

BOOK REVIEW

How Green is your Smartphone? Richard Maxwell and Toby Miller (2020) Polity Press, Cambridge, 160pp., £35.00 (hardback) £10 (paperback) ISBN 9781509534722

I've been teaching an undergraduate media and the environment class for a dozen years. When I first started, it was challenging to find works in media studies that connected media with environmental issues. This is partially owing to a Western cultural legacy based on the body/mind duality, which leads to a belief that anything related to thoughts, images or ideas is primarily immaterial. The dearth of environmental connections is also related to the way that the media ecology tradition inspired by McLuhan and Postman has evolved. Their exploration of how medium reshapes perception has led to a convoluted understanding of media environments as purely technological and abstracted from their physical ecologies. To this day, the average media scholar (based on anecdotal evidence) still does not immediately grasp the intimate connection between media and their impact on the environment (and if you are wondering what that is yourself, I will get to it shortly).

Initially, when I gathered materials and research for my course, I was especially concerned to approach the subject from multifaceted scholarship that explored media from different perspectives: representation, rhetoric, affect, phenomenology, political economy and materiality. This was not easy because the strength of media studies is political economy and representation, but generally it is not holistic enough to cover environmental themes or the material impacts of media (e.g., I have yet to find a media studies textbook that mentions the environment). Consequently, I had to expand beyond media studies to delve into science communication and philosophy. Guattari's *Three Ecologies* (2008) is one of the few earlier works to acknowledge different ecologies, namely material, social and mental. For an interdisciplinary method that applies representation, identity, production, consumption and regulation to media gadgets, such as the Walkman and iPod, the circuit of culture developed by cultural studies is useful, but it still eschews environmental concerns (Du Gay *et al.*, 1997, 2013). Philosophers focused on ecology and film, such as Ivakhiv (2008, 2013), expanded upon Guattari's three ecologies and the circuit of culture by applying them to process-oriented philosophy. In recent years, a materialist turn in the study of media has emerged in which scholars are focusing more on the materiality of the media and our gadgets (Parikka, 2015; Bollmer, 2019). Not until Maxwell and Miller wrote *Greening the Media* (2012) did we start to get a more interdisciplinary study of media and the environment exploring the material history of a particular medium (i.e. print, film, TV, cell phones) that incorporated labour history and political economy.

Since I started teaching this subject, there has been an explosion of research and scholarship on media and the environment (Corbett, 2006; Hackett *et al.*, 2017; Maxwell *et al.*, 2015; Parham, 2016; Parks and Starosielski, 2015; Rauch, 2018; Rust *et al.*, 2013, 2016; Walker and Starosielski, 2016). Emerging from this new scholarship is the concept of ecomedia, which conflates ecology and media to recognize that media are first and foremost materially embedded in and extracted from the environment in the form of cables, satellites, electromagnetic energy, server farms, energy consumption, mineral resources and so on; and second, that media circulate and educate us about the environment and how to engage politically. Humans are also part of the environment, so ecomedia takes into consideration how our media technologies impact our health and well-being, but also how we experience the world phenomenologically. In my own methodology as an ecomedia literacy scholar, I have divided these categories into media's ecological footprint and mindprint, although I see them as dialectically interconnected and not separate from each other (López, 2014).

Returning to the problem of trying to find appropriate scholarship to teach media and the environment, admittedly my job has gotten much easier. The eruption of scholarship has been a tremendous boon. But until now, I still have been missing something that connected all the different ways media are materially produced. When it comes to the point in the semester where we explore conflict minerals and mining, manufacturing and labour, and e-waste and disposal, I have had to cobble disparate resources that were not coherent for a media studies course. I badly needed a coherent text that tied together the entire production chain of media gadgets *and* an exploration of marketing, representation and journalism. With the release of Miller and Maxwell's *How Green is your Smartphone?*, this problem is now solved.

This short and concise book follows up *Greening the Media*, doing what the former book could not: provide a clear step-by-step analysis of the single most dominant media device ever produced. This is not to say that *Greening the Media* is flawed: it's just so vast and sweeping that my students would get lost in the details of all the different media histories that are explored in that book. The scholarship in *Greening the Media* is a vital and necessary resource, but to borrow an environmental metaphor, we lose the forest for the trees. In *How Green is your Smartphone?*, the various issues around labour, environment and political economy are distilled clearly and concisely with a sharp focus. For teaching purposes, this is the book I have been waiting for.

Maxwell and Miller's call to action is to outsmart our smartphones. Given the environmental consequences of cellphone production and the impact they have on workers, 'smart' has always been a misnomer. With the exception of the Fairphone, from a strictly ecological and social justice standpoint, the current generation of mobile gadgets are quite dumb, and not smartly designed for low environmental impact or fair labour practices. As the authors rightly point out, we have been too enthralled by the technological sublime and 'digital enchantment' to question the impact of our beloved gadgets on the environment, even when we express concern for the climate crisis. This leads to a major blind spot in our understanding of how gadget production and use has huge energy impacts, from the production of silicon wafers and semiconductors to running server farms (and therefore increased CO2 emissions), and a massive toxic legacy from their manufacture and disposal.

One of the book's main focuses is the effect of electromagnetic radiation from wireless devices on our physical health. If you believe that radiofrequency (RF) levels are safe, try this simple exercise: see if you can find the RF exposure guidelines for your phone. Go ahead, try it. OK, how easy was it? And if not, why do you think that information is so difficult to access? The answer to this mystery is in the book but suffice to say that a lack of acknowledgement and willingness to honestly confront electromagnetic pollution requires that we outsmart the propaganda system that obfuscates this problem. The authors illustrate how telecom companies utilize the same tactics as the carbon industry to create confusion and doubt about science. This 'war gaming of science' to reduce regulation and awareness of the safety of our devices requires an analysis of industry practices, but also the political economy of media that enables tech companies to confuse the public. For example, do you know if cell phones cause cancer? If you're not sure, then this is precisely the point. You should have clear awareness of this issue.

In addition to RF risks, they also explore the issue of addiction and screen time, noting the literal dangers of distraction (such as traffic accidents), impacts on learning and health risks to our natural electromagnetic rhythms and sleep patterns. As they methodically break down the environmental and health risks of mobile gadgets, they call for the precautionary principle (better safe than sorry) to be applied to how media gadgets are produced and utilized. The precautionary principle should be applied in lieu of a cost-benefit analysis, 'which looks at the pluses and minuses of consumer satisfaction versus safety' (p.21). Starting from the personal and practical – keep your phone or your laptop from touching your body and avoid whenever possible pressing your phone to your head – to the level of policy and regulation, they encourage solutions throughout. As they note, the cellphone industry is shockingly underregulated in the US (Europe fares a bit better). How this came to be involves a larger analysis of the regulatory and political system.

Invariably, an exploration of the environmental and health impacts of gadgets requires a critique of the global economic system that encourages dangerous environmental and safety practices. In what I consider to be the most useful chapter, 'The Greenest Smartphone is the One you Already Own,' they argue that, once a phone is made, it is actually the greenest media technology we can own. Its primary environmental impacts happen when it's produced and discarded. For example, the manufacture of one phone uses as much power as a refrigerator running for a whole year. During the lifetime of a phone, the energy consumption it needs to run is negligible. If we want to conserve energy, buying a new phone is not the way to do it. Still, on average we replace cell phones every one and a half to two years, yet we keep our refrigerators and dishwashers for more than ten years. Why is that? They argue that there are three environmental reasons why we should hold onto our phones for as long as possible: 'Doing so contributes less often to the problem of e-waste, a global disaster for ecosystems and the atmosphere; reduces carbon emissions, which are highest when new phones are manufactured and lowest over the smartphone's useful lifetime (compared to other digital devices); and de-pressurizes demands that systematically pull millions of young people into intensive and hazardous factory conditions, where the length of the workday and pace of production are dictated by brand companies and their annual promotions of dubious upgrades (not to mention their lack of responsibility for dealing with discarded products)' (pp.90–1).

One hopeful note is that, even though our use of data centres grows exponentially every year, their energy consumption does not. It remained at 1.8% of total electricity use in the US (whose data centres are the biggest power consumers of cloud computing in the world) between 2010 and 2014. Entertainment media consumed on phones substantially reduces the energy consumed on TVs and PCs. (An interesting aside, the financial sector has huge energy demands because they require super-powerful computers to process information at increasingly infinitesimal increments of milliseconds.)

The chapter's most insightful subsections are the overview of the labour process, which is divided into four areas: mining hazards and conflict minerals; manufacturing and assembly; the business model that keeps wages low and compromises worker health; and our global e-waste problem. This is the first accessible text I have found that describes for a lay audience these different processes all in one place. The book incorporates research on the specific chemicals and health hazards from the production system, but also puts that into an understandable context to explain how the system functions: 'There is enough research on how digital technologies affect the bio-physical environments to mitigate the worst features of planetary digital despoliation. But much scientific information is ignored or distorted by corporations, governments, and the media' (p.95).

In the spirit of a manifesto, Maxwell and Miller deploy snappy, no-nonsense language to alert us to the urgency of their call to action, namely the creation of a greener communication system. The final chapter is hopeful in that it maps how we may solve some of these problems. The one thing that smartphones can do intelligently is signal boost solidarity. They acknowledge that we cannot participate fully in society without our smartphones, so if we are going to do it, we have to outsmart the system that was designed to be environmentally dumb.

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