Ingrid Burrington, Sand in the gears, 2018. Source: https://thecreativeindependent.com/essays/sand-in-the-gears/

Research Institute for Art and Design

FROM CLOUD AESTHETICS TO ALTERNATIVE CIRCUITS AND ASSEMBLAGES
Bridging theory, fieldwork and design to nuance our computational tropes and narratives

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15 July 2024 by Cyrus Khalatbari

TEXT

INTRODUCTION: MINIMALISTIC INTERFACES, PROCEDURAL RHETORIC AND SEAMFULNESS

From red heart emojis we use on Facebook to light blue buttons on Instagram pressuring us to post content – matcha lattes, fluffy cats, niche memes, you name it -, the design and marketing of platforms we use on a daily basis are structured around a core ideology: seamlessness. Seamlessness is the desire to obfuscate these platform's "seams" and the technical logics – algorithms, protocols, codecs – at play when interacting with content. What these platforms consciously hide is, to put it differently, the way they manipulate our data as well as our attention[1]. They slice, moreover, the experience of scrolling online into 'jittery, schizoid intervals'[2] giving us the impression that, in addition to their lack of materiality due to their minimalistic interfaces, they annihilate time. In opposition to these behaviours and intentions, the design theorist Matt Ratto urges us to design for "seamfulness"[3]. Seamfulness – as opposed to *seamlessness* – materialises a broader intention to shed light on these platform's seams. This desire comes moreover with a specific will: focus on the various actors, and procedural rhetoric[4]

revealing how these platforms operate, intentionally craft specific socio-technical interactions and make us inhabit the world in a specific way. Emphasising on the seamfulness also means, from my perspective, to engage as artists and designers with three specific postures bridging theory with fieldwork and practice. I argue through this article that embracing these postures is foundational inside our arts and design practices and pedagogies in order to crack open these platform's opacity and blackbox[5] resulting from their seamless design. The first one is to contextualise and trace the emergence of these technical objects through what anthropologist André Leroi-Gourhan calls their *chaîne opératoire*[6]: mapping their sequential and chronological processes occurring from their production and optimisation to when they reach their end of life and are discarded. The second one, centred around the concepts of the critical technical practitioner[7] and making[8], urges us to engage – as artists and designers – with methodologies coming from social sciences in order to demystify and understand how these platforms operate in the real world[9]. The third and final posture the article puts forward opens the door to the importance of "conversational pieces"[10] where technology is used as a medium to critique and nuance the dominant tropes and narratives it conveys.

'WHEN YOU VISIT CANADA...WHEN CANADA VISITS YOU": EXTRACTING MINERAL, LEAKING TOXICITY AND POSTCOLONIAL VIOLENCE

Credit and source: https://www.reddit.com/r/HistoryMemes/comments/j0dlad

Computers or smartphones always give the same feel: they are shiny, smooth and they are supposed to *always work*. Drawing from the work of Bruno Latour, Ratto or others, this article argues that technology is made simple – seamless, blackboxed, comparable to magic – on purpose. By transforming these items into objects known as computers, smartphones, tablets, and so on, corporations create a cognitive shift that allows them to obscure the human infrastructures of extraction, optimization, and waste that initially enabled these objects to come into existence. Starting, as artists, designers and educators, with an investigation of the different states of our technologies' *chaines opératoires* helps us contextualise the inherent entanglements between these devices and the environment. Hidden behind sliced intervals, micro-temporalities[11] and other gamified strategies is therefore, at first, a tentacular circuit of raw mineral extraction needed to purify[12] from large quantities of substrate a handful of needed metals. These processes, whether raw mineral extraction or optimisation and discard as explored in the next paragraphs, are "matters of concern"[13] that *leak* pervasively and impact territories and natural resources both vertically and horizontally. Bauxite, the main substrate used for the production of aluminium, is a blatant example of this pervasiveness of the mining industry. As a substrate found only one or two metres close to the surface[14], its extraction requires mining companies to constantly expand – both on the ground and at the Earth's surface – in order to sustain their productions and needs. This geology of media[15] our computational culture depends upon reinforces, in turn, postcolonial dynamics where toxicity, ecological damage and land appropriation are common. In the context of bauxite and the manufacturing of computer cases, hard drives or heat sinks, this manifests in massive deforestation and forced displacement of Indigenous communities in the Amazon; as well as several pollution accidents occurring with red mud leaking into surrounding streams and rivers[16].

COOLING COMPUTERS, EXTRACTING POWER: OPTIMISING "HEAT" INSIDE OUR COMPUTATIONAL CULTURE


Credit and source: https://www.youtube.com/watch?v=1bnTxvPwBOo
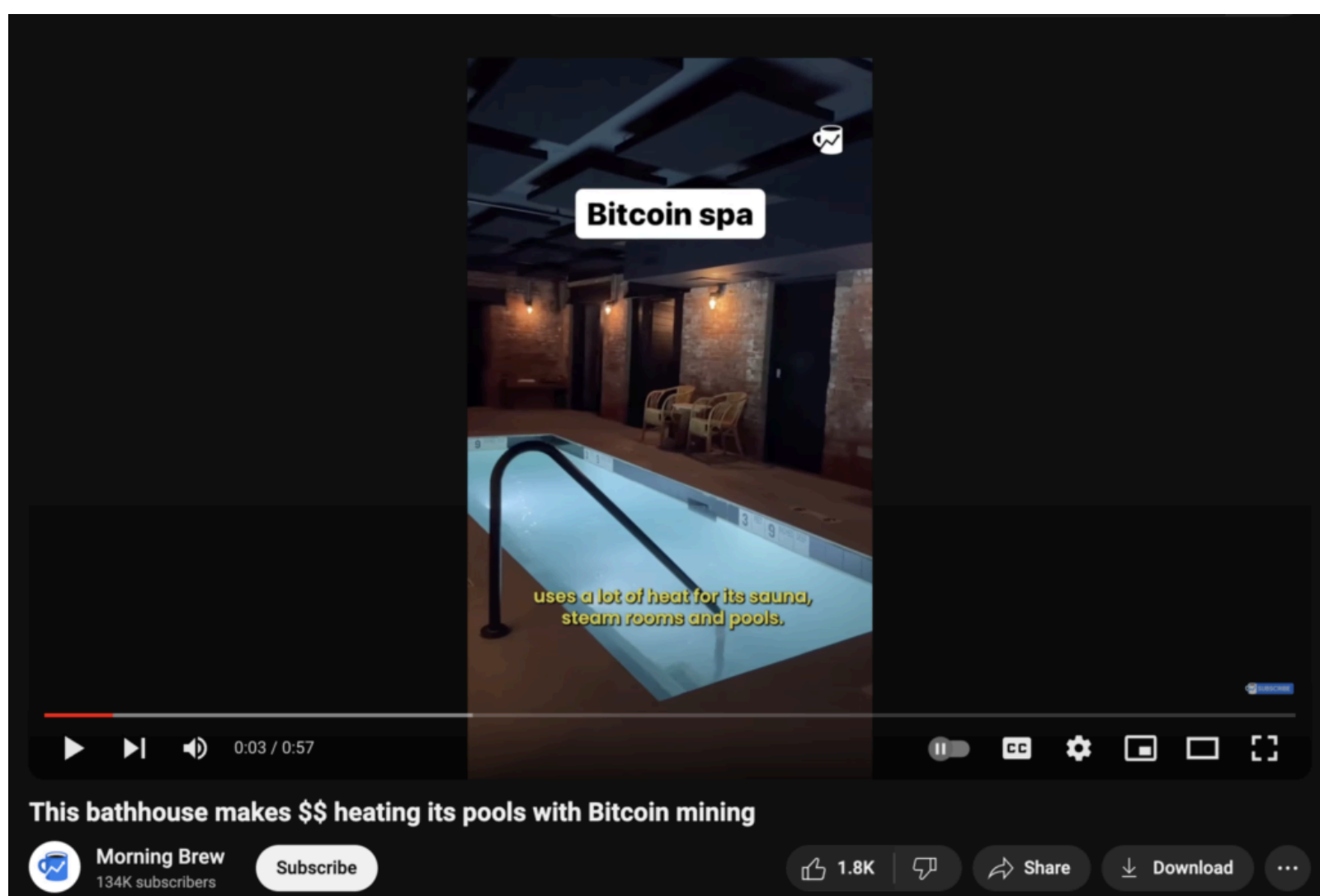
In addition to these raw substrates extracted and purified in order to power and operate our information ecosystem with its required metals, we – as consumers – are also intertwined with another elemental characteristic of media: heat. In this context, a core and structuring term developed to tackle the entanglement between media and the production, regulation and optimization of heat in our computational culture comes from the work of media scholar Nicole Starosielski: thermocultures[17]. Starosielski's analysis is rooted in Foucault's analysis and framework on alternative genealogies through the study of historical archives[18]. Nuancing our tropes and dominant narratives that do not take into consideration these invisible materialities of computation, the author bridges the emergence of printing, archives and data centres with the one of the air conditioning unit (AC), fans and cooling

systems. This helps contextualise modern media as inherently dependent on thermal control and manipulation[19]. By generating heat, cloud services, internet platforms we use on a daily basis also intertwine with another element: water. With big data and intense computation making "server rooms reach temperatures of 35-45 celsius degrees that could result in server failure", water becomes a crucial computation traffic commodity[20]: managed through pipes and tanks in order to cool down and optimise hardwares for the crafting of seamlessness. The role, importance and implications of water infrastructures in the context of big data and the internet is further developed by scholar Mel Hogan. Through her analysis of the National Security Agency (NSA)'s Utah-based data centre whose role is to collect large quantities of citizen's produced data in order to correlate it, the author sheds light on the contradiction and environmental violence rooted in the project. While situated on the arid territory of the Utah's desert, running the operation displaces vast quantities of water as well as bringing issues of land displacement, toxicity and deregulations in water treatments[21].

THERE IS NO CLOUD, IT'S JUST SOMEONE ELSE'S COMPUTER: DISENTANGLING INVISIBILIZED INFRASTRUCTURES OF DISCARD AND REPAIR

Credit and source: https://i.imgflip.com/38nltf.jpg
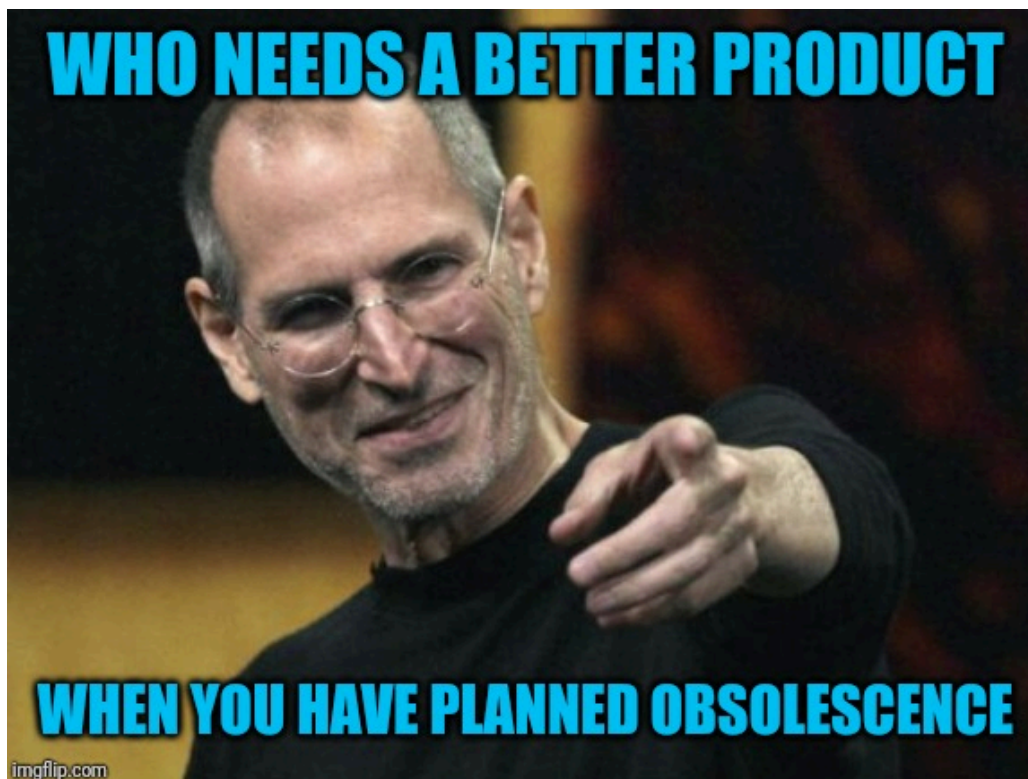
Another core material implication of our computational culture connects to the recycling and repurposing of second-hand computers when these are considered "trashed"[22] due to planned obsolescence. In order to disentangle these infrastructures, two academic frameworks are especially useful: discard[23] and maintenance[24] studies. Discard studies, on one side, propose to break mainstream discourses and disconnected perspectives around waste. While waste is, in these tropes, mostly approached in a closed and technically defined circuit of industrial recycling, discard studies clarify how these discards are embedded into wider social, political and material systems[25]. Maintenance studies, closely connected to discard studies, shed light on infrastructures of breakdown and repair at play when these objects are located at the end of their lifecycle. Circling back to our media devices and the minimalistic – cloudy – interfaces we interact with on a daily basis, both discard and maintenance studies commit moreover to the same goal: underlying infrastructures of labour and power emerging from the planetary circulation of electronic waste (e-waste). A blatant example of these infrastructures emerges from the electronic waste and equipment (EEE) processing site of Agbogbloshie, Ghana. While often portrayed by our Western and euro-centric media and environmentalists as the world's largest e-waste dump where our "computers go to die"[26], discard and maintenance studies help nuance and contradict this narrative. First, they help us demystify how computers and electronics make their way to Ghana within the global market of second-hand devices. Second, they uncover the marginalised communities, labour dynamics, and actions involved in the maintenance, dismantling, and recycling of these objects; devices which are intricately linked with the needs and desires of computational culture.

The Global Internet Is Being Attacked by Sharks, Google Confirms

BY WILL OREMUS AUG 15, 2014 · 3:23 PM

Sharks' attraction to undersea fiber-optic cables has been well-documented over the years.

Screenshot / YouTube

Credit and source: https://www.reddit.com/r/pcmasterrace/comments/ohl1tx

How can artists and designers investigate these hidden infrastructures of computing through the lens of their practices? How can they bridge insights emerging from theory and fieldwork with their own medium in order to nuance these dominant narratives around technology and our computational culture? The first framework I shed light on is developed by Nicolas Nova and Gauthier Roussilhe under the term of "*numérique situé*"[27]. While the internet and our computational culture *feels* immaterial and non-physical through the lens of its metaphors and its light aesthetics, the *numérique situé* invites critical technical practitioners to hijack these narratives. Bridging design and technology making through interviews and fieldwork – a posture Nova frames as investigation/design[28] – critical practitioners become actors of social analysis and change. Outside of these dominant and market-emerging tropes around the internet, they use design as a research-oriented practice in order to demystify the cloud and help us contextualise it in a set of environmentally and culturally situated practices and materialities. A first example of this posture is the work and projects of Ingrid Burrington utilising maps, drawings, walks and material experimentations. In her work entitled: "Networks of New York" (2014-2016), she documented how invisible traces of the internet infrastructure – cellphone towers, sensors, underground systems – manifest in both vertical and horizontal ways at the level of the city. The result of the project is dynamic: published as a zine where drawings, maps and texts are collected and shown. In dialogue with extracting minerals and the first section of this contribution, another project of Burrington aiming to geologically[29] situate our computational culture is developed as "Sand in the gears" (2018). The project is simple: an iPhone is sanded and grinded until it becomes a pile of dust. In opposition to the seemingly shininess and seamlessness of the object, the deep connections between our digital platforms and the slow geological time of accumulated rocks and sediments is then revealed.

Ingrid Burrington, *Networks of New York*, 2014-2016. Credit and source: http://lifewinning.com/projects/networks-of-new-york/

Ingrid Burrington, *Sand in the gears*, 2018. Credit and source: https://thecreativeindependent.com/essays/sand-in-the-gears/

Credit and source: https://imgflip.com/i/50s2lf

Whereas the *numérique situé* aims to make tangible the hidden infrastructure, materiality and politics[30] of sediments, rocks, switches, cables, cellphone tower and other devices in which our computational culture operate, I argue that another framework is helpful to debunk and nuance these dominant narratives of the internet: zombie media[31]. Developed by Garnet Hertz and Jussi Parikka as a methodological take for artists and designers, the methodology is inspired by circuit-bending: a practice consisting in opening electronic devices and changing – or hacking – how their circuits operate in order to render them as alternatives. Drawing from this, it invites critical technical practitioners to create technological assemblages and installations in order to nuance the concept of "new media". Taking the counterpoint of this glossy, high-tech and shiny narrative of technology associated with Silicon Valley's "Californian ideology"[32] and the need to always renew our devices, zombie media aims to make obsolescence visible through arts and technology contexts. Referring back to the discussions on disposal and maintenance in the third part of this contribution, this section demonstrates how these objects are repurposed at the end of their lives in new contexts. Additionally, it reveals how the prevailing narratives of technology, which often create an illusion of seamlessness, obscure the various temporal and energy regimes involved. A striking example of zombie media is the work of the Ghanain's artist Akwasi Bediako Afrane. With its "TRONS" (2022), old computers are given alternative purposes outside of their economic value and become entangled with new devices. This creates fragile and unstable circuits where information is transmitted through materialities that are both analog and digital: breaking the linearity of technology and showing its various temporal regimes. A striking piece of the Ghanaian artist is the installation created for the festival "Driving the human" (2022). The piece takes the form of an assemblage of interfaces and screen-mediated devices emerging from various temporalities of media. Amongst them, two objects are placed in dialogue in the same circuit: a cathode-ray tube (CRV) television and a virtual reality (VR) headset. This tension and association reveals here the repressed[33] genealogy of media and the material evolution of our devices through time. Outside of this dominant trope of "new media", it recontextualizes our smartphones, smartwatches and other screen-mediated "blackbox" of our computational landscape as inherently material and analog.

Akwasi Bediako Afrane, *TRONS for Driving the human*, 2022. Credit and source: https://www.gameoftrons.com/driving-the-human-21-projects-copy

People in 1013: In 1000 years we will have flying cars! 2023:

5 MODES RGB BACKLIT

Credit and source: https://imgflip.com/i/7q0bod

A third arts and design framework I argue as foundational to nuance private-emerging discourses framing our computational culture is developed as design fiction[34]. Building from the work of the science-fiction author Bruce Sterling[35], design fiction proposes to create tangible and evocative technological prototypes from possible near futures in order to understand and represent the consequences of decision making. In this framework, disciplinary constraints arising from ways of understanding technology are then broken apart. In other words, technology does not follow a solutionalist[36] approach and agenda but is used to materialise in playful and provocative ways potential futures. Through these alternative assemblages and conversational pieces borrowing both from science and fiction, our social and technological interaction rituals are then questioned, reframed and nuanced in speculative and humorous ways through design artefacts and prototypes. In this context, an installation and performance created by the british artist Max Dovey is especially evocative: the "respiratory mining" (2017). The project takes the form of a bitcoin mining apparatus. However, rather than being plugged into the electric grid and operated from the power of a computer, the device is configured to mine the cryptocurrency using human respiration and its velocity. As an echo with *zombie media* and the work of Bediako Afrane, Dovey's piece reveals how the production of these seemingly digital objects is in fact intertwined with an infrastructure rendered hidden by the dominant narratives around technology. While in the context of the Ghanaian artist this manifests in showing the forgotten

media upon which VR is built upon, Dovey's piece sheds light on the fragility of our digital and computational devices, crafted by precarious workers situated along its *chaine opératoire*, and processes of extraction, optimization and waste. While the activity and process of bitcoin mining seems at first immaterial and intangible, Dovey intertwines it with bodily fluids and processes arising from the respiratory activity and effort of the visitor experiencing the piece. Outside of the way technology is depicted and experienced by end-users, the piece calls for a recontextualisation of labour and invisibilized bodies and communities at play when mining, dismantling and recycling devices of our computational culture.

Max Dovey, *Respiratory Mining*, 2017. Credit and source: https://www.vice.com/en/article/bjyyq3/breath-mining-cryptocurrency-monero

CONCLUSION: SITUATED TECHNOLOGIES FOR SEAMFUL DESIGN AND AWARENESS

Taking the counterpoint of minimalistic interfaces and erroneous metaphors reinforcing the belief that the internet is a seamless object we observe from far, my contribution argues for the importance of showing the network's technical, cultural and ecological seams through the lens of art and design practices. As artists and designers, I propose to operate moreover outside of the purely solution-driven approach of technology but use it as a medium for investigation and critique. Emphasising on these internet seams and underlying logics means therefore to engage with three conceptual and material frames of action I posit through the article as beneficial in order to feed, enrich and nuance our arts and design practices. The first argues for a decentering of the studied object from its finite state to its network of extracting, optimisation and recycling/discard processes on which it depends upon. The second one, drawing from concepts of critical making and critical technical practices, invites artists and designers to employ fieldwork and interviews in order to crack-open its blackbox and *situate* it. The third grounding posture is centred around alternative embodiments of computing. Whether installations, sculptures or performances, these serve as interfaces to nuance past and future histories and narratives emerging from the digital and our sociotechnical cultures. Through this article and in the light of capitalocene[37] shift and condition, I argue that bridging these three postures is key inside our arts and design practices in order to crack-open these internet platforms and infrastructure's opacity and shed light on the politics at play in their contexts of extraction, optimisation and waste.

Notes

1. Yves Citton, *L'économie de l'attention : Nouvel horizon du capitalisme ?*, Paris: La Découverte, 2014. https://doi.org/10.3917/dec.citto.2014.01 ↵
2. Adam Greenfield, *Radical Technologies: The Design of Everyday Life*, New York/London: Verso Books, 2017, p. 40. ↵
3. Matt Ratto, "Ethics of Seamless Infrastructures: Resources and Future Directions", *The International Review of Information Ethics*, vol. 8, no. 12, 2007, p. 20-27. https://doi.org/10.29173/irie93. ↵
4. Ian Bogost, *Persuasive Games: The Expressive Power of Videogames*, Cambridge, MA: MIT Press, 2007.
   Following Bogost, "procedural rhetoric" is a type of rhetoric tied to the algorithmic logic of computers: executing rule-based symbolic manipulation in order to influence and direct user's specific behaviours through their interfaces' design. ↵
5. Bruno Latour, *Pandora's Hope: Essays on the Reality of Science Studies*, Cambridge, MA: Harvard University Press, 1999. Following Latour's words, the blackboxing of technology occurs when "technical and scientific work is made invisible by its own success" (p. 304), rendering it opaque, intangible and hard to understand to its users. ↵
6. As cited in Nicole Pigeot, "Chaînes opératoires : contexte théorique et potentiel cognitif", in René Treuil (ed.), *L'archéologie cognitive*, Paris: Éditions de la Maison des sciences de l'homme, 2011. https://doi:10.4000/books.editionsmsh.14554 ↵
7. Philip E. Agre, "Toward a Critical Technical Practice: Lessons Learned in Trying to Reform AI", in Geoffrey Bowker et al. (eds.), *Social Science, Technical Systems, and Cooperative Work: Beyond the Great Divide*, London: Psychology Press, 1997, p. 131-157. ↵
8. Garnet Hertz, *Conversations in Critical Making*, Victoria, BC: CTheory, 2015. ↵
9. Victor Papanek, *Design for the Real World: Human Ecology and Social Change*, New York: Pantheon Books, 1971. ↵
10. Julian Bleecker, "Design Fiction: A Short Essay on Design, Science, Fact and Fiction", *Near Future Laboratory*, 2009. https://drbfw5wfjlxon.cloudfront.net/writing/DesignFiction_WebEdition.pdf ↵
11. Winnie Soon, "Executing Micro-temporalities", in Helen Pritchard, Eric Snodgrass and Magda Tyżlik-Carver (eds.), *Executing Practices. DATA browser 06*, London: Open Humanities Press, 2018, p. 99-115. http://www.data-browser.net/pdf/DB06_Executing_Practices.pdf ↵
12. Nicole Starosielski, "Thermocultures of geological media", *Cultural Politics*, vol. 12, no. 3, 2016, p. 293-309. https://doi.org/10.1215/17432197-3648858 ↵
13. Bruno Latour, "Why Has Critique Run out of Steam? From Matters of Fact to Matters of Concern", *Critical Inquiry*, vol. 30, no. 2, 2004, p. 225-248. https://doi.org/1344358 ↵
14. A. Michael Donoghue, Neale Frisch and David Olney, "Bauxite mining and alumina refining: process description and occupational health risks", *Journal of Occupational and Environmental Medicine*, vol. 56, no. 5, 2014, p. 12–17. https://doi.org/10.1097/JOM.0000000000000001 ↵
15. Jussi Parikka, *A Geology of Media*, Minneapolis: University of Minnesota Press, 2015. ↵
16. Simon Lobach, "Suspicious minds: Aluminium production in the Amazon", *Aluminium International Today*, 2023, p. 15-17. https://aluminiumtoday.com/content-images/news/Simon-Lobach.pdf ↵
17. Nicole Starosielski, "The Elements of Media Studies", *Media+Environment*, vol. 1, no. 1, 2019. https://doi.org/10.1525/001c.10780. ↵
18. Michel Foucault, *The Archaeology of Knowledge*, London: Tavistock Publications, 1972. ↵
19. Nicole Starosielski, *Media Hot and Cold*, Durham, NC: Duke University Press, 2022. ↵
20. Julia Velkova, "Data that warms: Waste heat, infrastructural convergence and the computation traffic commodity", *Big Data & Society*, vol. 3, no. 2, 2016, p. 3. https://doi.org/10.1177/2053951716684144 ↵
21. Mel Hogan, "Data flows and water woes: The Utah Data Center", *Big Data & Society*, vol. 2, no. 2, 2015. https://doi.org/10.1177/2053951715592429 ↵
22. Jonathan Sterne, "Out with the Trash: On the Future of New Media", in Charles R. Acland (ed.), *Residual Media*, Minneapolis: University of Minnesota Press, 2007, p. 16-31. ↵
23. Max Liboiron and Josh Lepawsky, *Discard Studies: Wasting, Systems, and Power*, Cambridge, MA: MIT Press, 2022. ↵
24. Jérôme Denis and David Pontille, "Beyond breakdown: exploring regimes of maintenance", *Continent*, vol. 6, no. 1, 2017, p. 13-17. https://hal-mines-paristech.archives-ouvertes.fr/hal-01509617 ↵
25. Max Liboiron and Josh Lepawsky, *op. cit.*, p. 4. ↵
26. Kevin Mcelvaney, "Inside the Hellscape Where Our Computers Go to Die", *Wired*, April 2015, https://www.wired.com/2015/04/kevin-mcelvaney-agbogbloshie/ ↵
27. Nicolas Nova and Gauthier Roussilhe, "Du low-tech numérique aux numériques situés », *Sciences du Design*, vol. 1, n° 11, 2020, p. 91-101. https://hal.science/hal-02867603/document ↵
28. Nicolas Nova, *Investigation/Design*, Genève: HEAD — Publishing, 2021. ↵
29. Jussi Parikka, *op. cit.* ↵
30. Langdon Winner, "Do Artifacts Have Politics?", *Daedalus*, vol. 109, no. 1, Winter 1980, p. 121-136. http://www.jstor.org/stable/20024652 ↵
31. Garnet Hertz and Jussi Parikka, "Zombie Media: Circuit Bending Media Archaeology into an Art Method", *Leonardo*, vol. 45, no. 5, 2012, p. 424–430. https://doi.org/10.1162/LEON_a_00438 ↵
32. Richard Barbrook and Andy Cameron, "The Californian Ideology", *Science as Culture*, vol. 6, no. 1, 1996, p. 44–72. https://doi.org/10.1080/09505439609526455 ↵
33. Garnet Hertz and Jussi Parikka, *op. cit.* ↵
34. Julian Bleecker, *op. cit.* ↵
35. Bruce Sterling, *Shaping Things*, Cambridge, MA: MIT Press, 2005. ↵
36. Evgeny Morozov, *To Save Everything, Click Here: Technology, Solutionism, and the Urge to Fix Problems that Don't Exist*, Allen Lane: London, 2013. ↵
37. Jason W. Moore, *Capitalism in the Web of Life: Ecology and the Accumulation of Capital*, London: Verso Books, 2015. ↵

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