be discernible: it is possible to *tell* whether the concept applies.<sup>[11]</sup> Reproducibility, however, is what specifies conceptual content: what must be 'tell-able' by their material differences is what it would be for two material arrangements to be the 'same phenomenon' in the relevant respects. Thus, any intra-action whose outcome discernibly produces marks on relevantly fixed bodies *is* a determination of the position of whatever entity holds the relevant place in that arrangement. The *term* 'position' is a semantic marker for what those similarities and differences tell, in the sense that others could learn to tell the same differences independently.

[18] Where there is no way to tell a difference within a particular material arrangement, the relevant concept is indeterminate in that context (it would then be a concept at all only because it is determinate in other contexts). Indeterminacy is not plasticity. The indeterminacy of position in certain arrangements still configures it within a field of possibilities and probabilities, with more or less determinate inferential relations to other concepts. Indeed, those conceptual relations (including the inferential relations to other phenomena within which the phenomenon in question can be iterably reconfigured, e.g., as what is expressed by the antecedent of a conditional, 'if-then' determination) are themselves holistically determinative of their character *as conceptual*. As Wilfrid Sellars famously put the crucial point, "one can have the concept of green only by having a whole battery of concepts of which it is one element, ... and there is [likewise] an important sense in which one has *no* concept pertaining to the observable properties of physical objects in Space and Time unless one has them all—and indeed, a great deal more besides" (*Empiricism* 45). Sellars was thinking about what it means for a *person* to have a concept (i.e., the ability to use it), but the point applies as well to specifying the (reproducible, communicable, material) differences between phenomena that articulate conceptual differences, and sub-patterns within phenomena that only do so as part of a larger arrangement. Conceptual determinations, such as the material arrangements that specify a determinate position of something, also incorporate the capacity to tell other conceptual differences. Most notably, they minimally involve the capacity to mark, as part of the phenomenon in question, the difference between correct and incorrect applications of the concept (in which the ability to tell other conceptual differences plays an ineliminable role).

[19] We can now return to the brittlestar. The brittlestar's autopoietic reconfiguration of the topology of its skeletal structure allows it to respond differentially to approaching predators as integral to what matters within the phenomenon of its way of life. Nor is this a mere coincidence: the developmental pattern that enables telling that difference has selectively shaped and been shaped by the phenomenon of which it is a part. The pattern of that phenomenon thereby constitutes a developmental and selective environment as one side of its 'agential cut', as differentially mattering to the iterative unfolding of its entanglement across that constitutive boundary. The result is what I call a 'one-dimensional' directedness toward what

is also thereby constituted as its environment, as part of an integrated, iterated phenomenon.<sup>[12]</sup>

[20] A two-dimensional intentional directedness would require a partially autonomous practical repertoire as part of a larger pattern of autopoietic intra-action with an environment.<sup>[13]</sup> Within such an organism's partially autonomous repertoire, the significance of particular performances and responses is proximally determined by their relations to other aspects of the same repertoire. For example, a performance is proximally constituted as linguistic by the ability to track it both as an iterative performance, and as contextually responsive to its 'conversational' setting.<sup>[14]</sup> Yet such a practical/perceptual repertoire is significant because its autonomy is only partial: whole networks of proximally intra-active responsiveness within the repertoire are also tracked and assessed (i.e., via differential responsiveness) as part of the larger behavioral economy of an organismal way of life.<sup>[15]</sup> Such partial autonomy enables a conflict between what is meant by a performance (its appropriateness within the partially autonomous repertoire) and its contribution to what is at stake in the organism's overall way of life. It thereby becomes possible for an organism's behavior to be *mistaken* in some respect, to *mean* something that is nevertheless incorrect or counter-productive, rather than merely abnormal or sub-optimally adaptive. This two-dimensional responsiveness, as *conceptually* articulated behavior, thereby constitutes two-dimensional stakes. In a passage quoted above, Barad succinctly expresses the one-dimensional normativity of the brittlestar's engagement with its environment, as having "life-and-death stakes" (*Meeting* 380): what is at issue for it in its way of life is always the maintenance and reproduction of that way of life. That much is also true for two-dimensionally articulated ways of life; like any other organism, they (we) engage their environment with the constitutive goal of sustaining themselves.<sup>[16]</sup> Yet the articulation of a partially autonomous, conceptual repertoire directs that way of life toward two-dimensional stakes, incorporating both *whether* it maintains itself, and *what* it will be(come), in ways that can then come into conflict.<sup>[17]</sup>

[21] As far as we can tell, the two-dimensional normativity of conceptually articulated intra-action has only emerged within the material arrangements of human ways of life as 'naturalcultural'.<sup>[18]</sup> An extraordinary variety of organisms articulate the world one-dimensionally, as ways of life that matter, and thereby differentiate what matters from what does not, within their ongoing ways of life. Conceptually articulated phenomena nevertheless seem only to show up within one biological lineage, through a long, complex, shifting pattern of behavioral niche construction. Does this claim then reinstate from within Barad's agential realism the humanism that she so adamantly rejects, by ascribing to human beings a special kind of intentional directedness? No, for two reasons. First, conceptually articulated responsiveness to our environment is not a special capacity *of us* as organisms: it is an articulation of the world, via the gradual, intra-active construction of a conceptually articulated niche that co-evolved with the abilities of organisms in our lineage to produce and track its conceptual markers in their dual significance. Such niche-construction-and-response is one more "*material (re)configuring of the world through which boundaries, properties, and meanings are differentially enacted* [as] differentiating patterns of mattering" (Barad, *Meeting* 139). More important, other organisms are not 'merely' one-dimensionally normative, lacking some desirable trait that we possess. To appropriate a classic bumper sticker from second-wave feminism, non-human organisms need conceptually articulated responsiveness like a fish needs a

bicycle. Indeed, the capacity to construct and respond to a two-dimensionally articulated environmental niche would not merely be useless, but mal-adaptive for them. Conceptually articulated understanding is not a general capacity that could offer organisms a general benefit, but a strange and hypertrophic oddity within a single lineage.<sup>[19]</sup>

[22] We are nevertheless now in a better position to recognize why conceptual understanding and ethical accountability are always entangled, as Barad rightly insists. The brittlestar, and other richly autopoietic phenomena, enact constitutive exclusions. Not everything in their material surroundings are significant within their developmental and selective environment, and so the brittlestar as a way of life "excludes" many things, as (literally and in both senses) not *matter*ing in the context of that iteratively reconfigured phenomenon. Yet the brittlestar does not articulate these exclusions *as exclusions* (the boundary between what is included as significant for its way of life and what is excluded is not itself included within it). The two-dimensional normativity of conceptually articulated understanding opens a gap between meaning and truth broadly construed.<sup>[20]</sup> It thereby also establishes an accountability for what we become and how we live, within our constitutive goal-directedness toward maintaining our conceptually articulated way of life. How we ought to live, and what exclusions are enacted within our way of life, are part of what is at issue in enabling us to respond two-dimensionally to our conceptually articulated environment.

[23] The riskiness of our conceptually articulated way of life has become increasingly evident in an era of nuclear proliferation and anthropogenic climate change. It remains unsettled whether a two-dimensional directedness toward not only whether an organism's way of life is sustained, but also what it will be(come), is inimical to the continuation of that way of life and others with which it is entangled. Nietzsche once remarked that, when the "clever beasts who invented knowledge ... have to die ... nothing will have happened." (Nietzsche, 79). From the imagined standpoint of the universe that Nietzsche implicitly (and perhaps ironically) invokes, that judgment would be correct, if such a god-trick were intelligible, but it is not intelligible. *Mattering* (including how attempting that god-trick matters) is always materially enacted within a phenomenon. Within the phenomena that constitute our ways of life, the possible exclusions in their vicinity, including issues of justice as well as survival, are instead the locus of our most profound ethical responsibilities. Whether and how we hold ourselves and our way of life accountable to them is centrally at issue and at stake in almost everything we do, as organisms enacting our lives within the world.

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## Notes

1. Barad more commonly speaks of 'ontology' rather than 'metaphysics', except where she speaks of the sciences as undertaking experimental metaphysics. Although I cannot further discuss the issue here, I think Barad's view requires a distinction between metaphysics (what there is) and ontology (what it 'is' or 'means' to be), along with a commitment to maintaining the difference, akin to Heidegger's claim that "the sense of being is not an entity," i.e., not something that there is, metaphysically (Heidegger, *Sein und Zeit* 1963 5-8; *Being and Time* [English translation] 24-28).

2. 'Metaphysical' is substituted for the first occurrence of 'ontological' in the passage. Phenomena are what there is. Intra-active inseparability is part of what it is to *be* a phenomenon. See note 1 above.
3. For other efforts to dissociate naturalism from representationalism, see Rouse, *How Scientific Practices Matter* and *Articulating the World* and Price, *Naturalism Without Mirrors*. For a more extended discussion of Barad's naturalism, see Rouse, "Barad's Feminist Naturalism".
4. The reasons for describing phenomena as 'naturalcultural' rather than 'natural' will emerge in passing later in my discussion.
5. In the absence of 'back boundaries' to phenomena, and given her conception of spacetime as itself configured within phenomena, phenomena can only be meaningfully configured by how they matter. For an alternative conception of 'distance' in terms of differential mattering rather than spatial distance, see Heidegger, *Sein und Zeit* sections 22-24. Barad's most explicit discussion of how phenomena are meaningfully configured by what is at stake in their ongoing articulation is in the course of her account of brittlestars as optical phenomena (*Meeting* 375-383), which makes vivid her rejection of the human-centered conception of significance in Heidegger.
6. For a more extensive discussion of organism/environment complementarity, and the inseparability of the determinacy of the traits or components of each, see Rouse, *How Scientific Practices Matter*, 272-284.
7. As Okrent, *Rational Animals* rightly notes, this just is the Aristotelian (and also Darwinian) conception of an organism as energeia, adding only a recognition of its constitutive interdependence with what thereby becomes its environment.
8. Thompson, *Mind in Life* ch. 3-6 provides a good introductory account of autopoiesis.
9. It is important to note that this difference is not somehow magically or vitalistically an outcome of being alive. This difference between kinds of material intra-action is what it is to be alive. For a parallel discussion (in a very different idiom) of the relevant kind of robustness, concerning the object-directedness of intentional states rather than a 'self-directed concern for its own self-maintenance as an iteratively unfolding pattern, see Haugeland, *Having Thought* 142-145.
10. For a more extensive critical discussion of the difference between epistemic objectivity, conceptual objectivity, and the character of the 'objects' to which such norms are accountable, see Rouse, *Articulating the World*, especially chapter 5.
11. Communication or 'telling' here does not presume explication in language. As John Haugeland notes, "Telling what (who, when, where, whether ...) something is, telling things apart, telling the differences between them, and so on ... can often be expressed or reported in words, but is not in itself essentially verbal. ... People can tell things for which they have no words, including things that are hard to tell" (*Having Thought* 313).
12. Whether one should then regard one- and two-dimensional directedness as different modes of 'intentionality', or distinguish 'intentionality' as two-dimensional from non-intentional directedness in only one dimension is not just a verbal dispute: its outcome turns on the other inferential entanglements of the concept of intentionality, and what is at issue and at stake in those entanglements. The complexity of those issues forecloses further discussion here. See Rouse, *Articulating the World*, especially ch. 2-5.
13. Rouse, *Articulating the World* ch. 3-4, provides a much more extensive discussion of the difference between one- and two-dimensional biological normativity, including the barriers to the evolution of two-dimensional environmental responsiveness, and the emergence of two-

- dimensional biological normativity as a distinctive form of behavioral niche construction.
14. The 'proximity' of an utterance to other utterances in the same conversation is not spatial, but rather one of differential responsiveness and mattering. For informative of such non-spatial proximity, see Barad *Meeting* 223-226, and Haugeland, *Having Thought* 214-215.
  15. Conceptual behavior thus requires the ability to produce, track and respond to marks on bodies in ways that are responsive and accountable to other marks on bodies, whether the former 'markers' involve literal marks (such as inscriptions or drawings) or more transient gestures or utterances whose persistent marking of the world is dependent upon chains of comparably transient responses. An ideational 'language of thought' (Fodor, *Language of Thought*) would thus invoke an anti-naturalistic god-trick.
  16. Okrent, *Rational Animals*, ch. 2-4 explains why the teleology of organismic physiology and behavior should be understood in terms of goal-directedness rather than 'proper' functional roles, and how goal-directedness can be more basic than intentional contentfulness.
  17. The claim is not that other biological ways of life are static and unchanging. On the contrary, they continue to develop and evolve, and in many relatively complex ways of life, even to change their own patterns of responsiveness in response to previous proximal outcomes. The point is only that they maintain their own continuity in changing ways, without also directing themselves toward those changes as an issue within their way of life. Brittlestars over time may change their patterned responsiveness to predators, and some organisms do so within a single lifetime, but they do not also change their responsiveness to the significance of predators as something to respond to in one way or another within their overall behavioral economy.
  18. As I argue in Rouse, *Articulating the World*, conceptual understanding, biologically understood, is a form of behavioral niche construction within the human lineage.
  19. There is some compelling evidence that the neural capacities that would enable tracking and producing conceptually significant markers is an ancestral trait within the great ape lineage (Savage-Rumbaugh et al., *Apes, Language and the Human Mind*; Lloyd, "Kanzi, Language and Evolution"; Rouse *Articulating the World* ch. 3). In that context, the fact that this capacity has not developed in other primates is strongly suggestive either that it is not adaptive, or that there are significant adaptive or developmental barriers to its emergence.
  20. Rouse, *How Scientific Practices Matter* 284-293 shows why meaning and truth, like position and momentum, are marked by complementary material arrangements, in which conceptually articulated performances are either measured (as meaningful) by their material circumstances, or serve as partial measures of the semantic significance of those circumstances in those terms (as true or false), depending upon whether the relevant semantic uptake is 'movable' or fixed.
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