

Our dirty love affair with technology

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It is time to recognise that the digital economy is a large-scale contributor to ecological damage.

Global expenditure on electronics reached a trillion dollars in 2012 - a 5 per cent increase on 2011 despite the deep recession. The United States alone can be credited, if that's the word, for more than a quarter of this growth, most of it via the demand for mobile devices - laptops, tablets, and smart phones. This love affair with high-tech goods shows no signs of cooling, and the very big problem is that as the market heats up so does the environment.¹

Over ten billion of these large and small computers use electricity, which means that 15 per cent of the world's residential energy is now dedicated to domestic digital technology. When you add to this the power required to make and distribute these toys, consumption from digital living translates into carbon emissions that rival those of aviation. According to the International Energy Agency, if usage continues to grow at this rate, the residential electricity needed to power digital culture will rise to 30 per cent of global demand by 2022, and 45 per cent by 2030.²

Furthermore, we now increasingly rely on data centres or server farms for 'cloud computing'. That metaphor - of a natural, ephemeral, beneficent weather phenomenon - belies the dirty reality of coal-fired energy that feeds most data centres around the world. Greenpeace estimates that if the computing cloud were a country, it would be the world's fifth-largest energy consumer.³

Older readers will recall telephone exchanges as places that stood out physically in the landscape, even though their interiors were mysterious. And Los Angeles, for

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example, remains marked by awesome and uninviting buildings that are run by the Department of Water and Power - keeping alive memories of Polanski's *Chinatown*. Though today's warehouse-sized computer systems are located in data centres that are more private than their venerable socialistic predecessors, they are of comparable dimensions; the demand for power and cooling from these server farms doubled between 2000 and 2005, and grew about 56 per cent between 2005 and 2010 - a period when industrial energy use was otherwise flat.

A further massive environmental and social problem arises from the ways in which the technology is produced (compounded by the frequency with which we replace devices). Clearly, our digital habits come at a price far greater than the bills we pay

Consider the notorious case (even the *Daily Telegraph* piled in) of Foxconn, one of Apple's key suppliers.⁴ With over a million employees across China, Foxconn is responsible for almost half the world's electronics manufacturing, but its treatment of employees has been widely condemned, particularly its use of a military-style discipline characterised by verbal and physical abuse (many line supervisors are ex-army officers from Taiwan). These conditions have contributed to suicides at some plants, and all-out rebellion and worker violence at others. The response from the company? It is assembling thousands of robots to take over from humans, even as Apple basks in dubious claims that it is taking better care of workers.⁵ And the legion of loyal Macsters (we're members) is not alone in benefitting from this exploitation.

Yet the broader problem isn't Apple or its suppliers. What matters more is the opaque global supply chain that allows scoundrels to abuse and poison electronics workers around the world, harm our environment and permit a complacent ignorance on the part of consumers.

This customer complicity is animated by the high-tech industry's insistence that what is good for it is good for us. Why else would it design fast fashions and short lifespans for digital devices? The industry loves the word 'upgrade', a term that induces a frenzy for marginally innovative hardware and software, based on built-in obsolescence, agile marketing and a lust for newness. As new gadgets grow ever more rapidly old, vast amounts of electronic waste enter municipal waste systems each year - between 20 and 50 million tons worldwide. Wealthy high-tech nations dump 80 to 85 per cent of this waste in Latin America, Eastern Europe, Africa and

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Asia. It takes the form of a thousand different, often lethal materials that lurk within the toys that you tap, watch, listen to and read. And nowadays, the global south generates its own deadly media junk - India and China have 638 million internet users to 243 million in the US.⁶

Once discarded and dismantled, electronic waste can expose salvage workers and ecosystems to a morass of toxic components, posing health risks to bones, brains, stomachs, lungs and other vital organs, as well as leading to birth defects and disrupted biological development in children. Medical catastrophes can result from the search for precious metals, because it exposes people to lead, cadmium, mercury and other heavy metals, poisonous fumes, and such carcinogenic compounds as polychlorinated biphenyls, dioxins, polyvinyl chloride and flame retardants. Much of the research on this topic comes from epidemiologists, climate scientists and environmental engineers in Nigeria, Brazil, China, and India, where the problems are close to home. In the global north, attention is more likely to come from social movements than academics.

Where is the outrage?

One might think that the enormity of the environmental problems caused by making, using and disposing of media technologies would arrest enthusiasm for them. But many potential correctives to our 'love affair' with technology - our technophilia - have come and gone without having established much of a foothold against the breathtaking flood of gadgets, or the propaganda that promotes their awe-inspiring capabilities.

This is partly because it is difficult to comprehend the scale of environmental destruction when media technology is depicted in popular and professional quarters as a vital source of plenitude and pleasure, the very negation of scarcity and dross. In economies whose watchword is growth, consumerism has become virtually uncontested as a cultural norm. Another factor may be an obsession with immediacy and interactivity via networks - which helps induce an ignorance of the intergenerational effects of consumption, and inhibits our awareness of the long-term harm to workers and the environment. Could constant connectedness diminish our ethical ability to dwell on interconnections between the present and the future, between the media and the Earth?

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Perhaps widespread resistance to a critical, secular view of technology can be attributed to the technological sublime - the totemic, quasi-sacred power ascribed by industrial societies to modern machinery and engineering.⁷ The emergence of this relatively recent veneration of technology can be linked to Western triumphs during the post-second world war period, when technological power supposedly supplanted nature's capacity to inspire fear and astonishment. In philosophical aesthetics, the sublime (the awesome, the ineffable, the uncontrollable, the powerful) and the beautiful (the approachable, the attractive, the pliant, the soothing) are generally regarded as opposites. The unique quality of electronic technology has been its ability to combine them.

The media have been invested with just this potent blend of magic and science since at least the nineteenth century, when telegraphy was conceived of as a physical manifestation of human intellect that matched the essence of humanity to the performance of labour. In the early twentieth century, radio waves were said to move across 'the ether', a mystical substance that could contact the dead and cure cancer. During the interwar period it was claimed that the human 'sensorium' had been retrained by technology. By the 1950s and 1960s, machines were thought to embody and even control consciousness. In our own time, this strange enchantment has attached itself to wireless communication, touch-screen phones and tablets, flat-screen high-definition televisions, 3-D IMAX cinemas and mobile computing (among other items).

The story of the environmental impact of media technology is missing from all such accounts. That history began, in small, incremental stages, in the fifteenth century with the printing press. The volume of toxic drips and harmful puffs then increased over four centuries, spreading across the earth in a pattern of uneven development established by merchants, mercenaries and missionaries. The industrial revolution brought crucial transformations in the scale and scope of media technology, as the convergence of chemical, mechanical and electrical processes accelerated the accumulation of toxins in the environment. In the twentieth century these innovations launched the era of electronic media - and US hegemony - while increasing the burden borne by the earth's ecosystems.

The media are endowed with a unique symbolic potency, based on volume, verisimilitude and velocity: they proliferate everywhere and all the time; they are good at producing a semblance of truth; and they are increasingly quick to do so.

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And this helps conceal the relationship of technology to the environment. Indeed the overstated pre-eminence and newness attached to whatever the latest media gadget happens to be elicits a cult-like embrace of novelty that unconsciously links symbolic power to environmental impact. Juliet Schor refers to this as a 'materiality paradox' - the greater the frenzy to buy goods for their non-material cultural meaning, the greater the use of material resources.⁸

References to the symbolic power of media technology are so ubiquitous that they incite minimal if any scrutiny. The prayer book of true believers can be found across the internet, the press, education, politics, bureaucracy, commerce and academia. Although the litany is banally repetitive, it continues to excite because of what it promises:

technology is changing us
the newer media can solve social problems, or create new ones
monopoly ownership no longer matters
the internet is killing journalism
social networking enables social revolution
the planet must be comprehensively wired
every child needs a laptop
cell phones should proliferate
the media represent clean, post-industrial capitalism
we must all become cultural producers.

Such statements are laden with technologists' jargon. They mix half-truths and utter nonsense. In reality, old-time toxic manufacturing has moved to the global south, energy consumption is accelerating residentially and institutionally, and electronic waste is exploding. These developments are due almost entirely to information and communication technology and consumer electronics.

Yet these technologies and consumer goods are routinely presented as the foundation of our 'knowledge-based' economy, and of those happy, green, post-smokestack creatives who huddle outside offices in Clerkenwell drawing deeply on their ciggies before boldly returning to rebalance the British economy. (Change the *barrio*, country and drug to suit your locale.) More than that, ICT and consumer electronics are heralded as the answer to development in poor nations. Thus

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economists have claimed that cell phones streamline markets in the global south, enriching people through the provision of market data in zones where banking and economic information are scarce. Exaggerated claims include ‘the complete elimination of waste’ and massive reductions of poverty and corruption through the empowerment of individuals.⁹

Challenging technophilia

Any challenge to the media’s impact on the environment must break the enchantment that inflames popular and elite passions for media technologies. Right now, the mere mention of the political-economic arrangements that make i-Things possible, or the environmental consequences of their appearance and disappearance, is seen as bad medicine. It’s an unwelcome buzz kill - not a cool way to converse about cool stuff. It won’t win many allies among ICT/CE enthusiasts and industry leaders.

A number of key questions are raised by the notion of an eco-ethical turn away from the technological sublime. Technological solutions may themselves eventually be feasible, but a re-enchantment with low-wattage culture and non-human nature must come first. There is also a need to rethink how much media technology is socially necessary - not only on an individual or household basis, but also on the institutional and social scales.

One powerful antidote to technophilia would be a greater understanding of the realities of labour in the global assembly lines and salvage/recycling yards where these technologies are built and dismantled. By some estimates, there are nearly two hundred million ICT/CE workers, a figure that doubles if we add mining and related labour-intensive work.¹⁰ And a staggering number of organisational relationships, geographical ties and interlocking occupations operate across these supply chains. They link computer scientists, engineers, designers, marketers, miners, mineral brokers, refiners, chemists, factory labourers, server-warehouse employees, telecommunications workers, truck drivers, logistics managers, salespeople, office clerks - and anyone else whose job has been ‘revolutionised’ via ICT, or who has contributed innovation, time, blood, sweat or death to making, distributing, receiving, or rejecting media devices and texts. Blood and sweat are not just metaphors here: real bodies are at work, and in profoundly unequal ways.

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Enhancing solidarity across this vast division of labour will require a broad international effort dedicated to structural changes in the production, distribution and disposal of media technologies. This can only be based on greater transparency in working conditions throughout the ICT/CE supply chain - a goal that could unite workers, activists, researchers, policy makers, and unionists.

Another key challenge to technophilia could come from global governance enacted by public-interest bureaucrats, who play an important gate-keeping role in determining the ICT/CE we get and how their production, consumption and disposal are regulated. Here, though there are some promising changes in state and corporate governance, the bulk of bureaucratic thinking remains anchored to the belief that unfettered economic growth is necessary and good, and that ICT/CE is integral to such growth - with all the eco-ethical limitations that this implies. When the International Telecommunications Union undertook a thorough debate about internet governance in the last days of 2012, the usual positions were adopted: the US and its client states favoured virtually zero regulation, in the name of economic efficiency through corporate freedom of manoeuvre. (And they also derided efforts by Russia and other states to decentre Washington from the system, on the grounds that these were covert attempts to increase censorship through state involvement.)

These graceless debates need a shock of green splashed across the comfortable lounge suites that house their proponents: and by far the most powerful challenge to technophilia will come from environmental citizenship activism and campaigns for greener governance. In this context notions of citizenship need to be modified to account for transterritorial ecosystems and the global division of ICT/CE labour. And there must also be a shift away from the conventional neoliberal terms of national citizenship that think of the citizen and the consumer as alter egos (the *national* subject versus the *rational* subject). Citizen engagement in politics is not an artificial and meaningless endeavour, and consumption and individual acquisitiveness are not freedom. For proponents of neoliberalism, 'voting with your wallet' has become an act of citizenship, expressed through consumption - and citizens have thereby been reduced to a bundle of material desires. Though such forms of participation are seemingly self-actualising, they are usually in conformance with patterns of controlled market behaviour.

If green citizenship were limited to this neoliberal idea of market change through

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consumer choice, the result would be nothing more than a self-limiting, self-controlling individual who obliges corporate masters through dutiful purchasing and other insidious forms of behaviour modification. Thus, for example, the dark arts of marketing research are already exploring ways of manipulating residential energy consumption through the surveillance capacity of smart meters that can display your electricity usage alongside that of your neighbours. To your horror, you could find that the Joneses are living a greener life than you are - which, according to neoliberal logic, will stimulate narcissism and aspirational individualism to cause a green response.¹¹

The green citizenship we have in mind is radically different, based instead on serious engagement with environmental issues and political and ethical commitment to a greener society. This citizenship can include part-time eco-friendly practices within institutional settings such as schools, offices and other workplaces, as well as striving for broad systemic change; and it can involve the research- and policy-oriented work of critical advocacy groups, scholars, unionists and activists as well as the kinds of direct action that pressure corporate and government bureaucrats to revolutionise their conduct, policies and thinking. This kind of citizenship is the foundation for serious regulation, and for the enforcement of green legislation against the rising tide of the technophiliacs' dirty waste products.

What is being done?

As far as individual action is concerned, growing numbers of consumers are already re-evaluating their digital lifestyles. This change began modestly when recycling old electronics became another routine duty of environmental citizenship - alongside separating plastics, paper and garbage for recycling, refraining from littering, buying energy-efficient appliances or using public transport. And environmental citizenship is taking root in a growing number of workplaces, schools, residences and neighbourhoods where green is the new normal. These institutional settings provide part-time opportunities to foster a full-time culture of sustainability. Eco-ethico-political commitments also inform calls to protect workers' health from risks associated with the toxic substances and radiation that are designed into TVs, computers and other electronics. And there has also been legislation in the EU and other countries that requires recycling and other green routines.

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This is a start, but mitigating pollution levels will only happen if the illegal trade in electronic waste ceases to be profitable. There is a need for campaigning groups to consistently challenge technophilia and the clean-industry myth of the information society. Some groups, such as the Silicon Valley Toxics Coalition, Greenpeace and the Basel Action Network are already doing this, but more work is needed.

Partly because of the advocacy and activism of such groups, the EU has adopted directives that control some aspects of electronic waste generation. Its Directive on Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) limits the use of carcinogenic metals (lead, mercury, cadmium, and hexavalent chromium) and fire retardants that endanger humans and wildlife. And its Directive on Waste Electrical and Electronic Equipment (WEEE) sets targets for collection, recycling and recovery for national and local authorities, producers, distributors, consumers, treatment operators, recyclers, collectors and others. This is intended to eliminate electronic waste, or at least ensure that whatever cannot be eliminated is recycled to minimise environmental harm. And the directive also creates incentives to design and make ICT/CE with an eye to post-consumer waste.

The Directive allows for some electronic waste costs to be paid by local governments, but its measures are largely financed by equipment producers, including EU-based manufacturers and resellers. This exemplifies the doctrine of 'extended producer responsibility', whereby producers take responsibility for the end-of-life management of their products; and it also encourages new designs that cost less to collect, treat and recycle. Similar schemes exist across other parts of Europe, such as Switzerland, Norway and the Baltic States, as well as in South Korea, Taiwan and Japan. It perhaps goes without saying that the US has no national legislation of this kind, though it is spreading across the nation on a piecemeal, state-by-state basis that is all too typical of reactionary Federalism.

But despite these directives, the EU acknowledges that only one third of electrical and electronic waste in the European Union is reported as being separately collected and appropriately treated. Some of the remaining two thirds is therefore potentially still going to landfills, or to sub-standard treatment sites in or outside the Union. And the EU also concedes that illegal trading of electrical and electronic waste to non-EU countries continues to be identified at EU borders.¹² Other problems have also occurred as unanticipated side effects of RoHS, because

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of lack of transparency and labour inequities in the global supply chain. For example, bans on the use of cadmium in battery production and its transportation beyond the EU did stimulate other battery types, but it also provoked the shift of nickel-cadmium battery production to China. In 2007, twenty battery workers in Jiangsu province were diagnosed with cadmium poisoning in a factory contracted by a US company to make nickel-cadmium batteries for the Japanese multinational Panasonic.

Conclusion

The media have been intimate participants in environmental damage for a long time. The prevailing myth is that the printing press, telegraph, phonograph, photograph, cinema, telephone, wireless radio, television and internet changed the world *without* changing the Earth. The claim is that they brought fantasy, reality and pleasure to users in equal measure, fostering participatory and happy societies. In reality, each technology has emerged by despoiling ecosystems and exposing workers to harm inside and outside the factory, a truth that is obscured by both symbolic power and the power of moguls to set the terms by which such technologies are designed, deployed and depicted. Those who benefit from ideas of growth, progress and convergence, and profit from high-tech innovation, monopoly and state collusion - the military-industrial-entertainment-academic complex and the multinational commanders of labour - have for too long ripped off the Earth and its workers.

It is now time for a balanced assessment of the pluses and minuses of our love affair with gadgetry, undertaken with less hype and more practical understanding of the relationship of media technologies to the biosphere they inhabit. Together, we can stop electronic and electrical goods from poisoning ecosystems where they are manufactured; we can demand energy-efficient electronics; we can seek more extensive and thorough management of electronic waste; and we can press for ecologically sound design for high-tech goods that also protects the biophysical rights of workers. Environmental citizenship and green governance form our best hope of greening our digital life.

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Notes

1. This article draws in part on the authors' book, *Greening the Media*, Oxford University Press, New York 2012. Detailed references and sources for most of the data and quotations can be found there and in our monthly blog for *Psychology Today*, <http://www.psychologytoday.com/blog/greening-the-media>.
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