

Chapter 3

3D Printing and Actor– Network Theory

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ABSTRACT

Some futuristic technologies belong to a distant time that is hard for most to imagine in palpable terms. In the case of 3D printing, however, any citizen can easily grasp the stakes by simply watching a brief video (Global News 2013). The 3D printer, whose ancestry can be traced to factory innovations of the 1980s, provides a method of assembling objects piece by piece: a kind of less precise nanotechnology for the macro-level. Within a decade humans might be able to print functional body parts, bringing an end to the grisly waits for donated organs and the even more grisly international organ trafficking rings. Some believe that the “killer app” for 3D printing will be found in the printing of food, perhaps replacing single-site restaurants with a home library of Platonic forms of gourmet cuisine. Still others celebrate or fear the printing of assault rifles on a desktop, whether by right-wing citizens, convicted felons, or the mentally ill. One can expect the easy availability, in residential privacy, of all manner of benign and malignant objects, transforming economic structures, social life, and domestic security in roughly fifteen to twenty years.

1. ARMSTRONG ON MATERIALITY

In the past several years, nearly every conversation I have had about philosophy and technology has quickly turned into a discussion of the coming impact of 3D printing. Clearly, the topic is on everyone’s mind. Thus it is strange that as of late 2014, there is still relatively little published academic literature on the topic. Let’s begin our reflections with a recent article by Rachel Armstrong, one of today’s most diligent observers of the intersection between science, art, and architecture. The title of Armstrong’s article could hardly be more candid: “3D Printing will Destroy the World Unless it Tackles the Issue of Materiality.” (Armstrong 2014) Two questions can be asked on the basis of this title alone. First, how might 3D printing destroy the world? And second, what does Armstrong mean by “materiality”? Having clarified these preliminary themes, we can ask more broadly about what lessons 3-D printing might offer present-day philosophy in general, and actor-network theory in particular.

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Armstrong certainly does not come off as a luddite. She is willing to concede the appeal of “[architect] Norman Foster [planning] to print moon bases using an array of mobile printing nozzles on a 6 metre frame to squirt out sequential layers of lunar soil that will be set with a binding solution.” She is perfectly impressed by “experimental technology [that] may one day design entire ports to withstand future earthquakes that devastate places like Haiti, at a fraction of the cost of a traditional construction company.” Armstrong is also willing to appreciate both the efficiency and the science-fiction potential of the coming technologies: “Stratasys has just announced its new revolutionary 3-D printer that can produce multiple material types in a single print run, reducing the price of complex prototypes by around 50 per cent, while Skylar Tibbits promises us a phase of 4-D printing where geometries become even weirder when they encounter activating solutions.” Finally, she is well aware of the likely practical upside of 3-D printing: “[it] can also process locally sourced materials, reducing the expense of transport and distribution systems and has even been proposed to improve employment conditions.”

Yet Armstrong holds that all of these benefits are outweighed by the potential garbage-related catastrophe of the new technology. As she puts it, “urgent thinking is required to avoid the revolutionary potential of 3D printing being lost in a sea of pointless plastic products.” She rues the coming day when “the unit cost of printers falls and hobbyists make legions of *white elephants* out of toxic plastics and when our landfills are chock-a-block with yesterday’s badly made fashionable shapes,” most of which “will simply clutter up our rubbish dumps and precipitate our plastic marine continents as indestructible rubbish icebergs.” And just as poetically:

Climate change may be evidenced empirically in specific events—such as rising sea levels and escalating concentrations of atmospheric carbon dioxide—but it is also experienced through bizarre encounters with matter such as the covert continents of particulate plastics causing the painful death of marine wildlife and entering our own food chain.

Armstrong remains skeptical even of the energy-saving benefits of the technology, since she has “yet to see a full supply chain analysis on the energy and resource requirements of 3-D printing,” and notes as well that it is “extraordinary for a practice whose material platform is largely based on plastics, compounds that do not do well in ecosystems, to propose to be ‘ecological.’”

3-D printing must escape the imaginative constraints of familiar pre-existing industry, and “[become] the champion of research into dynamic systems and lifelike materials—which may not yet have a mature market—so that we can produce objects that in themselves forge positive environmental relationships such as carbon recycling or soil generating systems.” Armstrong concludes that “perhaps the most vexing aspect of 3-D printing is that squirting plastics into funny digital shapes says absolutely nothing about matter—which as Timothy Morton reminds us, is the essence of Nature.” (Morton 2013) To summarize, “in the 21st century, matter is lively, strange and unpredictable—and is a force to be reckoned with... 3-D printing is not a revolution in making until it addresses the fundamental issue of 21st-century materiality.”

Though Armstrong only stresses the word “materiality,” it is not a risky step to describe her position with the related word “materialism,” a term that has grown increasingly popular among theorists in recent years. Since ancient Greece the usual opposite term for matter is “form,” and even today materialism is often introduced to counter some type of *formalism*: especially in art, architecture, and literary criticism. It is easy to see how a materialist critique of possible formalism in 3-D printing might also hit home. Whatever forms of sculpture, consumer products, and vulgar amusement we might choose to generate

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