workshop "Is There an Ontology of the Digital?," held at the Open University, London, on May 7, 2015. I thank that workshop's organizers and participants. For additional suggestions, I thank Susan Coutin, Casper Bruun Jensen, Bill Maurer, Morten A. Pedersen, Justin Richland, Mary Weismantel, Leah Zani, and Mei Zhan. At *Current Anthropology,* Mark Aldenderfer and two anonymous reviewers provided insightful comments that were crucial to the revision of the manuscript.

Comments

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The Water Integrator was an analog computer created in the Soviet Union in 1936. It was designed to solve differential equations using a mechanism that might astonish many of us today: a hydraulic apparatus of pipes and tubes that, through a system of valves, pumps, and sluices, would manipulate volumes of water though a network of channels and holding chambers. Water levels in different chambers stood for different numbers in the computer's memory, and the flow of water between chambers enacted and represented mathematical operations that could change those values.

What makes the Water Integrator an analog computer is the one-to-one correspondence between a physical quantity (water levels) and a matching value (a number). Digital computation, by contrast, transforms a series of discrete, encoded values (typically, the zeros and ones of binary) into higher-order representations (e.g., e-mails, PDFs, spreadsheets, and YouTube videos) that have a conventional and arbitrary—not continuous or isomorphic—relation to those anchoring values.

Which kind of computation attaches its processes more firmly to "reality"? The one—analog—that uses real water to represent correlating quantities or the one—digital—that uses discrete voltage patterns to generate abstractions? One answer might be both or neither, since numbers are as abstract as any quality, and qualities are as real as any abstraction. Asked in the other direction, does there exist a difference between the "reality" of the numbers delivered by the Water Integrator and the "reality" created in a digital realm (say, World of Warcraft) conjured out of the computation of discrete quantities? The answer, again, is that it depends, for—as Boellstorff persuasively argues—reality is, above all, an interpretive relation, not a property that inheres as such in particular things, materials, media, or formats. As Boellstorff puts it, we should not "treat the digital as a 'lossy' approximation of the analog" but rather treat this mode of representation as supporting realities of its own, ones that "may or may not manifest," that may solidify or fracture through convention and contest. The real or the ontological is, as Boellstorff elegantly argues, an achieve-

ment, an arrangement of relations (see also Kockelman 2012; Smith 1996).

One worry did creep over me as I read through Boellstorff's tour de force of synthesis, intervention, and theorizing, and that was that he never quite defined "the digital." I came to see, however, that Boellstorff, ethnographically and expertly tuned to today's practice and usage, was taking as read a by now everyday acceptance of "the digital," one that has it as a synonym for computationally supported online venues and processes of social interaction. I decided, too, that my worry was beside the point, since Boellstorff's insight about reality as relational works as well for analog as it does for digital. This is to say that Boellstorff's argument is so persuasive that it might not need "the digital" to work.

But this raises a historical question for me and pages me back to ethnographic work I conducted in the 1990s among computer scientists who claimed that the "digital organisms" they programmed within computer models of evolution were real organisms in virtual worlds (see Helmreich 1998). Looking back at the claims of these scientists through the lens of Boellstorff's argument makes me a bit uneasy. While a relativist attitude would happily accept that a digitally real biological ontology precipitated from these scientists' work, such an account would miss the ways these people's "digital real" depended upon a rhetorical erasure of their own interpretative work, upon what Diana Forsythe once called the "deletion of the social" (2001). It may be difficult to remember, in these social-media days, that "the digital" was once quite ideologically sealed off from "the social" (Hayles [1994*b*] called the result "ontological closure"). The "digital real" is a shifting, historically situated social phenomenon.

The "social" is central to Boellstorff's definition of ontology. Boellstorff defines ontology as posing "questions of being—'who are we'?," immediately making "ontology" not about such ahuman entities as, say, rocks—the preoccupation of another branch of ontological scholarship, thing theory (see Brown 2001)—but rather about identity and belonging, about being as existing as a subject/creature/critter/agent.

And that is the key to why Boellstorff proposes, via Tarde, habeology—being through mutual interpretive possession—as an alternative to ontology. This is a very useful intervention and might even be ported back to make sense of those scientists who once believed in digital organisms. Scientists in "artificial life" held they had created real digital life in part because of the "holding power" of computationally rendered realms, zones into which they could project hopes and fantasies (Turkle 1984). Habeology, then, becomes about having and holding, about— permit me a moment of habeological camp—a kind of marriage. For artificial-life folk, the reality of digital organisms actually often arrived through the most normative, patriarchal heterosexual reproductive vision of marriage; digital organisms were rhetorically animated through imagery of a "male programmer mating with a female program to create progeny whose biomorphic diversity surpasses the father's imagination" (Hayles 1994*a*:125; or, in a schoolyard idiom, programmers loved their

computers so much that they wanted to marry them). Marriage, of course, can subtend many other sorts of relations (see Maurer 2015 on how to think of individual and corporate relations with "big data" as akin to marriage arrangements that require exchange of bridewealth), and the "historically specific grids of similitude and difference" that made analogies between heterosexual procreation and computer programming persuasive for some people in the 1990s have quite fallen apart. Digital organisms have become less, not more, "potentially real," and Boellstorff can help us see why.

From a less heteronormative and less anthropocentric view—where "to marry" refers to the grafting of vines in viticulture—the having and holding of the digital (or, indeed, analog) real may be about how ontology manifests through the grafting together of social commitments and technological affordances (and see Winograd and Flores 1986). The holding chambers of the Water Integrator held within them an ontology of number, of quantity and quality, married to a particular reality by the interpretative conventions of mathematicians. The Water Integrator, like today's digital computers, operated something like an oenophile in front of a flight of wine, working through sequences of conventionalized pairings of vocabulary and phenomenological experience to pronounce on the real. Boellstorff teaches us that ontology, channeled through habeology, can turn water into wine, digital and physical into real or unreal, transforming the very networks of similitude and difference through which we calculate the qualities and quantities of our worlds.

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This beautiful essay intervenes simultaneously in two heated anthropological conversations—one about the ontological turn, the other about what we might as well call the virtual or digital turn. Boellstorff reveals unexpected potential for generative interillumination between these two areas of concern, motivating his discussion by critically examining the dualistic, from-and-towards logic of the "turn" metaphor. Following in the gleeful spirit of flamboyant gyrations, I might recall that, since the era of nineteenth-century mass culture, "turn" has also had another meaning: an item of entertainment, strung together in the spectacular show-length progressions of American vaudeville and British music hall. Could this additional meaning also be relevant to the topic at hand?

I very much like Boellstorff's move to emplace intellectual currents he considers, associating the reflexive turn with (the idea of) California and the ontological turn with (the idea of) Cambridge. However, I might emphasize a different, more inclusive, kind of situatedness: the diacritical definition of the real in respect to the virtual as an intellectual commonplace in Euro-American ontologies. For reasons that are clear enough,

Boellstorff deemphasizes culture as an explanatory concept and does not invoke ideology at all, but the recurring dichotomizations of the real and the virtual that he describes clearly present us with powerful, culturally specific "media ideology" (Gershon 2010). This ideology places the real and the virtual "on a zero-sum continuum such that every step 'from' one is a step 'to' the other," as Boellstorff nicely phrases it, with authenticity, value, and meaning presumably increasing or decreasing in corresponding increments.

Boellstorff's "digital reality matrix" gives us an elegantly persuasive way to visualize precisely the kinds of interpretive possibilities occluded by conflating the physical with the real, on the one hand, and the digital with the unreal, on the other. As Boellstorff shows, it can be very difficult for scholars of digital culture to prevent these pervasive ideological associations from creeping into their analyses. In addition to the salutary habeological approach he advocates, Manning and Gershon (2013), who similarly draw inspiration from the ontological turn, suggest using the trope of animation to break down real/virtual binaries. Building on a multimodal view of human interaction (Keating 2005), linguistic anthropologists have focused on the way that people coordinate the use of different channels, simultaneously and sequentially, to accomplish communicative practices that they may construe as more or less real, regardless of whether those channels are proximate or mediate, analog or digital (Jones 2014).

But whether it is possible to achieve what Latour calls a "symmetrical anthropology" (2007) of communication that treats all channels as ontologically equivalent remains to be seen. For my part, I wonder whether the real/virtual binary will not always somehow be with us, insinuating itself as an implicit rationale for anthropological research seeking either to reveal that "online" sociality is really real or that naturalized, normative forms of "offline" sociality are deeply artificial—even if the valences are ultimately reversed. Perhaps the best we can hope to do is treat these binaries ethnographically, which at times may require "turning anthropology into an ethnographic object" (Herzfeld 1987:23), as a Euro-American discipline that has often been responsible for reifying such ethnotheoretical distinctions; hence Dominic Boyer's (2013) call to reflect upon anthropology's own "informatic unconscious" as the ethnography of digital culture comes into its own.

An archeology of anthropological approaches to virtuality could productively begin with Edward Sapir (1931:78), who articulated an early, fairly sophisticated account of the relationship between "primary processes" of communication associated with face-to-face verbal interaction and "secondary techniques" of mediation that enable interaction across distances of space and time. For Sapir, the primary processes reach their fullest form in the intimate settings of primitive tribes and nuclear families; secondary techniques, such as literacy or telephony, emerging "only at relatively sophisticated levels of civilization," increase "the sheer radius of communication" while lessening "the importance of mere geographical continuity" (80). (Clearly his ontology precluded human medium-

though this is obscured when the scholarship is acronymized (ontologized?) into a singular "OT" and its history recounted in a Whiggish fashion. These multiple perspectives are one reason I agree with Pedersen on the value of non-zero-sum frameworks for conceptualizing difference and similitude. This agreement is masked by Pedersen's claim that "the question of difference versus similarity is not a zero-sum game, as Boellstorff seems to think." My empirical claim that the turn from epistemology to ontology has largely remained bolted to difference is not a normative claim that this must remain so. Indeed, my ruminations on archipelagic difference and habeology are just two ways that I work to build on excellent insights of ontological-turn scholarship that exceed zero-sum frameworks.

Pedersen's view that I insist "that we need to render our concept of difference less 'radical'" is thus erroneous. Beware of scare quotes: I never use "radical" with regard to difference in this way, nor do I speak in a unilinear fashion of "more" or "less" difference. Instead, when discussing habeology, I speak of "troubling" the notion of radical alterity. I do not insist that we need to render our concept of difference less radical; were I to speak in such terms, I might say that we need to render our concept of difference less ontological.

In his classic discussion of the "real," J. L. Austin termed it a "trouser-word" for which "it is the negative use that wears the trousers. That is, a definite sense attaches to the assertion that something is real . . . only in the light of a specific way in which it might be, or might have been, not real" (1962:70). There might be value in extending such an analysis to "difference" in relation to similitude. Recalling Helmreich's observation that artificial life programmers often saw the reality of the digital as achieved via normative visions of marriage, we might queer these conceptual trousers and consider how visions of marriage and difference might "fall" were their premises destabilized (Boellstorff 2007b).

Rethinking understandings of difference holds great promise for forging a better conceptualization of the digital real. Placing bodies of scholarship in conversation with each other can help mightily in this regard but only if gatekeeping is set aside in favor of careful reading and generous engagement. In this sense, all four of these commentators illustrate how the unavoidable and valuable location work of anthropological analysis includes us, the anthropologists, just as much as those we study. Questions of the digital will only become more salient to the discipline. In our era of big data and algorithmic living, it is crucial to demonstrate the contributions anthropology can make to understanding digital cultures and their very real consequences.

—Tom Boellstorff

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