6 "What Do We Want?" "Materiality!" "When Do We Want It?" "Now!"

Jonathan Sterne

Starting around the turn of the last century, a generation of Chicago School sociologists went off in search of the community they found missing from their own world. Today, many of us constructivists go off in pursuit of an ever-receding horizon of materiality, one we are equally sure will fill a void we feel around us. As Finn Brunton and Gabriella Coleman put it in chapter 4, the quest for materiality is asymptotic: "we will never quite arrive." If there has been a collective call to emanate from the many different kinds of constructivists in the humanities and social sciences, it has been a cry for materiality. The desire is especially strong in the various human sciences that converge on the study of technology. I imagine throngs of professors and graduate students in various strains of media studies and science and technology studies taking to the streets, signs in hand, chanting their demands.

There are many sources for this longing. The writers in this collection have their own conception of materiality to which they attach it. Leah Lievrouw tells the story like a pendulum swing, where the constructionists have so thoroughly won in the battle against technological determinism and various behaviorisms that our attentions have swung too far in the other direction. Geoff Bowker argues that it is in part a reaction to our current condition of information overload. As journal articles proliferate to the point of cacophony, the project of "knowing everything about the world" (as Bowker puts it, in chapter 5) runs aground. Pablo Boczkowski and Ignacio Siles suggest the issue is that we've become too bounded up in intellectual silos, tied to objects in one or another corner of the study of media technology—production, consumption, content, materiality (which seems to function as "form" in their scheme)—when the real action happens in the middle. All of the authors, but most forcefully Brunton and Coleman, acknowledge the challenge is not to arrive at firm ground, an end point that also serves as a beginning, but rather to find some new kind of middle: "Each frame—of hardware, of users, of stories—implies and

affects the others. . . . Only with all three frames of reference in mind can we start to work at the breadth and detail appropriate to the polyphonic, massively multiuser, and materially intricate phenomena occurring on networked computers now" (chapter 4). Today, many constructivists are like Brunton and Coleman's geeks. We want to get "closer to the metal." We are exhausted by "the text-centered, social constructivist paradigm" (Packer and Wiley 2012, 7; referring to Coole and Frost 2010).

But what is this quality called *materiality*? Reading around in the humanities and social sciences, we can find dozens of calls for materiality, but often little agreement over what the term entails. For instance, Jeremy Packer and Stephen B. Crofts Wiley suggest that the material turn encompasses materialist approaches not only to technology, but also to economies, bodies, spaces, and even discourse itself. One finds different materialisms in the traditions of German media theory and what Bernard Siegert more recently calls "cultural technics" (Gumbrecht and Pfeiffer 1994; Kittler 1999, 2010; Siegert 2011); science and technology studies (Bowker 1993, 1994; Canales 2009; Galison 1994, 2003; Pinch and Trocco 2002); the turn to object-oriented ontology (Bogost 2012; Harman 2002); the new feminist materialisms (Grosz 2011; Bennett 2010; Hayles 1999); as well as other extensions of philosophical programs found in the writings of Foucault and Deleuze and Guattari (Foucault 1991; Deleuze and Guattari 1987; see also Massumi 2002).[1] This is to say nothing of the rising fashion for neuroscience in philosophy and some of the humanities like art history, film studies, and music; and the enduring interest in various intellectual descendants of Western Marxism (Hardt and Negri 2000; Terranova 2000; Lazzarato 1996; Grossberg 2010; Berland 2009). The various permutations of the term "material" signal the shape and affordances of the physical world we make and move through, as well as the constitutive social relations that compose our lived reality. But there are major disagreements over how to talk about the various relationships among the things that constitute our thoroughly technical *and* human realm: physical and social processes, consciousness and subjectivity, power and justice.

There is also a growing literature that suggestively argues against equating constructivism with relativism. Rather than assuming that there are multiple constructions of a single material reality, these authors argue, we should instead base our analyses on *multiple realities,* each of which is treated as an empirical fact, and each of which has its own materiality (Viveiros de Castro 1992, 1998; Hage 2011, 2012). This is a particularly challenging conception of materiality, and in an alternate reality to this one, it would be the subject of my response to this collection.

I am entirely sympathetic to the call for more attention to materiality (Sterne 2003, 2012), so long as materiality refers to both physical things and the irreducibly relational character of reality: a phonautograph made partly from human ears, a telephone made partly out of cats; the bandwidth in a transmission channel, the wear on a record or tape; the configuration of people at either end of a sound-reproduction event, whether a broadcast, phone call, or disparate and distributed moments of recording and playback; the institutions that condition "the technological imagination" (Balsamo 2011) as their inhabitants build devices and research their users; the signal-processing routines that operate and direct activity at the most basic and banal levels of infrastructure and consumer electronics; the political, economic, and regulatory apparatuses that motivate so much movement of communication technologies in capitalist societies. All of these things aren't simply material, but they have irreducibly material dimensions. To claims that data are immaterial, there is Matthew Kirschenbaum's (2008) rejoinder about the physicality of hard drives. If data took up no space, there would be no limit to the number of songs on your MP3 player or mobile phone. I conceive of technologies as repeatable social, cultural, and physical processes crystallized into mechanisms. But, of course, defining *technology* is one of the messiest operations in philosophy, history, and the humanities at large (no doubt because it also entails a definition of "humanity" as either technological or nontechnological, no small issue). At worst, "technology" is an amorphous term for an amorphous field. At best, when we get beyond immediate appearances of gadgetry, the term has tremendous breadth and capaciousness, from Mumford's (1934) *technics* to Heidegger's (1977) four causes, to Foucault's (1977) diagrammatics.

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But before we go too far down the path of affirming our fatigue with constructivism and seek refreshment in the garden of materiality, it is worth pausing for a few pages to remember why scholars pursued constructivism in the first place. For as strongly as we may feel the call of materiality, it was not so long ago people felt the same way—and more strongly—about constructivism.[2] A brief detour through intellectual history begins with an earlier generation of writers who turned to constructivism to solve epistemological problems caused by excessive commitments to positivism. They wrote what they wrote because they felt certain concepts—the ones in most dire need of critique—were beyond reproach in the available discourse. Scholars like Berger and Luckmann (1966), James Carey (1989), and David Bloor (1976) challenged correspondence theories of language

and instrumental understandings of representation, in part because both positions were increasingly incompatible with philosophical and political aspects of the liberal, reformist projects they championed. Berger and Luckmann radically extended the sociology of knowledge by assuming that knowledge of the world was itself a social fact, which in turn had effects: "How is it possible that human activity should produce a world of things? In other words, an adequate understanding of the 'reality *sui* generis' of society requires an inquiry into the matter in which this reality is constructed" (Berger and Luckmann 1966, 18). Bloor extended their approach into the sociology of science, arguing for an initial impartiality around truth and falsity so that the construction of scientific facts can be studied (Bloor 1976, 7). By resisting the correspondence theories of language, both writers sought to show how facts about the world came into being and had real (we might say material) effects. As Carey reflected on his own critiques of positivism in the 1960s and 1970s, "it was necessary to write such things at that time to try and clear some space in the academy so other things could be done" (Carey and Grossberg 2006, 199).

If we widen our scope, there is a whole wide range of Western intellectual traditions that have nourished one or another strain of constructivism and to which we can point back. Even the most mild constructivist owes debts to writers like Marx (Marx and Engels [1932] 1970), who argued that the ruling ideas were inextricably tied to power relations; Nietzsche, who asked after the obvious taken-for-granted opposition of terms like "good" and "bad" ([1887] 1967); Peirce, James, and the American pragmatists, who pursued ideas for what they could do, rather than searching for immortal truths (James 1970; Peirce 1955); and Canguilhem and writers in the French history of science tradition (Canguilhem 1978), who challenged the disinterestedness and normalism of scientific reasoning. But something special happened in the 1960s and 1970s. As Carey suggested, this work cleared a space for the wave of constructivists who would follow.

Over the last quarter century, much constructivist work on communication technology has carried all these influences (in varying combinations). But in this more recent period it is also marked by an often quite explicit reaction to the broader, commercial, technological culture that surrounded middle-class academics. From the 1980s on, scholars confronted a world full of grand claims for each new wave of digital technology, a world full of institutionally sanctioned, commercially amplified, technological imperatives and initiatives, ornately decorated with millennial rhetorics of inevitability, revolution, transformation, and the transcendence of materiality. To write about technology in this moment was to guide a sailboat against this

gust of common senses that came from a hurricane of industrial and institutional initiatives. Writers confronted a particularly virulent form of digital utopianism, and they encountered it personally in their own lives, their own institutions, among their colleagues and their students. Fighting back against this mass of ideas often meant directly confronting the proposition that technology was a causal agent in historical change. We might say that certain institutional imperatives in digital cultures and economies were the cause, and (constructivist) critiques of digital utopianism and technological determinism were the reactions. Fred Turner (2006) has given a particularly compelling account of the rise of digital utopianism. Besides his *From Counterculture to Cyberculture,* dozens of articles and books in this period built their accounts of communication technology on critiques of utopianism—whether historical or contemporary, and regardless of the specific technology. They started pouring out in the 1980s, and intensified in the 1990s (see in order of publication, Czitrom 1982; Slack 1984; Douglas 1987; Marvin 1988; Robins and Webster 1989; Spigel 1992; Stabile 1994; Brook and Boal 1995; Robins and Webster 1996; Balsamo 1996; Edwards 1996; Gitelman 1999; Jones 1999; Peters 1999; Swiss and Herman 2000; Sconce 2000; Abbate 1999. Another set of works of media history also dealt with technology in a constructivist fashion, but were more broadly cultural historical in orientation (Barnhurst and Nerone 2001; John 1995; Hilmes 1997; Ohmann 1996; Thompson 2002). These bodies of work mark a fairly significant shift from the earlier constructivists: the work on technology was often less epistemologically motivated or preoccupied. It was not fighting against positivism for the purpose of liberal social critique. It was debating about what it was fighting: some authors labeled it as capitalism, others as an institutional problem, and still others saw it as a technological problem.

By the twenty-first century, the critique of technological utopianism was so well made that I can't think of a single text (I am including my own writing here) that offers an argument about it that wasn't already available in the 1990s or before. And yet, the critiques of technological utopianism kept coming because cultural and commercial forces—beyond the content of scholarship—also shaped the conversation. To use Pierre Bourdieu's phrase, we struggled with the "pregiven" (Bourdieu, in Bourdieu and Wacquant 1992, 251). Even today, dissertations on communication technology still commonly take a moment to rehearse the terms of debate between determinism and constructivism as they were laid out in this period and before, and then take a position somewhere in between. It's a hard habit to break.

By the turn of the twenty-first century, constructivist work on communication technology routinely combined careful analysis of how the

technologies themselves worked as physical and social mechanisms (in order of publication, Zielinski 1996; Hillis 1999; Terranova 2004; Fuller 2005; Gitelman 2006; Slack and Wise 2006; Goggin and Newell 2006; Cartwright and Goldfarb 2006; Gillespie 2007; Helmreich 2007; Bijsterveld 2008; Kelty 2008; Zielinski 2008; Striphas 2009; Hildebrand 2009; Parikka 2010; Balsamo 2011; Mills 2011; Huhtamo and Parikka 2011; Gates 2011). These newer works combined constructivism and materialist analysis in various configurations. Depending on the author, their interest in materiality came from history, anthropology, political theory, philosophy, or science and technology studies, even though the basic premise behind looking at artifacts as themselves having some substance is quite old. It also came from the conflicted intellectual legacies of historical materialism, including some of its most heretical incarnations, like cultural studies. Increasingly, these approaches to materiality were supplemented by the range of conflicting materialisms I listed at the top of this chapter. But we couldn't fully escape the terms of the argument just by turning them around, and even today, scholars of communication technologies sometime still collapse their objects into *technology as such* (another rhetorical habit of digital promoters), begging the question of how and under what conditions communication technologies might be special cases of the more general category, *technology*, as well as whether things we attribute to communication technologies are in fact more broadly technological problems.

If a critique of consumerism and millennialism lay beneath one version of constructivism, another comes from the social construction of reality, and not just the construction of technology. This was constructivism's more discursive and less materialist guise, especially in the Anglophone world. Academic responses to movements like feminism, decolonization, civil rights of all kinds, AIDS activism, disability rights, and a host of other political movements all took up a specifically discursive version of constructivism. They did so in part because of the moments in which they emerged, where various poststructuralisms came into vogue as the university faculties started to diversify, allowing more people to occupy the position of professor and author, and putatively, bring with them more perspectives. A turn to a particularly discursive constructivism made it quite easy to argue that, for instance, there was no essential content to a category like "woman"— while still acknowledging the existence of differential power relations that would bear unequally on people as they were classed by gender. Indeed, classic work like Donna Haraway's mid-career writings, ranging from her work on cybernetics to her more famous "A Cyborg Manifesto" (in *Simians, Cyborgs, and Women,* 1991) attacked essentialisms and determinisms

around gender, species, and technology as part of the project of imagining other possible ways of being in the world and alternatives to male domination. This body of work engaged with science and technology, but it was not solely confined to it.

The discursive approach was a barricade against the weighty tendencies that collapsed descriptions of people into descriptions of their bodies, an issue still widely unresolved, especially in newer fields like disability studies (Butler 1993; Gilroy 1994; Kleege 2005; Siebers 2008).[3] This work is in one sense a direct heir of the earlier epistemological constructivists. But politically, they deliberately broke with the liberalism that animated Berger and Luckmann, Carey, and Bloor, borrowing instead from the various radical social movements by which they were inspired (even if there was not always a direct link between activists and scholars). It is difficult to overstate the importance of this move, not only for contemporary scholarship, but also for contemporary politics.

To oversimplify in the hope of making my point clearly, the difference between constructivism in fields like feminist theory, postcolonial studies, disability studies, and cultural studies, and the constructivism in science and technology studies (STS) and actor-network theory, is a matter of kind and strategy. Both are politically minded and assume the political character of knowledge, but they differ on what politics is and where scholarship is to be situated with respect to it. The former group methodologically presupposes the irreducibly political character of the constructive operation, they assume that power relations preexist the constructivist scenario, and they assume that any analysis is always situated and positioned (which is not to say that ideas are simply reducible to biography). They begin from the presumption that differential power relations animate any context before they arrive on the scene to analyze it, and they are motivated (often implicitly) by a normative framework that challenges those axes of difference at their very base. In STS, the motivations are similar but the working assumptions are different. Wiebe Bijker, for instance, wrote that his own interest in constructivism was rooted in Dutch peace activism, especially against nuclear weapons (Bijker 2001). But the employment of the "Strong Programme" and various other strategies of epistemological agnosticism insist on a strategic neutrality for the purposes of analysis. This affirms the traditional rhetorical position of the liberal social critic, at arm's distance from the fray. Latour, meanwhile, attends to politics but from a largely managerial point of view, where the scholar may care about politics, but does not take an oppositional stance (Latour 2004). Again, we find care and interest, but also the assertion of distance.

Yet today, many feel that constructivism itself, along with the critique of technological determinism, has overreached and run aground. This argument is also older than it feels, since some of the parameters are already apparent in Ian Hacking's (1999) *The Social Construction of What?* More specifically in relation to communication technology, writers like Geoffrey Winthrop-Young (2011) and John Durham Peters (forthcoming) have taken on the epithet "technological determinism." As Peters points out, the accusation of technological determinism is a conversation stopper. It often begs the question of what the term "technology" includes. For many writers tarred with the brush of determinist, "technology" is actually a much bigger term than "gadgetry."

It seems that we are tired of having this argument over and over. But why are we so compelled to have it and what are we to do about it? Geoff Bowker's materialist and somewhat scary analysis of our own situation in the production of knowledge is quite telling. As he surveys the every-growing glut of journal articles, each of which has a smaller and smaller audience, he sees: "We are clearly not creating a species of knowledge-power appropriate to the issues that we face. We are producing knowledge that is predicated on and replicates mass production and mass consumption. Our information infrastructure, willy-nilly, is the fold in the Moebius strip that permits the world to seem as society writ large" (chapter 5, this book). The declining relevance of the journal article as the materialization of scholarly knowledge, and the uncertain struggle to find alternatives, demands a certain patience, since if there is a new form of knowledge coming, it hasn't yet arrived. Bowker finds some hope in massive collaborations and new database logics. For my part, I retain some confidence in the resiliency of both the essay form and the codex, which have thrived for hundreds of years. Meanwhile, the journal article seems to undergo transformations every two or three decades.

Boczkowski and Siles turn more hopefully to pedagogy as a solution, getting students to work across disciplinary categories. If I still believe in the book and the essay, I still believe in the seminar even more. I am experimenting with disallowing rehearsals of "technological vs. cultural determinism" arguments in my classes and exams. It's harder than it sounds, especially when the rhetoric of techno-utopianism is alive and well in the commercial world and still operates in the truth spaces of journalism and online discussion. It's also difficult given how much this comes up in cultural analyses of technology of whatever stripe. But if we want to get beyond the argument, our students stand a better chance of succeeding than we do, so it's up to us to stop trying to reproduce it, even as a historical

curiosity. At the graduate level, my seminar on the historiography of new media in winter 2013 takes Boczkowski's approach to the extreme, though my model is less the social scientific diagram (with its quadrants) than the record collection with its eclecticism. Students will select the topic of their semester's research at the beginning of the term and each week retrieve a primary source relevant to it. Each week, they will also read a distinctive work of media historiography (mostly books, since that is still the core traffic in the field). They will then write about their artifact in the style of the author, which requires them to determine what the important stylistic aspects of the work really are. At the end of the term, the students can then revise these short papers into something longer, synthesized into something approaching their own authorial style. The approach is meant to encourage openness to other ways of writing and thinking, to free students of the pressure to take positions as their own against the positions of others, and to challenge them to reverse-engineer the work of other scholars so that they get a better sense of what's actually involved in the interface between writing and thought. The pedagogy imposes some strict limits and demands for imitation (at first) to encourage creativity by freeing students of the demand for creativity in the places we usually look for it (choice of object, originality of voice, etc). It is drawn from how musicians learn their instruments: when I wanted to learn to play a good bass line, my teachers had me learn to imitate what the best bassists did. I either succeeded and incorporated their techniques with my own, or failed and came up with something original-sounding in the process.

Of course, coming up with something original is harder than coming up with something original-sounding. This leads us to Bowker's most serious provocation, which is to ask: what if we no longer want for knowledge of the world, but have too much? As with the other rehearsed arguments mentioned earlier, the information overload proposition is an old one, and it demands the repetition of an old answer. While collaboration is becoming more common in the humanities, and it should, the humanities and social sciences also must continue their projects of interpretation, analysis, system building, and generalization, even as we are forced to confront the partiality and mortality of all knowledge. Our job is still to produce synthetic, meaningful accounts of the world, to answer big how and why questions, even if the job of "knowing everything about it" is really too much to impose on a single person. Transcendence, after all, is situated transcendence. All universalisms start from somewhere. Constructivists showed this to be true for the sciences; it is equally true for the humanities and social sciences. When we look beneath the debates about technological

determinism and constructivism, we find a mess of arguments about causality, and causality is where the action is. The desire for materiality is a desire for firm foundations. The excess of positivism was to assume it could be satisfied once and for all. The excess of technological utopianism was to co-opt it into an intellectualized consumerism. The excess of constructivism was to denigrate the desire altogether.

Acknowledgments

Notes

1. Throughout this essay I refer to long lists of works. The point is to be suggestive, not exhaustive. In most cases, I'm only referencing a very small segment of work that would exemplify what I'm describing. "Materiality" is such a central term for so many people that it's hard to stop the lists. Certainly, *copia* seems like a fitting rhetorical strategy.
2. Though we must remember this is only true in some places—take a look at how your school's strategic plan talks about technology and you're likely to see that a very simplistic notion of causality is alive and well among some academics.

3. To see how deep this goes, do a text search of your favorite humanities scholars for disparaging references to blindness and deafness. The blind and Deaf never seem to fare too well in the ableist critical imagination.