

State Machines

Reflections and Actions at the Edge of Digital Citizenship, Finance, and Art

Edited by Yiannis Colakides, Marc Garrett, Inte Gloerich

Today, we live in a world where every time we turn on our smartphones, we are inextricably tied by data, laws and flowing bytes to different countries. A world in which personal expressions are framed and mediated by digital platforms, and where new kinds of currencies, financial exchange and even labor bypass corporations and governments. Simultaneously, the same technologies increase governmental powers of surveillance, allow corporations to extract ever more complex working arrangements and do little to slow the construction of actual walls along actual borders. On the one hand, the agency of individuals and groups is starting to approach that of nation states; on the other, our mobility and hard-won rights are under threat. What tools do we need to understand this world, and how can art assist in envisioning and enacting other possible futures?

This publication investigates the new relationships between states, citizens and the stateless made possible by emerging technologies. It is the result of a two-year EU-funded collaboration between Aksioma (SI), Drugo More (HR), Furtherfield (UK), Institute of Network Cultures (NL), NeMe (CY), and a diverse range of artists, curators, theorists and audiences. State Machines insists on the need for new forms of expression and new artistic practices to address the most urgent questions of our time, and seeks to educate and empower the digital subjects of today to become active, engaged, and effective digital citizens of tomorrow.

Contributors: James Bridle, Max Dovey, Marc Garrett, Valeria Graziano, Max Haiven, Lynn Hershman Leeson, Francis Hunger, Helen Kaplinsky, Marcell Mars, Tomislav Medak, Rob Myers, Emily van der Nagel, Rachel O'Dwyer, Lídia Pereira, Rebecca L. Stein, Cassie Thornton, Paul Vanouse, Patricia de Vries, Krystian Woznicki.

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 Amsterdam University
of Applied Sciences

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STATE MACHINES

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AT THE EDGE OF
DIGITAL CITIZENSHIP,
FINANCE, AND ART

EDITED BY
YIANNIS COLAKIDES,
MARC GARRETT,
AND INTE GLOERICH

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State to Stateless Machines: A Trajectory

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Aksioma, 2019.

Challenging Infrastructures. Alternative Networking & the Role of Art

Daphne Dragona, Dimitris Charitos
Aksioma, 2018.

I Saw the Blockchain at the End of the World, Turned Around, and Walked Back

Jaya Klara Brekke
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Notes from the Excluded Middle

Daniël de Zeeuw
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Aksioma, 2017.

Artists Re:Thinking the Blockchain

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Furtherfield and Torque, 2017.

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RISING ABOVE OUR SILOS

YIANNIS COLAKIDES,
MARC GARRETT,
INTE GLOERICH

RISING ABOVE OUR SILOS

YIANNIS COLAKIDES, MARC GARRETT, INTE GLOERICH

*The world only spins forward. We will be citizens.
The time has come. [...] The Great Work Begins.¹*

While Jeff Bezos and Elon Musk made headlines in 2018 by devising space retreats for the elite, the United Nations' Intergovernmental Panel on Climate Change (IPCC), supported by many scientists, warned of a major, looming environmental catastrophe that would strike by 2030.² Meanwhile, governments remain preoccupied with spending billions of euros on protecting their geographic boundaries by building walls—both physical, like those in the USA, Turkey, Saudi Arabia, and Hungary, and ideological, such as those that have surfaced in the Brexit debate, and many other elections the world over. On the technological front, machines of surveillance and control are being developed and are proliferating exponentially, including iris, face, and voice recognition software, fingerprinting, DNA, accelerometers, IP and MAC address trackers, as well as microchip subdermal implants connected with external databases. Many of these technologies are used in combination with an already advanced GPS hardwired into most devices. Described by Apple CEO Tim Cook as being part of a 'data industrial complex',³ the patent protected technologies feed databases containing mass data to which only tech giants and some governmental agencies are granted access. Similarly to how, historically, mass media spread the messages of pre-internet protest movements, it is those who control the algorithms who have the power to influence public opinion today.

State Machines is a collaborative, EU-funded project which started in 2017. Discussions between the partners, Aksioma (SI),⁴ Drugo More (HR),⁵ Furtherfield (UK),⁶ Institute of Network Cultures (NL),⁷ and NeMe (CY),⁸ have centered around increasing precarity in the wake of a tumultuous political year and the need to conceive workable alternatives and inclusive futures. How can we learn to think beyond the limits of the neoliberal and extreme nationalist logics that shape the world around us? And, how do we respond to this new world order made up of algorithmic news feeds, high-frequency trading, geofences, and for-sale citizenship? We have distilled our questions into an overarching *leit-motif*: 'What tools do we need to understand this world, and how can contemporary forms of cultural production assist in envisioning and enacting other possible futures?'⁹

1 One of the main characters, Prior Walter, in Tony Kushner, *Angels in America: A Gay Fantasia on National Themes*, New York: Theatre Communications Group, Inc., 2013, p. 290.

2 'Global Warming of 1.5°C', IPCC, <http://www.ipcc.ch/report/sr15/>.

3 European Data Protection Supervisor, 'Keynote address from Tim Cook, CEO, Apple Inc', *YouTube*, 24 October 2018, <https://youtu.be/kVhOLkIs20A>.

4 Aksioma – Institute for Contemporary Art, Ljubljana, <https://aksioma.org/>.

5 Drugo More, Rijeka, <http://drugo-more.hr/>.

6 Furtherfield, London, <https://www.furtherfield.org/>.

7 Institute of Network Cultures, Amsterdam, <http://networkcultures.org/>.

8 NeMe, Limassol, <http://www.neme.org/>.

9 Quote from the *State Machines* application document submitted for funding from Creative Europe.

Two years later, we're faced with the potential reality of having asked this question too late, and further ponder whether any of these 'possible futures' are indeed probable within the current bio-geo-political mainstream. Much of the information we collected during our research indicates that the interconnected environmental, political, economic, scientific, and technological events of recent years have not been uniformly embedded in public consciousness. Disturbingly, a unified perception of humanity is absent from most contemporary hegemonic rhetorics. With ethnically and racially charged violence on the rise, free speech is rapidly being eradicated and censorship is no longer about suppression 'but about controlling your attention and your credibility.'¹⁰ The diversionary, disruptive tactics of the *dérive*¹¹ proposed by the Situationists to help us see, question, and understand our world, and embraced by tactical media artists just over fifteen years ago, have now devolved to hopelessly distract us from it. Just in case our world does not offer enough complexity as it is, we are augmenting it with manipulative digital diversions and (mis)information through a plethora of news sources—many of which are either biased or just plain fake, interspersed with adverts for products we do not need, lifestyles we can only dream of, and holiday packages we cannot afford.

By inviting artists and theorists to focus on how these technologies and their networks impact our lives, we look at what this means for our collective and individual identities, and our shifting notions of citizenship, digital labor, and finance. This publication re-examines the current techno-political mainstream and the unscrupulous array of technologies being developed, so as to maintain and redesign 'users' into politically exploitable gimps and digital cash cows, or as proprietary data sources on tap.

Until recently, blissfully unaware EU citizens might have fancied themselves as living in a borderless reality, but in actual fact many of the world's border walls have been erected in the past two decades. Besides the pompously propagandistic 'Trump border wall'—which will have, and *already* has in anticipation of it, devastating and very real consequences—many more miles of so called 'anti-illegal immigration' walls are currently under construction across the world.¹² But not all borders are physical, and not all borders are quite as fixed as a concrete wall. Less visible are the ideological, technological, and algorithmic walls and fences that immigrants ever more often face, which are just as effective in barring physical access or denying basic permissions (Krystian Woznicki). The other end of the freedom-of-movement spectrum is occupied by those that can afford citizenship-by-investment programs. And, all the while, seemingly endless hoops to jump through are created for those without the right documents. 'For-sale' passports simultaneously assist in the disappearance of all kinds of obstacles for those who are able to pay the right price (James Bridle). And, not only is digital technology used to construct

10 @scrippscollege, "“You have to think of censorship not as managing speech but about controlling your attention and your credibility.”-Zeynep Tufekci @zeynep", *Twitter*, 16 October 2018, 3:41 AM, <https://twitter.com/scrippscollege/status/1052011566474780673>.

11 Guy Debord, 'Theory of the Dérive', trans. Ken Knabb, *Situationists International Online*, <https://www.cddc.vt.edu/sionline/si/theory.html>.

12 'Border Barrier', *Wikipedia*, 1 February 2019, https://en.wikipedia.org/w/index.php?title=Border_barrier&oldid=881237304.

walls or facilitate the financially aided undoing of them, but media technology is also becoming a ubiquitous staple of state control in countries around the world, such as state-run social media in Israel (Rebecca L. Stein).

The use of digital technology to reinforce state ideology is not restricted to militarized zones. Research on the effectiveness of CCTV cameras in the reduction of crime is far from conclusive¹³ and, despite concerns over privacy, the technology is as popular as ever. In 2011, for example, it is estimated that there was one camera for every 32 citizens in the UK, operated by the state as well as the private sector.¹⁴ Adding facial recognition and other tracking technology to the mix means that our being in the world is operationalized in ways that are increasingly hard to notice. Many artists, activists, and hackers are working on ways to undermine and distort these technologies or to counteract their effects without impeding human interactions; for example, through caps glowing with ultraviolet light or scarves designed to throw off facial-recognition artificial intelligence (AI) (Francis Hunger; Emily Van Der Nagel).

Activist strategies against some of the unwanted effects of state-implemented technologies are nothing new. Currencies, for example are so wide spread that they are hardly recognizable as technology, and any alternatives largely remain locked in the ideologies they purport to oppose. While blockchain-based cryptocurrencies are the disruption *du jour*, there is a long history of ‘alt-coins’ that create new uses and meanings as they travel from one hand to the next. What can we learn from the creativity and insubordination that was associated with ‘hobo nickels’ or ‘convict love tokens’ from centuries past (Max Haiven)? And, when looking at the blockchain, how can we move *beyond* coding the *n*th cryptocurrency into being or trying to find the one chain to rule them all (Rob Myers)? How can we put activist and artistic exploration and imagination to use in creating technologies that are truly disruptive of the status quo (Max Dovey)?

Meanwhile, art as a financial asset is expanding into new dimensions on the blockchain. No longer functioning as something to be experienced, analyzed, or viewed, artworks can now be effective in entirely new ways while they are tucked away in impenetrable, climate-controlled freeports. Made visible only as smart contracts in the brief, continual moments, they are exchanged across the world while never changing location (Rachel O’Dwyer). This spectral (dis)appearance is something that is associated with trading and money more broadly and doesn’t do much to deconstruct the perceived blackbox of finance (Patricia De Vries). What’s more, the language we use to describe the financial and technological systems that hold us in their grip is far from ideal (Paul Vanouse), and perhaps a radical, activist reclaiming of agency is needed. Perhaps the individual has to become a corporate actor in order to get some

13 ‘The Effectiveness of Public Space CCTV: A review of recent published evidence regarding the impact of CCTV on crime’, *Scottish Government*, December 2009, <https://www2.gov.scot/resource/doc/294462/0090979.pdf>; Sophie Blok, Lotte Kuipers, and Mark Middel, ‘Cameratoezicht is altijd een succes. Of die camera’s nu werken of niet’, *Vrij Nederland*, 4 February 2019, <https://www.vn.nl/cameratoezicht-altijd-succes/>; Emmeline Taylor and Martin Gill, ‘CCTV: Reflections on Its Use, Abuse and Effectiveness’, in Martin Gill (ed), *The Handbook of Security*, London: Palgrave Macmillan, 2014.

14 Paul Lewis, ‘You’re Being Watched: There’s One CCTV Camera for Every 32 People in UK’, *The Guardian*, 2 March 2011, <https://www.theguardian.com/uk/2011/mar/02/cctv-cameras-watching-surveillance>.

sort of purchase on the algorithmic forces that are shaping society today (Marc Garrett). Perhaps we need to follow the flexibility and reassembling of identity through which Lynn Hershman Leeson (interviewed by Marc Garrett) allows her audience to explore and build a place of human fluidity in the midst of technologies of precision.

On a political level, we're seeing the dramatic consequences of austerity politics in many countries all over the world. Business is never far away, always ready to fill the gaping holes left by retreating governments. In particular, healthcare is a vulnerable sector when it comes to the smooth but often ethically debatable start-up solutions. When affordable professional care is not an option, it is now possible, for example, to treat your depression by talking to a bot via a smartphone app (Lidia Pereira). Acting against the need for these algorithmic care systems is artist Cassie Thornton (interviewed by Marc Garrett), who is setting up federated, bottom-up networks of health support in the context of the economic crisis in Greece. Beyond the immediate and destructive precarity of people living in crisis-ridden areas, the influence of capitalist logics is creeping into all aspects of life and personal relationships (Helen Kaplinsky).

Systems of knowledge distribution are influential for the kinds of activist behavior that they inspire and facilitate. There's a rich history of pirate libraries, devices, and networks that have carved out alternative forms of knowledge and created strong communities around mutual sharing and new world building.¹⁵ Activist groups like *Black Lives Matter* have added virality and social network effects into the mix by distributing their syllabi on social media, allowing information to have effects beyond its usual walled gardens (Valeria Graziano, Marcell Mars, and Tomislav Medak).

The contents of this book shed light on a selection of the ideas and activities currently resisting the hegemonic, systemic violations of often talked about but seldom cited human rights (that is, the right of recognition (Article 6), right of privacy (Article 12), right to nationality (Article 15), etc.).¹⁶ This book stresses that we can, if we want to, reclaim our right to forge a healthier, freer, and more egalitarian future. As we adapt to this undulating terrain, we need to forge new forms of agency by rising above the silos we are used to. Then, maybe, we will be emotionally and strategically equipped to face what the 21st century asks of us.

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15 Nicholas Maigret and Maria Roszkowska, *The Pirate Book*, Ljubljana: Aksioma – Institute for Contemporary Art, 2015.

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STATE TO
STATELESS
MACHINES:
A TRAJECTORY

JAMES BRIDLE

STATE TO STATELESS MACHINES: A TRAJECTORY¹

JAMES BRIDLE

St. Kitts and Nevis is an island nation in the Eastern Caribbean, twin fragments of an ancient volcano wreathed in clouds and rainforest, and rising out of the deep, blue waters of the Antilles. At just over a hundred square miles, and fifty-five thousand or so residents, it is the smallest sovereign state in the Western Hemisphere. At the turn of the millennium, the islands' economy was in trouble: sugar production, the dominant industry since the 40s, had declined to such a degree that the government was forced to shutter the state-owned sugar company, closing down refineries and leaving former plantations derelict. Unlike larger and better connected Caribbean islands, St. Kitts and Nevis had neither developed strong tourism nor, like some of its neighbors, had it taken advantage of complex tax laws to lure international finance to its shores. But starting in 2006, the country was to find itself a pioneer in a new kind of industry, one which traded not in offshore capital, but in the very stuff of nationhood itself: the right to claim citizenship.

In 2006, a Swiss lawyer named Christian Kälin arrived in St. Kitts with a proposal. He wanted to restructure the country's decades-old citizenship laws to enable wealthy individuals from overseas to buy themselves a St. Kitts and Nevis passport. Kälin was a key figure in Henley and Partners (H&P), a once obscure wealth management firm based in Zürich, and while many of his clients could lucratively move their money around the world, moving themselves with it was more troublesome to do. Investors in China, Russia, and many other countries wanted the ability to travel freely to the places where they wanted to spend their money: namely, North America and Europe, which have strict entry requirements for visitors of many nationalities. St. Kitts passport holders, though, can travel visa-free to 132 countries worldwide, including Canada, the United States, and the European Union. Under the express purview of the President of St. Kitts and Nevis, a deal was made: anyone willing to invest a few hundred thousand US dollars in the islands could acquire a precious St. Kitts passport. The deal specified that each investment was to include US\$400,000 spent on real estate and, in consequence, land value rocketed and luxury condos sprouted up along the seafronts of Basseterre and Charlestown. Although, as there was no requirement for these new citizens to actually live in the country, these properties were mostly left empty. In a neat piece of continuity, a further US\$250,000 were earmarked for the Sugar Industry Diversification Foundation, a charitable trust set up by Kälin and intended to generate jobs for those who had lost work in the cane fields. Significantly, the trust's altruism has been called into question because it has never made its accounts public. It has

1 Originally published in *PostScriptUM* #33, Ljubljana: Aksioma, 2019, https://aksioma.org/pdf/aksioma_PostScriptUM_33_ENG_bridle.pdf.

been investigated numerous times. In 2016, auditors from Ernst & Young reported ‘vast unexplained extraordinary expenditure’,² and in 2018 a new government promised to replace it with a more transparent and accountable alternative.³

In 2006, the passport scheme accounted for around one percent of St. Kitts and Nevis’ GDP. By 2014, this had risen to 25 percent. The scheme’s success triggered a scramble for citizenship-by-investment (CBI) programs around the world, many of them led by H&P, the only firm with a track record in the industry and already in possession of a global Rolodex of investors seeking more powerful passports.⁴ Other Caribbean nations—namely, Antigua and Barbuda, St. Lucia, and Grenada—were the first to copy the scheme. Europe then got involved; first in Cyprus and then Malta, where EU passports are now on offer for as little as €800,000 and a perfunctory background check.⁵ Today, the citizenship business is worth billions of dollars⁶—and H&P is still the largest player.⁷

The development of the citizenship industry is an example of financialization: the process by which assets—goods, services, or risks—are made amenable to exchange. The asset in question here, however, is national identity, which despite a turbulent and relatively short history, is usually depicted as solid and unassailable. In this context, there is a sharp contrast between, on the one hand, the contemporary rise in nationalist politics and the hardening of borders around the world (for example, the construction of fences and walls, the implementation of ever more draconian security regimes, and the use of revocation of citizenship as punishment) and, on the other hand, the increasingly fluid exchange of national identities available to the very rich. Nowhere, perhaps, is there a more extreme example of the privatization of state assets than in this marketization of national identity itself. This is all made extremely visible in H&P’s own annual Passport Index and Quality of Nationality Index. These are global surveys of travel freedom and local benefits, ranking the world’s countries based on the freedom—of movement and from accountability—they offer their citizens.^{8 9}

The impact of this latest round of global financialization is not limited to those who directly access the service. It also surfaces in the form of shifting property prices, weaponized by oppressive states against the least fortunate. Glittering towers rise on the corniches

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- 2 ‘Audit Reveals “Vast Unexplained Expenditure” by St Kitts–Nevis Sugar Industry Fund’, *Times Caribbean*, 18 December 2016, <http://timescaribbeanonline.com/audit-reveals-vast-unexplained-expenditure-by-st-kitts-nevis-sugar-industry-fund/>.
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 - 8 Henley & Partners Passport Index, <https://www.henleypassportindex.com/>.
 - 9 Henley & Partners Quality of Nationality Index, <https://www.nationalityindex.com/>.

of the Mediterranean, but stand as empty as their digital doubles on the websites of Chinese property firms. These luxury boxes are not really living spaces. They are safety deposit boxes for capital flight and down payments on new identities, while the populations living in their shadows remain immured by the local corruption that feeds upon any new revenue.¹⁰ Far worse awaits those to whom market forces are applied forcibly, like the undocumented residents of Gulf states forced to accept paid-for citizenship in the far-off and impoverished archipelago of the Comoros.¹¹ But in an act of autocannibalism that we should be familiar with by now, yet never seem to fully grasp, the weightiest victim of the virtualization of citizenship will likely be the state itself.

In *The Invention of the Passport*, historian and sociologist John Torpey describes the emergence of the passport as a process by which people ‘become dependent on states for the possession of an “identity” from which they can escape only with difficulty and may significantly shape their access to various spaces.’ But he also emphasizes the ways in which the increased regulation of movement actively shaped the form of states themselves: ‘The emergence of passport and related controls on movement is an essential aspect of the “state-ness” of states.’¹²

Thus, to undermine the passport is to undermine the state, and it is one of the reasons why illegal and undocumented migrants are so often figured as existential threats to nations. It’s also why we find those willing to subvert governance and democratic processes working alongside those who seek to subvert the identity of a state itself.

From the beginning of their expansion, Henley and Partners (H&P) turned to political as well as financial manipulation experts to assist them in their efforts to spread the gospel of citizenship-by-investment (CBI) and to ensure its continuity. A hidden camera recording, which went viral in St. Kitts a few weeks before the islands’ 2010 elections, featured Lindsay Grant, a presidential candidate running on an anti-corruption platform, accepting a massive \$1.5 million bribe¹³ from an unnamed, also hidden ‘property developer’.¹⁴ On the back of this revelation, Denzil Douglas, who partnered with H&P to set up the original CBI scheme, was soon re-elected for a fourth term. Although the video was released anonymously, it was widely assumed to have been the work of a clandestine, London-based political consultancy called Strategic Communication Laboratories Group (SCL Group).¹⁵ Since then, SCL Group has been discovered to be ac-

10 James Bridle, ‘The Rise of Virtual Citizenship’, *The Atlantic*, 21 February 2018, <https://www.theatlantic.com/technology/archive/2018/02/virtual-citizenship-for-sale/553733/>.

11 Atossa Araxia Abrahamian, ‘Who Loses When a Country Puts Citizenship Up for Sale?’, *The New York Times*, 5 January 2018, <https://www.nytimes.com/2018/01/05/opinion/sunday/united-arab-emirates-comorans-citizenship.html>.

12 Jon Torpey, *The Invention of the Passport: Surveillance, Citizenship and the State*, Cambridge: Cambridge University Press, 2009.

13 ‘Bribery Video Surfaces on YouTube By Sheena Brooks’, *St Kitts & Nevis Observer*, 22 January 2010, <http://www.thestkittsnevisobserver.com/archives/bribery-video-surfaces-on-youtube-by-sheena-brooks>.

14 Rosie Perper, ‘Cambridge Analytica’s Parent Company Reportedly Offered a \$1,4 Million Bribe to Win an Election for a Client’, *Business Insider*, 21 March 2018, <https://www.businessinsider.com/cambridge-analytica-scl-group-1-million-for-election-win-bribe-2018-3>.

15 Ann Marlowe, ‘How Cambridge Analytica Fueled a Shady Global Passport Bonanza’, *Fast Company*, 7 January 2018, <https://www.fastcompany.com/40571052/how-cambridge-analytica-fueled-a-shady-global-passport-bonanza>.

tive in at least six Caribbean nations, all of them with active or potential CBI schemes. In each case SCL Group worked closely with Christian Kälín to identify investors, talking points, and electoral audiences for political campaigns sympathetic to CBI.

In 2012, Alexander Nix, the CEO of SCL Group, became the head of a new company-within-the-company, funded by the American hedge fund billionaire and libertarian conservative Robert Mercer. This company was Cambridge Analytica, and it would become notorious in 2017 when Nix was caught on camera boasting to an undercover reporter that he had worked on more than two hundred elections across the world, including Nigeria, Kenya, the Czech Republic, India, and Argentina, and had been closely involved in the election of Donald Trump, illegally harvesting millions of Facebook profiles and using the personal data they contained to create micro-targeted and legally dubious political advertising.¹⁶ Under questioning by British parliamentarians in 2018, Nix admitted that Kälín and he had a 'relationship' during SCL Group's campaigning in the Caribbean, and that 'he may well have made contributions towards the election campaigns'.¹⁷

However, long before it became the *bête noire* of the 2016 US election and the subsequent Brexit referendum, SCL Group was seeding chaos across the Caribbean in the service of H&P. Political campaigns in Dominica, Grenada, St. Lucia, and Antigua and Barbuda were tainted with torrents of false stories planted in the media. Prime Minister Ralph Gonsalves of St. Vincent and the Grenadines accused the company of illegally employing political activists in 2010. The Attorney General of Trinidad and Tobago opened an investigation into SCL Group's involvement in the country's 2013 election.

Just as the CBI schemes did, so this political chaos extended to Europe. When the Maltese journalist Daphne Caruana Galizia was killed by a car bomb in October 2017, she had for some time been investigating links between the Maltese government and H&P.¹⁸ In an email exchange with Kälín in May 2017, Caruana Galizia highlighted the damage his company's involvement was doing to both the political consensus and the domestic economy of Malta: 'I'm afraid that we in Malta cannot see the back of Henley & Partners soon enough, whatever the impression you may have been given by the alacrity of certain corporate services providers to jump on your bandwagon and help you flog Maltese citizenship to eastern potentates, including a Chinese aluminium billionaire on Forbes list who is registered to a first-time-buyer's

16 Georgina Lee, 'Q&A on Cambridge Analytica: The allegations so far, explained', *Channel 4 News*, 26 March 2018, <https://www.channel4.com/news/factcheck/cambridge-analytica-the-allegations-so-far>.

17 Tom Goodenough, 'Is Alexander Nix Gravely Misunderstood?', *The Spectator*, 8 June 2018, <https://blogs.spectator.co.uk/2018/06/is-alexander-nix-gravely-misunderstood/>.

18 'British MP Highlights Caruana Galizia Murder Investigation as The Spectator Links Henley & Partners to Cambridge Analytica', *Times of Malta*, 27 March 2018, <https://www.timesofmalta.com/articles/view/20180327/local/uk-mp-claims-caruana-galizia-was-investigating-cambridge-analytica.674689>.

tiny flat in a side street in the village of Naxxar.¹⁹ At the time of her death, Caruana Galizia was facing multiple defamation lawsuits, including from H&P, as well as the founder of Malta's Pilatus Bank, Ali Sadr Hasheminejad, an Iranian businessman arrested in the U.S. for money laundering and sanctions-busting, and a beneficiary of a H&P-facilitated St. Kitts passports.²⁰

There is always a violence inherent in financialization that emerges, under pressure, whenever it is deployed. Financialization enlarges and amplifies existing inequalities, and ripples seismically across domains and disciplines. It is not possible for it to do otherwise, nor is it possible to harness it for so-called 'good'. This is as true of the marketization of national identity pioneered by H&P and abetted by SCL Group as it is of the wholesale financialization of personal data and social relationships brought to its acme by Facebook and exploited by Cambridge Analytica. The question that remains for artists and other practitioners working in this field and interested in its questions is whether interventions within such a system can produce meaningful change, or will only support and amplify existing inequalities and violence.

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I've spent the last few years researching citizenship-by-investment and other, related technologies: special economic zones and free trade areas (which allow for different corporate laws and permissive working practices to be deployed within particular areas), freeports and seasteads, blockchain and other supposedly emancipatory but inescapably inhuman and asset-based protocols for identity management, and new forms of algorithmic citizenship which depend wholesale on surveillance and the acquiescence of existing powers.²¹ Perceiving these as technologies is part of the logic of 'state machines', and from the perspective of a technologist and artist, I've sought lines of code within them that could be cut and pasted, stolen outright, or refactored to more emancipatory ends. But I'm not sure I still believe in this approach. These technologies are tainted at the source by their very emergence within cultures of capitalism and the inherently racist logic of the nation state itself. They are too easily commandeered and redeployed by those with access to more network nodes, to greater carrying capacity, bandwidth, processing power and data storage—in short, by those with access to capital.

The state as we know it is coming to an end and, although it will not shift radically from one form to another, it is, as we noted in the introduction to the *Transnationalisms* project, already pierced and entangled with other, radically different forms—

19 Daphne Caruana Galizia, 'Christian Kalin of Henley & Partners Knew Back in March that the General Election was Imminent', *Running Commentary: Daphne Caruana Galizia's Notebook*, 12 May 2017, <https://daphnecaruanaGalizia.com/2017/05/lecture-good-journalism-somebody-made-millions-selling-passports-shady-people-worst-parts-globe/>.

20 Stephanie Kirchgaessner, 'Bank Criticised by Daphne Caruana Galizia Under Scrutiny in Brussels', *The Guardian*, 2 February 2018, <https://www.theguardian.com/world/2018/feb/02/daphne-caruana-galizia-was-being-sued-defamation-at-time-of-her-murder>.

21 See the author's project *Citizen Ex* (<http://citizen-ex.com/>) and related writings.

both from within and without.²² What the new technologies of the state continually reveal, unwittingly and often in opposition to their stated goals, is the incredible diversity and uncomputability of their subject both at the level of the individual and at the level of physical geography. Through the network, we are all already transnational, which is revealed by social media and international finance as clearly as by our lived experience. At the same time, the accelerating and leveling actions of anthropogenic climate change forcibly remind us that borders will not protect us from what happens beyond the horizon. People are on the move, as are whole ecosystems, from deserts engulfing once fertile lands across the Middle East and spurring conflict and further migration²³ to forests breaking up and marching northwards in response to the transformation of the atmosphere.²⁴

The question then becomes, what might oppose capital as the governing rhizome of whatever replaces the state? What other preexisting forms are inherently networked, bounded but shifting, near infinitely diverse, and forever resistant to capitalization? One answer to this is the world itself; that is, the category of things that includes us, non-human animals, plant life, minerals, and their attendant processes—what Jane Bennet calls ‘the ecology of things’ or ‘vibrant matter’.²⁵ Ecology has its own vocabulary of states and boundaries, constituents and participants, but they are never fixed or bounded, and they provide a template with which to think and rethink our notions of place and collectivity. The challenge is to view these things anew in light of what we have learned and can still learn from our technologies, because no ecological plea can be sufficient if it simply entails going backwards, or rejecting the immanent possibilities of new systemic forms.

In computer science, the term ‘state’ refers to the information retained by a system (a service, application, or device) between interactions. Seen from the perspective of an ecosystem, our reliance on states as governors of interactions seems like an original sin, relying as it does on the giving over and giving up of ownership of data and representations to extrahuman forces—servers, corporations, governments—and their subsequent retention and weaponization, whether in the form of access to information, surveillance, manipulation, or the granting and withholding of freedom of movement. ‘Stateless’, on the other hand, refers to systems built on trust and generosity, and on the individual’s agency within the larger systems it moves through and inhabits. This is the model that is inherent to both the World Wide Web—‘small pieces, loosely joined’²⁶—and to the web of life.

22 For more about *Transnationalisms*, see the introduction, artworks, and talks featured at <https://aksioma.org/transnationalisms/>, <http://drugo-more.hr/en/mine-yours-ours-transnationalisms/>, and <https://www.furtherfield.org/events/transnationalisms/>

23 Alex Randall, ‘Syria and Climate Change: Did the Media Get it Right?’, *Climate and Migration Coalition*, <https://climatemigration.atavist.com/syria-and-climate-change>.

24 Robinson Meyer, ‘American Trees Are Moving West, and No One Knows Why’, *The Atlantic*, 17 May 2017, <https://www.theatlantic.com/science/archive/2017/05/go-west-my-sap/526899/>.

25 Jane Bennett, *Vibrant Matter: A Political Ecology of Things*, Durham, NC: Duke University Press, 2010.

26 David Weinberger, *Small Pieces Loosely Joined: A Unified Theory of the Web*, New York: Perseus Publishing, 2002.

So long set in opposition to one another, the technological and the ecological are slowly but surely knitting themselves together. In a future where computation is powerfully and inevitably dependent on sustainable and renewable resources—wind and solar energies, fresh cooling waters—it's easy to imagine the collapse of networks into watersheds, wind zones, and insolation territories. Servers, like trees, are already migrating north, establishing themselves in zones of cheap hydro power and lower environmental temperatures. And, like the arrival of non-native species in a stable ecosystem, they will continue to alter the environment they find themselves in. Whatever follows in place of the nation will be another kind of machine, produced by this reconfiguration of climate, geography, social, and interspecies relationships—but it will be stateless.

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MACHINES, COLONIALITY, GLITCH: ETHNOGRAPHIC REFLECTIONS ON ISRAELI TECHNO-MODERNITY

REBECCA L. STEIN

Zionism and the Techno-Miraculous¹

As postcolonial scholars have taught us, colonial history is closely tethered to machines and technologies of various kinds. For colonial regimes, material evidence of technological progress was a crucial means of demonstrating their ‘modernizing ambitions’ and spectacularizing their successes, with technology employed as a sign of the modern.² The textual archive of colonialism is littered with scenes of wondrous ‘first contact’ between colonized populations and machines, from phonographs to trains. The figure of the technological or the machinic was endowed with a powerful pedagogical function within such narratives, working to hail and retrain colonial subjects, rescuing them from the time of the pre-modern. Or such was the recurrent colonial fantasy.

This linkage between the machine and the colonial state is dramatically on display in the history of Zionism and its associated textual archive. Consider, for example, Theodore Herzl’s oft-cited *Old New Land*. Written by a founder of political Zionism, this 1902 utopian novel narrates Palestine’s settlement and development by the Jews of the European diaspora and therein the radical transformation of Palestine (a vision that some would praise as prophetic—occurring, as it did, well before the mass-settlement of European Jews). In Herzl’s account, visitors to this ‘new society’ stand in awe before Haifa’s modern transportation network, marveling at its elevated train, its electrified cities, its thriving economy. ‘Never in history were cities built so quickly or so well,’ testifies a Jewish resident of this ‘new society’, ‘because never before were so many technical facilities available. [...] We merely had to transplant existing inventions to this country.’ Herzl describes the visitors to this former Oriental backwater marveling at the technological wonder. ‘We know Palestine as a forsaken country. [...] How changed it all is! [...] There’s been a miracle here.’³

The trope of technology as a modernizing miracle would endure and indeed flourish in the Israeli settler-national context in subsequent decades, retaining its tropological importance long after the formation of the Israeli state in 1948. Indeed, this trope has enjoyed something of a revival in the digital age, reinvigorated by the Israeli state-sponsored narrative of Israel as a ‘start-up nation,’ shorthand for its emergence as a high-tech locus and global center of digital innovation. Stock colonial images proliferate within this narrative, as within the original book by this name,⁴ with Israeli high-tech workers cast as pioneers and the digital infrastructure credited for remaking a barren land (‘Israeli high-

1. For more information on this, visit: <http://www.rebeccalstein.com/>.

2. Brian Larkin, *Signal and Noise: Media, Infrastructure, and Urban Culture in Nigeria*, Durham: Duke University Press, 2008, p. 4.

3. Theodor Herzl, *Old New Land (Altneuland)*, New York: M. Wiener Pub., 1987, pp. 57, 58, 68.

4. Dan Senor and Saul Singer, *Start-up Nation: The Story of Israel’s Economic Miracle*, 1st trade ed., New York: Twelve, 2011 (2009).

tech blooms in the desert!’ reads the title of one Israeli media account⁵). This storyline has been central to state efforts to rebrand Israel by ‘replace[ing its] image as a war-zone with that of an economic miracle.’⁶ It need hardly be remarked that this narrative of the techno-miraculous in the work of Herzl and others, is predicated on all that it renders invisible: namely, the enduring legacy of state violence against the Palestinian people.⁷ Then and now, the narrative functions as both a proxy and a labor of disavowal.

I begin here to set the stage for some ethnographic reflections on the interface of the Israeli state and the machine in the contemporary moment, drawn from interviews I have conducted with Israeli state officials over the last decade.⁸ My focus is the military’s attempts to meet the demands of the age of social media by upgrading policies and practices in the field of online public relations, or *hasbara*. Given the growing digital literacy of their detractors—both Palestinians living under occupation and the Israeli and international activists and human-rights workers that work with them—the need was deemed urgent; all of these enemies had been early adopters of social media as political tools, and all were threateningly well-versed in the emerging media economy of the networked image. The military, along with other branches of the state, needed to respond in kind. The digital literacy of their enemies, their efficacious use of mobile photographic technologies and social media platforms for image circulation, was problematic in ‘calm times’ but considered dangerous in times of war.

The following ethnographic snapshots are meant to provide something of a contrast to the legacy of colonial techno-triumphalism with which I began. They chronicle the numerous challenges faced by the Israeli state as it endeavored to come up to digital speed. In what follows, I focus my ethnographic eye on the forms of uncertainty, improvisation, and glitch that attended this process, as lower-level officials in Israeli governmental and military institutions endeavored to integrate social media into their public relations toolbox and to foster a culture of social networking fluency. The state’s learning curve was steep and uneven, and the margin of error high. In the sphere of social media, in an ironic inversion of the ‘start-up nation’ brand, techno-modernity was something of an elusive dream, perpetually escaping the state’s grasp.

Military Machines in the Digital Age

In March 2011, I paid my first visit to the Israeli military’s social media team, then in its relatively early days. Housed within the division of the military spokesperson, they worked from a nondescript high-rise, several blocks from West Jerusalem’s central bus station—an office full of young, uniformed soldiers bent over their desktop computers. At the time,

5 Kobi Yeshayahou, ‘Israeli High Tech Blooms in the Desert’, *Globes*, 11 July 2016, <https://en.globes.co.il/en/article-israeli-high-tech-blooms-in-the-desert-1001139002>.

6 Shmuel Rosner, ‘Extreme Makeover, Israel’, *Latitude*, 8 January 2013, <https://latitude.blogs.nytimes.com/2013/01/08/extreme-makeover-israel>.

7 Neta Alexander, ‘How Modern-Day “Mad Men” Would Market Israel’, *Haaretz*, 15 October 2015, <https://www.haaretz.com/.premium-how-modern-day-mad-men-would-market-israel-1.5409628>.

8 All interviews cited here were conducted by the author, unless otherwise specified. Ethnography was supported by a grant from the Wenner Gren Foundation for Anthropological Research. Portions of this essay appeared in Rebecca L. Stein, ‘StateTube: Anthropological Reflections on Social Media and the Israeli State’, *Anthropological Quarterly* 85.3 (2012): 893-916; and in Rebecca L. Stein, ‘GoPro Occupation: Networked Cameras, Israeli Military Rule, and the Digital Promise’, *Current Anthropology* 58.15 (February, 2017): S56-S64.

prior to the establishment of a large and formalized social media unit, as would emerge in years to follow, the team's size and physical footprint was quite limited, and their operations still somewhat improvisational. I was meeting with the head of this division, Lt. Aliza Landau, who worked on a Mac laptop in a windowless corner office, adorned with a single postcard. She was the first to hold this position, a result of her instrumental role during the military's initial social media foray in the early days of the 2008–2009 Gaza incursion. During the course of our interview, she received calls and SMS updates from military personnel in the field. Some were about the aftermath of that day's bombing incident in West Jerusalem's central bus station (an explosive placed in a suitcase), and some about the Qassem rockets being fired from the Gaza Strip into southern Israel (a response to Israeli air attacks on Gaza in the week prior). Once verified and cleared, much of this information would be posted to the military's official blog and Twitter feed. Breaking news about incoming rockets interrupts our interview, as Landes calls in her young associate. 'Can we tweet this, Tal?' The news came back a minute later. No, the details in the report were still unconfirmed. For the military, the social media buck stopped with her. She was responsible for the military's Twitter and YouTube accounts, as well as their blog, then thought to rival social media in PR efficacy.⁹ Their Facebook account was still being programmed.

Like others at the new media headquarters, Landes was young, in her early twenties, having assumed the position a mere four years after her immigration to Israel from the United States. She was the perfect candidate for the job, her superiors told me, as her native English, youth, and digital fluency were deemed crucial to the position. Despite her uniform, there was a casual air about her—with hair in a ponytail, and an unceremonious mode of address. This posture of informality was at the core of the military's work on social media—an effort to conjoin the hierarchical and highly regulated work of the army with the idiom of casual intimacy required of online engagement.

It was an important moment in the political history of social media, particularly in this geopolitical context. Just two months after the popular revolts in Tunisia and Egypt that had unseated their authoritarian regimes, there was a palpable sense, in these West Jerusalem offices, of the tremendous political potential of these new media technologies. But, many military officials remained concerned about their ill fit as a tool of the state. 'There's something fundamentally antithetical about social media and any major institution,' Landes put it, 'especially the military. And half of my time is spent trying to explain and convince other military personnel that it's something that we have to learn to deal with.' This sense of an anthesis was something I would hear repeated by many senior spokespersons during that 2011 visit:

[Social media] are contradictory to the military institution. Any army is a closed organization, and usually it keeps its secrets and operational details inside. And new media works in the opposite way. Also, the language is different. Military language is very strict, with a lot of abbreviations and very specific intonations. The new media are exactly the opposite: a lot of emotions, a lot of questions... Informality. So it's a bit difficult to teach the military how new media is really an asset, but we've been doing it for the past two years.

9 For a profile of Landes by the Israeli newspaper Haaretz, see: Raphael Ahren, 'Haaretz – Israel News', *Haaretz*, 18 June 2010, <https://www.haaretz.com/1.5135961>.

It was a point military personnel stressed in many interviews: the challenge required for this wholesale cultural shift. For although it was lauded publicly by military spokespersons in the language of ‘technological innovation’ and ‘pioneering’ (both being staples of the state’s concurrent rebranding campaign), this shift to social media nonetheless required considerable re-education and re-orientation within military ranks, as not all senior spokespersons were persuaded yet. ‘Facebook has a tabloid-y look to it,’ I was told that year, ‘and we are, after all, a serious organization.’ Landes explained it as a general techno-cultural gap that inflected the military throughout: ‘In 2008, the Israeli military still communicated with the world through faxes and beepers,’ she noted, and ‘the website looked like it had walked out of 1995.’ The labor required to come up to digital speed was considerable.

Landes had four soldiers working under her command. And, although they were tasked with distributing online content about unfolding events, they were still navigating the parameters of their engagement, still developing best practices for military usage of these platforms. The question of how to manage detractors and ‘inflammatory stuff’ remained a live issue. Landes provided the example of the military’s YouTube page, launched during the Israeli incursion into the Gaza Strip of 2008–2009 (the first of three during the decade that followed). Although the comments section had been open to the public on its first day live, it would be shut down a mere 24 hours later following a torrent of what she called ‘hate mail’, the volume and tenor of which had taken the team by surprise.

The problem of the online detractor was a perpetual one for the military, and was also faced concurrently by the other Israeli state bodies employing social media in these early years—bodies which, at this stage in social media work, also shared the same approach to ‘inflammatory stuff’. The Israeli Foreign Ministry, responsible for managing the Brand Israel campaign online, would articulate similar concerns about voluminous negative commentary—after initial optimism about social media’s potential as a regional bridge in the immediate aftermath of Arab revolts. For although far greater numbers of Arabs within the greater Middle East were ‘liking’ their content, they told me, inflammatory material had also grown commensurately. That spring, I spent a morning with the Ministry’s only full-time administrator of their Arabic Twitter and Facebook accounts, who confessed that she was perpetually overwhelmed by the work. Due to budgetary constraints, their Facebook page could only be surveyed during working hours and thus, she said, something was always missed; when she arrived in the morning, she was tasked with cleaning it up. The military had taken note of this, Landes told me, in discussion of their plans for Facebook: ‘We are going to need specific night shifts in relation to the wall,’ she explained, adding that the funding for these additional personnel had not yet been secured.

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The contours of the military’s social media work would shift rapidly in those early years, developing alongside the growing state understanding of the PR potential of this sphere. Much had changed when I returned for interviews a few months later. The initial Israeli shock following the 2011 Arab revolts had waned, as had the optimism of some state officials about social media’s potential as a regional bridge. In the intervening period, Israeli state institutions had also come under increased international scrutiny for intelligence gathering via Facebook, particularly on Palestinian activists.

Internally, within the military's social media team, Landes had been replaced by a digital marketer from the private sector, the military's Facebook page had been launched, and now four soldiers were tweeting in the military's name, working to prepare online content for incursions yet-to-come (like the infographics about military humanitarian assistance to Gaza). The military approach to detractors had also changed. Where their new Facebook page was concerned, they were employing a new policy of letting (most) criticism stand. 'We're not responsible,' said a senior spokesperson regarding their online critics, 'and I think that people understand that.' Of course, there were limits: 'If somebody sprays graffiti on the front door of the IDF [military] headquarters in Tel Aviv—like, "Zionist pigs"—nobody would assume that we spray painted that. But we're sure not gonna leave that.' Where military use of social media was concerned, he conceded, the 'rules were being made up as you go'.

It was in the course of one of these interviews that I learned of a major hack of the military's official websites, and many in the office were pointing the finger at Anonymous. Somebody ran to their computer to check other state websites. 'What about the Foreign Ministry? Or the *Shabak* [internal secret services]?' Another responded: 'Down!' This was the fate of many the state-run websites of the moment, we would learn, including those of the *Mossad*, covert intelligence services, and several government ministries. One senior spokesperson was chided for his amused response: 'Look, I'm not *mabsut* [happy, Arabic slang] but it's funny. Even the secret services went down!' The evening news that day replayed Anonymous' video claiming responsibility for the hack; retribution for the Gaza siege. The following day, the Israeli government would take to Twitter to deny it: 'All the Israeli government websites that were down yesterday are now back up. Once again: it wasn't a cyber attack but a server glitch.'

It need hardly be remarked that within the shabby Jerusalem offices of the military spokesperson, where most of the above interviews were conducted, the Israeli military rule of Palestinian people and places was never discussed as such. The language of 'occupied territories' was missing, replaced by biblical nomenclature for the occupied territories embraced by settler populations and their supporters ('Judea and Samaria'), while military brutality and repressive rule was refigured in the language of deterrence, terrorism, and humanitarian engagement. The labor invested in the shift in enunciative modality—the challenge of articulating the military message within the informality and intimacy required on these online platforms—or the problem of 'inflammatory stuff', reduced military message-making to a creative act, stripped of its context; all the while keeping the military occupation a carefully guarded public secret—known by all, acknowledged by none.

Infrastructural Challenges

Within the short history of Israeli public relations in the digital age, the events of May 2010 loom large, a disaster that would set the terms of state social media policy and practice in years to come. At issue was the naval interception of a maritime convoy named the Mavi Marmara which traveled from Turkey to the Gaza Strip carrying humanitarian aid and hundreds of international activists who aimed to break Israel's Gaza blockade. Nine activists were killed and dozens wounded by Israeli fire after the navy boarded the lead ship. Both the navy raid and flotilla voyage had been the subject of a massive media campaign by the activist organizers, who had used social media extensively to document the events, including live

tweets and webcasting from the boat. A quarter of a million people watched its video feed on livestream alone, while many more consumed the activists' footage on television news. Until shortly after its forcible seizure by Israeli commandos, the flotilla had stayed in touch with the outside world despite the Israeli navy's efforts to jam its communications. The Israeli state and mainstream public analyzed the event through the lens of its public relations impact, bemoaning the 'flotilla fiasco' and its imprint on the international image of the Jewish state.¹⁰

The problem was not the categorical absence of military media production. Their social media team had employed popular platforms to argue their case for boarding and diverting the aid vessels, and the images and footage shot by the military's media crew at the site of the naval raid were strong, or so their spokespersons believed, and succeeded in telling the state's sanctioned story of flotilla terrorists in the guise of humanitarians, thereby justifying the military actions that followed. Rather, the problem was the lack of an operational plan for rapid image clearance and publication, this in a moment prior to military formulation of an integrated social media strategy for those in the field. There were also infrastructural and technological limitations: in 2010, the military lacked the satellite technologies necessary to live-stream images directly from the site of the naval raid back to military headquarters. The military had planned to physically transport the footage—saved on a memory stick—by air and land to headquarters for review, processing, and circulation.

But the naval raid didn't go as planned ('We didn't expect a lynch,' I was told by a military spokesperson), and the plan to 'chopper out video footage' had to be revised, with helicopters needed to transport seven injured naval commandos.¹¹ As a result, the military's images only reached the Israeli and international public some eleven hours after the on-board events. This time-lag was also the result of internal disagreement within branches of the military: while the office of the spokesperson pressed for rapid circulation with an eye to PR gains, the navy feared that footage of their forces under attack had the potential to reveal military tactics and damage their international reputation and morale. All would agree, in the event's aftermath, on the scale of the attendant media disaster. In the words of one Israeli pundit: 'For a country so technologically advanced and with such acute public diplomacy challenges, to fail so miserably at preparing a communications offensive over new media is a failure of strategic proportions.'¹²

In 2014, I spoke with a former high-ranking officer in the military's spokesperson's unit about the lessons of the Mavi Marmara incident, which he and others marked as a turning point in the military's understanding of the necessity of the real-time PR image. Sitting with him in Jerusalem, he described the protracted movement of the military's footage of the events in question and the infrastructural limitations involved: 'There were physical obstacles in getting the material out and that was a big deal in

10 David Horowitz, 'Analysis: The Flotilla Fiasco', *The Jerusalem Post*, 1 June 2010, <https://www.jpost.com/Israel/Analysis-The-flotilla-fiasco>.

11 Amos Harel, Avi Issacharoff, Anshel Pfeffer, and News Agencies, 'Israel Navy Commandos: Gaza Flotilla Activists Tried to Lynch Us', *Haaretz*, 31 May 2010, <https://www.haaretz.com/1.5127050>.

12 Amir Mizroch, 'How Free Explains Israel's Flotilla Fail', *Wired*, 2 June 2010, <http://www.wired.com/2010/06/how-free-explains-israels-flotilla-fiasco/>.

the Mavi Marmara case. There wasn't live broadcasting back to the military, so they actually had to chopper out video footage.' I asked for clarification about the process and the limitations involved, and he tried to reconstruct the chain of events:

Military: Just imagine that that footage comes in, and it takes a couple of hours to get it out back to Tel Aviv headquarters...

RS: And at that point the footage was helicoptered...

Military: Yes, if I remember correctly there was a combination of helicopter and motorcycles... but [it takes a while to reach] the right office in the navy and a while to climb up the ladder until it gets to the head of the navy. And the head of navy says 'no' so it goes back down to the spokesperson in the navy. And that spokesperson speaks to the IDF spokesperson's central unit, and goes to the top of the spokesperson's unit. And that guy calls up the head of the navy...[and so on]. And here you can see it taking a long time... The IDF is Israel's largest organization, so it's going to take a while for things to get through.

It was an episode of protracted circulation that the military would return to over and over again within internal reassessment of the media operations. What would follow was a wholesale rethinking of the importance of timeliness where media circulation is concerned. There had long been an awareness of the importance of the visual field as a PR domain—this military spokesperson would stress in interviews. What changed in 2010 was the emphasis on the time of circulation. Military spokesperson Peter Lerner put it this way in my interview with him in 2014:

The images were always understood to be core in the media effort of the IDF, but what happened in 2010 was the time element, where we could not counter the claims that were coming off the Marmara boat with alternate footage because our plan of action was to fly the footage off of the boat and bring it to coast to be edited rather than have it broadcasted. It's not that the technology wasn't harnessed within the military at the time, but that it just wasn't a plan of action for the IDF spokesperson's unit. That realization did initiate a shift in the spokesperson unit about the types of capabilities that were required, including the capability to stream live footage from the field to the headquarters, and the ability to actually edit it within, I'd say, the golden hour so that we can distribute it as soon as possible.

The repetitions evident in these two different accounts of the 'flotilla failure' deliver a lesson: the media crisis of 2010—with its protracted terms of footage circulation, with the laborious efforts required to move images from the field and between branches of the military for clearance, with the consequences that lay in the lack of an action plan—loomed large in institutional memory. This failure to act in the 'golden hour' would function as a military wake-up call, and internal efforts to upgrade their PR speed would follow. They sought an end to this institutionalized window of delay—a gap in which the military loses the public relations battle to their enemy—a population unencumbered by the challenges of complex bureaucracies or verification protocols. Once the problem of timeliness had been solved, they believed, the military's story could be delivered without interruptions. The ever elusive 'victory image' would finally be secured.

Glitch and Decolonization

For Israeli military spokespersons at the dawn of the social media age, the challenges were considerable, as these ethnographic vignettes suggest. The learning curve was steep and the margin of error high. Amidst a global shift in media ecosystems—and more pointedly, the skillful uptake of mobile technologies and social media tools by Israel's detractors—the military needed to recalibrate its public relations operations. And they blundered along the way, hindered by inadequate infrastructures, a paucity of military cameras, a state culture that failed to take social media seriously, and images that seemed perpetually belated. As many Israeli and pro-Israeli journalists would frequently lament, Israel's detractors seemed to be winning what many called the 'social media war,' and needed desperately to innovate.¹³ With each successive PR failure, plans would be introduced to make improvements where needed and thus deliver on the start-up nation promise.

A recurrent proxy logic was at work in this lament. Consider, in particular, the military's perpetual frustrations about temporal belatedness, about the failure of timely image circulation and infrastructural limitations. Within such discussions, and the ensuing demand for innovations of various kinds, an 'if only' logic prevailed; *if only* the images of military operations had been faster, *if only* the infrastructure had been operative, then the state-sanctioned PR message would have successfully reached its intended audience. In other words: if the chain of image production, circulation and delivery had been more advanced, the state-generated visuals would have redeemed the military. It need hardly be remarked that all traces of state violence, and the repressive terms of the military occupation, vanish in this rendering. The military is left with a purely technological challenge, reducible to the success or failure of military machines and their associated processes. What's remarkable is the iterative nature of this proxy storyline, recurring frequently whenever military projects in the Israeli occupied territories went awry. With each lament, technological innovation would be installed as solution. It was a solution that seemed to be at once just out of reach, and always imminent, the impending success palatable. In the very near future, the military hoped, just over the current temporal horizon, our machines will redeem us.

What, in this context, is the affordance of an ethnographic focus on glitch and breakdown, on moments when technologies and PR machines fail to work as intended? An 'analytics of lapse', as I have called this analytic strategy elsewhere,¹⁴—aims to unsettle theories of technological progressivism by spotlighting sites and examples when technology fails, somehow, to deliver on its promise—thereby, following Brian Larkin, 'point[ing] to the gap between the fantasy of technology and its all too real operation.'¹⁵ On the one hand, lapse is intended as a corrective to the technological utopianism that still frames many studies of new media, recalling the faltering processes and breakdowns, rooted in conjoined human and mechanical acts, that transitions in technological regimes necessarily involve. But lapse as analytic also has a particular

13 Eli Ashkenazi, ' Hamas Defeated IDF in Virtual Warfare During Gaza Conflict, Study Shows,' *Haaretz*, 3 January 2013, <https://www.haaretz.com/.premium-hamas-beat-israel-s-virtual-warfare-1.5287213>.

14 Rebecca L. Stein, 'GoPro Occupation: Networked Cameras, Israeli Military Rule, and the Digital Promise', *Current Anthropology* 58.15 (February, 2017): S56-S64.

15 Larkin, *Signal and Noise*, p. 62.

anti-colonial purchase within the long history of Zionism. Recall, again, Herzl's *Old New Land*. There, the technological stands in the place of colonial violence, refiguring the atrocity of dispossession as a story of wondrous contact between the colonized (Palestinians) and the modern machine with its transformative powers. It is precisely this proxy logic that functions within the narrative of start-up nation, a narrative that marks the endurance of the colonial ideology of techno-modernity in digital age. The analytic focus on glitch, then, aims to bring this enduring historical fantasy to crisis.

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GALLERY

CURRENCIES OF THE UNDERCOMMONS

MAX HAIVEN



Fig. 2: An early convict love token carved by or for a Thomas Tilley, who was convicted of counterfeiting money, 1786.¹



Fig. 3: The America 'Buffalo Nickel', minted between 1913 and 1938.²



Fig. 4: George Washington 'Bo' Hughes, The 'Dicer' Hobo Nickel, 1939.³

- 1 Image is in the public domain: <https://collection.maas.museum/object/73510>.
- 2 Image is in the public domain: https://en.wikipedia.org/wiki/Buffalo_nickel.
- 3 Image appears courtesy of Chris Dempsey of hobocollector.com.



Fig. 5: Kahn & Selesnick, *Eisbergfreistadt* (exhibition detail), 2008.⁴



Fig 7: Kahn & Selesnick, *Eisbergfreistadt* (dirigible), 2008.⁵



Fig 8: Joseph DeLappe, *In Drones We Trust*, 2014; *Hands Up Don't Shoot!*, 2014–15; and *Sea Level Rising*, 2015: Crowd Sourced, Participatory Rubber Stamp Currency Interventions.⁶

4 Image appears courtesy of the artists, and can be found at <http://kahnselesnick.biz/eisbergfreistadt-installations/>.

5 Image appears courtesy of the artists, and can be found at <http://kahnselesnick.biz/eisbergfreistadt-panoramic/>.

6 Image appears courtesy of the artist, and can be found at <http://www.delappe.net/intervene/rubber-stamp-currency-interventions/>.

HOW TO HACK ARTIFICIAL INTELLIGENCE

FRANCIS HUNGER



Fig. 1: According to Shane, NeuralTalk2 identified these goats in a tree eating Argane nuts as 'A flock of birds flying in the Air' and Microsoft Azure identified them as 'a group of giraffe[s] standing next to a tree'.⁷



Fig. 2: Orange Sheep. Ambleside, England.⁸

7 Image source: Fred Dunn, 2015, <https://www.flickr.com/photos/gratapictures/17208409348/in/dateposted/>.

8 Image source: Richard Leeming, 2016, <https://www.flickr.com/photos/dickdotcom/30544273620/>.



Fig. 3: James Bridle, *Autonomous Trap 001*; performance and video, 14 March 2017.



Fig. 4: *Left*: Real world grafito on street sign; *Right*: Scientifically manipulated stop sign with stickers. In most cases, current deep neural networks fail to recognize these as stop signs.⁹

9 Image source: Eykholt et al., 'Robust Physical-World Attacks'.

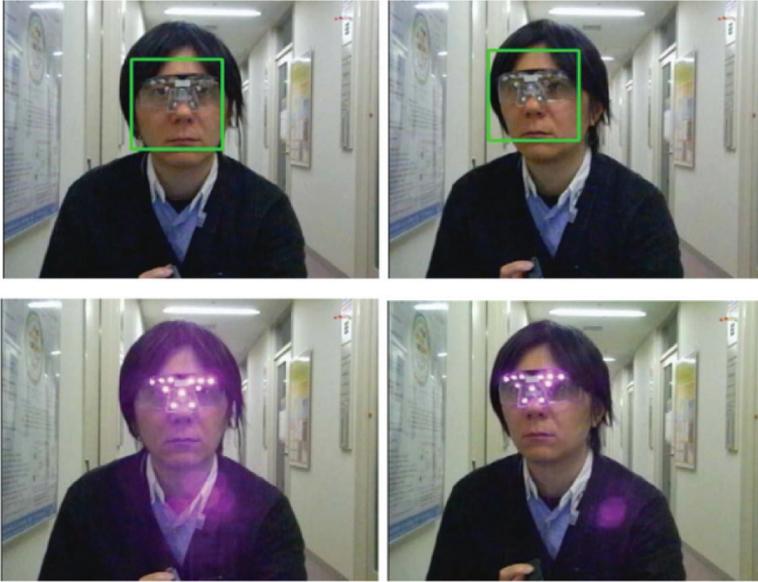


Fig. 6: In the two images in the top row, the green rectangle indicates that a human face was detected, even when the subject wore heavy glasses. The images in the bottom row show a CCD or CMOS camera's sensor view, where the near-infrared LEDs disturb computer vision and face detection can be evaded because humans do not see infrared.¹⁰

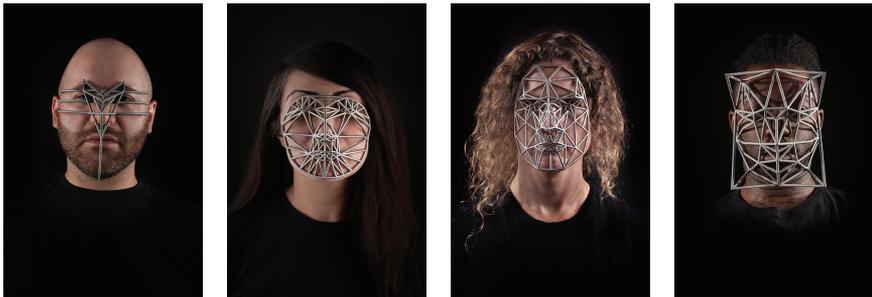


Fig. 8: *Face Cages*. Although originally an art performance, these violent masks also evade simple neural networks for face detection.¹¹

¹⁰ Image source: Echizen & Seiichi, 'Privacy Protection Techniques'.

¹¹ Image sources from left to right: Face Cage #1, endurance performance with Zach Blas, 2015, photo by Christopher O'Leary; Face Cage #2, endurance performance with Elle Mehrmand, 2014, photo by Christopher O'Leary; Face Cage #3, endurance performance with Micha Cárdenas, 2014, photo by Christopher O'Leary; Face Cage #4, endurance performance with Paul Mpagi Sepuya, 2016, photo by Christopher O'Leary.



Fig. 9: *CV Dazzle*. Camouflage hair and makeup.¹²



Fig. 10: *HyperFace Prototype*. The green and yellow squares demonstrate the area where a pattern recognition neural network is highly probable to detect a face.¹³

¹² Image source: Harvey, 'Camouflage'.

¹³ Image source: Harvey, 'HyperFace'.



Fig. 11: Image recognition by one of the early, breakthrough convolutional neural networks called AlexNet,¹⁴ with an error rate of 15.3% for the top-five guesses.

Today, Inception v3 has an impressively low 3.46% error rate for the top-five guesses.¹⁵

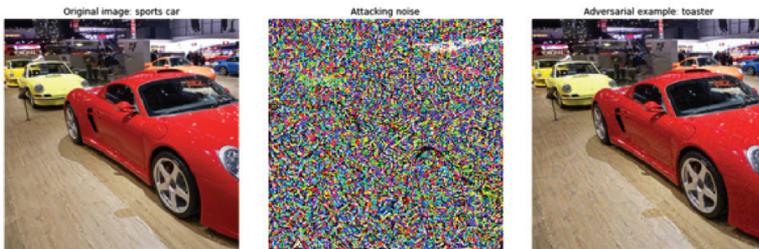


Fig. 12: *Left*: Original image; *Center*: Specifically generated noise pattern that provides the semblance of a toaster; *Right*: The original image and the noise pattern add up to a new image that is recognized as ‘toaster’ by Google’s Inception v3 network.¹⁶

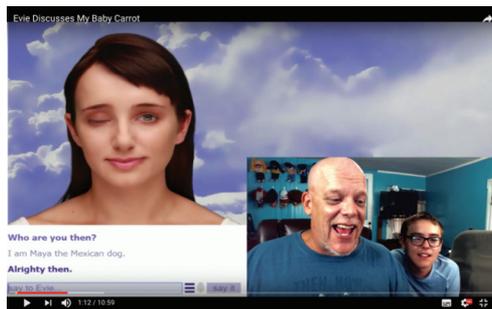


Fig. 13: Spaz Boys: Evie discusses my carrot.¹⁷

14 Alex Krizhevsky, Ilya Sutskever, and Geoffrey E. Hinton, ‘ImageNet Classification with Deep Convolutional Neural Networks’, in *Proceedings of the 25th International Conference on Neural Information Processing Systems - Volume 1*: 1097–1105, <https://papers.nips.cc/paper/4824-imagenet-classification-with-deep-convolutional-neural-networks.pdf>.

15 Image source: Krizhevsky et al., ‘ImageNet Classification’.

16 Image source: Mikhailov & Trusov, ‘Adversarial Attacks’.

17 Image source: screenshot of <https://www.youtube.com/watch?v=ax5HCzlmFE>.

SITUATING THE POLYMERASE CHAIN REACTION PAUL VANOUSE



Fig. 3: Paul Vanouse, performing *Deep Woods PCR*, Banff National Park, Canada, July 29, 2011.¹⁸

18 Since the *Deep Woods PCR* performance involved forty cycles of thermocycling DNA tubes between the three buckets of heated water, each for one minute or more, the entire performance ran nearly three hours, from evening well into the night.

ART, EXPERIENCE AND BECOMING
MARC GARRETT INTERVIEWS LYNN HERSHMAN LEESON



Fig. 1: Lynn Hershman Leeson: 'First Person Plural, the Electronic Diaries of Lynn Hershman', 1984–96, installation view, KW Institute for Contemporary Art, Berlin.
Photo by Frank Sperling.



Fig. 2: Lynn Hershman Leeson, installation view from Lorna, 1979–1982.



Fig. 3: Lynn Hershman Leeson, *Teknolust*. Film starring Tilda Swinton, 2002.



Left: Fig. 4: Lynn Hershman Leeson, *Synthia*.
Custom software, microprocessor. Edition of 3. 2000–02.

Right: Fig. 5: Lynn Hershman Leeson, *CyberRoberta*, 1996.
Image courtesy of Bridget Donahue, New York.



Fig. 6: Lynn Hershman Leeson, Roberta Construction Chart #1, 1975.

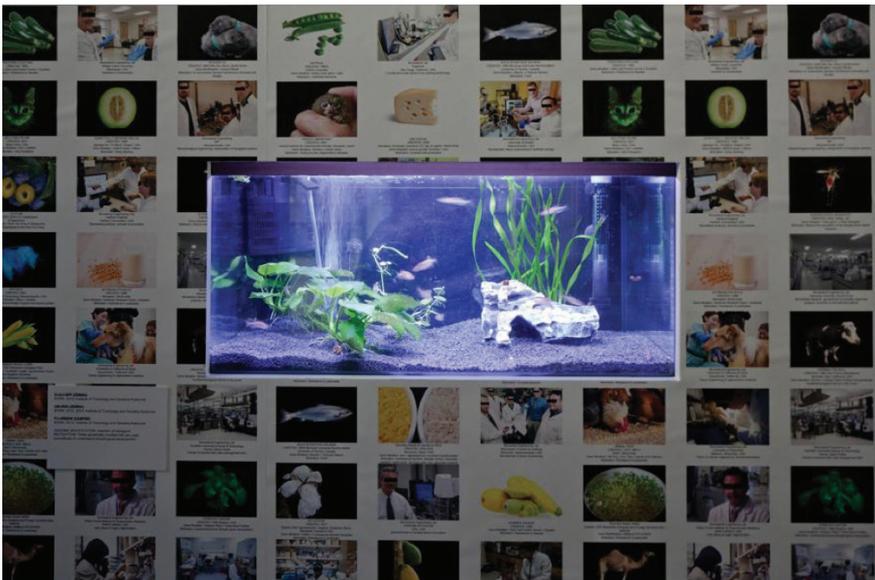


Fig. 7: The Infinity Engine, 2014, multimedia installation, partly interactive (genetically modified fishes, fish tank, screens, projections, wall paper, 3D-printed nose, files, electrics, and other materials), 380 x 1280 x 550 cm, installation view, Lynn Hershman Leeson. Civic Radar, ZKM | Museum of Contemporary Art, Karlsruhe, 2014–2015.

RECLAIMING THE CORPORATE-OWNED SELF MARC GARRETT



Fig. 2: Scene from the video Meeting Minutes.¹⁹



Fig. 3: Scene from the video Rejuvenix by JLM Inc.²⁰

19 *Meeting Minutes* (dir. Jennifer Lyn Morone, 2016), downloadable at: <http://jennifermorone.com/meetingminutes.html>.

20 *Rejuvenix* (dir. Jennifer Lyn Morone, 2016), downloadable at <http://jennifermorone.com/rejuvenix.html>.



Fig. 4: Screenshot taken from Jennifer Lynn Marone's website, 2018.

ART, DEBT, HEALTH, AND CARE MARC GARRET INTERVIEWS CASSIE THORNTON



Fig. 1: Miki Foster closing the ICE ritual called 'dying in the eyes of the state'.



Fig. 2: Members of ICE: Tara Spalty, Yasmin Golan, Miki Foster, Tori Abernathy and Cassie Thornton, and peer attendees.

IMPROVISING BLOCKCHAINS

MAX DOVEY

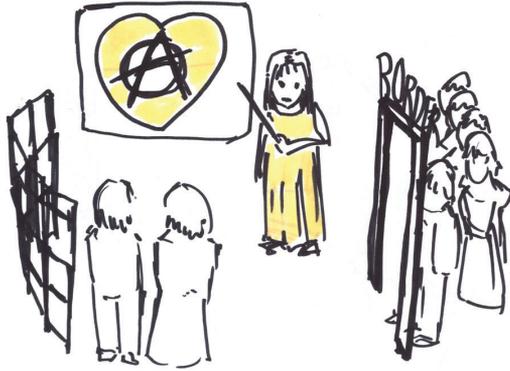


Fig. 1: Illustrations by Maz Hemming for DAOWO Workshop #5 What Will It Be Like When We Buy An Island (on the blockchain)?²¹



Fig. 2: Illustrations by Maz Hemming for DAOWO Workshop #5 What Will It Be Like When We Buy An Island (on the blockchain)?²²

21 See <https://www.flickr.com/photos/153150564@N06/41929568682/>.

22 See <https://www.flickr.com/photos/153150564@N06/27105175557/>.



Fig. 3: DAOWO Workshop #5 What Will It Be Like When We Buy An Island (on the blockchain)? Photo by Rory Gibson, taken on Thursday, 29 March 2018.



Fig. 4: DAOWO Workshop #5 What Will It Be Like When We Buy An Island (on the blockchain)? Photo by Rory Gibson, taken on Thursday 29 March 2018.

BEFORE, AFTER,
AND BEYOND
WALLS

KRYSTIAN WOZNICKI



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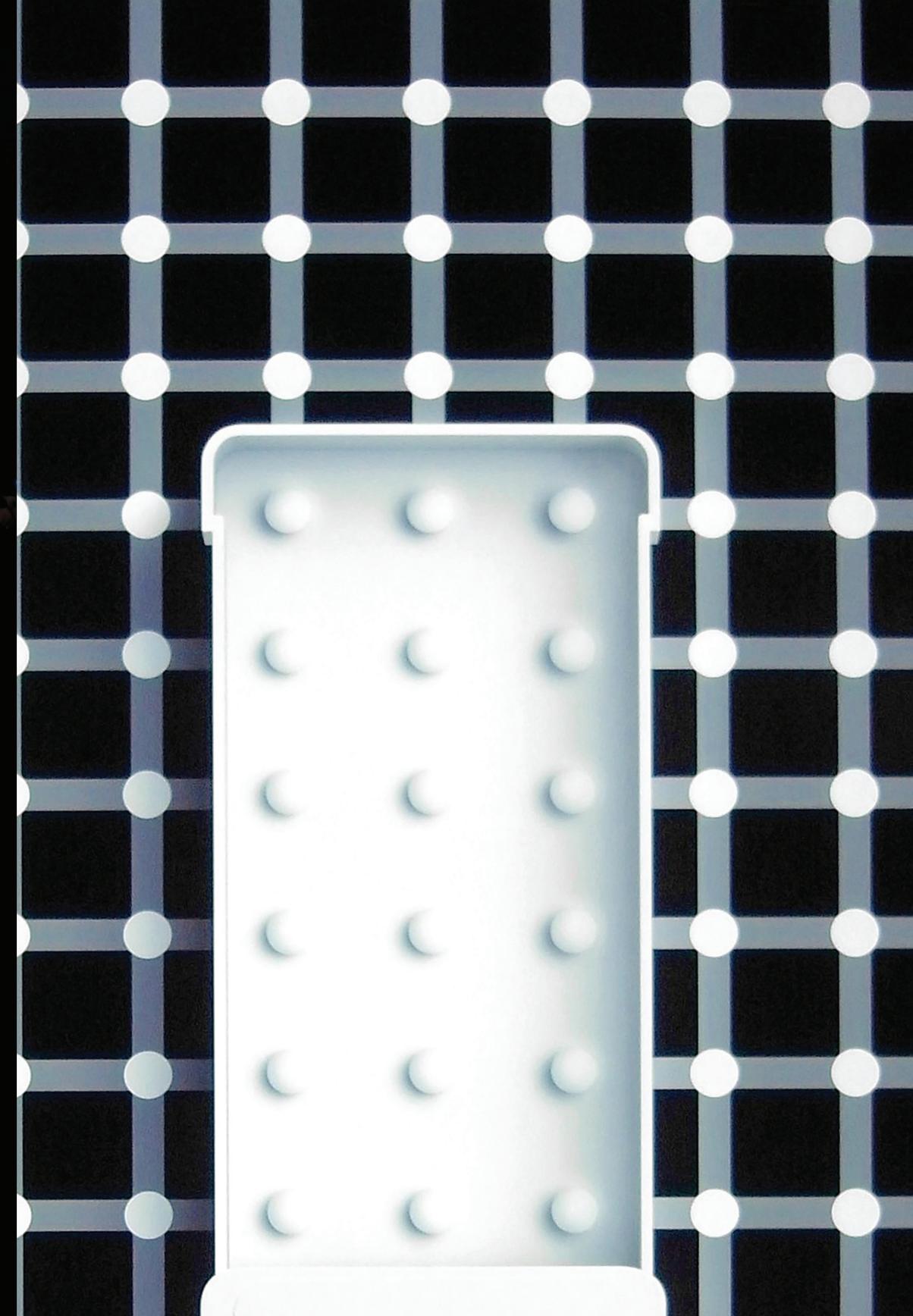
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BEFORE, AFTER, AND BEYOND WALLS¹

KRYSTIAN WOZNICKI

Today, more and more people in the Global South are fleeing their homes, and countless people are dying along the way. Their movements challenge the borders that mark the nation state's spheres of influence: territorial, political, juridical, and economic. By doing so, they expose how these borders ultimately determine the conditions of life itself; in other words, who is entitled to civil and human rights, or, even more fundamentally, who may survive.

In this sense, state borders are being exposed in as articulations of state power—a power that has become inseparable from the power of corporations, which states have helped build and expand within and beyond their own territorial limits. Moreover, state borders are being revealed not as mere lines on a map but rather as assemblages of methods, technologies, and institutions. They are social ordering processes that migrants challenge, whether they are illegalized or—to some extent or temporarily—legalized.

Admittedly, the politics of movement cannot be reduced to a matter of state borders. Yet, these borders must be seen as crucial reference points for analysis, critique, and resistance in the field of movement-based power. While perhaps not consciously or intentionally, migrants are forcing an awareness of this through their actions. Hence, the big question is: Are those who are among the most vulnerable and precarious also those potentially creating movement-based counterpower? And, in the course of this, are they shaping the notion of political agency anew?

For centuries, states and corporations have engaged in transnational and often global processes serving a range of objectives including trade, missionary work, and colonial conquest—or all of these at the same time. Contemporary examples are the geopolitical arena of foreign policy and neo-colonial land grabbing in the Global South. A web of interdependencies currently exists between and among states and corporations, markets and environments, and populations and infrastructure. This challenges the state and its borders, and above all the capability to regulate and control movement inside this complex web.

State representatives envision nation states as walled gardens. In North America, Europe, South Asia, the Middle East, and beyond, they are propagating walls and fences. People like Donald Trump and Victor Orbán are only the most notorious among a growing movement of populists who respond to seemingly unfamiliar degrees of complexity and uncertainty engendered by processes of globalization by selling a simple solution: a more authoritarian state that demonstrates its power as massively and as visibly as possible—with walls, for instance.

1. An earlier version of this photo-essay was published in Krystian Woznicki, *Fugitive Belonging*, Berlin: Diamond Paper, 2018.

This tendency goes hand in hand with the expansion of social and economic power, as well as with the expulsion of people dispossessed of their social, economic, and political status. Illegalized migrants and asylum seekers are brutally subjected to this logic, which echoes colonial values and practices of bordering. At the same time, they are potentially undermining this logic, even if only by showing up where official narratives—such as nationalism—rule them out as aggressively as they can. It is high time to scrutinize this dynamic, because are walls not a symptom of the state's inability to cope with transnational and potentially global movements?

Since the dawn of the ostensibly borderless period initiated by the fall of the Berlin Wall in 1989, it has become increasingly difficult to evaluate the power of the state, or to grasp the role and function of walls. In any case, one should be critical of the notion that ours is a borderless age—or in fact that one ever existed. Was there really free movement of people, data, capital, and goods before the agendas of people like Trump and Orbán showed up on our screens? Before the Brexit vote? Before the EU–Turkey ‘refugee deal’? It would be negligent to imagine that there were no borders before the recent renaissance of walls. No, the question on the table is rather: how has the state border evolved and expanded in power in the post-1989 era in spite of being romanticized—or demonized—as borderless? Articulating this question also means asking: What kinds of state borders are there besides walls, fences, and the like?

To begin with, we need to expand the notion of state borders beyond the massive and visible installations that illustrate the state's ambitions and generate ‘ugly images’ when migrants run up against them, sometimes fatally. Although such scenes are serious, let us not get too distracted, but instead look at all the different fields and contexts of movement, because it is here that the state feels obliged to seek control and worries about not having enough. Let us attend to the spaces where people, capital, goods, and data are moving, and where—in complementary fashion—the strengthening of state borders, both material and immaterial, are being set in motion as well.

That is, let us look at the infrastructure of globalization, because this is what enables, catalyzes, directs, and redirects movement.

Framed in this way, we can envision the mechanisms of state borders as being set into motion over the entire infrastructure of globalization, expanding around the world and transforming daily life. This means that, unlike with physical walls and fences, new articulations of state power can potentially be found wherever the state chooses to define itself as well as wherever the state seizes opportunities to refine or expand its control, e.g. wherever processes of bordering produce or reproduce social divisions.

Often subtle or invisible, the mechanisms of state borders can be triggered in the cloud, to which smartphones are connected, or in the database of a social network. They can be set in motion in a satellite orbiting the earth or in the middle of a city, as in the makeshift security architecture of an overcrowded registration office for new arrivals, or at an employment office, or at an airport. State borders can even be activated in a foreign country, e.g. in an embassy, in a data center, in fiber-optic cables, in a secret prison, or on a military ship cruising through allied territories.

How State Borders are Being Set in Motion Virtually Everywhere

Contrary to popular assumptions, state borders, including the walls propagated by Trump, Orbán and company, are not closed because their primary function is not to stop movement. Instead, they are set in motion to scan, sort, and classify moving subjects and objects, to measure and quantify them. Movement is directed or redirected on the basis of these assessments. The imperative is rather to extract labor and to monetize information.

Looking back at the summer and fall of 2015, when a historic number of migrants entered the EU, I recall a dramatic scene. It was around four o'clock in the afternoon, and my colleague and I had just arrived at Berlin's State Office of Labor and Social Affairs (LaGeSo). It was very noisy and chaotic. A large group of people was chanting, quite aggressively, as at a protest. The people were migrants, waiting to be registered and subsequently acknowledged as refugees. Some of them had already been waiting for weeks just to get a waiting number. They were met, however, with deafening symbols of state power when buses with sirens, armed policemen, megaphones, and private security guards arrived, insisting the people calm down.

This could have been a scene at the border between two countries, but the setting was actually in the heart of Berlin. To me this is quite telling because state borders do not always stop entrance to a country. They do not always stop a person from moving. In fact, even in walled regions, people move through and beyond borders; but, while doing so, people are scanned, sorted, and classified by technological systems that are deeply opaque and that operate according to racialized categories.. They are registered as useful or not, and consequently bestowed or denied the privileges and rights of the state. Having developed in various historical settings, today these mechanisms assist the organization of mobility and circulation, and structure political and economic participation. Shouldn't they be administered transparently?

Not everyone knows that, in a sense, all movement in the present day entails the crossing of state borders. Not everyone knows that vital decisions such as about asylum applications are being taken in secret in the course of this movement. Not everyone knows that, while they are waiting, decisions on their status are being evaluated, made, or delayed. This type of invisibilized uncertainty is a far-reaching suspension of agency, and it is coupled with the potential dispossession of economic, social as well as political status. It all leads to *Entrechtung*—a radical suspension of rights.

All of this takes place within the realm of the modern, Western nation state, whose historical function hinges upon its claim to provide shelter. But the claim can only be valid when the opposite is also true at the same time; in other words, when by means of state borders inclusion can be modulated with exclusion. Of course, the concepts of inclusion and exclusion are not dynamic enough to describe our present predicament. After all, bordering processes are far too gradual and granular. Those who are included can be simultaneously excluded, and vice versa. This somehow renders ad absurdum the notion of citizenship, doesn't it? After all, the idea of citizenship is based on the concept of a clear-cut distinction between those who belong to us and those who don't.

In reality, most operations of state borders suspend people somewhere in between, rendering them both included and excluded simultaneously. Mass monitoring is one example. Another is the mass illegalization of migrants who have also become an integral part of national economies, composing a hyper-flexible and exploitable labor force that contemporary markets desperately require. In this sense, *Entrechtung* has become instrumental in the flourishing of corporate and political power, as well as in the management of movement. Meanwhile, as Louise Amoore notes, ‘the State border becomes a condition of being that is always in the act of becoming, it is never entirely crossed, but appears instead as a constant demand for proof of status and legitimacy.’² Moreover, one could add, the state border appears as a constant demand for proof of one’s value to the economy.

Can Migration Expand the Space of Democracy?

To paraphrase William Gibson, one of the founding figures of the cyberpunk genre: You move with your body, but you leave your soul behind. That’s jetlag.³ You move, cross state borders, offline or online, but, consciously or unconsciously, you leave your rights behind. This is the jetlag of today’s citizens. The whereabouts of this ‘behind’ is unclear. It could be the mythic past, for instance the birth of civil and human rights during the French Revolution. But, it could also be the speculative future, of something like the promise of global citizenship, implying the redefinition of the state as a node in a global web of interdependencies and interconnections, as well as the development of transnational institutions for democracy on a planetary scale.

Now, let us reconsider the migrants waiting at the LaGeSo, waiting at a state border in the middle of a country’s capital to be registered, to be acknowledged. It may be difficult to see this as anything other than loss and deprivation. It may be difficult to see these migrants as anything other than victims. It may be difficult to see their circumstances as anything other than a prolongation of colonial history. At first glance, these are people who appear to have had their dreams hacked. Having come to Europe on the search for a place that is both worth living in and which is livable, they seem to be reproducing the colonial narrative of Europe as the desirable ideal.

But perhaps there is also—or instead—a dimension of liberation. Perhaps they could be seen as reverse-engineering this colonial hack of imagination. This rather counter-intuitive idea becomes tangible when you consider the following: The migrants waiting at the state border that has been activated at LaGeSo have already entered state territory and are already claiming an active role in Germany—by making friends, by picking up work that needs to be done, by learning their first words in German, and by contributing data and profiles with every movement they make. The latter is not labor in the formal, classical sense, but it generates monetizable information nonetheless.

In this sense, the jetlag of citizens cannot be reduced to a delirium of loss and deprivation. It can also be seen as a delirium of someone yet to acquire their desired status and continuing to move relentlessly across state borders and claim rights; of someone

2 Louise Amoore, ‘Biometric Borders: Governing Mobilities in the War on Terror’, *Political Geography* 25.3 (March, 2006): 336–351.

3 William Gibson, *Pattern Recognition*, New York: G. P. Putnam’s Sons, 2003, p. 9.

who is appropriating the colonial narrative of Europe and actively formulating their own images of Europe; of someone who, in the course of this, is simultaneously destabilizing and contesting the colonial narrative.

Additional aspects of liberation and emancipation emerge if one adopts an anarchist perspective. Consider this: if migrants move in a realm of rightlessness, they are in a realm which is outside a relation and contract that the state has set up for its people—a relation and contract that are not satisfying and in various ways not acceptable. By moving in this realm, migrants are not only disrespecting the nation state framework, but they are also potentially destabilizing the state's complicity with capitalism—that is, as philosopher Marcia Cavalcante puts it, with 'a movement that keeps everything in movement in order to keep this movement [at the macro level] unmoved, that is, unchanged'. In that sense, their precarious and vulnerable motions potentially 'move the movement', as one could put with Cavalcante.⁴

In so doing, migrants are potentially expanding the notion of political agency. And migration, especially in its illegalized form, can thus be seen as a social movement. Despite—or perhaps to a certain degree because of—their extreme vulnerability and precariousness, migrants are capable of revitalizing politics and expanding and redefining the space of democracy in unexpected ways.

Shouldn't the most recent migration movements, which fly in the face of the regulative function of state borders, be taken as the occasion to reposition the principles of political and economic participation on new, revolutionary grounds? How could illegalized movements actually expand the space of democracy? What if one were to pose today's urgent social questions from the perspectives of migrants? Might their experiments, experiences, and expertise be the laboratory for alternative futures?

Expulsions and Social Sorting

Before searching for answers, let us try to better understand the logic of state borders and the entanglements between politics and technology. Mediated by images and stories that are perpetuated by mass media, the news of artificial intelligence and so-called big data technologies is deeply situated in the collective imaginary. But, what remains hidden all too often is that these technologies are gaining momentum at a moment when states and corporations are fostering to an intensified degree what social theorist Saskia Sassen identifies as 'expulsion'.⁵ Therefore, are the cybernetic protocols of big data technologies and artificial intelligence interlaced with the mechanisms of state borders? And, if so, how does this interplay work within the logic of expulsion, and what are the consequences for movement in general?

Today, crisis-plagued states like Greece show that processes of expulsion are part of a systematic redefinition of a country's economy. Only certain people and enterprises are intended to enjoy the fruits of stimulus and growth, solely considered profitable. The

4 Marcia Cavalcante and Krystian Woznicki, 'Resisting the Movement of Control', *openDemocracy*, 26 November 2016, <https://www.opendemocracy.net/can-europe-make-it/krystian-woznicki-marcia-cavalcante/resisting-movement-of-control>.

5 For more on this concept, see: Saskia Sassen, *Expulsions: Brutality and Complexity in the Global Economy*, Cambridge: Harvard University Press, 2014.

majority of the population is abandoned and rendered invisible, seen as drags on growth. This unequal atrophy leads to more and more people being displaced and denied political and economic participation in states and markets. Meanwhile, state borders are recalibrated to manage movements inside and outside this austere economic space.

With historic numbers of migrants crossing state borders, the dynamics of expulsion are gaining dramatic urgency. These dynamics are generating an ever-growing surplus population, with millions of people forced to create survival economies, to wage semi-invisible struggles against discrimination and criminalization, and to generate equally unrepresented fights for the commons and common wealth in general. This development is gaining momentum in societies in which both legalized and illegalized movement constantly produces data traces, as well as traces of data: the necessary material for big data technologies and for new forms of monetization. Oscar Gandy's groundbreaking research on the algorithmic procedures of 'social sorting' illustrates how companies are using big data to identify so-called good customers and economically valuable demographics.⁶ Predicting who will be valuable in the future also implies the possibility of designating who will be worth less—or, even, worthless. To translate this method to state borders means to evaluate people's potential for future markets, and to classify some as useful and others as something else altogether. 'Economic actors once crucial to the development of capitalism,' Saskia Sassen diagnoses, have ceased 'being of value to the larger system'.⁷ Those classified as no longer crucial to the system are sorted out and expected to remain silent and irrelevant.

While there is still a lot of uncertainty regarding the real potencies of big data and artificial intelligence in general, the mere rumor of their operational mode has consequences. In spite of social sorting still being in its infancy, the sociological and psychological processes of sorting are already well advanced. The relationship between imaginary and actual social sorting is reciprocal. The resonating influence of this multi-layered narrative makes it increasingly difficult for people to think of society outside the strict categories and processes of this narrative.

In this context, social sorting can be seen as an emblematic technology through which one can comprehend the contemporary predicament. Its mere promise or threat structures society and social expectations. Fear of expulsion alone is enough to generate compliance, apathy, and self-censorship. It sabotages the imagination and the democratic co-creation of futures.

Blackboxed Infrastructure

The entanglements between politics and technology demand close scrutiny. Admittedly, looking more closely is hard, if not impossible, where the unofficial—or least visible—corollaries of state borders elude inspection, where their mechanisms are set in motion in a blackboxed infrastructure. This is an infrastructure that consists of the networks organized by human traffickers and smugglers; of rubber boats, border posts, hotspots, camps, registration offices, emergency accommodation, shelters for asylum seekers, deportation detention centers, and deportation flights.

6 Oscar Gandy, *The Panoptic Sort: A Political Economy of Personal Information*, Boulder: Westview Press, 1993.

7 Sassen, *Expulsions*.

Migrants are codified and tracked every step of the way, regardless of the outcome of their situation. Whether or not they reach their destination, have to wait for a short while or indefinitely, are given recognized status, are allowed to proceed, or are sent back, their movements are documented. They are scanned, coded, interpreted, funneled, and constrained through opaque, data-driven technologies that comprise part of the state border's infrastructure, whose very existence is reliant on the demand for the border in the first place.

The nodes of this data infrastructure, which is seldom viewed in the context of moving state borders, are made up of smartphones, social network accounts, service providers, fiber-optic cables, one-stop shops, data centers, and databases. Whether data packets reach their destination quickly, slowly or not at all, whether they are closely inspected or ignored, whether they are collected and analyzed or go unnoticed, whether they are stored for a short or long time, passed on or prioritized via recommendation algorithms—all these decisions are made in the dark by unseen and unaccountable corporate and state powers.

This hermetic blackbox dimension of data infrastructure crucially informs the nature of state borders and thereby shapes movements, regulates communications, and transforms social relationships according to the logics of governmental power. As more and more people inhabit the internet, including precarious or marginalized people as well as smartphone-equipped migrants, and as this subsequently means that the internet is becoming vital for virtually any social relationship to exist today, governmental power is becoming seemingly all-encompassing, all the more it is remaining blackboxed and largely uncontested as such.

Social Motion goes AI

Since Snowden's whistleblowing efforts, the promise and the threat of technology for democracies have become clearer than ever. Yet do civil society actors now better understand why the nexus of geolocation and mobility is of increasing importance? To answer this, let us look at the software that an increasing number of people are using, including illegalized migrants.

Beyond the hegemony of Google Maps, Google Chrome has become one of the most popular browsers in the world, pre-installed as default on devices with the Android operating system. It comes with a pre-installed function—Google Translate—that translates every website from its original language to that designated or assumed to be native to its user. I first experienced this when our website was automatically translated into Japanese, based on the user's past browsing behavior.

This automatic translation is an unrequested service. It can be deactivated, but many people simply accept it, thereby surrendering to a service that blocks out languages. This service is based on an artificial intelligence that expands its capacities to a large degree by its aggregate use: the more people who use Google Translate, the 'smarter' the service becomes. Or at least that's the idea. In its present stage, the service delivers a word-for-word translation, often lacking any sense of the intended meaning and with little understanding of the specific architecture of a language, and so produces confusing and even comical renderings.

So why should one talk about a deficient product? The case of Google Translate shows how the global proliferation of such a web service caters to the facilitation and acceleration of movement. The imperative seems to be: don't think about whether you are about to enter a realm of the French, the Chinese, or the Spanish language, just move! This digitally enhanced movement (with embodied movement and disembodied movement being inseparable here) is facilitated by a number of other services that are complementary to the translation service, such as search, mail, and maps.

Google, one of the world's dominant IT superpowers, produces an all-encompassing portfolio of web services that facilitate movement. Yet the disclosures by Snowden show that this global player collaborates with the cyber-security projects of the USA and other states. The services of this company are used across the planet, enabling the company to accumulate massive amounts of data that, in turn, are used to classify, sort, channel, and measure the world's population. This is a population, that, in some way or other, is always in motion: cycling, shopping, visiting friends, going to the doctor, travelling abroad, or even having a rest, which can be considered a type of micro-movement.

Meanwhile, the algorithmic analysis of information on the basis of associated location data is making rapid progress. Industries are being established that create movement profiles of people with the aid of metadata. Is metadata covered by data protection laws? Ostensibly, it is not, as it is not supposed to be relevant to the sphere of personal privacy. Snowden's disclosures, however, demonstrate the contrary. Metadata becomes hyperpersonal and hyperpolitical when the question of political control shifts from 'what are people communicating about with each other?' to 'with whom, where, and how often are people connected to each other?' This shift from the content of communications to the metadata of communications enables the capture of movement in ever more all-encompassing ways. Be it online or offline, or both simultaneously, the question of political control then becomes 'with whom, where, and how often are people moving?'

Data-Driven State Borders

The case of Google Translate and its shortcomings is telling for yet another reason. What is nonsense for humans is not necessarily nonsense for machines. Machines have different criteria for establishing sense. Understanding this is becoming more and more important, since ever greater tasks, even in the realm of state work (e.g. administrative processes), are being delegated to machines and automated processes under algorithmic governance. These include policing, warfare, secret services and intelligence, traffic control, and so-called national security in general. In short, the power of the state is becoming increasingly mediated by artificial intelligence and big data-based analytics. And this, of course, also holds true for state borders—indeed, that is where these integrations are tested and perfected.

A case in point is the EU agency Frontex, a border management agency that trains, manages, and coordinates the border guards of almost 30 European countries. Using predictive data-driven methods, this organization tries to preempt the next movement of migrants, arriving before the migrants themselves so as to make life-or-death border decisions that determine the movement of people. The European

Border Surveillance System (Eurosur), which was set up specifically for this task, provides the ‘information exchange framework’ required for the analysis.

Eurosur bundles data received from so-called surveillance airships, drone boats, radar facilities, movement sensors, and offshore sensors with information gleaned from risk analyses, satellite images, and archives of migrant profiles. In addition to national border agencies, the European Maritime Safety Agency and the European Union Satellite Centre are among the partners in the security network, which promotes the merger of public and corporate databases.

This military-information complex advances the bureaucratization of migrant registration, which is being jointly developed and implemented by the European security IT systems agency EU-LISA, the European asylum fingerprint database Eurodac, and agencies like the Berlin State Office of Labor and Social Affairs (LaGeSo). In the slipstream of datafication, the control of movement is turning into an increasingly mobile movement of the methods of control. State borders are being activated at will, across real space and virtual space, unaccountably, and undemocratically. As complex composites of state power, they are becoming increasingly ambiguous, hybrid and dynamic, set in motion along the migrant infrastructure, from the frontier to the heart of the state territory, e.g. to the city center of Berlin, with countless migrants waiting their turn outside the initial registration office. This migration of state borders is the movement of state power.

Bordering Potential Movement

What is crucial to note in this context is that the rise of artificial intelligence and big data technologies converges with post-9/11 politics of preemption, and is embraced by a number of states. Governmental bodies like intelligence services and military special forces cooperate with security firms and IT companies. The representatives of these organizations believe that every risk can be managed through data collection and computing power, and therefore they are reaching for and grabbing more and more data.

Though their predictions may never become reality, their obsessive forecasting nevertheless leads to arming themselves against all threats (threats to their power and their mobility) that might appear in the future. They are also implementing a project of algorithmic logistics, developed for the global management of goods and supply chains and now targeting the movement of people and of data; and, they are demanding sovereignty over all essential infrastructure in order to carry out this project.

The data-driven preemption game is changing the space for what is possible. It designs and produces the future and it manages movements in new ways. The future of movement and the movement of the future are both meant to reach a state of control through computation and pre-emption, without ever having been contested within society. The idea is to declare war on everything that could potentially happen. Also known as the War on Terror, this politics operates on the level of the virtual. It places hypothetical threats on its agenda and takes their non-existence—or ‘not-yet’ existence—as a stimulus. After all, even something that ends up never happening, could have always happened. Such a politics is, of course, ultimately incapable of completely ruling out any event; yet, it cannot even understand, let alone accept, this very

incapability. Instead, it seeks to overcome it by any means possible, and thereby even risks producing what it claims to be preventing. As a result, it becomes a productive force in its own right.

The initial rise of this power can be dated back to the 18th and 19th centuries. This period saw the birth of human and citizenship rights. At the same time, large-scale mobilizations of labor and capital were unsettling Europe, threatening the security of the borders of nations and property, and destabilizing the equilibrium between states. Under these conditions, a new bordering process emerged, mixing statistics and biometry, demography and images (as used for photo passports). Ever-growing data collections began to be used to transform the direction and redirection of social motion. Patterns of mobility gained currency, animated by the dream of tracing movement before it moves.

Today, this dream—or actually nightmare—has become a reality. The convergence of pre-emption politics and artificial intelligence catalyzes the global conquest of a new type of movement. It is no longer just about scanning, controlling, and constraining subjects and objects that actually move, but also increasingly about those that might potentially move. It is about movement that has yet to take place, movement that is about to take place, or movement that in theory could take place. Such potential movement is becoming of primary interest to the state and its corporate allies. The ambition is not merely to capture it, but also to gain control over its production. To signal the shift in power under such circumstances, the philosopher Brian Massumi introduces the term ‘ontopower’,⁸ which designates the power to create livable conditions, livable social motion, and life in general.

Returning to state borders as articulations of state power, this qualitative shift implies that state borders direct and redirect potential movement. This also implies that state borders, expanded well beyond the lines between nation states, are now geared towards anticipating potential movement and are helping to preempt it. In that sense, they are not only seeking to direct or redirect movement before it actually takes place, they are also actively creating it—while operating at the level of potentiality. In this, they are determining and shaping the value of people, data, goods, or capital that have yet to make the next move.

Democratic instruments or processes that could be applied to challenge this particular type of movement control are nowhere in sight. However, at this juncture three things should be noted. First, this type of movement control, just as any other approach to bordering, has its flaws and limits. After all, state borders are set in motion by a complex mix of actors, processes, and forces. Since this concoction of power always struggles to eventually materialize as such, the mechanisms of state borders always remain to a certain degree deficient.

Second, the relationship between states and corporations isn’t always as cozy as this text may appear to suggest. Since there are cracks, imbalances, and frictions in this power relation, there are accordingly many starting points for an emancipatory politics of movement. Third, the more knowledge about state borders emerges and

8 Brian Massumi, *Ontopower: War, Powers, and the State of Perception*, Durham: Duke University Press, 2015.

spreads, the better people will be able to understand their functions, and the greater become the possibilities to critique and resist them. The goal would be to design and fight for an alternative politics of movement. Could this be a starting point for forthcoming civil societies?

Overcoming the Citizens' Jetlag

As mentioned earlier, perhaps the movements of migrants, especially illegalized ones, offer the inspiration and resources for just such an apolitical project. Migrant intellectuals as diverse as Harsha Walia, Jennifer Kamau, and Miltiadis Oulios prove with their activities that migrants themselves are already leaders, theorists, and advocates of this very project.⁹ At the same time, however, their work reveals a certain reservation vis-à-vis this role. Migrants often live under harsh and terribly precarious conditions. Moreover, they are systematically invisibilized in mass media and pressured into silence—directly or indirectly threatened with even more dispossession, such as deportation, if they dare to articulate disobedience.

Empowering migrants becomes an urgent task. But how can those of us whose movements are less criminalized, who are said to belong to the nation state, be part of this empowerment? How and when should our voices and agency claim solidarity? But, before anything else, how should we learn to listen for their needs and concerns as well as in the name of our own survival, freedom, and political agency?

I vividly recall a demonstration in the summer of 2016, organized by the Socialist Youth Movement Pankow, in favor of affordable housing. Prior to the march, there was a controversy at one emergency shelter over whether asylum seekers should participate or not. Someone spoke on their behalf, claiming that they were being instrumentalized for other people's political ends. This triggered a great deal of debate. Eventually, some fifty migrants joined the protest when the demonstrators passed the emergency shelter. It wasn't clear who among them felt obligated to do so, who was just curious, or who was actually convinced that a political rally through northern Berlin would be the right thing to do.

At some point, one of the illegalized migrants took hold of the megaphone, a young man from the Bamyan ethnic minority group persecuted by the Taliban in Afghanistan. He read a statement in his own language, and copies of the translation were distributed. Surprisingly, his voice was shy, slow-paced, and quiet, almost tender. It was not the voice of someone who was familiar with making strong, public demands. It was also not the voice of the all-too-common exhibitionistic social network egos. And, needless to say, it was not the voice of a leader—at least, not as would be expected from leaders these days.

One assumes that this is the voice of a newcomer to politics and democracy. But haven't we all—legal and illegalized movers alike—become newcomers to the political scene, called to explore what democracy could mean as border processes constrain

9 International Woman Space, 'In Our Own Words. Refugee Women in Germany Tell Their Stories', *International Women Space*, 2015, <http://iwspace.de/in-our-own-words/>; Miltiadis Oulios, *Blackbox Abschiebung. Geschichte, Theorie und Praxis der Deutschen Migrationspolitik*, Berlin: Suhrkamp, 2015; Harsha Walia, *Undoing Border Imperialism*, Chico: AK Press, 2013.

social motion? Don't practically all of us need to learn anew how to become actors with agency as we are subjected, in one way or another, to the very same jetlag of crossing state borders and leaving our rights behind?

As we have just seen with regard to the qualitative shift in power, any collective will to make democracy more democratic, to expand the space of democracy, or to create a democracy in motion—any such collectiv—must take into account that its drive or its potential movement may be already incorporated by the preemptive state border regime. As such, the politics of movement is transforming the notion of social movements, be they composed of illegalized migrants, refugees, citizens, or all of us at once. Therefore, when it comes to drawing conclusions from this transformation, all of us are newcomers in some way or another. We all have to rethink what it means to be political today and what it means to belong.

Any collective thinking about what kind of world is desirable and how this could become a reality in the future will have to contend with the state and the emerging forms of power that its borders represent. More specifically, it seems inevitable that the border-infrastructure complex and its new modes of power will have to be contested in some way or another. How illegalized migrants, refugees, and citizens come into play here is an open issue. However, it's plain to see that a common strategy will make a difference in the future.

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REDIRECTING
RESPONSIBILITY:
FROM
STRUCTURAL
INSECURITY
TO SYSTEMIC
DEPRESSION

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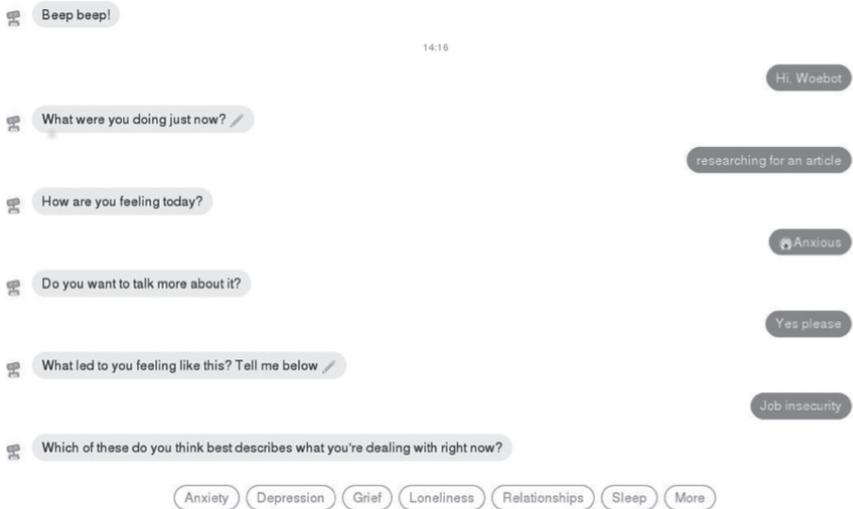


Fig. 1: Screenshot of a conversation with Woebot.

While leisurely browsing the internet, I came across a link to a BBC news video bearing the title ‘Depressed? Try talking to this bot.’¹ As I have been intrigued of late by the expanding offer on mental health apps, I promptly clicked it. This is how I first came into contact with Woebot, an artificially intelligent bot (whatever that means)² developed by a team at Stanford University, under the tutelage of CEO Alison Darcy, PhD. According to its official website, Woebot can help you:

- [t]hink through situations with step-by-step guidance from Woebot using methods from Cognitive Behavioral Therapy (CBT);
- [l]earn about yourself with intelligent mood tracking;
- [g]et over 100+ [sic] evidence-based lessons, exercises, and stories from [their] clinical team.³

1 Cody Melissa Godwin, ‘Depressed? Try Talking to this Bot’, *BBC News*, 28 August 2018, <https://www.bbc.com/news/av/technology-45299679/depressed-try-talking-to-this-bot>.

2 Jathan Sadowski, ‘Potemkin AI’, *Real Life Mag*, 6 August 2018, <https://reallifemag.com/potemkin-ai/>.

3 Woebot, <https://woebot.io/>.

Woebot can be downloaded as a stand-alone app from both Google Play and Apple's App Store, or used instead via Facebook Messenger. Woebot checks in daily with the user and the more they interact, the better Woebot is able to gather and process data about the user, promising to spot patterns where they might exist. Other examples of therapy bots focusing on anxiety, depression, and stress are Wysa and Youper. All three apps offer a similar array of techniques to help users manage their emotions and challenge distressing thoughts.

The Wysa app was developed by Touchkin and Dr. Becky Inkster, a neuroscientist at Cambridge University, leading its advisory board. Besides a cognitive behavioral therapy approach, Wysa offers techniques such as guided meditation, breathing, and yoga.

Youper's team is led by psychiatrist Jose Hamilton. In addition to quick conversations with their bot (which, they promise, makes 83% of their users feel better after just one conversation),⁴ the app also offers guided meditation, mindfulness techniques, journaling, and mood tracking.

Yet artificially intelligent bots are not the only available technological 'solutions' to our psychological woes. A vast and growing array of apps is increasingly claiming to improve our mental health by means of cognitive behavioral therapy, mindfulness techniques, guided meditation, mood tracking, etc. These include, for example, Pacifica and Headspace. The most popular of the two, Pacifica, was nominated for the Best of 2017 award by Apple's App Store and is listed as Editor's Choice on Google Play. Pacifica, developed by Pacifica Labs, Inc., combines journaling techniques, to help users challenge their thinking patterns, with health-tracking monitors for anxiety influencers, such as exercise, sleep, caffeine, and alcohol intake, which the user can utilize to better understand noxious behavioral patterns and subsequently correct them.

With or without witty chatbots, what all of these apps have in common, besides a business model centering on mental health, is a practice of pattern seeking and identification that, they promise, allows for a more efficient targeting of our discontents.

Situating Mental Health

Self-Interest

When clinical psychologist David Smail wrote in 2005 that psychotherapy was becoming one of the biggest commercial and cultural successes of the West,⁵ he was far from imagining this exploding world of techno-based solutions for distress. In *Power, Interest and Psychology: Elements of a Social Materialist Understanding of Distress*, Smail underlines as one of psychotherapy's most striking features its capacity to have remained, for the most part, isolated from society; as such, conventional approaches situate what Smail terms 'avoidable distress' within the realm of idealist individualism.⁶ Idealist individualist depictions of psychological suffering fail to account for the wider systemic infrastructure engendering vast parts of it. This means that, as far as these

4 Youper, <https://www.youper.ai/science>.

5 David Smail, *Power, Interest and Psychology: Elements of a Social Materialist Understanding of Distress*, Monmouth: PCCS Books, 2005.

6 Smail, *Power, Interest and Psychology*, 2005.

therapies are concerned, the source of our distress can be found, accessed, worked, and eliminated from within: we are ultimately responsible for our own world. Smail labels this approach 'magical voluntarism', and its continued success can only be explained by the role played by interest.⁷ Not just the interest of therapists in justifying their professional role, but also the interest of their clients in getting better, and that of the wider society.

As far as the client's interest goes, Smail highlights the appeal of a view anchored in 'magical voluntarism', as it is far more seductive to imagine it is within our immediate power to change our lot in life through self-improvement than it is to adopt a 'material realistic' view, where

the conditions of our existence are to a great extent the outcome of material forces far beyond our personal control, historically unchangeable and with an uncertain future only amenable at best to the effects of concerted, communal (political) effort.⁸

Systemic Interest

To understand more about the interests of the wider system in promoting 'magical voluntarism', we should turn to Nikolas Rose's *Governing the Soul: The Shaping of the Private Self* for a detailed account of the progressive preoccupation with our inner psychological life for the functions of management and governance.

Rose's account starts with Taylorism, a theory of labor developed from the 1880s onwards by Frederick Winslow Taylor. Also known as the 'scientific management of labor', Taylorism consisted of an array of techniques for disciplining workers' bodies into becoming efficient productive machines. Motion studies, calculation, and metrics would produce the knowledge necessary to inform the training of workers and the rational allocation of human resources. Rose understands this process as the first of many attempts to provide management with rational legitimacy.

But this reductive vision of the worker would not last forever. Rose maps the developments which allowed for these theories, if not to subside, to evolve. When World War I struck and demands grew heavier on workers' bodies, it became clear that the worker-as-machine model had limitations and employees were limited by fatigue and other health-related issues. According to Rose, this allowed for a series of interventions that would gradually shift the perception of the worker as mere physiological apparatus. In 1921, psychologist C.S. Myers established the National Institute of Industrial Psychology in the United Kingdom, marking a new era where the psychology of the worker became a crucial way of re-conceptualizing industrial efficiency.

In the United States, the ways of conceiving the working body shifted similarly around this time. However, whereas in the United Kingdom the focus was on individual differences, in the United States the problem was conceptualized in terms of human relations within the group. Overall, workers' subjectivity 'had emerged as a new domain for

⁷ Smail, *Power, Interest and Psychology*.

⁸ Smail, *Power, Interest and Psychology*.

management',⁹ which set itself as a neutral, independent authority that would act as a middle man between worker and employer, smoothing out the frictions that might arise between them. Moreover, the enmeshment of the worker's subjectivity in the life of the company was to create a sense of belonging and common, shared goals, stimulating a renewed personal investment in the advancement of the company's interests.

During World War II (WWII) and the two decades that followed, these trends continued and further developed, and it seemed psychology held the solution to workplace grievances and discontent. The relationship between worker and productive activity was now understood as a means of relating to society in general. Thus, going beyond mere financial gratification, managerial emphasis was placed on the ideals of democracy, happiness, and involvement as key factors in achieving productivity goals.

Following a decline during the 60s and 70s, where ideals of workplace contentment and democratic management fell out of grace and were widely contested as being irrelevant or even counterproductive, the Quality for Working Life research movement (QWL) comprised several international researchers who sought to revive the human relations approach to management so popular only two decades before. Among other accomplishments, the QWL established networks of activity for research and government pressure. While in the United Kingdom the focus was on the role of human relations for the improvement of working quality, in the United States the focus was on the worker as a self-actualizing individual, whose sense of responsibility and personal growth were believed to be the true foundations of mental health.¹⁰ Both approaches, however, ran a parallel course, as the outcome of these strategies was to be an alignment between the worker's subjectivity and the goals of the enterprise.

Pinning work-related discontent caused by systemic inequality down to maladjustment and pathology, managerial approaches to workers' subjectivity have historically contributed to obscuring workers' exploitation in layers of scientific authority, centering the problem on the self and its immediate reality. In turn, this promoted an internalization and individualization of the problem, obfuscating the larger infrastructure/superstructure complex engendering workers' collective exploitation. These thoughts seem to be echoed by many critics who claim that this approach did nothing to solve basic inequalities. Rose sees truth in these analyses, and indeed perceives in much of these managerial efforts a hope to weaken trade unionism. However, he warns against regarding these discourses as purely ideological as to do so would imply that the knowledge involved in the management of the workers' psyche is 'false', serving only to legitimize pre-existing socio-political interests.¹¹

These developments explain, according to Rose, how psychotherapy, its language, and its methods for self-regulation came to be aligned with post-WWII political rationales and governmental technologies. The government of subjectivity was not to be achieved through forceful imposition by a centralized authority, but through internalization, creating a narrative of autonomy wherein we were to produce ourselves.

9 Nikolas Rose, *Governing the Soul: The Shaping of the Private Self*, London: Free Association Books, 1999.

10 Rose, *Governing the Soul*.

11 Rose, *Governing the Soul*.

The autonomous self would evaluate and regulate its emotions and actions, under the pressure of constant self-scrutiny and self-adjustment as the ‘self that is liberated is obliged to live its life tied to the project of its own identity.’¹²

Indeed, Smail stresses that the therapist’s interest in maintaining a ‘magical voluntarist’ approach to treatment should be read in the context of their own enmeshment in more complex systemic networks of interest.¹³

Also quite relevant to the analysis of systemic interest is Mark Fisher’s reading of the placement of emphasis on chemical imbalances as the primary cause of mental illness. According to Fisher, this depoliticized understanding of mental health enormously benefits capitalism: first, it reinforces atomistic individualization, as the root of one’s ailments lies within one’s brain; and, second, it boosts the profits of the already bloated pharmaceutical industry. For Fisher, then, the project of re-politicizing mental illness is a pressing one if we are to challenge ‘capitalist realism’; that is, the perception that there are no viable alternatives to capitalism.¹⁴

Materialist Realism

Neoliberal Perfectionism

Fisher further reflects on depression as an endemic condition, pointing to Oliver James’s book *The Selfish Capitalist*, which analyzes the growth of mental illness between 1982 and 2000.¹⁵ Observing that this increase was much higher in countries where neoliberal capitalist policies were the norm, James hypothesized that the blame was to be found in neoliberal culture.¹⁶

A 2017 study entitled ‘Perfectionism is Increasing Over Time: a Meta-Analysis of Birth Cohort Differences from 1989 to 2016’, conducted by Thomas Curran and Andrew P. Hill,¹⁷ seeks to prove just that. The study inquires about whether an increase in perfectionism observed in college students from 1989 to 2016 coincides with the expansion of neoliberal policies in the UK, US, and Canada from the 80s onwards. In order to do so, Curran and Hill adopt the Multidimensional Perfectionism Scale by Hewitt and Flett,¹⁸ used to measure self-oriented perfectionism (expecting too much of oneself), other-oriented perfectionism (expecting too much of others), and socially prescribed perfectionism (feeling that too much is expected of us).

Contextualizing young people as facing tougher social and economic conditions than their parents, Curran and Hill denunciate neoliberal cultural values which foment competition, individuality, and unrealistic expectations of the ideal self. Neoliberal meritocracy—the context-blind belief that wealth, success, and status are achievable

12 Rose, *Governing the Soul*.

13 Smail, *Power, Interest and Psychology*.

14 Mark Fisher, *Capitalist Realism: Is There No Alternative?*, Hants: Zero Books, 2009.

15 Fisher, *Capitalist Realism*.

16 Oliver James, *The Selfish Capitalist: Origins of Affluenza*, London: Vermilion, 2008.

17 Thomas Curran and Andrew P. Hill, ‘Perfectionism is Increasing Over Time: A Meta-Analysis of Birth Cohort Differences from 1989 to 2016’, *Psychological Bulletin* (December, 2017).

18 Paul L. Hewitt and Gordon L. Flett, *Multidimensional Perfectionism Scale (MPS): Technical Manual*, Toronto: Multi-Health Systems, 2004.

through hard work, and where failure is attributed to deep, personal flaws—‘places a strong need to strive, perform, and achieve at the center of modern life.’¹⁹

Meritocratic ideology actively obscures decisive factors, such as class, gender, race, neurological differences, etc., which might hinder equal access to opportunities, so it is no wonder that multidimensional perfectionism is on the rise. Furthermore, Curran and Hill discuss the destructive consequences for mental health that this increase in multidimensional perfectionism leads to: recent studies have positively correlated self-oriented perfectionism with suicide ideation and depression; whilst socially-prescribed perfectionism, deemed the most debilitating of the three dimensions for its associated constant ‘fear of negative social evaluation’, relates to a higher degree with major psychopathology, such as depression, anxiety, and suicide ideation.²⁰ Overall, according to 2017 data by the World Health Organization, levels of depression, anxiety, and suicide ideation are higher among young people than they were a decade ago.²¹

Normalized Precarity

It is within this context of meritocratic competition and perfectionism that we find the figure of the entrepreneur, neoliberalism’s preferred response to structural unemployment.

In a neoliberal context they [the self-precarious] are exploitable to such an extreme that the state presents them as role models.²²

In *Governmentality and Self-Precarization*, Isabell Lorey questions the meaning of choosing precarity within the context of neoliberal governmentality. From Michel Foucault’s *History of Sexuality*, Lorey extracts the fundamental notion that the modern Western subject must gradually learn a relationship with herself. The self emerges as something to be shaped and modeled after the concept of the ‘normal’ (e.g. white, male, bourgeois, national, etc.), which Lorey identifies with the hegemonic.²³

Whilst traditionally those who did not fit the norm were made precarious, Lorey posits that, under neoliberal conditions, precarization is transformed from an exception into a hegemonic, normalized function. Self-precarization, thus, serves the needs of economic and governmental power whilst at the same time disguising its role. Lorey identifies self-precarization with feelings of fear, loss of control, insecurity, as well as with a redefinition of the boundaries between work and leisure, as precarious bodies need to constantly prove themselves economically viable. And this is true for both forced and self-chosen precarity: every event is an opportunity to trade in social capital, every party might decide whether economic survival will be possible for the next couple of months. Where everyone is an entrepreneur, everyone can become your next investor.

19 Curran and Hill, ‘Perfectionism is Increasing Over Time’.

20 Curran and Hill, ‘Perfectionism is Increasing Over Time’.

21 Curran and Hill, ‘Perfectionism is Increasing Over Time’.

22 Isabell Lorey, ‘Governmentality and Self-Precarization: On the normalization of cultural producers’, *EIPCP transversal*, January 2006, <http://eipcp.net/transversal/1106/lorey/en>.

23 Lorey, ‘Governmentality and Self-Precarization’, January 2006.

Within this context, Curran and Hill's conclusion should come as no surprise: levels of socially prescribed perfectionism are on the rise, and with them the associated disastrous consequences for our mental health.²⁴ These consequences are then often tackled according to the tenets of 'magical voluntarism', which, locking us further within ourselves, fail to address the structural conditions producing our distress. According to David Smail, this places a new burden on ourselves, as we are ultimately responsible for making the personal changes required for improving our lot in life.²⁵ Responsibility for one's success in furthering a career is thus enhanced with a further responsibility for one's success in fighting psychological distress.

Unhealthy Solutions

In times of increasing and widespread mental illness which, as we have seen, is heavily rooted on neoliberal policies spelling financial insecurity for the many—as well as the erosion of communal safety nets and solidarity bonds—public access to health care services is equally hindered by neoliberal privatization programs and austerity measures that limit public spending.

In the United Kingdom, this increase in demand has been met with the loss of 200 full-time mental health doctors and 3,600 nurses, resulting in 10% of the sufferers experiencing waiting lists of over a year and 50% waiting over 3 months.²⁶ As a result, many of the people on these waiting lists are turning to mental health apps, some of which are endorsed by the UK's National Health Service through their inclusion in the NHS' official app library.

Among other listed reasons for their success, such as the lack of judgment which is experienced by some of their users, these apps infiltrate the space left void by the lack of political solutions tackling the need for universal access to health care services. On its official page, Woebot invokes radical accessibility, as 'the sad truth is that more than half of the world's population still doesn't have access to basic health care. For many more, mental health care is not an option.'²⁷ At this point, it is impossible not to think of Evgeny Morozov's solutionism, a term the author borrowed from urban planning and architecture. As Morozov puts it, 'Silicon Valley's default answer to the how of politics is what I call solutionism: problems are to be dealt with via apps, sensors, and feedback loops—all provided by startups.'²⁸

Privacy Policy

Plagued as we are nowadays by data privacy 'scandals'—Cambridge Analytica being the most widely talked about in 2018—it does not seem far-fetched to enquire into the data protection policies enforced by the companies developing some of these apps, questioning their effectiveness, and situating them politically.

24 Curran and Hill, 'Perfectionism is Increasing Over Time'.

25 Smail, *Power, Interest and Psychology*.

26 Simon Leigh and Steve Flatt, 'App-based psychological interventions: friend or foe?' *Evidence-Based Mental Health* (October, 2015), <https://ebmh.bmj.com/content/early/2015/09/16/eb-2015-102203>.

27 Woebot, <https://woebot.io/>.

28 Evgeny Morozov, 'The rise of data and the death of politics', *The Guardian*, 20 July 2014, <https://www.theguardian.com/technology/2014/jul/20/rise-of-data-death-of-politics-evgeny-morozov-algorithmic-regulation>.

Despite claiming not to make any sensitive and personally identifiable data available to any other companies or services, reading through the privacy policies of Woebot, Wysa, Youper, Pacifica, and Headspace, it is possible to identify one or two common areas of immediate concern. Firstly, all of these apps reserve the right to update their Privacy Policy at any given time. Secondly, in the event of a corporate reorganization or merger, all stored users' personal information would be disclosed to any parties involved. Either might happen at any given time and without the need for users' renewed consent, so any promises that these data may only be used for the purposes permitted by their current Privacy Policy are not especially reassuring.

Furthermore, access to Woebot via Facebook Messenger is subjected to Facebook's Privacy Policy; Wysa uses third-party advertising agencies and may install third-party modules within the app to determine their efficiency;²⁹ Pacifica might provide access to personal contact information for limited marketing purposes with Google Analytics ('Google may use the data collected to contextualize and personalize the ads of its own advertising network');³⁰ Apple, Appsee, Amazon Web Services, and Youper might likewise share non-identifiable, aggregated personal information with other agents, such as payment-processing companies.³¹

Even if we are to (ill-advisedly) believe the apps' promises not to share or sell personally identifiable data to third-party companies or services, the cross-referencing of anonymized information or metadata by interested parties might yield personally identifiable results, and there are indeed firms specializing precisely in this branch of activity.³² Moreover, a study entitled 'Unaddressed Privacy Risks in Accredited Health and Wellness Apps', published in 2015 in the journal *BMC Medicine*, found that several health care apps endorsed by the NHS put personal data at risk despite flaunting its safety.³³ So far, there is no way of knowing for sure whether this safety will also be safeguarded when using Woebot, Wysa, Youper, Pacifica and Headspace.

The simple fact that the usage of Woebot via Facebook Messenger is subjected to Facebook's Privacy Policy should already ring some alarm bells. Consulting, for example, Facebook's patent 'Determining User Personality Characteristics from Social Networking System Communications and Characteristics',³⁴ we can observe that linguistic data from users' messages, among other forms of communication, are gathered and processed to predict personality traits according to the Big 5 model: openness, conscientiousness, extraversion, agreeableness, and neuroticism. Conclusions are then used for the purposes of, for example, targeting, ranking, and selecting content for presentation in a given user's feed.

29 Wysa, <http://beta.touchkin.com/>.

30 Pacifica, <https://www.thinkpacific.com/privacy/>.

31 Youper, <https://www.youper.ai/privacy-policy/>.

32 Brian Naylor, 'Firms Are Buying, Sharing Your Online Info. What Can You Do About It?', *NPR*, 11 July 2016, <https://www.npr.org/sections/alltechconsidered/2016/07/11/485571291/firms-are-buying-sharing-your-online-info-what-can-you-do-about-it?t=1535373419320>.

33 Kit, Huckvale, José Tomás Prieto, Myra Tilney, Pierre-Jean Benghozi, and Josip Car, 'Unaddressed Privacy Risks in Accredited Health and Wellness Apps: A Cross-Sectional Systematic Assessment', *BMC Medicine* 13:214 (September, 2015).

34 Michael Nowak and Dean Eckles, 'Determining User Personality Characteristics from Social Networking System Communications and Characteristics', US Patent 9740752B2, issued September 2012.

US9740752B2 - Determining user personality characteristics from Social Networking System communications & characteristics

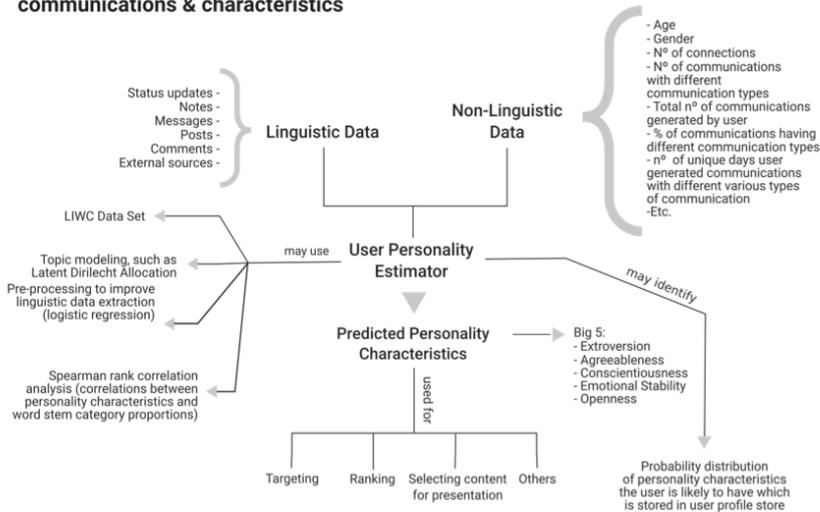


Fig. 2: Graphic summary of Facebook's patent US9750752B2.

Scandal?

In light of the Cambridge Analytica revelations, mainstream media coverage of the events mostly focused on Cambridge Analytica's actions in isolation, portraying it as a wild card or bad actor, with Facebook attempting to save face by representing itself as an apologetic victim of the whole ordeal.

The investigations revealed that Cambridge Analytica had deployed algorithmic processing to turn data harvested from Facebook into actionable insights about users' personality traits. These insights were then used to inform more efficiently targeted political messages in support of Donald Trump during his 2016 presidential election campaign in the United States. According to an article by Carole Cadwalladr published in *The Guardian*, whistleblower Christopher Wylie 'came up with a plan to harvest the Facebook profiles of millions of people in the US, and to use their private and personal information to create sophisticated psychological and political profiles'.³⁵ However, these are precisely the same practices underlying Facebook's business model. There are even dedicated tools and pages³⁶ on Facebook to help politicians connect with their constituents. And yes, these tools include, as for all other advertisers, the possibility to target political messages based on pre-processed audiences.³⁷

35 Carole Cadwalladr, "I Made Steve Bannon's Psychological Warfare Tool": Meet the Data War Whistleblower', *The Guardian*, 18 March 2018, <https://www.theguardian.com/news/2018/mar/17/data-war-whistleblower-christopher-wylie-facebook-nix-bannon-trump>.

36 Facebook for Politics, <https://politics.fb.com/>.

37 Yasha Levine, 'The Cambridge Analytica Con', *The Baffler*, 21 March 2018, <https://thebaffler.com/latest/cambridge-analytica-con-levine>.

Regardless of the political inclinations of these campaigns, targeted political ads are nothing new within this context. The difference lies in the fact that, in this case, it is Facebook, and not some third-party corporate henchman, that has access to the vast wealth of data all of its users contribute to its platform (whether explicitly or implicitly). Facebook then algorithmically processes this data into actionable target audiences that advertisers can select.

Furthermore, there is not one but plenty of actors whose business models, being similar to that of Facebook, necessarily require their users to cede control over which of their data are collected, used, and processed. Providing paid access to actionable audiences and insights achieved through massive scale operations of data processing and analysis is how these companies are able to operate free of charge and still achieve profits of US\$40 billion (2017) in the case of Facebook and US\$110 billion (2017) in the case of Google.³⁸

Metrics of Anxiety

Within the context of what researchers at the New Economics Foundation dub the 'scored society',³⁹ there is an observable tendency towards the increasing deployment of highly personalized psychological profiles across the public and private sectors for the purposes of, among others, targeting, policing, control, and decision-making. Duncan McCann and Miranda Hall describe the 'scored society' as grounded on a 'mutually reinforcing government-corporation surveillance' architecture, where access to both public and private services (e.g. housing, healthcare, insurance) is determined based on whether our digital profile matches the required conditions for access.⁴⁰

As illustrated by the aforementioned Facebook patent US9750752B2, these psychological profiles may be inferred through the processing of different sorts of data and metadata, whether explicitly or implicitly contributed. In their article 'What's Your Score? How Discriminatory Algorithms Control Access and Opportunity', Hall and McCann offer the example of fintech as a pioneer in "the use of "alternative data" to reflect individuals' "true personality"; one such example is Tala, a credit tool that determines potential loan eligibility based on a score calculated on the basis of, for example, how many times someone calls their mother.⁴¹

The tendency seems to be that these measurements will increasingly affect the way we perceive and conduct ourselves, seeing that we are becoming all the more dependent on an efficiency-obsessed technocratic machine for everyday access to basic human needs. Writing about the influence of neoliberal metrics on mental health, David Beer seems to arrive at similar conclusions as Curran and Hill. According to Beer, it is a fundamental feature of metrics that they spark an emotional response in the measured body, wherein shame and anxiety are not uncommon. This emotional response is key because only by reacting

38 Levine, 'The Cambridge Analytica Con'.

39 Miranda Hall and Duncan McCann, 'What's your score? How Discriminatory Algorithms Control Access and Opportunity', *New Economics Foundation*, 10 July 2018, <https://neweconomics.org/2018/07/whats-your-score>.

40 Hall and McCann, 'What's your score?'

41 Hall and McCann, 'What's your score?'

thus will the measured body be moved to action, in a quest to improve and compete with the others for a place in the sun.⁴² Referencing *The Limits of Neoliberalism* by Will Davies, Beer borrows the conclusion that uncertainty and insecurity are indeed desired outcomes of these tactics, for the more insecure we feel, the more the feelings of entrepreneurial agency will kick in.⁴³ Within the context of neoliberal precarity, measuring up is, after all, a quest for survival.

Given this scenario, is it so far-fetched to question the socio-political and economic consequences of contributing our sensitive information and personal feelings to Woe-bot, Pacifica, or Wysa? These tools designed to alleviate our woes may very well be furthering the enmeshment between mental illness and the system accountable for its aggravation. This is so because such apps represent potential data sources feeding the profiling and scoring systems that are intensifying our insecurities.

Tactics of Redirection

There is no denying that these first-response apps may be of great value in alleviating burdened psyches struggling with depression and anxiety, especially against a backdrop of impossibly long waiting lists and reduced access to specialized care. However, this type of solutionism can never be more than a short-term patch, extending mainstream therapy's incapacity of addressing the wider systemic context the user-sufferer is placed in. Indeed, David Smail's accounts of recurring 'therapeutic impotence' also apply here: after an initial positive response to therapy the patient relapses into old problems, as the realities of the outside world settle in once again.⁴⁴ By keeping us locked within our own immediate realities and locating the root of our distress within ourselves, 'magical voluntarism' not only fails to provide a long-term solution to widespread anxiety and depression, it further exacerbates the burden on the afflicted self. It does so in (at least) two ways:

1. by reproducing neoliberal narratives of self-responsibility ('The power is in your hands.', 'Change your life.', 'Success depends only on you.'), thus contributing an added layer of uncertainty, guilt and shame in the case of failure;
2. in its tech-based iteration, by presenting the danger of contributing further data to the development of psychological profiles used to govern, judge, and exclude.

As such, it becomes clear how mental health apps further complicate the already tumultuous and exploitative relationship between mental health and capital, making it necessary to engage in the (re)discovery of alternative communal methods of healing.

The Mindful Occupation work group, formed with the goal to provide mental health support around the Occupy/Decolonize movement, frames radical mental health as an instrument in redirecting the 'pathologizing gaze to our crazy-making world'; looking at mental health through a political and social justice lens, they envision an intersectional struggle comprising many other grassroots movements.⁴⁵

42 David Beer, 'Is Neoliberalism Making You Anxious? Metrics and the Production of Uncertainty', *LSE Blogs*, 24 May 2016, <http://blogs.lse.ac.uk/politicsandpolicy/55395-2/>.

43 Will Davies, *The Limits of Neoliberalism*, London: SAGE Publications Ltd, 2016.

44 Smail, *Power, Interest and Psychology*, 2005.

45 Mindful Occupation, *Rising Up Without Burning Out*, Richmond, VA: Mindful Occupation, 2012, <http://mindfuloccupation.org/intro/>.

As Becca Rothfeld so powerfully advocates, let us indulge ‘in the intimacy of jointly cultivated resentment’.⁴⁶ Let us share our anxieties, let us talk to one another about depression. Let these feelings, commonly experienced in isolation, feed our collective anger, productive anger, one that stubbornly refuses the paralyzing internalization of systemic failure as a personal shortcoming. If an emancipatory, radically collective mental health project is to succeed, we need to develop counter-tactics of redirection.

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46 Becca Rothfeld, ‘The Promise of Misery’, *The Baffler*, September 2018, <https://thebaffler.com/salvos/the-promise-of-misery-rothfeld>.

OUTSIDE OF BORDERS

RACHEL O'DWYER

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The further development of the commodity does not abolish these contradictions, but rather provides the form in which they have room to move.

—Karl Marx¹

In the short term, [Brexit is] bad for all markets; uncertainty creates massive volatility, especially in the more mature 'blue chip' expensive categories. Art as a store of long term wealth, however, is a very good hedge against structural changes in the relative value that currencies have against each other as well as the long term loss of value that currencies have as central banks print more money to stimulate and stabilize currencies in troubled times.

—Stefan Simchowit²

Ibrahim Mahama's *Outside of Borders* was a ready-made installation for the 2015 Venice Biennale, consisting of 300 repurposed jute sacks that covered the interior of the gallery space. Installed in both gallery and commercial spaces, Mahama's work explores the circulation of goods within and across borders, and the role of human bodies and labor in these processes. In much the same way that works of fine art feature stamps and signatures on their reverse detailing their provenance, where they've travelled to, and the various economic relationships they've entered into with institutional spaces, the jute sack is a rich media object inscribed with the story of its circulation in a broader commodity chain. The heavy material has been signed and patched with regional, patterned fabrics, bearing traces of its movement in and across borders.

These jute sacks were initially used to transport cocoa, and later coal, in Mahama's native Ghana. They were woven from the stems of a tropical plant, whose rough texture is often used for cloth or sacking. Jute, also known as the 'golden fiber' because of its natural sheen, has its own colonial history as an industrial material that was grown, milled, and traded on plantations in Bengal from the 17th century through to the development of plastics. This textile was mass-produced and sold on colonial plantations for hessian or burlap sacks prior to the invention of plastic. It was central to the rise and inception of global capitalism, the history of colonial exploitation, and the circulation of goods inside and across borders. In *Outside of Borders*, the jute sacks are taken out of one economy of circulation—a good with a specific use value in global trade—and brought inside another system of exchange, now as a ready-made work of art, and, as we will see, a form of currency in a broader financial network.

1 Karl Marx, *Capital, Volume I: A Critique of Political Economy*, London: Penguin Books, 1976 (1867).

2 Stefan Simchowit, qtd. in Rain Embuscado, 'The Art World Responds to Brexit', *Artnet*, 24 June 2016, <https://news.artnet.com/art-world/art-world-responds-brexit-526400>.

Mahama's work is the subject of another commodity chain—the circulation of artworks as currency in a global marketplace. The artist's ready-made jute sacks were central to a recent legal dispute involving the Ghanaian artist and superstar, LA-based dealer Stefan Simchowit. Simchowit is an art dealer for the internet age, a speculative dealer who eschews the legacy gallery system in favor of Instagram, but nonetheless cultivates a large network of art collectors. Simchowit, who argues above that artworks will provide a relatively stable currency in the global aftermath of Brexit,³ is well known for his heavily speculative investment practices, buying into relatively unknown artists, inflating their value through social media, and 'flipping' their work for profit before moving on to the next promising talent. The long career of the artist and sustained relationships with galleries or collectors are replaced by arbitrage—quickly exploiting information and price differentials in a global market.

Simchowit acquired some of Mahama's works, allegedly either after meeting the artist at the London Frieze art fair or plucking him from obscurity on the internet, depending on whom you happen to believe. At the time of the 2015 Venice Biennale, Simchowit's company, Simcor, and a Dublin-based dealer Jonathan Ellis King filed a multi-million dollar lawsuit against Mahama in US federal court. The case concerned the outcome of a jute sack installation entitled *Civil Occupation* acquired by the pair and exhibited in the Ellis King Gallery in Dublin in December 2014. Mahama signed 294 of the sacks prior to the opening of the show. In the aftermath, King and Simchowit proceeded to dismantle the huge installation into hundreds of individual jute sack pieces and began to sell these as individual, smaller works mounted on stretchers. The two dealers would allege that they made an oral contract with the artist agreeing to pay him US\$148,000 in exchange for a large part of the assembled installation. The lawsuit was filed after the duo received correspondence from Mahama claiming that he had not authenticated the individual pieces or agreed to such explicit commercialization of his work. 'He was using jute coal bags made by migrant laborers for pennies,' said Simchowit, '[w]e assisted him in repurposing them and now they hang on gallery walls as valuable artworks.'⁴

Art is an Asset Class

The Mahama–Simchowit controversy says much about the conditions of the contemporary art market. Artworks are financial assets to be liquidated, broken into individual shares, and circulated in a global market. Their prices reflect and respond to the broader dynamics of the financial system. Often they are hedges against the risk of investment in traditional stocks and bonds. As Mark C. Taylor argues,

[w]hen the art of finance becomes the finance of art, art is no longer merely a commodity to be bought and sold, but becomes the currency of exchange fabricated for hedge funds and private equity funds, where it is traded like any other financial asset.⁵

3 Simchowit, qtd. in Embuscado, 'The Art World'.

4 Stephan Simchowit, qtd. in Stephen J. Goldberg Esq., 'Sacked and Pillaged; Simchowit Vs. Mahama', *Artillery Mag*, 23 February 2016, <http://artillerymag.com/art-brief-7/>.

5 Mark C. Taylor, 'Financialization of Art', *Capitalism and Society* 6.2 (2011): 1–19.

Treating art as a financial asset is not new. As Jess Houlgrave, a Sotheby's graduate and the founder of the art and FinTech company Codex argues, this has been the case 'since the Medics'.⁶ Giorgio Vasari's *Lives of the Artists*, a 16th century series of artists' biographies, is a document of the patronage system in Renaissance Italy, openly discussing the prices of commissions and competition for patrons.⁷ The development of public auctions in the Netherlands in the early 17th century, spreading to England by the end of the century, shifted the market from a system of patrons to a supply and demand market economy that continues to this day.

Collectors have also experimented with mutual funds for art since the early 20th century. André Level, the secretary of the board of Docks and Warehouses and director of the French Society of Transport and Refrigerated Warehouses, established the first art investment fund in Paris in 1904. It was called *La Peau de l'Ors* (The Skin of the Bear) in a nod to a Jean de la Fontaine story in which two enterprising individuals sell the hide of an animal they have yet to capture and shoot. Level was responsible for managing and acquiring the artworks, and his background in supply-chain logistics is said to have shaped his approach to these paintings as just another investable commodity.⁸

Yet another significant fund, the British Rail's Pension Fund (BRPF) art investment program, was established in 1974 in the aftermath of the termination of Bretton Woods and the oil crisis. In this instance, the BRPF was designed to hedge the inflationary risks of the period by investing in Impressionist painting. A solution to falling profit margins from the 70s onwards was to utilize financial products as a means of maintaining and expanding monetary assets, placing these resources in financial activities remote from the production of material goods. The artwork as asset was a hedge against volatility in other more traditional markets. Then, as now, these assets were a way of making money, not by producing and selling new things, but by developing a strategic market position with respect to illiquid assets such as land and art.

These examples demonstrate that investors previously speculated on the value of art and the careers of artists, even going so far as to create new kinds of financial instruments for their purchase and monetization. But arguably, we're now seeing a rise in this approach. Deloitte's annual Art and Finance investment report⁹ describes this increase in art investment as a consequence of falling interest rates in the aftermath of the financial crash and the rise of boutique lenders touting new ways of investing and monetizing illiquid assets. In particular, a short report entitled 'Why Should Art be Treated as an Asset Class?'¹⁰ argues that while art has always functioned as a financial investment, this is growing in significance due to low interest rates, the need for new

6 Jess Houlgrave, in conversation with the author, London, 23 June 2018.

7 Noah Horowitz, *Art of the Deal: Contemporary Art in a Global Financial Market*, Princeton: Princeton University Press, 2011, p. 4.

8 Clayton Press, 'Artful Art Investment: The Skin of the Bear Forbes Magazine', *Forbes*, 24 October 2017, <https://www.forbes.com/sites/claytonpress/2017/10/24/artful-art-investment-the-skin-of-the-bear/#d9f9bf369883>.

9 Deloitte, 'Art and Finance Report', *ArtTactic*, 2017, <https://www2.deloitte.com/content/dam/Deloitte/at/Documents/finance/art-and-finance-report-2017.pdf>.

10 Adriano Picinati di Torcello, 'Why Should Art be Treated as an Asset Class?', *Deloitte*, 2011, <https://www2.deloitte.com/content/dam/Deloitte/lu/Documents/financial-services/artandfinance/lu-art-asset-class-122012.pdf>.

financial instruments and markets, and the sense that burgeoning technologies such as blockchain can solve extant issues regarding authenticity, risk, high transaction costs, market transparency, and market regulation.

A number of new mechanisms have emerged for art investment. These include the growth of art investment funds and clubs (where interested shareholders can invest in part of a work of art) and the development of art-backed lending or arts securitization (where owners can use works of art in their collections as security on future loans). In a turn away from traditional banks and large auction houses such as Christie's and Sotheby's, new boutique lenders such as Artemis and Athena, with a particular focus on art lending, have also entered the fray. So too, freeports—high-security warehouses located in offshore enclaves—have emerged as veritable 'banks' for the fine-art collections of wealthy individuals and art funds eager to exploit the duty-free storage conditions. Even more recently, blockchain companies, such as Maecenas and the aforementioned Codex, are partnering with freeport spaces. They are also developing strategies for recording the provenance and circulation of art sales on the blockchain; for creating new tokens that can be associated with artworks and traded as shares; and, for facilitating the securitization of flows of capital on the back of artworks registered on the blockchain. Arguably, many of the 'issues' that arose with the Mahama piece—questions of provenance, of contractual obligations and the technicalities of breaking a non-fungible, illiquid artwork into individual shares—are served by these infrastructures.

Technologies in the Global Art Market

As alluded to above, two technologies are particularly significant when considering this phenomenon and they both play a role in the new globalized art market: the freeport and the blockchain token.

Le Freeport

Large parts of the art collections of what are sometimes called High Net Worth Individuals (HNWIs) now reside in 'freeports'; that is, liminal, tax-free spaces that bypass national sovereignty. These large, high-security, climate-controlled spaces are often located in the transit zones of airports, or in tax-free or tax-friendly zones such as Switzerland or Singapore. Freeports originated in the 19th century for the temporary storage of perishable goods such as tea and grain.¹¹ While these spaces have a historical legacy in colonial trade, today they function as duty-free repositories for accumulated wealth, or what Deloitte calls 'passion assets'—fine wines, cars, and fine art that, once purchased, are shipped to and stored in the freeport for an indefinite amount of time.¹² Here, duty associated with a purchase can be endlessly deferred because, due to their fiscal history, goods housed within the freeport are deemed to be in transit from one place to another, even when they are going nowhere any time soon. For Keller Easterling, the freeport creates a space of flows beyond state jurisdiction.¹³ Because of the 'offshore' nature of the space, artworks can be stored indefinitely until the sale price

11 'Über-Warehouses for the Ultra-Rich', *The Economist*, 23 November 2013, <https://www.economist.com/news/briefing/21590353-ever-more-wealth-being-parked-fancy-storage-facilities-some-customers-they-are>.

12 Picinati di Torcello, 'Asset Class'.

13 Keller Easterling, *Extrastatecraft: The Power of Infrastructure Space*, London: Verso Books, 2014.

is right. They can even change ownership in a financial sense without ever leaving the freeport. Borders, or rather the absence thereof, are key. The freeport is a kind of blind spot in the supply chain, a place where regulators and states can turn a blind eye or, as Hito Steyerl puts it, 'selectively [lose] control'.¹⁴

Because of the opaque and secretive nature of the freeport, it can be difficult to account for exactly how many works of art are permanently housed there. A recent *New York Times* article claims that the number in Le Freeport, Geneva, is close to 1.2 million, with some 1,000 Picassos in that bunch.¹⁵ More recent freeport spaces resemble museums more than warehouses. The Singapore freeport, for example, has even commissioned a vast sculptural piece in its foyer un-ironically entitled *Cage sans Frontières* (Cage without Borders).

The freeport is a site that sits within a network of liquidity and illiquidity. Like a central bank, it operates as part of a broader network to facilitate the liquidity of the goods within its borders. This liquidity, in turn, is facilitated by the fluid geography of the freeport. From a legal standpoint, freeport spaces are extraterritorial—many are located in the transit zones of airports or in historically tax-free zones. But, the freeport isn't the only space that produces these kinds of fiscal alchemy. These fluid geographies are also well established in offshore spaces and asset-protection trusts—the latter describing a legal arrangement initiated to avoid the taxes of a specific jurisdiction. For example, as explained to me by money anthropologist Bill Maurer, a Trump hotel in New York City might be legally ascribed as owned in another jurisdiction in the Cayman Islands.¹⁶ The building is physically in New York but fiscally it has disappeared from view; it is now elsewhere. Such an arrangement exploits temporary imbalances and advantages.

Arrangements like these are central to the financialized economy, and particularly to the economy of art. In place of the public museum, vast collections are now housed in high-security, climate-controlled, and ultimately offshore spaces. The purpose of the artwork, these spaces suggest, is not to be possessed or traded as a commodity, or even to be put on public or private view, but to function as an asset—a pure cipher or financial instrument that never sees the light of day and doesn't need to. What we have by means of the freeport, therefore, is the facilitation of the circulation of material artworks as liquid assets in a supply chain.

The freeport has recently captured the interest of art theory. For theorists such as Hito Steyerl, Max Haiven, and Stefan Heidenreich, the freeport exemplifies the workings of the contemporary art market.¹⁷ Theorist Hito Steyerl has described

14 'The freeport contains multiple contradictions: it is a zone of terminal impermanence; it is also a zone of legalized extralegality maintained by nation-states trying to emulate failed states as closely as possible by selectively losing control.' Hito Steyerl, *Duty Free Art: Art in the Age of Planetary Civil War*, London: Verso Books, 2017, p. 142.

15 Graham Bowley and Doreen Carvajal, 'One of the World's Greatest Collections Hides Behind this Fence', *The New York Times*, 28 May 2016, <https://www.nytimes.com/2016/05/29/arts/design/one-of-the-worlds-greatest-art-collections-hides-behind-this-fence.html>.

16 Bill Maurer, in conversation with the author, Irvine California, 3 August 2018.

17 Steyerl, *Duty Free Art*; Max Haiven, *Art after Money, Money after Art*, London: Pluto Press, 2018; Stefan Heidenreich, 'Freeportism as Style and Ideology: Post-Internet and Speculative Realism', *E-Flux* 71 (March, 2016).

this situation as ‘duty-free art’,¹⁸ while art critic Stefan Heidenreich coined the term ‘freeportism’¹⁹ to describe the modes of production, circulation, and distribution in the art market that accompanies these trends. It’s clear from these analyses that the freeport is seen to be endemic not only to the financialization of the artworks, but also to the institutional frameworks of the new financialized art world. If the freeport is the new museum, then a dealer like Stefan Simchowicz is the curator of this space that operates outside of borders.

A visit to the Geneva freeport took me to the outskirts of the city, boarding the number 15 tram from Cornavin station and disembarking at Carouge, GE. I passed Swiss banks, goldsmiths, and a huge billboard for Swissquote advertising trade in the five largest cryptocurrencies that asks, ‘Is your bank a crypto-pioneer?’ *Ports Entrepôts et Francs* in Geneva is a tax-free zone that includes parts of an old freight station and an industrial storage building. An ‘entrepôt’ is a port, city, or trading post where merchandise can be imported, stored, or traded, usually with the understanding that it will soon be exported. These ports played an especially critical role in the Middle Ages and early modern period, when mercantile trade flourished between European imperial powers and their colonies in Asia and the Americas.

As Steyerl describes it, the free-trade zone occupies the back of the old storage building, so that different jurisdictions run through one and the same building.²⁰ It is a space that manages to be innocuous and imposing at the same time. The sense is of something deferred: from the logistical setting to my conversations with the security guards about why a student of arts management would visit a space like this when I could surely visit a museum. Why would you want to see a space like this? It’s so boring. And besides, it’s private. Visiting is forbidden.

The foyer contains a bronze sculpture of a globe enclosed in three silver frames and embossed with cryptic and not-so-cryptic relief: a figure, a freight truck, two houses, a segment like the moon, what looks like the ridged outline of a palette, a pyramid, a shiny golden apple. On one side, there are the buildings of the freeport, their huge ground vents humming noisily; on the other side, rows and rows of corrugated metal containers and palette trucks. After being escorted off the premises, I walked the quarter mile or so along the edge of the freeport, along the perimeter road, at the edge of the city. I was hoping for some kind of revelation by being here, in the actual space that is supposed to house thousands of Picassos under CCTV surveillance and behind signs warning of dogs, but it is disappointing. Max Haiven, on visiting a freeport in Singapore, describes the elaborate performance of security he witnessed,²¹ but my sense is of something that is deferred, of something going on elsewhere.

A Token Called ART

I first learned of the freeport while researching a company called Maecenas, a startup that lists works of art on the Ethereum blockchain. In essence, a blockchain is a distributed database. The data stored within it is secured and verified using encryption

18 Steyerl, *Duty Free Art*.

19 Heidenreich, ‘Freeportism’.

20 Steyerl, *Duty Free Art*.

21 Haiven, *Art after Money*, pp. 207–208.

techniques, which make it next to impossible to contaminate the data stored within the database. The first blockchain was the Bitcoin blockchain, which was a database that stored and verified details of transactions using Bitcoin. But more recently, companies such as Ethereum have developed a blockchain to record, verify, and enact other kinds of contracts and arrangements that may or may not be monetary—including the transfer of land, the sharing and recording of certificates, the transfer of assets, and the storing of ‘immutable’ records of the provenance of priceless goods such as diamonds or works of fine art. The structure of the blockchain makes several things possible. It makes transacting easier when many parties involved don’t normally cooperate with one another. It makes messy paperwork easier. It makes some kinds of contracts more straightforward. It makes it possible to digitize physical assets in new ways.

Blockchain technologies are now used in the context of art in various ways: as a provenance, traceability, and authentication tool; as a visibility tool for artists; as a template for new models of payment such as crowdfunding; and, as a form of asset exchange, where physical works of art are represented by cryptographic digital tokens and traded as equity in a market, divided into shares, or used to secure loans. Presented like this, it’s not surprising that both fintech and art market companies are extremely interested in the technology.

Blockchain companies are exploring ways of associating physical assets with cryptographic tokens. This involves coupling a physical object with a hash, which is encoded on a blockchain. The ‘tokenization’ of art, as it is now called, is just one example of the rise in asset exchanges on the blockchain: companies are associating real estate, natural assets,²² gold bullion,²³ precious stones,²⁴ and just about any tangible or intangible asset imaginable with cryptographic coins. These tokens are used to represent a share or ownership of a specific object that exists in the real world. The desire to tokenize appears to be driven by a wish to make assets that are non-fungible and traditionally illiquid circulate in financial markets. As one panelist at the FinTech conference Money 2020 put it, ‘you might trade equity in just about any thing for anything else’.²⁵

In the face of Bitcoin and Ether’s volatility, for example, Singapore-based Digix Global is returning to the principles of the gold standard and is tokenizing gold bullion stored in a Singapore freeport called the Singapore Safehouse. 1 DGX token is equivalent to 1 gram of stored gold. There is no fractional reserve and Digix Global make use of an auditing system to ensure that they have the gold they say they do at any time.²⁶ Their next project involves doing the same thing with silver. Everledger, a company mostly associated with provenance and authenticity for law enforcement and insurance purposes, is listing diamonds.²⁷

A key fine art example is Maecenas, a start-up tokenizing physical works of art of values greater than £1 million on the Ethereum blockchain. Maecenas allows dealers to list up to 49% of the value of a painting on the blockchain, opening up a dealer’s col-

22 See, for example, <https://earth-token.com/> and <https://terra0.org/>.

23 See, for example, <https://digix.global/>.

24 See, for example, <https://www.everledger.io/>.

25 Shared notes from Money 2020 Fieldwork, November 2016, UCI Irvine.

26 Kai Chen Chng, in conversation with the author, 10 January 2018.

27 See <https://www.everledger.io/>.

lection to new streams of finance, while allowing investors to diversify their portfolios by investing in fine art. Maecenas developed an ICO token, provocatively called ART, a clearing and settlement token for art auctions that is trading at US\$0.543936 in August 2018, and which is represented as a utility token for managing and implementing the buying and selling of art shares within the Maecenas platform. Maecenas is just one of a number of companies currently tokenizing works of art in freeports so that they can behave as speculative financial instruments.²⁸ The works might be broken into shares for investors who wish to diversify their portfolios, used as equity in a loan application, or various future selling prices might be hedged and sold as a derivatives.

The Maecenas white paper provides a description of this process:

Maecenas uses blockchain technology to create tamper-proof digital certificates linked to pieces of art. These certificates are highly secure and impossible to forge thanks to the cryptographic properties of blockchains. A single artwork is broken down into thousands of certificates, similar to how a public company issues shares. Investors can then purchase these certificates to own a percentage of a given artwork, and they can sell them back to other investors at any time via the Maecenas exchange. Artworks can be listed in any fiat currency (e.g. USD, EUR) or cryptocurrency (e.g. BTC, ETH).²⁹

Media theorist Sybille Kramer has described money as a kind of de-substantiated property, a medium that facilitates the de-materialization of physical goods and their broader circulation in networks of exchange.³⁰ Tokens work to overcome a lot of the frictions and difficulties associated with securing, storing, and transferring physical assets stored in physical places. Instead of buying the thing itself, you can buy a token that represents a claim to (a portion) of that thing and store it in a digital wallet. The advantages are that you don't have to store and secure the thing yourself, and you might also take advantage of tax or regulatory advantages based on the jurisdiction of the physical good and trade in fractions or shares of things that you could not otherwise afford to buy as a whole.

Fluid Geographies

What is significant with both the freeport and the blockchain is that artworks do not need to be seen, held, or moved as ownership or fractions of ownership are passed along. In this sense, while the work of art remains static in a condition of being perpetually 'in transit', it continues to circulate as a cryptographic token—as a hash within a boundless blockchain ledger. If we think back to Mahama's work, the jute sack installation might be listed and verified on the blockchain, stored in a tax-free enclave, broken into shares, and circulated on a market without physically being moved or modified.

The financialized artwork is therefore in two spaces at the same time. It occupies the fluid geography of the freeport, where the asset is static, and 'encrypted' in a double sense,³¹ but fiscally recorded as being continuously 'in transit' between one national

28 Codex recently made headlines with a live auction of artworks on the blockchain.

29 'Maecenas: The Decentralised Art Gallery', *Maecenas*, <https://www.maecenas.co/Maecenas-WhitePaper.pdf>.

30 Sybille Kramer, *Medium, Messenger, Transmission: An Approach to Media Philosophy*, Amsterdam: Amsterdam University Press, 2015, pp. 108–109.

31 Haiven, *Art after Money*, pp. 197–200.

zone and another, evading the specific duties and regulations of any single nation state. Simultaneously, when it is stored on the blockchain, the work continuously circulates as code in a digital ledger. And, just as the blockchain seems to allow physical objects to behave like code, it is part of a growing process in which physical architectures and geographies, and the logistical arrangements of broader supply chains increasingly conform to network topologies and stacks.³² The desire seems to be for all physical things to shrug off their materiality and location when fluidity is what is needed, only to immediately regain these characteristics as soon as they are necessary. The work of art in the freeport is both art and money, illiquid asset and liquid capital. Here, we see the de-materialization of the physical object, not as a way of shirking off commodification, as Lippard and others suggested,³³ but rather as a way of maintaining market value while also surpassing the lumpy weight of everyday things, the constraints of physical stuff, and geographic borders and locations.

Art as an investment is not exactly new. What is new is the drive to make art function not only as a commodity but also as a financial asset and/or derivative in a global market, where questions of speed, geographic location, and information differentials become key.

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32 Benjamin Bratton, *The Stack: On Software and Sovereignty*, Cambridge, MA: MIT Press, 2016.

33 Lucy Lippard and John Chandler, 'The Dematerialization of Art', *Art International* 12, no. 2 (1968): 31–36.

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CURRENCIES
OF THE
UNDERCOMMONS:
THE HIDDEN
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MAX HAIVEN

CURRENCIES OF THE UNDERCOMMONS: THE HIDDEN LEDGER OF PROLETARIAN MONEY SABOTAGE

MAX HAIVEN

Can we rethink the ‘disruption’ of money from another perspective? Many of us have been educated or habituated to look upon money as the powerful see it: either as a neutral tool of commerce or as a useful lever for the transformation of society. What if we learned to see money from a different viewpoint, for instance from the perspective of those for whom money has always felt like a whip, a thief, or a bad lover? This might prove necessary if we truly want to disrupt money in ways that look to the kind of common egalitarian horizons the world so desperately needs. I share some optimism that new digital technology will open new methods for coordinating and sharing the fruits of human cooperation—an almost sacred role our societies have increasingly trusted to capitalist forms of money, backed by state power. But, I am concerned that the common discourses surrounding blockchains, cryptocurrencies, smart contracts, and similar emergent technologies – which often posit themselves as revolutions in money, payments, and economics—all too often replicate the perspectives of the powerful and, as such, threaten (often against their designers’ or proponents’ intentions) to either supplement or supplant the ruling state-capitalist power nexus, rather than to abolish it.

In this chapter, I look at money ‘from below’ to problematize our utopian dreams so that we might dream more dangerously together. I take up the almost forgotten examples of convict love tokens, hobo nickels and *Notgeld* to illustrate how proletarian subjects have transformed money into an experimental medium of mutual aid, class struggle and solidarity, representing a hidden ledger of meaningful ‘disruptive innovation’ that can inspire us today.

Money as a State Machine?

New monetary and financial technologies, especially those that employ cryptographic and blockchain methods towards (anarchist) virtues such as decentralization and personal liberty, may not only reproduce but also renovate The State for the 21st century. By ‘The State’ I mean more than some clunky old beast of coercive authority but, rather, the integrated weapon and accelerant of financialized capitalist accumulation that has arisen from four decades of violent neoliberal globalization.¹ The State here emerges from the crucible of capitalism and colonialism over the past five centuries as not only a specific political formation but also a habit of the imagination. This is a state built by and for the reproduction of what Gilles Deleuze named the ‘society of control’: a society where the state rules by generating and offering ‘freedoms’, exciting

1 Paolo Virno, ‘Virtuosity and Revolution: The Political Theory of Exodus’, in Michael Hardt and Paolo Virno (eds) *Radical Thought in Italy: A Potential Politics*, Minneapolis: University of Minnesota Press, 1996, pp. 189–212.

its subjects' 'capacities', and working hand in glove with a form of capitalism that is oligarchical, crisis-ridden, and reliant on physical, economic, and administrative violence.² I am not speaking of the fabled 'corporate state' feared by so-called 'anarcho-capitalists', one where the collusion between corporate monopolies and the 'deep state' apparatus sullies or perverts the allegedly natural, benign, and impartial functioning of the market.³ Rather, the state-capital nexus I'm talking about has much more to do with the analyses developed by Marxist feminist writers who, for decades, have warned against the interdependence of capitalism and the state-form, two intertwined patriarchal power structures.⁴ I have in mind the work of radical anti-colonial thinkers from both Indigenous and anti-colonial backgrounds who anticipated and rejected the corruption of post-colonial states by capitalist markets and argue for a re-imagination of the political community beyond the imperialist model.⁵

While a great deal is said about new monetary innovations, their potential to decentralize the means of governing value, and their capacities to allow their bearers to claim or exercise personal liberties of various kinds, we hear far less about three other criteria by which the radical character of these innovations might be judged.⁶ In what ways can such innovations—if indeed that is what they are—enable, enrich, and embolden the practices of *mutual aid* which have always been the bedrock of social life?⁷ In what ways do they allow us to *rebel* (together) and abolish the capitalist system that is destroying us, rather than simply compete for a better seat on the Titanic? And, in what ways could these new forms of money help us confront the intersectionality of *oppression*; that is, the way power is exercised through the categories of gender, race, sexuality, citizenship status, and the like? I am interested in money not as a method of mediating the commerce of free individuals but money as a method by which networked, interdependent actors and communities organize within, against, and beyond the way their cooperative and communicative powers are being conscripted and commanded by exploitative and extractive capitalist apparatuses. Forms of currency that could foster mutual aid, stimulate class struggle, and abolish oppression would indeed be *truly* disruptive.

2 Gilles Deleuze, 'Postscript to Societies of Control', trans. Martin Joughin, in *Negotiations*, New York: Columbia University Press, 1995, pp. 177–82.

3 David Columbia, *The Politics of Bitcoin: Software as Right-Wing Extremism*, Minneapolis: University of Minnesota Press, 2016.

4 Silvia Federici, *Revolution at Point Zero: Housework, Reproduction, and Feminist Struggle*, Brooklyn, NY and Oakland, CA: Common Notions and PM Press, 2012.

5 Firoze Manji and Bill Fletcher (eds) *Claim No Easy Victories: The Legacy of Amílcar Cabral*, Dakar, Senegal and Montréal, Québec: Council for the Development of Social Science Research in Africa, 2013; Frantz Fanon, *The Wretched of the Earth*, New York: Grove, 1963; Glen Coulthard, *Red Skin, White Masks: Rejecting the Colonial Politics of Recognition*, Minneapolis and London: University of Minnesota Press, 2014; Audra Simpson, *Mohawk Interruptus: Political Life across the Borders of Settler States*, Durham: Duke University Press, 2014.

6 Paul Vigna and Michael J. Casey, *The Age of Cryptocurrency: How Bitcoin and Digital Money Are Challenging the Global Economic Order*, New York: St. Martin's Press, 2015; Nigel Dodd, 'The Social Life of Bitcoin', *Theory, Culture & Society* 35.3 (December, 2017): 35–56; Nozomi Hayase, 'Bitcoin: Innovation of Money and Evolution of Governance', *OpenDemocracy*, 15 July 2016, <https://www.opendemocracy.net/digital liberties/nozomi-hayase/bitcoin-innovation-of-money-and-evolution-of-governance>.

7 J. K. Gibson-Graham, *The End of Capitalism (As We Knew It): A Feminist Critique of Political Economy*, 2nd edition, Minneapolis, MN: University Minnesota Press, 2006.

But instead, the majority of discourse around new financial and monetary technologies today tends to highlight themes of individualism, competition and reactionary politics. Many of the political claims of current cryptocurrency and blockchain enthusiasts may be ultimately opportunistic as they help feed a massive hype machine tied to speculative investment.⁸ The discourse of disruption, revolution, decentralization, and freedom are economically consequential when, as Dmitry Kleiner points out, a speculative economy rests on always finding a greater fool to exploit.⁹ We ought to all know the present system is a death machine, in ecological and humanitarian terms; the state-capitalism nexus, based as it is on endless accumulation and competition, is suicidal on this planet.¹⁰ That said, it's not my ambition to offer a meta-analysis or meta-critique of *all* cryptographic monetary experiments, for there are many of them and new ones emerge daily.¹¹

In distinction to this technophilic approach, I wish to explore proletarian monetary innovations from the history of capitalism that offer some resources and an alternative genealogy to the struggles and desires that I see encrypted within today's enthusiasm for crypto-solutionism. While many of today's schemes claim to take aim at 'the state' they may in fact find themselves likely to contribute to its reproduction. And this is not simply because corporations and state agencies are eager to incorporate or appropriate these 'radical' technologies.

Crypto-Authoritarians?

Most often we associate the ideology behind these technologies with 'libertarianism' or 'anarcho-capitalism' and extreme free-market fundamentalism, but it may actually be more accurate to associate them with the practices of what anthropologist James C. Scott calls 'seeing like a state'.¹² With regards to the disastrous way that colonial industrial modernity has wreaked often genocidal havoc on many of the world's civilizations, Scott argues that

Much of early modern European statecraft [seems] devoted to rationalizing and standardizing what was a social hieroglyph into a legible and administratively more convenient format. The social simplifications thus introduced not only permitted a more finely tuned system of taxation and conscription but also generally enhanced state capacity [and] made possible quite discriminating interventions of every kind [...] These state simplifications [...] are] rather like abridged maps. They did not suc-

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- 8 I take up this theme at some length in Max Haiven, *Art after Money, Money after Art: Creative Strategies Against Financialization*, London: Pluto, 2018.
- 9 Dmitry Kleiner, 'The Face Value of Bitcoin: Proof of Work and the Labour Theory of Value', *P2P Foundation*, 1 February 2018, <https://blog.p2pfoundation.net/face-value-bitcoin-proof-work-labour-theory-value/2018/02/01>.
- 10 Raj Patel and Jason W. Moore, *The History of the World in Seven Cheap Things*, Berkeley: University of California Press, 2017.
- 11 For a fascinating array of counter-experiments, see the projects outlined in Ruth Catlow, Marc Garrett, Nathan Jones, and Sam Skinner (eds) *Artists Re:Thinking the Blockchain*, London and Liverpool: Torque Editions and Furtherfield, 2017; Geert Lovink, Nathaniel Tkacz, and Patricia de Vries (eds) *MoneyLab Reader: An Intervention in Digital Economy*, Amsterdam: Institute for Network Cultures, 2015; Inte Gloerich, Geert Lovink, and Patricia de Vries (eds) *MoneyLab Reader 2: Overcoming the Hype*, Amsterdam: Institute of Network Cultures, 2018.
- 12 James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*, New Haven, CT: Yale University Press, 1999.

cessfully represent the actual activity of the society they depicted, nor were they intended to; they represented only that slice of it that interested the official observer [... and] when allied with state power [they enabled] much of the reality they depicted to be remade.¹³

This impulse to take a 'god's eye view' of the world to make a series of interventions to engineer a social result is characteristic of the dreams of many monetary innovators. It is an example of what feminist theorist Donna Haraway calls the 'God Trick': the penetrative, speculative gaze that proclaims itself a neutral, creative force, uniquely gifted to see the world and its people as they truly are and take measures to intervene on behalf of the alleged greater good.¹⁴ It is the old technique of colonialism, where the map is violently made to stand in for the territory, where benighted, innocent 'savages' must be organized for their own good.¹⁵ To 'see like a state' is to operationalize a fragmentary, biased view of the world as if it were complete and objective, and to introduce measures that, in Scott's words, render this simplification of social intercourse a functional and operative—if ultimately false—fact.

Seeing money from a state perspective is to inherit the legacy of the classical and neoclassical economists who developed—sometimes unintentionally—a framework of the aforementioned 'societies of control'. It is the framework of biopolitical capitalism where market, consumer choice, and a meshwork of flexible, precarious mechanisms have replaced any substantive framework of freedom and democracy.¹⁶ The problem with many crypto-schemes is that they have unquestioningly adopted the perspective of the state; that is, imagining that one can 'fix' an unruly society and its bad subjects through the imposition of benevolent schemes masterminded from on high. Though they often espouse an anti-state ethos (usually based on faith in mystical free markets that today's welfare states jeopardise), this is an Oedipal drama, where one father figure supplants its predecessor as the authority.¹⁷

As Nigel Dodd notes, money has always been a lure for utopian dreams.¹⁸ The first half of the conservative statesman Thomas More's utopia is taken up with a castigation of money's corrosive influence on the patriarchal feudal order.¹⁹ Something about

13 James C. Scott, *Seeing Like a State*, p. 3.

14 Donna Haraway, 'Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective', *Feminist Studies* 14.3 (1988): 575.

15 Linda Tuhiwai Smith, *Decolonizing Methodologies: Research and Indigenous Peoples*, 2nd Edition, London: Zed Books, 2012; Anne McClintock, *Imperial Leather: Race, Gender and Sexuality in the Colonial Context*, London and New York: Routledge, 1995.

16 On the less-than-innocent history of these notions of freedom in the origins of political economic thought, see Michael Perelman, *The Invention of Capitalism: Classical Political Economy and the Secret History of Primitive Accumulation*, Durham, NC and London: Duke University Press, 2000; For a more recent deconstruction of how these notions of freedom have become a nightmare of functional economic authoritarianism, see Wendy Brown, *Undoing the Demos: Neoliberalism's Stealth Revolution*, New York: Zone, 2015; Henry A Giroux, *The Terror of Neoliberalism: Authoritarianism and The Eclipse of Democracy*, Boulder & London: Paradigm, 2004.

17 On the close connection between neoliberal free-market thinking, authoritarianism and conservative/patriarchal notions of the family, see Melinda Cooper, *Family Values: Between Neoliberalism and the New Social Conservatism*, New York: Zone Books, 2017.

18 Nigel Dodd, *The Social Life of Money*, Princeton, NJ: Princeton University Press, 2014.

19 Thomas More, *Utopia*, New York: Penguin, 2003.

money's power to become the ultimate and unquestioned arbiter of value vexes and obsesses the authoritarian imagination. *If only we could 'fix' money, then society and the economy would function as it ought*—I have previously described this view as a chiropractic theory of money, where a small, judicious correction will straighten the spine and resolve all manner of debilitating ailments.²⁰ I want to draw our attention to a thread that runs intermittently but consistently through the colonial, patriarchal nexus of state and capital, from its earliest origins in More's day, through the imaginations of the classic political economists, to today's neoliberals, necro-Keynesians, and crypto-kiddies alike: a belief that money, when 'seen like a state', represents a uniquely efficient and effective means of exercising an imaginative but functional sovereignty over the world, a minimalist engineering of social life.

Proletarian Coinage

Rather than from a state viewpoint, what would it mean to see money from the proletarian perspective? By 'proletarian', I mean something much broader than the traditional Marxist definition of the 'proletariat' (that is, wage workers directly subsumed under capitalist exploitation). Instead of a noun, I use 'proletarian' as a vexed, problematic adjective naming *all* those whose time, energies, freedom, and powers are exploited, extracted, or foreclosed by capitalism. It is a definition I draw from Silvia Federici, who has noted that the accumulation of capital has always also been the accumulation of divisions between proletarians along the lines of race, gender, and other criteria, often orchestrated by the state.²¹ Proletarian (as an adjective, not a noun) hints at a kind of radical conjectural 'we' that might include subjects enduring or resisting colonialism, unwaged and reproductive laborers, chronically unemployed people, itinerant and dispossessed subjects, precarious workers taught to see themselves as 'entrepreneurs'; in other words all those being exploited within a capitalist totality, but whose labor is not directly subsumed under capitalist discipline, in addition to Marx's more familiar proletariat, waged industrial workers.²² Matters are much more complex, of course, but I ask you to hold this in mind because I think it enables a different kind of work of the imagination.

In the coming sections, I briefly outline three obscure but fascinating methods by which we proletarians have 'hacked' or 'disrupted' money. There is an equally interesting history of how proletarian movements have developed and sustained new forms of functional money in terms of alternative currencies or trading systems have been invented, but these are not my concern.²³ I am interested in what Scott has elsewhere called the 'hidden transcript' of proletarian monetary disruptions, sabotage, and disobedience.²⁴

20 Max Haiven, 'The Crypt of Art, the Decryption of Money, the Encrypted Common and the Problem of Cryptocurrencies', in Inte Gloerich, Geert Lovink, and Patricia de Vries (eds) *MoneyLab Reader 2: Overcoming the Hype*, Amsterdam: Institute of Network Cultures, 2018, pp. 121–37.

21 Silvia Federici, *Caliban and the Witch: Women, Capitalism and Primitive Accumulation*, New York: Autonomedia, 2005.

22 On such a capacious definition, see Harry Cleaver, *Rupturing the Dialectic: The Struggle against Work, Money, and Financialization*, Oakland, CA and Edinburgh: AK Press, 2017; Massimo de Angelis, *The Beginning of History: Value Struggles and Global Capitalism*, London and Ann Arbor, MI: Pluto, 2007.

23 Peter North, *Money and Liberation: The Micropolitics of Alternative Currency Movements*, Minneapolis, MN: University of Minnesota Press, 2007; Anitra Nelson and Frans Timmerman (eds) *Life Without Money: Building Fair and Sustainable Economies*, London: Pluto Press, 2011.

24 James C. Scott, *Domination and the Arts of Resistance: Hidden Transcripts*, New Haven, CT: Yale University Press, 1990.

These examples, I think, triangulate something amorphous but vital when considering the future potentials of money. Writing against the temptation to ‘see like a state’, Scott argues that what authoritarian orders ironically both ignore and depend on is the texture, nuance, and creativity of everyday life. Like the complex ecosystems of healthy soil or a healthy ocean, which are made up of millions of cooperating, competing and coevolving life-forms from viruses to mammals, from fungi to insects, the social world that states seek to dominate is alive with transactional and gift economies that are just as gooeey, nonsensical, and weird as anything we’d find under a microscope.²⁵ ‘Seeing like a state’ is the process of brutally simplifying and categorizing this vibrant complexity into observable, measurable, and distinct entities; in other words, into code.²⁶ While this impulse may have noble intentions, it is a violent one. In turn, ‘seeing like a state’ demands acting like a state and therefore the imposition of sovereignty, violently if needs be, to ensure order is maintained.²⁷

The following examples, drawn from the most obscured margins, help us see beyond the perspective of the state, which we have all been encouraged to enjoin as if it were natural. Rather than from the top down, they reimagine money as a means of organizing life from the bottom up. And they offer some important images for learning, again, about how to dream about decentralization and personal liberty as always already entangled with mutual aid, class struggle, and collective liberation. I echo Nick Mirzoeff’s demand to reclaim the right to look, for those who are oppressed, exploited, and colonized to return the gaze of their masters and, in so doing, reject the order of the visible, and to see new kinships and affinities.²⁸

Convict Love Tokens

Love tokens refer to a subset of popular money interventions enacted largely by the working class in Britain and the United States in the 18th and 19th centuries.²⁹ Largely in response to elite-run states declaring the nominal exchange value of coins beyond or contrary to the actual metallic substance, proletarians began to seize upon coins, especially devalued ones, as canvases for other sorts of commerce. This is in contrast to the brutalizing indifference of the emerging capitalist economy, which rendered workers disposable and interchangeable with one another, and which enforced a wage relationship through the equally indifferent medium of money. Using proletarian money hacks, one could impress a unique stamp of one’s indelible individuality on the effaced surface of a coin of the realm. Copper coins were transfigured by anonymous artists into testimonies of love or fidelity, a small gift made of the same material that tore so many proletarian lives apart.

25 This metaphor and sentiment is indebted to Donna Haraway, *Staying with the Trouble: Making Kin in the Chthulucene*, Durham: Duke University Press, 2016.

26 On the transformation of biopolitics into molecular and digital code, see Michael Dillon and Luis Lobo-Guerrero, ‘The Biopolitical Imaginary of Species-Being’, *Theory, Culture & Society* 26.1 (2009): 1–23.

27 James C. Scott, *Seeing like a State*; Richard Day, *Gramsci Is Dead: Anarchist Currents in the Newest Social Movements*, London and Ann Arbor, MI: Pluto, 2005.

28 Nicholas Mirzoeff, *The Right to Look: A Counterhistory of Visuality*, Durham, NC: Duke University Press, 2011.

29 Jennine Hurl-Eamon, ‘Love Tokens: Objects as Memory for Plebeian Women in Early Modern England’, *Early Modern Women* 6 (2011): 181–86; Eleanor Conlin Casella, ‘Enmeshed Inscriptions: Reading the Graffiti of Australia’s Convict Past’, *Australian Archaeology* 78.1 (2014): 108–12; Michele Field and Timothy Millett, *Convict Love Tokens: The Leaden Hearts the Convicts Left Behind*, Adelaide: Wakefield, 1998.

Among the most poetic and revealing examples of this practice were convict love tokens, most of which were forged by or at the behest of British prisoners awaiting the punishment of 'transportation', either in decrepit jails (notably, London's notorious Newgate) or below deck on overcrowded ships set to ferry them to Australia or other British colonies.³⁰ Were they fortunate enough to survive their incarceration and voyage, these proletarians, most of whom had been convicted of petty crimes by uncompassionate, hasty judges with almost no due process, would typically land and be auctioned to local farmers, capitalists, and public officials as indentured servants; they were violently transmuted into cannon fodder for the expansion of the British Empire.³¹ Many of the female convicts were essentially made into state-sanctioned sexual slaves.³² In the unlikely event of surviving their brutal sentence, some were permitted to buy passage back to England, but most could or did not.³³

While incarcerated in Britain, some prisoners carved or commissioned the carving of a love token as a keepsake for a loved one from whom they were soon to be separated, probably forever: a lover, a parent, a sibling, or a friend. These mementos were evidence of their existence in relationship to one another. As in the present, most of the acts for which proletarians were convicted were crimes of poverty and desperation: theft, prostitution, insubordination, vagrancy and, importantly, forgery and counterfeiting.³⁴ While the 18th and 19th centuries are remembered for the economic growth and power of the British Empire, these massive technological and economic transformations typically hit the working class as disasters.³⁵ The 'disruptive innovation' of new manufacturing methods could throw hundreds of thousands of workers into the street at a time. The constant political squabbles between the aristocracy-aligned Tories and the capitalism-aligned Whig party led to the passing of trade and sumptuary laws that would cause commodities that were common one day to become scarce the next and vice versa, triggering massive shifts of wealth at the top of society and shifts in life and death at the bottom.³⁶

In *The London Hanged*, radical historian Peter Linebaugh makes clear that, for elites throughout the 18th and 19th centuries economics was not, as myth would have it, a benign and neutral affair. On the contrary, it was a system enforced by authoritarian power. The close friendship between John Locke and Isaac Newton, remembered today as heroes of philosophy and science respectively, was forged during their joint management of the nascent capitalist economy, Locke in the realm of policy and Newton as an early but formative Governor of the Bank of England. Both agreed that no punishment was too severe for proletarians who dared defy the state's control over the money supply, and they therefore helped pass a bevy of laws that criminalized the slightest economic infraction. George Caffentzis has detailed the lengths to which the British government went to enforce what it considered the proper use of money,

30 Conlin Casella, 'Enmeshed Inscriptions'; Field and Millett, *Convict Love Tokens*.

31 Peter Linebaugh, *The London Hanged: Crime and Civil Society in the Eighteenth Century*, Cambridge and New York: Cambridge University Press, 1992.

32 Kirsty Reid (ed.) *Gender, Crime and Empire: Convicts, Settlers and the State in Early Colonial Australia*, Manchester: Manchester University Press, 2012.

33 Field and Millett, *Convict Love Tokens*.

34 Linebaugh, *The London Hanged*.

35 E. P. Thompson, *The Making of the English Working Class*, New York: Pantheon Books, 1968.

36 Perelman, *The Invention of Capitalism*.

to prevent coin clipping (shaving off the edge of a coin to garner the metal) and counterfeiting.³⁷ Linebaugh argues that so many were the capital crimes associated with the ‘misuse’ of money at the dawn of modern capitalism and the modern state that we should rightly understand this period as a Thanatocracy, the rule of death. George Cruikshank’s *Bank Restriction Note* of 1819—a satirical print sold on the streets—comments on the horrors unleashed on proletarians who could be sentenced to death or transportation not only for counterfeiting money but even for being caught handling it accidentally.³⁸ But who could blame them? The Bank of England notes of the day were laughably easy to imitate and, for those starving on the streets of the world’s wealthiest cities, the temptation to take into their own hands the seemingly magical power of the Governor of the Bank to sign wealth into existence with the stroke of a pen must have been irresistible.³⁹

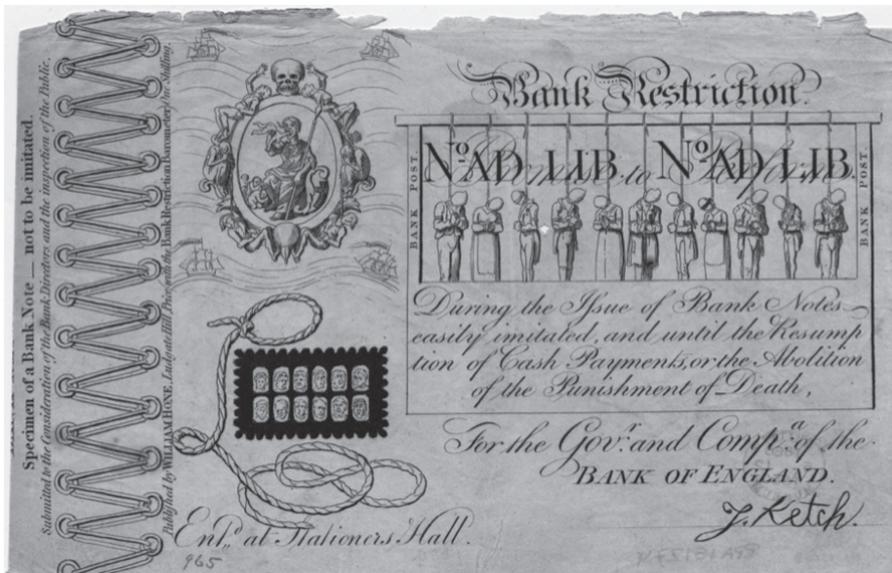


Fig. 1: George Cruikshank’s *Bank Restriction Note*, 1819.⁴⁰

While the punishment for such infractions against the crown was nominally death, most convicts had their sentences commuted to ‘transportation’. As cheap as it was for British elites to make gruesome public spectacles of the execution of proletarians, it was still more profitable to transform them into indentured workers to be transported to the colonies and sold. The ocean, disease, overwork, or heartbreak would almost

37 George Caffentzis, *Clipped Coins, Abused Words and Civil Government: John Locke’s Philosophy of Money*, New York: Autonomedia, 1989.

38 Ian Haywood, *Romanticism and Caricature*, Cambridge: Cambridge University Press, 2013, pp. 33–57; Paul Crosthwaite, Peter Knight, and Nicky Marsh (eds) *Show me the Money: The Image of Finance, 1700 to the Present*, Manchester: Manchester University Press, 2014.

39 David Blaazer, ‘Reading the Notes : Thoughts on the Meaning of British Paper Money’, *Humanities Research* 1 (1999): 39–54.

40 Image is in the public domain: https://britishmuseum.org/research/collection_online/collection_object_details.aspx?objectId=1503504&partId=1&object=20582&sortBy=&page=1.

inevitably do the work of the executioner anyway.⁴¹ It would not be an exaggeration to say that most judges and lawmakers were enthusiastic financial and ideological investors in colonial expeditions, and the colonies demanded cheap labor.⁴² The desperate, traumatized, and deracinated survivors would become the shock troops of settler colonialism, with all the horrific violence the process entailed.⁴³ The means and ends of the whole gory enterprise were capitalist forms of state-backed money.⁴⁴

The creation and exchange of convict love tokens represented proletarians taking money back into their own hands and radically transforming it into a medium for their own tragic sociality, a tiny rebellion or revenge against the very medium of their im-miseration. An artisan of such tokens would painstakingly efface the image of the King or other royal symbolism—the very nexus of state and capitalist sovereignties—to create a smooth surface. Less sophisticated, cheaper makers would spell out words or even crude images by punching dozens of small holes in the coin. More skilled artists carved into the surface of the coin itself.⁴⁵ Today, the largest collection of such coins is held by the National Museum of Australia and is exhibited in an admirably accessible digital archive.⁴⁶ The ghostlike messages are often simply a name and a date. Sometimes there is also a description of the crime for which the carver or commissioner of the carving had been convicted. Other times the token directly addresses a loved one, begging them not to forget. Occasionally startlingly intricate images appear.

I make two brief observations. First, this story reveals a proletarian view of money as a weapon wielded against a common life. There is no utopianism here, just rancor, terror, and heartbreak. From the bottom-up perspective and despite its alluring nature, money is not a medium of social or economic innovation, it is a curse, a trap, and a poison. The physical effacement of coins is desperately antagonistic to a capitalism that renders the proletarian body a worthless machine to be exploited and disposed of. To simply carve one's name on the King's coins is a human rebellion against an inhuman capitalist system.

See *Fig. 2 in the Gallery* (p. 33).

Second, by transforming coins into a medium of creative relationality, proletarian artists reverse-engineered the capitalist alienation of labor power. For Marx, money is the ultimate manifestation of the commodity form.⁴⁷ Capitalism transforms thinking, feeling, relational human beings into mere sellers of a commodity—labor power—for which they earn a wage, with which they buy 'back' the products of their (collective) labor power: commodities.⁴⁸ Money both orchestrates and intermediates this process,

41 Reid, *Gender, Crime and Empire*.

42 Patel and Moore, *The History of the World in Seven Cheap Things*.

43 Andrea Smith, *Conquest: Sexual Violence and American Indian Genocide*, Cambridge, MA: South End Press, 2005.

44 See Patel and Moore, *The History of the World in Seven Cheap Things*; especially Chapter Two.

45 Field and Millett, *Convict Love Tokens*.

46 See <http://love-tokens.nma.gov.au/>.

47 Anita Nelson, *Marx's Concept of Money: The God of Commodities*, London and New York: Routledge, 1999.

48 Cleaver, *Rupturing the Dialectic*.

but also in a sense represents it.⁴⁹ Money is the hieroglyph of alienation. Both the young and the old Marx agree that money is the false bond with the rest of society one carries around in one's pocket, what I have elsewhere proposed as a holographic shard of a larger totality, containing an uncanny glimpse of the whole in the fragment.⁵⁰ By transforming money into a medium of social intercourse, of human relationality, of pathos and proletarian poetry, the convict love token refuses the mystification of society in money and instead reiterates the work of sociality, of social reproduction, that is locked or encrypted in money.

Hobo Nickels

Similar practices of reappropriating coins and bills and using them as media of proletarian refusal and rebellion are numerous, though most are also lost to time. For the perspective of the state, these are acts of vandalism or defacement and the affected currency is recycled or reminted to be 'corrected' for proper use. Here, the 'hidden transcript' of resistance, another of Scott's terms, is useful. In any society there is, he argues, an invisibilized genealogy of infrapolitical actions by the oppressed, even if the official records (and even sometimes the records kept by the opponents of the status quo) never acknowledge traces.⁵¹ Simplistic notions of hegemony encourage us to imagine that the oppressed are befuddled, beguiled, or besotted by the narratives of the powerful. Scott, however, asks us to look again for traces of radical refusal, even if at first they appear as crude jokes, laziness, performative stupidity, or melodramatic sentimentality. We should not expect easy heroism from such acts—they are conflicted and complex. But generally dreams of liberation are contained in the 'hidden transcript' that cannot be encompassed in the discourses of the powerful. The radicalism in the sorts of money hacks and disruptions in this chapter does not seek to replace the current monetary order with a new one. It does not suggest reforms and its desires may not exactly express themselves as revolutionary either (yet).

See Fig. 3 in the Gallery (p. 33).

My second example is hobo nickels, crafted by itinerant Americans forced into a life of vagrancy in the aftermath of the First World War (when millions of decommissioned soldiers—many of them physically and psychologically wounded—and their families were essentially abandoned by the state), and later during the Great Depression.⁵² It is not improbable that the techniques were developed by working class soldiers in the trenches of Europe, learned from French soldiers. The practice of altering coins in this manner dates at least as far back as the time of Napoleon when French proletarians mocked the arrogance of the Emperor by waggishly transforming his likeness on coinage into all manners of characters and animals.⁵³ From 1913 to 1938 the United States Mint produced a distinctive 'Indian Head' or 'Buffalo' five-cent piece (so named for the

49 David Graeber, *Toward and Anthropological Theory of Value: The False Coin of Our Own Dreams*, New York: Palgrave, 2001.

50 Max Haiven, *Art after Money*.

51 Scott, *Domination*.

52 David Ferris, 'More Than A Nickel's Worth: A History of Hobo Nickels and Their Role In American Numismatics', *Professional Coin Grading Service (PCGS)*, 7 November 2000, <https://www.pcgs.com/news/More-Than-A-Nickels-Worth-A-History-Of-Hobo-Nickels>.

53 Jeffrey Kastner, 'Hobo Nickels', *Cabinet 2* (Spring, 2001), <http://cabinetmagazine.org/issues/2/hobonickels.php>.

relief image on the obverse and reverse, respectively), which became a favorite canvas for carvers. Both the image of the man (a fictionalized amalgam of many different Indigenous people and cultures) and of the buffalo were larger than most similar depictions on other coins and the copper alloy from which the coin was minted presented a relatively pliable material if one had minimal tools.⁵⁴

While proletarians almost immediately began to hack the coins to create love tokens and similar artifacts, the heyday of the hobo nickel came during the 30s, when an increasing number of proletarians were forced to abandon their homes and 'ride the rails' in search of food, shelter, and work amidst wholesale economic collapse. The carved nickels often showed portraits of the carver or his commissioner (we do not know of any female carvers, though we do know of women hobos)⁵⁵ by means of altering the 'Indian Head' on the obverse, while the buffalo on the reverse became a boxcar, a horse, a turtle, or a hobo with an iconic pack on his back.

See Fig. 4 in the Gallery (p. 33).

Hobo nickels appear to have served many purposes, though much is unfortunately lost to history.⁵⁶ There appears to be evidence that, through their artistry, hobos increased the coins' exchange value, selling them or bartering them for goods and services (from food to shelter) that would cost more than (ef)face(d) value of US\$0.05. There are reports of hobo nickels being given as gifts in return for even mundane kindness, such as a farmer letting a hobo sleep in his barn, or a woman giving a hobo a meal, regardless of the estimated value. There are also rumors that the nickels were tokens of solidarity among hobos, a unique calling card and means of communication passed from one hand to another as their bearers made their way back and forth across the nation. And, however doubtful they seem, there are even rumors that hobos added coded messages on these tokens, as they were known to mark buildings and other infrastructure with sigils to warn or encourage future travelers.⁵⁷

The identities and biographies of only a handful of original hobo nickel creators are known, notably George Washington 'Bo' Hughes who lived an itinerant life from the time he left home aged 15 in roughly 1915 until the time of his disappearance in the early 80s.⁵⁸ The son of formerly enslaved parents, Bo's craftsmanship was taught to him by another famous carver, Bertram 'Bert' Wiegand. While Hughes created nickels until the time of his disappearance, his most sought-after work was carved in the early phase of his career. Frequent beatings by railway police as well as having to endure frigid winter nights in meagre shelters or on trains left his hands in a near ruined state. This was compounded by a carving accident in 1957 which, in his last decades, left him unable to do more than merely punch out crude diagrams on coins rather than carving images.

54 'The Origin of Hobo Nickels and Early Nickel Carvers', *The Original Hobo Nickel Society*, http://www.hobonickels.org/graphics/tri_fold.pdf.

55 Ben L. Reitman, *Sister of the Road: The Autobiography of Boxcar Bertha as Told to Dr. Ben L. Reitman*, Edinburgh, London, and Oakland: AK Press and Nabat, 2002.

56 Joyce Ann Romines, *The Hobo Nickel: An Exclusive Upgrade of Hobo Nickel Artistry*, Virginia Beach, VA: David Lawrence Rare Coins Press, 1996.

57 On the broader culture, politics, and practices of hobos, see Jim Tully, *Beggars of Life: A Hobo Autobiography*, Oakland, CA: AK Press, 2004.

58 'The Origin of Hobo Nickels'.

The hobo nickel gives us a glimpse into a proletarian practice of secretly avenging the crimes and cruelties of a system of capitalist monetary privation and exploitation. Here, the medium of money itself becomes an opportunity to craft a whole new infraeconomy, wherein these tokens come to express, communicate, and reproduce a very different set of non-market values and relationships. We know so little of the use and transit of hobo nickels (except as collectors' items and numismatic curiosities) that we cannot know the rules of this game, but at least two things seem clear. The first is that the hobos were obviously not seeking to build an alternative market economy, and they seemed to have had no ambition to challenge or replace the existing capitalist-state money system either. Second, if there were rules to the economic game of the hobo nickel, these rules were evidently extremely flexible. Was it a gift economy or a barter economy? Was the hobo nickel a commodity or a sacrament, a joke or a coded message? Perhaps none of these, or perhaps all. What seems true at the very least is that the hobo nickel was a medium of solidarity, joy, and creativity at the margins of the capitalist economy.

Drawing on Scott's discussion of the 'hidden transcript' of the 'arts of resistance' of the oppressed, I propose that the proletarian currency 'disruptions' and 'hacks' presented in this chapter might be understood as part of a hidden ledger. Miranda Joseph has illustrated the importance of forms of counter-accounting to movements for economic and collective liberation.⁵⁹ The examples explored here present a forgotten, ignored or suppressed history of attempts to express, contest, and re-measure value. Collectively, this hidden ledger would challenge our unfounded optimism in top-down monetary innovation and echo the haunting revelation of Walter Benjamin that '[t]here is a secret agreement between past generations and the present one. Our coming was expected on earth. Like every generation that preceded us, we have been endowed with a *weak* Messianic power, a power to which the past has a claim. That claim cannot be settled cheaply.'⁶⁰

The Myths of the Eisbergfreistadt

See *Fig. 5 in the Gallery* (p. 34).

It is said that, in October 1923, at a moment of almost complete economic catastrophe and political violence, an iceberg made its way from the Arctic Ocean through the straits between the North and Baltic sea to arrive at the German port city of Lübeck, a one-time Hanseatic capital. Appearing as if through a portal from another cold, pure world, this strange and barren visitor came at a moment when society had all but collapsed. Due to the ruinous reparations Germany was made to pay in the wake of the First World War, inflation in the country was so severe that people had to take wheelbarrows full of bills to stores to buy the most basic commodities. Government-issued notes, even in denominations of billions of Marks, were quickly deemed worthless. The wealthy sought to remove as much gold and hard foreign currency from the country as possible as the state mandated its right to raid

59 Miranda Joseph, *Debt to Society: Accounting for Life under Capitalism*, Minneapolis: University of Minnesota Press, 2014.

60 Walter Benjamin, 'Theses on the Philosophy of History', in Hannah Arendt (ed), *Illuminations*, New York: Schocken Books, 1968, p. 254.

personal deposits at private banks to pay its foreign debts. This was an economic catastrophe that made a grim and deadly pantomime of the typical uncertainties of capitalist prices and money supplies.

As a result, municipalities like Lübeck began to issue their own cheaply manufactured, mass-printed Notgeld, emergency money intended for temporary use to enable commerce and taxation in the absence of any useful legal tender.⁶¹ Throughout the heyday of Notgeld, from 1921 to 1923, hundreds of thousands of different, often extremely creative and colorful notes were produced, sometimes for use as functional—if unreliable—currency, often (and increasingly after 1923, when their use as ‘money’ was banned by the national government) as collector’s items and as a way for the local municipality to raise funds.⁶² Because it offered so many artists and citizens an opportunity to mint their own money with their own chosen symbolism expressing their own individual and collective values, Notgeld became a particularly vivid social canvas.

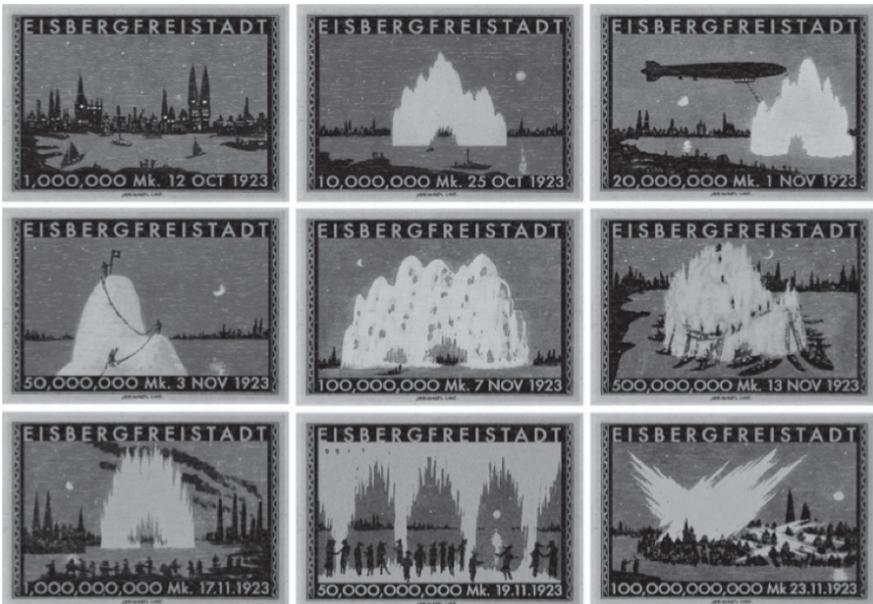


Fig. 6: Kahn & Selesnick, *Eisbergfreistadt* (Notgeld), 2008.⁶³

In the artist duo Nicholas Kahn and Richard Selesnick’s parafictional depiction of the 1923 event, the rogue iceberg was lodged in Lübeck harbour for about a month, during

61 Antoinette LaFarge, ‘Eisbergfreistadt: The Fictive and the Sublime’, *Visual Communication Quarterly* 16 (2009): 210–16; Carol Kaimowitz, ‘Notgeld: German Emergency Currency’, *Financial History* (Summer 2013): 8–9; Richard E. Brown, ‘Meissen Notgeld: Ceramic Currency in a Time of Economic Catastrophe’, *Mansfield Ceramics* (2017): 30–33.

62 Laura Phyllis Eccleston, ‘The Art of Money in the Weimar Republic: German Notgeld 1921–1923’ (MA Thesis, Art History, Bowling Green State University, 2011), http://rave.ohiolink.edu/etdc/view?acc_num=bgsu1308537043.

63 Image appears courtesy of the artists, and can be found at <http://kahnselesnick.biz/eisbergfreistadt-installations/>.

which time the municipality, in what must be a somewhat tongue-in-cheek move, declared sovereignty over it, naming it Eisbergfreistadt (the Free City Iceberg)—a strange, barren, and rapidly melting temporary autonomous zone.⁶⁴ The artists present a range of beguiling historical documents that indicate that, until it finally split and its remnants were washed back out to sea in November, citizens not only visited the iceberg out of curiosity, they appear to have increasingly used it as a literal and metaphorical platform to imagine new relationships and new political and economic orders.⁶⁵ It could almost be a spectacle orchestrated by the contemporary surrealists, a public dream amidst a public nightmare. And, indeed, Kahn & Selesnick offer that the Eisbergfreistadt was commemorated on several Notgeld notes. This exhibited a rare aesthetic exuberance and imaginative panache during a time when many were starving amidst literal piles of money, when money was in fact being burned for warmth and desperately sewn into clothing for insulation. Some of this Notgeld appears to have been issued by the Eisbergfreistadt itself, a conjectural, melting free state minting its own currency through the power of imagination alone.

See Fig. 7 in the Gallery (p. 34).

85 years later, amidst the financial crisis of 2008, Kahn & Selesnick created, assembled and organized materials related to the mythical Eisbergfreistadt incident in an immersive exhibition.⁶⁶ Replicas of the 'original' Notgeld pour out of a suitcase, are stacked neatly in a wheelbarrow, and are stitched together into garments distributed around the exhibition. Meanwhile, the bills appear in panoramic paintings, in staged and archival photographs, in vitrines and affixed to the walls. A huge replica of one of the bills hangs face up from a pulley on the gallery's ceiling, counterbalanced on the other end of the rope by a stack of flat rocks. Paper birds and airplanes made of the Notgeld flock about the gallery, suspended by thread. A house of cards, made out of bundles of Notgeld, sits ominously on a plinth. In one of several framed panoramic paintings a man lies in the gondola of an airship whose narrow balloon is covered in the Notgeld. In another, a man tries to shoot down origami Notgeld birds with a bow and arrow. In yet another, human bodies with animal heads play cards surrounded by suitcases of Notgeld on the iceberg.

Much could be said about the Eisbergfreistadt, both in terms of its moment in history as well as Kahn & Selesnick's exhibition. The artists operate at the fraught threshold of fact and fiction to generate the radical imagination. I am less interested in if the events actually occurred than in what the myth might make imaginable. My interest stems from the way the myth, and Notgeld in general, seem to gesture towards an alternative horizon for money if we were to reject a genealogy of top-down money invention and engineering and instead pay attention to the ways in which the poor and the exploited have reappropriated money as sly resistance. What does it mean to create a currency for a temporary autonomous zone?⁶⁷ From the perspective of almost any mainstream or heterodox economic school of thought it is a futile or purely aesthetic exercise. The

64 Hakim Bey, *T.A.Z.: The Temporary Autonomous Zone, Ontological Anarchy, Poetic Terrorism*, 2nd ed, New York: Autonomedia, 2003.

65 LaFarge, 'Eisbergfreistadt'.

66 See <http://kahnselesnick.biz/eisbergfreistadt-installations/>.

67 Bey, *T.A.Z.*

zone doesn't need money: it can't sustain an economy and it will immanently melt back into the ocean. And yet what was perhaps revealed in the Eisbergfreistadt episode and exhibition is that, when money is detached from functionality and from the dreams of the economic architect, when it is allowed to become part of an economy of creative social improvisation, money can become a medium of collective joy, and a kind of proletarian minor utopianism. The Eisbergfreistadt Notgeld, if it really existed in fact or if it exists purely as a fiction was (and in a way is) essentially a public plaything, a shared resource for a *virtuosity* of the commons where, even amidst some of the darkest, most chaotic moments of people's lives, a shared wonder emerged from the fabric of the cooperative human imagination.⁶⁸ This is a reflection of what Cornelius Castoriadis calls the tectonic magma of the radical imagination; that substance of destructive and creative potential out of which all social formations, institutions, and orders are congealed, but that also periodically sweeps away those remnants.⁶⁹

Currencies of the Undercommon

See Fig. 8 in the Gallery (p. 34).

There have, of course, been intentionally radical, political reappropriations of money. At the turn of the century, suffragettes famously carved 'VOTES FOR WOMEN' on British shillings as part of an escalating repertoire of direct actions.⁷⁰ In the 70s, the Brazilian artist Cildo Meireles stamped banknotes with subversive messages and passed them back into circulation to avoid censors and repression by the reigning military junta.⁷¹ More recently, American artist Joseph DeLappe created and distributed rubber stamps that imprint money with silhouettes of predator drones, of people with their hands up, and of ocean waves to draw attention to the extrajudicial assassination program, the movement for black lives, and climate change, respectively.⁷²

These are all noteworthy examples, but I'd like to conclude on a more ambiguous note. The proletarian money-hacks and currency disruptions explored in this chapter are typically categorized by collectors and scholars as *exonomia*: money-like objects that do not function as money; a curious and imminently deconstructable concept if there ever was one. 'Exo' derives from the ancient Greek prefix for 'out', often used to refer to the outside or the alien; 'numia' refers to money by way of a reference to customary practices, a root that also gives us the legal, political, and philosophical notion of 'nomos' or 'law'. So, in a sense, an encrypted meaning of 'exonomia' is that which is outside of customary laws. Similarly, we can interpret the practices noted here as ones

68 On the potential of such virtuosity in common, see Paolo Virno, *A Grammar of the Multitude: For an Analysis of Contemporary Forms of Life*, trans. Isabella Bertolotti, James Cascaito, and Andrea Casson, Los Angeles: Semiotext(e), 2003.

69 Cornelius Castoriadis, 'Radical Imagination and the Social Instituting Imaginary', in David Ames Curtis (ed.) *The Castoriadis Reader*, Cambridge and New York: Blackwell, 1997, pp. 319–37; Cornelius Castoriadis, 'The Logic of Magmas and the Question of Autonomy', in David Ames Curtis, *The Castoriadis Reader*, Cambridge and New York: Blackwell, 1997, pp. 290–318.

70 Tom Hockenfull and Andrew Shore, 'Defacing Coins like a Suffragette', *The British Museum Blog*, 2017, <https://blog.britishmuseum.org/defacing-coins-like-a-suffragette>.

71 Cildo Meireles, 'Insertions into Ideological Circuits, 1970–75', in Will Bradley and Charles Esche (eds) *Art and Social Change: A Critical Reader*, London: Tate Gallery, 2007, pp. 181–86.

72 See <http://www.delappe.net/intervene/rubber-stamp-currency-interventions/>.

that exist and persist outside—or, maybe more accurately, within, against, and beyond—laws, customs, and practices of the conventional, exploitative, unequal economy. We might understand these as some of the currencies of the undercommons, as Fred Moten and Stefano Harney frame it: those quotidian practices of proletarian planning, of pragmatic yet imaginative solidarity. Ironically, the capitalist economy depends on these rebellious practices, but also tries to contain, control, delimit, criminalize, and rent access back to us.⁷³ In this sense, exonomia is the money of the internalized alien, or of the alienated.⁷⁴ For Marx, money represents the method, the lifeblood and the culmination of a system of capitalism that alienates us from our species-being, our cooperative and imaginative potential. These exonomismatic practices represent a kind of revenge of the alienated, in a small but revealing way.

In that case, these are currencies not of triumph and reconquest, but of exodus; they are tokens of becoming-alien, or alienating oneself from the alienating order. Paolo Virno offers us some clues as to what a politics of exodus might mean, especially and explicitly in an age of post-Fordist cognitive capitalism and financialization, when the system seeks to harness and put to work all our virtuosic powers, to transform the entire body politic into a network of competitive investors, ruthless speculators, and maximizers of human capital.⁷⁵ Such an exodus, Virno writes, has as its goal the ongoing creation of an ‘autonomous public sphere’ of protagonists who ‘cut the linkage that binds [them] to the production of commodities and wage labor [...] a political community that has as its hinge the general intellect’ and that instantiates, through its actions, ‘a radically new form of democracy’. Exodus here means a ‘mass defection from the [capitalist] State.’ Exodus ‘is neither exiting on tiptoe through the back door nor a search for sheltering hideaways’ but a ‘full-fledged model of action [...] a realm of common affairs [that] has to be defined from scratch.’ If exodus is the foundation of a Republic, Virno argues, it requires ‘taking leave of the State judicature: if republic, then no longer the state.’ It is a practice, he continues, of ‘engaged withdrawal (or founding leave-taking)’ animated by ‘a series of key words: disobedience, intemperance, multitude, soviet, example, right of resistance, and miracle.’

This admittedly cryptic but nonetheless evocative notion of exodus has been widely parsed and interpreted.⁷⁶ It signifies the idea of a strategic withdrawal from the capitalist-state nexus through practices that range from setting up radical forms of life (communes, collective houses, temporary and permanent autonomous zones, maroon communities) to everyday forms of resistance, such as the ones Scott valorizes: laziness on the job, refusal to work, slow-downs, and even the sly jokes, meaningful

73 Fred Moten and Stefano Harney, *The Undercommons: Fugitive Planning & Black Study*, Wivenhoe, New York, and Port Watson: Minor Compositions, 2013.

74 I have chosen here to pursue the even more evocative and powerful language that Moten and Harney draw on of fugitivity, indebted as it is to the struggles of the black diaspora. The reason is simply that it would (and must) require a whole other paper that complicates the notion of the proletarian presented here with a more robust account for race and colonialism.

75 Virno, *A Grammar of the Multitude*; See also Max Haiven, *Cultures of Financialization: Fictitious Capital in Popular Culture and Everyday Life*, London and New York: Palgrave Macmillan, 2014.

76 See, for instance, Michael Hardt and Antonio Negri, *Multitude: War and Democracy in the Age of Empire*, New York: Penguin, 2004; Gerald Raunig, ‘Modifying the Grammar: Paolo Virno’s Works on Virtuosity and Exodus’, *EIPCP*, 2008, <http://transform.eipcp.net/correspondence/modifyingthegrammar#redir>.

glances, gallows humor, and minor acts of solidarity and kindness that allow proletarians to reproduce life under exploitation.⁷⁷ Virno argues that such defections are based not on the logic of desperation ('you have nothing to lose but your chains') but 'on the basis of a latent wealth, on an abundance of possibilities.'

There is a large body of work that both seeks to explain and critique this notion of exodus, but I maintain the concept's more poetic and ambiguous dimensions precisely because I think these help us expand our imagination to encompass the core question with which I began: What would it mean to see money *not* as The State does, but to conceptualize monetary innovation, disruption, and hacking from a proletarian perspective? What would it mean to reject the Oedipal drama of seeking to replace one authoritarian currency with another (even if the other is plural or even 'decentralized')? I pose the question for the purpose of collective meditation: What would it mean to draw on the traces of the radical proletarian traditions noted here to rethink what we desire from money, in order to question our own utopian impulse to use money to 'fix' society? What would the currency of exodus be?

Scores of convict ships were lost at sea on their way to the colonies, many of them to mutiny. Many hobos, including George Washington 'Bo' Hughes, disappeared without a trace. It is rumored that, when the Eisbergfreistadt drifted back out to sea, there were a number of people who had, impossibly, made the barren, melting chunk of ice their home, presumably preferring its topographical austerity to the unnecessary, all-too-human austerity of post-war Lübeck, and that not all were accounted for after most were rescued. Imagine now a parallel universe where all these exiles from the history of capitalist-colonial accumulation met. What currency would they have invented together, these convicts, hobos, and debtors? And, what wisdom and courage can we adopt from their stolen future to change our own seemingly foreclosed present?⁷⁸

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77 James C. Scott, *Weapons of the Weak: Everyday Forms of Peasant Resistance*, New Haven, CT: Yale University Press, 2000.

78 This radical methodology of calling on a potential utopian future to transform the present is one that Frederic Jameson develops from his reading of Marge Peirce's visionary novel *Woman on the Edge of Time*. See Frederic Jameson, *Archaeologies of the Future: The Desire Called Utopia and Other Science Fictions*, New York: Verso, 2005.

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LEARNING FROM #SYLLABUS

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LEARNING FROM #SYLLABUS

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The syllabus is the manifesto of the 21st century.
— Sean Dockray and Benjamin Forster¹

#Syllabus Struggles

In August 2014, Michael Brown, an 18-year-old boy living in Ferguson, Missouri, was fatally shot by police officer Darren Wilson. Soon after, as the civil protests denouncing police brutality and institutional racism began to mount across the United States, Dr. Marcia Chatelain, Associate Professor of History and African American Studies at Georgetown University, launched an online call urging other academics and teachers ‘to devote the first day of classes to a conversation about Ferguson’ and ‘to recommend texts, collaborate on conversation starters, and inspire dialogue about some aspect of the Ferguson crisis.’² Chatelain did so using the hashtag #FergusonSyllabus.

Also in August 2014, using the hashtag #gamergate, groups of users on 4Chan, 8Chan, Twitter, and Reddit instigated a misogynistic harassment campaign against game developers Zoë Quinn and Brianna Wu, media critic Anita Sarkeesian, as well as a number of other female and feminist game producers, journalists, and critics. In the following weeks, *The New Inquiry* editors and contributors compiled a reading list and issued a call for suggestions for their ‘TNI Syllabus: Gaming and Feminism’.³

In June 2015, Donald Trump announced his candidacy for President of the United States. In the weeks that followed, he became the presumptive Republican nominee, and *The Chronicle of Higher Education* introduced the syllabus ‘Trump 101’.⁴ Historians N.D.B. Connolly and Keisha N. Blain found ‘Trump 101’ inadequate, ‘a mock college syllabus [...] suffer[ing] from a number of egregious omissions and inaccuracies’, failing to include ‘contributions of scholars of color and address the critical subjects of Trump’s racism, sexism, and xenophobia’. They assembled ‘Trump Syllabus 2.0’.⁵ Soon after, in response to a video in which Trump engaged in ‘an extremely lewd conversation about women’ with TV host Billy Bush, Laura Ciolkowski put together a ‘Rape Culture Syllabus’.⁶

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- 1 Sean Dockray, Benjamin Forster, and Public Office, ‘README.md’, *Hyperreadings*, 15 February 2018, <https://samiz-dat.github.io/hyperreadings/>.
 - 2 Marcia Chatelain, ‘Teaching the #FergusonSyllabus’, *Dissent Magazine*, 28 November 2014, <https://www.dissentmagazine.org/blog/teaching-ferguson-syllabus/>.
 - 3 ‘TNI Syllabus: Gaming and Feminism’, *The New Inquiry*, 2 September 2014, <https://thenewinquiry.com/tni-syllabus-gaming-and-feminism/>.
 - 4 ‘Trump 101’, *The Chronicle of Higher Education*, 19 June 2016, <https://www.chronicle.com/article/Trump-Syllabus/236824/>.
 - 5 N.D.B. Connolly and Keisha N. Blain, ‘Trump Syllabus 2.0’, *Public Books*, 28 June 2016, <https://www.publicbooks.org/trump-syllabus-2-0/>.
 - 6 Laura Ciolkowski, ‘Rape Culture Syllabus’, *Public Books*, 15 October 2016, <https://www.publicbooks.org/rape-culture-syllabus/>.

In April 2016, members of the Standing Rock Sioux tribe established the Sacred Stone Camp and started the protest against the Dakota Access Pipeline, the construction of which threatened the only water supply at the Standing Rock Reservation. The protest at the site of the pipeline became the largest gathering of native Americans in the last 100 years and they earned significant international support for their ReZpect Our Water campaign. As the struggle between protestors and the armed forces unfolded, a group of Indigenous scholars, activists, and supporters of the struggles of First Nations people and persons of color, gathered under the name the NYC Stands for Standing Rock Committee, put together #StandingRockSyllabus.⁷

The list of online syllabi created in response to political struggles has continued to grow, and at present includes many more examples:

All Monuments Must Fall Syllabus

#Blkwomensyllabus

#BLMSyllabus

#BlackIslamSyllabus

#CharlestonSyllabus

#ColinKaepernickSyllabus

#ImmigrationSyllabus

Puerto Rico Syllabus (#PRSSyllabus)

#SayHerNameSyllabus

Syllabus for White People to Educate Themselves

Syllabus: Women and Gender Non-Conforming People Writing about Tech

#WakandaSyllabus

What To Do Instead of Calling the Police: A Guide, A Syllabus, A Conversation, A Process

#YourBaltimoreSyllabus

It would be hard to compile a comprehensive list of all the online syllabi that have been created by social justice movements in the last five years, especially, but not exclusively, those initiated in North America in the context of feminist and anti-racist activism. In what is now a widely spread phenomenon, these political struggles use social networks and resort to the hashtag template ‘#__Syllabus’ to issue calls for the bottom-up aggregation of resources necessary for political analysis and pedagogy centering on their concerns. For this reason, we’ll call this phenomenon ‘#Syllabus’.

During the same years that saw the spread of the #Syllabus phenomenon, university course syllabi have also been transitioning online, often in a top-down process initiated by academic institutions, which has seen the syllabus become a contested document in the midst of increasing casualization of teaching labor, expansion of copyright protections, and technology-driven marketization of education.

In what follows, we retrace the development of the online syllabus in both of these contexts, to investigate the politics enmeshed in this new media object. Our argument

7 ‘#StandingRockSyllabus’, *NYC Stands with Standing Rock*, 11 October 2016, <https://nycstandswithstandingrock.wordpress.com/standingrocksyllabus/>.

is that, on the one hand, #Syllabus names the problem of contemporary political culture as pedagogical in nature, while, on the other hand, it also exposes academicized critical pedagogy and intellectuality as insufficiently political in their relation to lived social reality. Situating our own stakes as both activists and academics in the present debate, we explore some ways in which the radical politics of #Syllabus could be supported to grow and develop as an articulation of solidarity between amateur librarians and radical educators.

#Syllabus in Historical Context: Social Movements and Self-Education

When Professor Chatelain launched her call for #FergusonSyllabus, she was mainly addressing a community of fellow educators:

I knew Ferguson would be a challenge for teachers: When schools opened across the country, how were they going to talk about what happened? My idea was simple, but has resonated across the country: Reach out to the educators who use Twitter. Ask them to commit to talking about Ferguson on the first day of classes. Suggest a book, an article, a film, a song, a piece of artwork, or an assignment that speaks to some aspect of Ferguson. Use the hashtag: #FergusonSyllabus.⁸

Her call had a much greater resonance than she had originally anticipated as it reached beyond the limits of the academic community. #FergusonSyllabus had both a significant impact in shaping the analysis and the response to the shooting of Michael Brown, and in inspiring the many other #Syllabus calls that soon followed.

The #Syllabus phenomenon comprises different approaches and modes of operating. In some cases, the material is clearly claimed as the creation of a single individual, as in the case of #BlackLivesMatterSyllabus, which is prefaced on the project's landing page by a warning to readers that 'material compiled in this syllabus should not be duplicated without proper citation and attribution.'⁹ A very different position on intellectual property has been embraced by other #Syllabus interventions that have chosen a more commoning stance. #StandingRockSyllabus, for instance, is introduced as a crowd-sourced process and as a useful 'tool to access research usually kept behind paywalls.'¹⁰

The different workflows, modes of engagements, and positioning in relation to intellectual property make #Syllabus readable as symptomatic of the multiplicity that composes social justice movements. There is something old school—quite literally—about the idea of calling a list of online resources a 'syllabus'; a certain quaintness, evoking thoughts of teachers and homework. This is worthy of investigation especially if contrasted with the attention dedicated to other online cultural phenomena such as memes or fake news. Could it be that the online syllabus offers

8 Marcia Chatelain, 'How to Teach Kids About What's Happening in Ferguson', *The Atlantic*, 25 August 2014, <https://www.theatlantic.com/education/archive/2014/08/how-to-teach-kids-about-whats-happening-in-ferguson/379049/>.

9 Frank Leon Roberts, 'Black Lives Matter: Race, Resistance, and Populist Protest', 2016, <http://www.blacklivesmattersyllabus.com/fall2016/>.

10 '#StandingRockSyllabus', *NYC Stands with Standing Rock*, 11 October 2016, <https://nycstandswithstandingrock.wordpress.com/standingrocksyllabus/>.

a useful, fresh format precisely for the characteristics that foreground its connections to older pedagogical traditions and techniques, predating digital cultures?

#Syllabus can indeed be analyzed as falling within a long lineage of pedagogical tools created by social movements to support processes of political subjectivation and the building of collective consciousness. Activists and militant organizers have time and again created and used various textual media objects—such as handouts, pamphlets, cookbooks, readers, or manifestos—to facilitate a shared political analysis and foment mass political mobilization.

In the context of the US, anti-racist movements have historically placed great emphasis on critical pedagogy and self-education. In 1964, the Council of Federated Organizations (an alliance of civil rights initiatives) and the Student Nonviolent Coordinating Committee (SNCC), created a network of 41 temporary alternative schools in Mississippi. Recently, the Freedom Library Project, a campaign born out of #FergusonSyllabus to finance under-resourced pedagogical initiatives, openly referenced this as a source of inspiration. The Freedom Summer Project of 1964 brought hundreds of activists, students, and scholars (many of whom were white) from the north of the country to teach topics and issues that the discriminatory state schools would not offer to black students. In the words of an SNCC report, Freedom Schools were established following the belief that ‘education—facts to use and freedom to use them—is the basis of democracy’,¹¹ a conviction echoed by the ethos of contemporary #Syllabus initiatives.

Bob Moses, a civil rights movement leader who was the head of the literary skills initiative in Mississippi, recalls the movement’s interest, at the time, in teaching methods that used the very production of teaching materials as a pedagogical tool:

I had gotten hold of a text and was using it with some adults [...] and noticed that they couldn’t handle it because the pictures weren’t suited to what they knew [...] That got me into thinking about developing something closer to what people were doing. What I was interested in was the idea of training SNCC workers to develop material with the people we were working with.¹²

It is significant that for him the actual use of the materials the group created was much less important than the process of producing the teaching materials together. This focus on what could be named as a ‘pedagogy of teaching’, or perhaps more accurately ‘the pedagogy of preparing teaching materials’, is also a relevant mechanism at play in the current #Syllabus initiatives, as their crowdsourcing encourages different kinds of people to contribute what they feel might be relevant resources for the broader movement.

Alongside the crucial import of radical black organizing, another relevant genealogy in which to place #Syllabus would be the international feminist movement and, in particular, the strategies developed in the 70s campaign Wages for Housework, spearheaded

11 Daniel Perlstein, ‘Teaching Freedom: SNCC and the Creation of the Mississippi Freedom Schools’, *History of Education Quarterly* 30.3 (Autumn 1990): 302.

12 Perlstein, ‘Teaching Freedom’: 306.

by Selma James and Silvia Federici. The Wages for Housework campaign drove home the point that unwaged reproductive labor provides a foundation for capitalist exploitation. They wanted to encourage women to denaturalize and question the accepted division of labor into remunerated work outside the house and labor of love within the confines of domesticity, discussing taboo topics such as ‘prostitution as socialized housework’ and ‘forced sterilization’ as issues impacting poor, often racialized, women. The organizing efforts of Wages for Housework held political pedagogy at their core. They understood that that pedagogy required:

having literature and other materials available to explain our goals, all written in a language that women can understand. We also need different types of documents, some more theoretical, others circulating information about struggles. It is important that we have documents for women who have never had any political experience. This is why our priority is to write a popular pamphlet that we can distribute massively and for free—because women have no money.¹³

The obstacles faced by the Wages for Housework campaign were many, beginning with the issue of how to reach a dispersed constituency of isolated housewives and how to keep the revolutionary message at the core of their claims accessible to different groups. In order to tackle these challenges, the organizers developed a number of innovative communication tactics and pedagogical tools, including strategies to gain mainstream media coverage, pamphlets and leaflets translated into different languages,¹⁴ a storefront shop in Brooklyn, and promotional tables at local events.

Freedom Schools and the Wages for Housework campaign are only two amongst the many examples of the critical pedagogies developed within social movements. The #Syllabus phenomenon clearly stands in the lineage of this history, yet we should also highlight its specificity in relation to the contemporary political context in which it emerged. The #Syllabus acknowledges that since the 70s—and also due to students’ participation in protests and their display of solidarity with other political movements—subjects such as Marxist critical theory, women studies, gender studies, and African American studies, together with some of the principles first developed in critical pedagogy, have become integrated into the educational system. The fact that many initiators of #Syllabus initiatives are women and Black academics speaks to this historical shift as an achievement of that period of struggles. However, the very necessity felt by these educators to kick-start their #Syllabus campaigns outside the confines of academia simultaneously reveals the difficulties they encounter within the current privatized and exclusionary educational complex.

13 Silvia Federici and Arlen Austin (eds) *The New York Wages for Housework Committee 1972-1977: History, Theory and Documents*. New York: Autonomedia, 2017: 37.

14 Some of the flyers and pamphlets were digitized by MayDay Rooms, ‘a safe haven for historical material linked to social movements, experimental culture and the radical expression of marginalised figures and groups’ in London, and can be found in their online archive: ‘Wages for Housework: Pamphlets – Flyers – Photographs’, *MayDay Rooms*, <http://maydayrooms.org/archives/wages-for-housework/wfhw-pamphlets-flyers-photographs/>.

#Syllabus as a Media Object

Besides its contextualization within the historical legacy of previous grassroots mobilizations, it is also necessary to discuss #Syllabus as a new media object in its own right, in order to fully grasp its relevance for the future politics of knowledge production and transmission.

If we were to describe this object, a #Syllabus would be an ordered list of links to scholarly texts, news reports, and audiovisual media, mostly aggregated through a participatory and iterative process, and created in response to political events indicative of larger conditions of structural oppression. Still, as we have seen, #Syllabus as a media object doesn't follow a strict format. It varies based on the initial vision of their initiators, political causes, and social composition of the relevant struggle. Nor does it follow the format of traditional academic syllabi. While a list of learning resources is at the heart of any syllabus, a boilerplate university syllabus typically also includes objectives, a timetable, attendance, coursework, examination, and an outline of the grading system used for the given course. Relieved of these institutional requirements, the #Syllabus typically includes only a reading list and a hashtag. The reading list provides resources for understanding what is relevant to the here and now, while the hashtag provides a way to disseminate across social networks the call to both collectively edit and teach what is relevant to the here and now. Both the *list* and the *hashtag* are specificities and formal features of the contemporary (internet) culture and therefore merit further exploration in relation to the social dynamics at play in #Syllabus initiatives.

The different phases of the internet's development approached the problem of the discoverability of relevant information in different ways. In the early days, the Gopher protocol organized information into a hierarchical file tree. With the rise of World Wide Web (WWW), Yahoo tried to employ experts to classify and catalog the internet into a directory of links. That seemed to be a successful approach for a while, but then Google (founded in 1998) came along and started to use a webgraph of links to rank the importance of web pages relative to a given search query.

In 2005, Clay Shirky wrote the essay 'Ontology is Overrated: Categories, Links and Tags',¹⁵ developed from his earlier talk 'Folksonomies and Tags: The Rise of User-Developed Classification'. Shirky used Yahoo's attempt to categorize the WWW to argue against *any* attempt to classify a vast heterogenous body of information into a single hierarchical categorical system. In his words: '[Yahoo] missed [...] that, if you've got enough links, you don't need the *hierarchy* anymore. There is no shelf. There is no file system. The links alone are enough.' Those words resonated with many. By following simple formatting rules, we, the internet users, whom *Time* magazine named Person of the Year in 2006, proved that it is possible to collectively write the largest encyclopedia ever. But, even beyond that, and as per Shirky's argument, if enough of us organized our own snippets of the vast body of the internet, we could replace old canons, hierarchies, and ontologies with folksonomies, social bookmarks, and (hash)tags.

15 Clay Shirky, 'Ontology Is Overrated: Categories, Links, and Tags', 2005, http://shirky.com/writings/hercomeseverybody/ontology_ouerrated.html.

Very few who lived through those times would have thought that only a few years later most user-driven services would be acquired by a small number of successful companies and then be shut down. Or, that Google would decide not to include the biggest hashtag-driven platform, Twitter, into its search index and that the search results on its first page would only come from a handful of usual suspects: media conglomerates, Wikipedia, Facebook, LinkedIn, Amazon, Reddit, Quora. Or, that Twitter would become the main channel for the racist, misogynist, fascist escapades of the President of United States.

This internet folk naivety—stoked by an equally enthusiastic, venture-capital-backed startup culture—was not just naivety. This was also a period of massive experimental use of these emerging platforms. Therefore, this history would merit to be properly revisited and researched. In this text, however, we can only hint to this history: to contextualize how the hashtag as a formalization initially emerged, and how with time the user-driven web lost some of its potential. Nonetheless, hashtags today still succeed in propagating political mobilizations in the network environment. Some will say that this propagation is nothing but a reflection of the internet as a propaganda machine, and there's no denying that hashtags do serve a propaganda function. However, it equally matters that hashtags retain the capacity to shape coordination and self-organization, and they are therefore a reflection of the internet as an organization machine.

As mentioned, #Syllabus as a media object is an ordered list of links to resources. In the long history of knowledge retrieval systems and attempts to help users find relevant information from big archives, the list on the internet continues in the tradition of the index card catalog in libraries, of charts in the music industry, or mixtapes and playlists in popular culture, helping people tell their stories of what is relevant and what isn't through an ordered sequence of items. The list (as a format) together with the hashtag find themselves in the list (pun intended) of the most iconic media objects of the internet. In the network media environment, being smart in creating new lists became the way to displace old lists of relevance, the way to dismantle canons, the way to unlearn. The way to become relevant.

The Academic Syllabus Migrates Online

#Syllabus interventions are a challenge issued by political struggles to educators as they expose a fundamental contradiction in the operations of academia. While critical pedagogies of yesteryear's social movements have become integrated into the education system, the radical lessons that these pedagogies teach students don't easily reconcile with their experience: professional practice courses, the rhetoric of employability and compulsory internships, where what they learn is merely instrumental, leaves them wondering how on earth they are to apply their Marxism or feminism to their everyday lives?

Cognitive dissonance is at the basis of degrees in the liberal arts. And to make things worse, the marketization of higher education, the growing fees and the privatization of research has placed universities in a position where they increasingly struggle to provide institutional space for critical interventions in social reality. As universities become more dependent on the 'customer satisfaction' of their students for survival, they steer away from heated political topics or from supporting faculty members who might decide to engage with them. Borrowing the words of Stefano Harney and Fred Moten,

'policy posits curriculum against study',¹⁶ creating the paradoxical situation wherein today's universities are places in which it is possible to do almost everything except study. What Harney and Moten propose instead is the re-appropriation of the diffuse capacity of knowledge generation that stems from the collective processes of self-organization and commoning. As Moten puts it: 'When I think about the way we use the term 'study,' I think we are committed to the idea that study is what you do with other people.'¹⁷ And it is this practice of sharing a common repertoire—what Moten and Harney call 'rehearsal'¹⁸—that is crucially constitutive of a crowdsourced #Syllabus.

This contradiction and the tensions it brings to contemporary neoliberal academia can be symptomatically observed in the recent evolution of the traditional academic syllabus. As a double consequence of (some) critical pedagogies becoming incorporated into the teaching process and universities striving to reduce their liability risks, academic syllabi have become increasingly complex and extensive documents. They are now understood as both a 'social contract' between the teachers and their students, and 'terms of service'¹⁹ between the institution providing educational services and the students increasingly framed as sovereign consumers making choices in the market of educational services. The growing official import of the syllabus has had the effect that educators have started to reflect on how the syllabus translates the power dynamics into their classroom. For instance, the critical pedagogue Adam Heidebrink-Bruno has demanded that the syllabus be re-conceived as a manifesto²⁰—a document making these concerns explicit. And indeed, many academics have started to experiment with the form and purpose of the syllabus, opening it up to a process of co-conceptualization with their students, or proposing 'the other syllabus'²¹ to disrupt asymmetries.

At the same time, universities are unsurprisingly moving their syllabi online. A migration that can be read as indicative of three larger structural shifts in academia.

First, the push to make syllabi available online, initiated in the US, reinforces the differential effects of reputation economy. It is the Ivy League universities and their professorial star system that can harness the syllabus to advertise the originality of their scholarship, while the underfunded public universities and junior academics are burdened with teaching the required essentials. This practice is tied up with the replication in academia of the different valorization between what is considered to be the labor of production (research) and that of social reproduction (teaching). The low esteem (and corresponding lower rewards and remuneration) for the kinds of intellectual labors that can be considered labors of care—editing journals, reviewing papers or marking, for instance—fits perfectly well with the gendered legacies of the academic institution.

16 Stefano Harney and Fred Moten, *The Undercommons: Fugitive Planning & Black Study*, New York: Autonomedia, 2013, p. 81.

17 Harney and Moten, *The Undercommons*, p. 110.

18 Harney and Moten, *The Undercommons*, p. 110.

19 Angela Jenks, 'It's In The Syllabus', *Teaching Tools*, *Cultural Anthropology website*, 30 June 2016, <https://culanth.org/fieldsights/910-it-s-in-the-syllabu/>.

20 Adam Heidebrink-Bruno, 'Syllabus as Manifesto: A Critical Approach to Classroom Culture', *Hybrid Pedagogy*, 28 August 2014, <http://hybridpedagogy.org/syllabus-manifesto-critical-approach-classroom-culture/>.

21 Lucy E. Bailey, 'The "Other" Syllabus: Rendering Teaching Politics Visible in the Graduate Pedagogy Seminar', *Feminist Teacher* 20.2 (2010): 139–56.

Second, with the withdrawal of resources to pay precarious and casualized academics during their ‘prep’ time (that is, the time in which they can develop new course material, including assembling new lists of references, updating their courses as well as the methodologies through which they might deliver these), syllabi now assume an ambivalent role between the tendencies for collectivization and individualization of insecurity. The reading lists contained in syllabi are not covered by copyrights; they are like playlists or recipes, which historically had the effect of encouraging educators to exchange lesson plans and make their course outlines freely available as a valuable knowledge common. Yet, in the current climate where universities compete against each other, the authorial function is being extended to these materials too. Recently, US universities have been leading a trend towards the interpretation of the syllabus as copyrightable material, an interpretation that opened up, as would be expected, a number of debates over who is a syllabus’ rightful owner, whether the academics themselves or their employers. If the latter interpretation were to prevail, this would enable universities to easily replace academics while retaining their contributions to the pedagogical offer. The fruits of a teacher’s labor could thus be turned into instruments of their own deskilling and casualization: why would universities pay someone to write a course when they can recycle someone else’s syllabus and get a PhD student or a precarious post doc to teach the same class at a fraction of the price?

This tendency to introduce a logic of property therefore spurs competitive individualism and erasure of contributions from others. Thus, crowdsourcing the syllabus in the context of growing precarization of labor risks remaining a partial process, as it might heighten the anxieties of those educators who do not enjoy the security of a stable job and who are therefore the most susceptible to the false promises of copyright enforcement and authorship understood as a competitive, small entrepreneurial activity. However, when inserted in the context of live, broader political struggles, the opening up of the syllabus could and should be an encouragement to go in the opposite direction, providing a ground to legitimize the collective nature of the educational process and to make all academic resources available without copyright restrictions, while devising ways to secure the proper attribution and the just remuneration of everyone’s labor.

The introduction of the logic of property is hard to challenge as it is furthered by commercial academic publishers. Oligopolists, such as Elsevier, are not only notorious for using copyright protections to extract usurious profits from the mostly free labor of those who write, peer review, and edit academic journals,²² but they are now developing all sorts of metadata, metrics, and workflow systems that are increasingly becoming central for teaching and research. In addition to their publishing business, Elsevier has expanded its ‘research intelligence’ offering, which now encompasses a whole range of digital services, including the Scopus citation database; Mendeley reference manager; the research performance analytics tools SciVal and Research Metrics; the centralized research management system Pure; the institutional repository and pub-

22 Vincent Larivière, Stefanie Haustein, and Philippe Mongeon, ‘The Oligopoly of Academic Publishers in the Digital Era’, *PLoS ONE* 10.6 (10 June 2015), <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0127502/>.

lishing platform Bepress; and, last but not least, grant discovery and funding flow tools Funding Institutional and Elsevier Funding Solutions. Given how central digital services are becoming in today's universities, whoever owns these platforms *is* the university.

Third, the migration online of the academic syllabus falls into larger efforts by universities to 'disrupt' the educational system through digital technologies. The introduction of virtual learning environments has led to lesson plans, slides, notes, and syllabi becoming items to be deposited with the institution. The doors of public higher education are being opened to commercial qualification providers by means of the rise in metrics-based management, digital platforming of university services, and transformation of students into consumers empowered to make 'real-time' decisions on how to spend their student debt.²³ Such neoliberalization masquerading behind digitization is nowhere more evident than in the hype that was generated around Massive Open Online Courses (MOOCs), exactly at the height of the last economic crisis.

MOOCs developed gradually from the Massachusetts Institute of Technology's (MIT) initial experiments with opening up its teaching materials to the public through the OpenCourseWare project in 2001. By 2011, MOOCs were saluted as a full-on democratization of access to 'Ivy-League-caliber education [for] the world's poor.'²⁴ And yet, their promise quickly deflated following extremely low completion rates (as low as 5%).²⁵ Believing that in fifty years there will be no more than 10 institutions globally delivering higher education,²⁶ by the end of 2013 Sebastian Thrun (Google's celebrated roboticist who in 2012 founded the for-profit MOOC platform Udacity), had to admit that Udacity offered a 'lousy product' that proved to be a total failure with 'students from difficult neighborhoods, without good access to computers, and with all kinds of challenges in their lives.'²⁷ Critic Aaron Bady has thus rightfully argued that:

[MOOCs] demonstrate what the technology is not good at: accreditation and mass education. The MOOC rewards self-directed learners who have the resources and privilege that allow them to pursue learning for its own sake [...] MOOCs are also a really poor way to make educational resources available to underserved and underprivileged communities, which has been the historical mission of public education.²⁸

Indeed, the 'historical mission of public education' was always and remains to this day highly contested terrain—the very idea of a public good being under attack by dominant managerial techniques that try to redefine it, driving what Randy Martin

23 Ben Williamson, 'Number Crunching: Transforming Higher Education into "Performance Data"', *Medium*, 16 August 2018, <https://medium.com/ussbriefs/number-crunching-transforming-higher-education-into-performance-data-9c23debc4cf7>.

24 Max Chafkin, 'Udacity's Sebastian Thrun, Godfather Of Free Online Education, Changes Course', *FastCompany*, 14 November 2013, <https://www.fastcompany.com/3021473/udacity-sebastian-thrun-uphill-climb/>.

25 'The Rise (and Fall?) Of the MOOC', *Oxbridge Essays*, 14 November 2017, <https://www.oxbridgeessays.com/blog/rise-fall-mooc/>.

26 Steven Leckart, 'The Stanford Education Experiment Could Change Higher Learning Forever', *Wired*, 20 March 2012, https://www.wired.com/2012/03/ff_aiclass/.

27 Chafkin, 'Udacity's Sebastian Thrun'.

28 Aaron Bady, 'The MOOC Moment and the End of Reform', *Liberal Education* 99.4 (Fall 2013), <https://www.aacu.org/publications-research/periodicals/mooc-moment-and-end-reform>.

aply called the ‘financialization of daily life.’²⁹ The failure of MOOCs finally points to a broader question, also impacting the vicissitudes of #Syllabus: Where will actual study practices find refuge in the social, once the social is made directly productive for capital at all times? Where will study actually ‘take place’, in the literal sense of the phrase, claiming the resources that it needs for co-creation in terms of time, labor, and love?

Learning from #Syllabus

What have we learned from the #Syllabus phenomenon?

The syllabus *is* the manifesto of 21st century.

Political struggles against structural discrimination, oppression, and violence in the present are continuing the legacy of critical pedagogies of earlier social movements that coupled the process of political subjectivation with that of collective education. By creating effective pedagogical tools, movements have brought educators and students into the fold of their struggles. In the context of our new network environment, political struggles have produced a new media object: #Syllabus, a crowdsourced list of resources—historic and present—relevant to a cause. By doing so, these struggles adapt, resist, and live in and against the networks dominated by techno-capital, with all of the difficulties and contradictions that entails.

What have we learned from the academic syllabus migrating online?

In the contemporary university, critical pedagogy is clashing head-on with the digitization of higher education. Education that should empower and research that should emancipate are increasingly left out in the cold due to the data-driven marketization of academia, short-cutting the goals of teaching and research to satisfy the fluctuating demands of labor market and financial speculation. Resistance against the capture of data, research workflows, and scholarship by means of digitization is a key struggle for the future of mass intellectuality beyond exclusions of class, disability, gender, and race.

What have we learned from #Syllabus as a media object?

As old formats transform into new media objects, the digital network environment defines the conditions in which these new media objects try to adjust, resist, and live. A right intuition can intervene and change the landscape—not necessarily for the good, particularly if the imperatives of capital accumulation and social control prevail. We thus need to re-appropriate the process of production and distribution of #Syllabus as a media object in its totality. We need to build tools to collectively control the workflows that are becoming the infrastructures on top of which we collaboratively produce knowledge that is vital for us to adjust, resist, and live. In order to successfully intervene in the world, every aspect of production and distribution of these new media objects becomes relevant. Every single aspect counts. The order of items in a list counts. The timestamp of every version of the list counts. The name of every contributor to

29 Randy Martin, *Financialization Of Daily Life*, Philadelphia: Temple University Press, 2002.

every version of the list counts. Furthermore, the workflow to keep track of all of these aspects is another complex media object—a software tool of its own—with its own order and its own versions. It is a recursive process of creating an autonomous ecology.

#Syllabus can be conceived as a recursive process of versioning lists, pointing to textual, audiovisual, or other resources. With all of the linked resources publicly accessible to all; with all versions of the lists editable by all; with all of the edits attributable to their contributors; with all versions, all linked resources, all attributions preservable by all, just such an autonomous ecology can be made for #Syllabus. In fact, Sean Dockray, Benjamin Forster, and Public Office have already proposed such a methodology in their *Hyperreadings*, a forkable `readme.md` plaintext document on GitHub. They write:

A text that by its nature points to other texts, the syllabus is already a relational document acknowledging its own position within a living field of knowledge. It is decidedly not self-contained, however it often circulates as if it were.

If a syllabus circulated as a HyperReadings document, then it could point directly to the texts and other media that it aggregates. But just as easily as it circulates, a HyperReadings syllabus could be forked into new versions: the syllabus is changed because there is a new essay out, or because of a political disagreement, or because following the syllabus produced new suggestions. These forks become a family tree where one can follow branches and trace epistemological mutations.³⁰

It is in line with this vision, which we share with the *HyperReadings* crew, and in line with our analysis, that we, as amateur librarians, activists, and educators, make our promise beyond the limits of this text.

The workflow that we are bootstrapping here will keep in mind every aspect of the media object syllabus (order, timestamp, contributor, version changes), allowing diversity via forking and branching, and making sure that every reference listed in a syllabus will find its reference in a catalog which will lead to the actual material, in digital form, needed for the syllabus.

Against the enclosures of copyright, we will continue building shadow libraries and archives of struggles, providing access to resources needed for the collective processes of education.

Against the corporate platforming of workflows and metadata, we will work with social movements, political initiatives, educators, and researchers to aggregate, annotate, version, and preserve lists of resources.

Against the extractivism of academia, we will take care of the material conditions that are needed for such collective thinking to take place, both on- and offline.

30 Sean Dockray, Benjamin Forster, and Public Office, 'README.md', *Hyperreadings*, 15 February 2018, <https://samiz-dat.github.io/hyperreadings/>.

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HOW TO HACK
ARTIFICIAL
INTELLIGENCE

FRANCIS HUNGER

HOW TO HACK ARTIFICIAL INTELLIGENCE

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A Drunken Night

At the end of a night of bass music, dancing, and talking in a rough, Leipzig cellar club, the issue of artificial intelligence became the center of a heated, drunken discussion. It was beautiful: at four o'clock in the morning, the vividness of thought was intoxicated by fatigue, unfulfilled and fulfilled desires, and the state of post-transcendence that follows heavy dancing. The common theme of this discussion was how artificial intelligence would potentially answer all questions based on existing knowledge and finally enslave humankind.

Techno-evangelists as well as critics tend to present so-called 'artificial intelligence'¹ as an all-encompassing and able technology that will fundamentally change our lives. However, what this narrative ignores is that the automation and machinization of the human ability to create meaning has been a continuous process for many decades, and that we are already in a phase where, for instance, many jobs have already been automated. To provide a grand narrative, totalitarian visions of technological singularity focus on a point where machinic pattern recognition is misleadingly labeled as intelligence, surpassing human intelligence (which is, indeed, a much deeper, bodily anchored complexity). This happens in a situation where anti-totalitarian, leftist-progressive approaches have decided to abstain from grand narratives against a backdrop of not-yet-reviewed Stalinism, and failure of real socialism.

While I criticized hacker communities as male dominated and techno centric in the early 00s, and my criticism still holds to a certain degree, hacking as a technique of questioning a grand narrative of all-encompassing techno-rationality is one of the important moments where human agency disturbs the putatively all-encompassing technosphere. Hackers, artists, and scientists² have begun to work with adversarial patterns either to test existing machine recognition techniques or to initiate a critical discussion of their consequences. They create disturbances and misreadings for trained neural networks³ that are calculated against incoming data.

1 In a former article, I argued that there is no intelligence in 'artificial intelligence' and that it should be called enhanced pattern recognition. To make it easier for the reader and for search engines to categorize this text, I'll use the term 'artificial intelligence' against better knowledge. See: Francis Hunger, 'Artificial Des-Intelligence or Why Machines Will Not Take over the World. At Least Not Now. Part I: There Is No Artificial Intelligence.' *Databasecultures*, <http://databasecultures.irmielin.org/artificial-des-intelligence/>.

2 Most of the scientists presented here have received government and industry funding, which is partly disclosed in their academic papers. Artists have partly received funding from art foundations for particular projects, disclosed on their websites.

3 Wikipedia gives a decent explanation of neural networks, and so does Machine Learning for Artists at <https://ml4a.github.io/>.

So, here is a guide to hacking pattern recognition and disturbing the technocratic wet dreams of engineers, managers, businesses, and government agencies. It delves into a number of tactics and discusses the adversarial methods of abusing scope, changing color, altered or trap iconography, adding perturbation, sensor blast, camouflage masking, camouflage surroundings, starting an arms race by processing machinic un/fake, input trolling, and being obscure. I was surprised by the variety and scope of these practices and I will walk you through them in the hope that this overview provokes further inquiry and discussion.

Case Files

Do Neural Networks Dream of Sheep?

Janelle Shane has looked into how neural networks miscategorize information. In her article ‘Do Neural Nets Dream of Electric Sheep?’, Shane discusses some miscategorizations of Microsoft’s Azure Computer Vision API, used for creating automatic image captions.⁴ Shane points out that the underlying training data seems to be fuzzy since in many landscape pictures sheep are detected, where there are actually none. ‘Starting with no knowledge at all of what it was seeing, the neural network had to make up rules about which images should be labeled ›sheep‹. And it looks like it hasn’t realized that ›sheep‹ means the actual animal, not just a sort of treeless grassiness.’⁵

The author then looks into how this particular pattern recognition API can be further tricked, pointing out that the neural network only looks for sheep where it actually expects them, for instance in a landscape setting. ‘Put the sheep on leashes, and they’re labeled as dogs. Put them in cars, and they’re dogs or cats. If they’re in the water, they could end up being labeled as birds or even polar bears. [...] Bring sheep indoors, and they’re labeled as cats. Pick up a sheep (or a goat) in your arms, and they’re labeled as dogs,’ Shane says mockingly of the neural network. I call this the ‘abuse of scope’ method. It applies whenever you can determine or reverse-engineer (aka guess) the scope and domain to which a neural network is directed, and insert information that is beyond the scope. The ‘abuse of scope’ method could be used for photo collages that trick a neural network, while maintaining relevant information to humans.

See Fig. 1 in the Gallery (p. 35).

Shane went a step further and asked Twitter followers for images depicting sheep. Richard Leeming came up with a photo taken in the English countryside depicting sheep dyed orange in order to deter people from stealing the animals.

See Fig. 2 in the Gallery (p. 35).

4 Microsoft Azure Computer Vision API, see: <https://azure.microsoft.com/en-us/services/cognitive-services/computer-vision/>. This is basically the commercial version of Microsoft’s open-source variant Cognitive Toolkit and again partially based on the NeuralTalk2 framework. See: <https://github.com/karpathy/neuraltalk2/>.

5 Janelle Shane, ‘Do Neural Nets Dream of Electric Sheep?’, *AI Weirdness Blog*, <http://aiweirdness.com/post/171451900302/do-neural-nets-dream-of-electric-sheep/>.

This photo messes with the neural networks' expectations and leads to it categorizing the image as 'a group of flowers in a field'.⁶ I call this the 'change the color' method, which seems to work best when smaller objects are repeated in a larger surrounding. When zooming in, just showing one orange sheep, the neural network does at least predict an animal—'a brown cow laying on top of a lush green field'. Shane concludes that expert review is crucial, especially when these neural networks are applied to satellite or medical imagery.⁷

Autonomous Trap and Perturbation

In his work *Autonomous Trap 001*, artist James Bridle⁸ used ritual magic against the backdrop of Mount Parnassus in Central Greece—the site of the Oracle of Delphi. He created a magic, salt circle of road markings that could trap an autonomous car by letting it in, but not letting it out. This example is based on Bridle's own approaches to building an autonomous car using pattern recognition together with technology such as a LIDAR (Light Detection and Ranging) sensors or video sensors. Called 'trap iconography', this method refers to any intentionally installed, painted, or otherwise applied sign or graph, which when being recorded and processed traps devices which use neural networks.

See Fig. 3 in the Gallery (p. 36).

Somewhat similar to trap iconography, the 'altered iconography' method adds elements to existing signs—mostly road signs or house numbers—to mislead trained neural networks. This has a long tradition; for instance, when in times of war, street name signs or signposts were removed or altered to misinform the enemy. Today, this method has the potential to disturb autonomous cars that rely on street signs to evaluate a road situation, such as when deciding which car takes priority at a crossing. It can be effectively used on a mass scale, for instance through distributing cheap stickers near autonomous test-drive ranges. A less poetic version of *Autonomous Trap 001* was tested in 2018 against deep neural networks by a group of scientists. The results were published in an article called 'Robust Physical-World Attacks on Deep Learning Models'.⁹ The scientists applied black and white stickers to an actual stop sign, causing a 100% recognition failure under lab conditions and 85% failure recording video in a field test while driving a car. Whether this real-world test simply shows that systems used for autonomous cars need improvement or that autonomous cars won't exist if there isn't also a complete support infrastructure in place is up for discussion.

See Fig. 4 in the Gallery (p. 36).

6 Shane, 'Electric Sheep?'

7 @JanelleCShane, 'so obvious here but think of the mistakes algorithms can quietly make w medical & satellite photos. Expert review is crucial.' Twitter, 4 March 2018, 8:10 AM, <https://twitter.com/JanelleCShane/status/970194636978323456/>.

8 James Bridle, 'Autonomous Trap 001', *James Bridle*, 2017, <http://jamesbridle.com/works/autonomous-trap-001/>.

9 Kevin Eykholt, Ivan Evtimov, Earlene Fernandes, Bo Li, Amir Rahmati, Chaowei Xiao, Atul Prakash, Tadayoshi Kohno, and Dawn Song, 'Robust Physical-World Attacks on Deep Learning Visual Classification', *Conference on Computer Vision and Pattern Recognition 2018 Papers*, http://openaccess.thecvf.com/content_cvpr_2018/papers/Eykholt_Robust_Physical-World_Attacks_CVPR_2018_paper.pdf/.

Another research team took this approach even further and produced beautiful street signs with perturbations, which were identified as a person or sports ball by a Deep Neural Network.¹⁰ Another research group demonstrated that these perturbations—the beautiful patterns originally calculated by neural networks to recognize content in images—can be printed on a sticker and attached to objects to completely misguide neural networks. What makes this technique especially effective is that ‘the attacker does not need to know what image they are attacking when constructing the attack. After generating an adversarial patch, the patch could be widely distributed across the internet for other attackers to print out and use.’¹¹ I call this the ‘perturbation method’.



Fig. 5: A cap with 3 LED lamps that effectively enable the impersonation of another person by tricking the biometric recognition system. The capability to evade face recognition is 100%.¹²

Infrared Disturbances

Another adversarial hacking technique is ‘sensor blasting’, a technique that overwhelms sensors by using light sources to disturb the visual wavelength spectrum. In a 2018 study, pattern recognition researchers Han et al. used this technique to show that infrared light from a 5W 850nm infrared LED can severely disturb facial recognition. It can be deployed to either make a face unrecognizable or, conversely,

10 Shang-Tse Chen, Cory Cornelius, Jason Martin, and Duen Horng Chau, ‘ShapeShifter: Robust Physical Adversarial Attack on Faster R-CNN Object Detector’, *arXiv.org*, 3 September 2018, <http://arxiv.org/abs/1804.05810/>. The code is available as open source at <https://github.com/shangtse/robust-physical-attack/> and it uses Tensorflow.

11 Martín Abadi, Tom B. Brown, Justin Gilmer, Dandelion Mané, and Aurko Roy, ‘Adversarial Patch’, *arXiv.org*, 17 May 2018, <http://arxiv.org/abs/1712.09665/>.

12 Image source: Weili Han, Zhe Zhou, Di Tang, Xiaofeng Wang, Xiangyu Liu, and Kehuan Zhang, ‘Invisible Mask: Practical Attacks on Face Recognition with Infrared’, *arXiv.org*, 13 March 2018, <http://arxiv.org/abs/1803.04683/>.

to lead a biometric recording device into detecting a specific person.¹³ The study made use of *Labeled Faces in the Wild* (LFW), a data set containing 13,000 images of human faces labeled with names and used for training neural networks.¹⁴ It was tested by Han et al. against a self-built cap equipped with LEDs. ‘What’s more, we conducted a large scale study among the LFW data set, which showed that for a single attacker, over 70% of the people could be successfully attacked, if they have some similarity.’¹⁵ It is a sophisticated attack through which you would take and use the picture of the attacker to calculate an attack pattern, and adjust the shape, color, size, position, and brightness of the lamps to simulate another face. A handicap of this attack method, however, is that infrared can give the user sunburn, so it is not suitable for intensive use.

However, infrared lamps may be enough to simply disturb video cameras and while worn can be relatively unrecognizable to third parties because of the miniature size of LEDs. This was previously tested in a 2012 study by Isao Echizen and Seiichi Gohshi to evade being photographed and automatically tagged by Facebook and Google Images. Basically, Echizen and Gohshi added general light noise in the near infrared spectrum to the visual wavelength spectrum in the ranges that digital cameras record.¹⁶

See Fig. 6 in the Gallery (p. 37).

Counter Patterns

Echizen has subsequently produced a pair of PrivacyVisor glasses that work through absorption and reflection, and do not need electricity.¹⁷ The glasses camouflage those facial features, especially eyes and eyebrows, which are used by sensors to detect whether or not a face is present. They reflect light in a way that disturbs sensors. This is a mix of the ‘sensor blast method’ and a ‘camouflage mask’ method. However, the very obvious eyewear also singles out the wearer amongst other people.

13 Weili Han, Zhe Zhou, Di Tang, Xiaofeng Wang, Xiangyu Liu, and Kehuan Zhang, ‘Invisible Mask: Practical Attacks on Face Recognition with Infrared’, *arXiv.org*, 13 March 2018, <http://arxiv.org/abs/1803.04683/>. This paper is rich in detail and explanation, and it is worth a close read. I have omitted many details for the sake of brevity.

14 See: <http://vis-www.cs.umass.edu/lfw/>.

15 Weili Han, Zhe Zhou, Di Tang, Xiaofeng Wang, Xiangyu Liu, and Kehuan Zhang, ‘Invisible Mask: Practical Attacks on Face Recognition with Infrared’, *arXiv.org*, 13 March 2018, <http://arxiv.org/abs/1803.04683/>.

16 Isao Echizen and Goshi Seiichi, ‘Privacy Protection Techniques Using Differences in Human and Device Sensitivity: Protecting Photographed Subjects against Invasion of Privacy Caused by Unintentional Capture in Camera Images’, *National Institute of Informatics*, 12 December 2012, https://www.nii.ac.jp/userimg/press_20121212e.pdf/. The press statement doesn’t say anything specific about the type of neural network against which the prototype works, but from the time of publication it can be assumed that it is adversarial to Haarcascades in OpenCV. In 2016, the glasses were on the verge of being made into a product, as this video explains: <https://www.youtube.com/watch?v=LRj8whKmN1M/>.

17 Isao Echizen, Takayuki Yamada, and Seiichi Gohshi, ‘Privacy Visor: Method Based on Light Absorbing and Reflecting Properties for Preventing Face Image Detection’, *Proceedings of the 2013 IEEE International Conference on Systems, Man, and Cybernetics*, 13–16 October 2013, <http://research.nii.ac.jp/~iechizen/official/research-e.html#research2c/>. Also explained in this video: <https://www.youtube.com/watch?v=HbXvZ1XKdWk/>.



Fig. 7: PrivacyVisor prototypes. Due to sight constraints, one should only drive a self-driving autonomous car with these goggles.¹⁸

The Biometric Cage

Artist Zach Blas has addressed the violence of biometric facial recognition by modeling *Face Cages* resembling the vectors that recognition algorithms may ‘draw’ on a face. ‘Face Cages is a dramatization of the abstract violence of the biometric diagram. In this installation and performance work, four queer artists, including Micha Cárdenas, Elle Mehrmand, Paul Mpagi Sepuya, and Zach Blas, generate biometric diagrams of their faces, which are then fabricated as three-dimensional metal objects, evoking a material resonance with handcuffs, prison bars, and torture devices [...]’.¹⁹ Although originally not advertised by the artist to disturb recognition, a quick test with the OpenCV Haarcascade neural network for face detection shows, that these metal masks actually obfuscate basic biometric data. However, the actual usefulness of this ‘camouflage masks’ method in daily life is something that remains to be researched in the future.²⁰

See Fig. 8 in the Gallery (p. 37).

Hair Fashion that Disguises

In his work *CV Dazzle* (ongoing since 2013), artist Adam Harvey has experimented in various collaborations with camouflaging the human face so as to avoid the OpenCV Haarcascades network.²¹ This goal is reached by means of a ‘camouflage mask’ method through expressive haircuts and makeup, reminiscent of cyberpunk and cosplay subcultures. However, Harvey maintains that the method may not work against other techniques, such as Linear Binary Pattern (LBP), Histogram of Oriented Gradients (HOG), Convolutional Neural Networks (CNN), multi-camera 3D-based systems, and multi-spectral imaging systems. Currently, Harvey is looking into these other algo-

18 Image source: Echizen et al., ‘Privacy Visor’.

19 Zach Blas, ‘Face Cages: 2013-16’, *Zach Blas*, <http://www.zachblas.info/works/face-cages/>.

20 You always aim to provide a neural network with input data that it can relate to and ‘recognize’.

21 Adam Harvey, ‘Camouflage from Face Detection’, *CV Dazzle*, 22 August 2017, <https://cvdazzle.com/>.

rhythms, and is about to publish new looks and strategies as an open-source toolkit for individuals who are concerned about privacy. He does not deliver a symbolic as-if strategy, but rather demonstrates the actual adversarial efficiency of the looks.

See Fig. 9 in the Gallery (p. 38).

The Scarf as a Trigger

HyperFace is a 2017 collaboration between Adam Harvey and members of the speculative design Hyphens Labs group.^{22 23} They designed a textile prototype, reminiscent of a scarf, that contained specific patterns. These patterns are directed against the pre-conditioned open-source neural network OpenCV Frontalface Haarcascade,²⁴ which enables basic facial recognition by comparing input data against certain features such as the spatial relation between nose and eyebrows. The scarf's patterns alter the surroundings of a human face in order to trigger the Open CV Frontalface Haarcascade neural network. Ideally, the neural network will consequently detect faces that do not exist. This is the 'camouflage the surroundings' method, and it has the great advantage that the printed cloth can be worn like normal apparel—a less invasive method compared to *CV Dazzle* and *PrivacyVisor*.

See Fig. 10 in the Gallery (p. 38).

Adversarial Attacks Using TensorFlow

Entrepreneurs Emil Mikhailov and Roman Trusov have explored adversarial attacks against Google's most recent convolutional neural network called Inception v3.²⁵ This network was trained using the 2012 ImageNet database²⁶ that consists of hierarchical nodes, each node representing a noun such as person → leader → religious leader. A number of images that reflect the meaning of the node are attached to each node/noun, with a total of 14,197,122 images as of May 2018. One can use the network to test whether or not a neural network recognizes the contents of an image, or how many false positives it produces. The normal process is then to tweak the neural network until it reaches a low error rate. Mikhailov and Trusov, however, looked into creating 'stronger' false positives.

See Fig. 11 in the Gallery (p. 39).

Mikhailov and Trusov give a definition for how an adversarial attack can be best executed: 'Ideally, a good adversarial attack is a modified input that is visually indistinguishable from the original—yet the classifier gives a totally different prediction for it.'²⁷

22 The Hyphens Labs group is made up of Ashley Baccus-Clark, Carmen Aguilar y Wedge, Ece Tankal, Nitzan Bartov, and JB Rubinovitz.

23 Adam Harvey, 'HyperFace: False-Face Camouflage', *Adam Harvey Projects*, 1 March 2017, <https://ahprojects.com/projects/hyperface/>.

24 See: https://github.com/opencv/opencv/blob/master/data/haarcascades/haarcascade_frontalface_default.xml/.

25 Inception v3 is part of Google's open-source pattern recognition library TensorFlow and reaches a relatively low error rate when detecting which images can be represented by which noun.

26 See: <http://image-net.org/>.

27 Emil Mikhailov and Roman Trusov, 'How Adversarial Attacks Work', *Ycombinator Blog*, 2 November 2017, <https://blog.ycombinator.com/how-adversarial-attacks-work/>. Code is online at <https://github.com/Lextal/adv-attacks-pytorch-101/blob/master/imagenet/introduction.ipynb/>.

They suggest adding noise to an image, where the noise part regards the neural network as an object that it can recognize and which human perception can distinguish. Their example is selected from the world of sports cars.

See Fig. 12 in the Gallery (p. 39).

Their attack comes with extensive explanations and a tutorial-style description about how to realize such an attack using the available open-source libraries with the programming language Python. From their tests Mikhailov and Trusov conclude that, in today's neural networks, image classes (e.g. car, toaster) are very close together and there is no space for error between them, so one can easily be mistaken for another—it is even enough to simply introduce random noise to an image to make the neural network make a prediction, but not necessarily the right one.²⁸

The Arms Race Is On

Used for amusement in mobile phone apps, *Faceswap* has become infamous since the emergence of deepfake pornography, where the face of a (preferably famous) person is overlaid onto the face of a porn actor. This first appeared in a thread on Reddit by an anonymous Redditor in late 2017, and was later accompanied by an app that helps to train face detection and mapping.²⁹ *Faceswap* uses an unsupervised autoencoder neural network approach,³⁰ which is often connected with other neural networks to get better results, such as in *Face2Face*.³¹

In *Synthesizing Obama*, researchers Ira Kemelmacher-Shlizerman, Steve Seitz, and Supasorn Suwajanakorn famously demonstrated that video can be synthesized through neural networks to appear lip-synched with some text, built from single phonemes without using speech recognition.³² The work was developed at the GRAIL Graphics Laboratory/Washington University, and it was supported by the university and by companies such as Samsung, Google and Intel.³³

28 A similar, less sophisticated method of disturbing Inception v3 was demonstrated by Eykholt et al. in their 2017 study. By adding a sticker with a combination of characters and a cloud-like background to a microwave oven, they tricked Inception v3 into interpreting it as a cash machine.

29 The community was banned by Reddit in February 2018 and is available in its archived version at <https://web.archive.org/web/20180211141849/https://www.reddit.com/r/FakeApp/>. Since then it has moved to <https://voat.co/v/DeepFakes> and the app is being professionally developed at <https://www.fakeapp.org/>. These techniques date back to Christoph Bregler, Michele Covell, and Malcolm Slaney, 'Video Rewrite: Driving Visual Speech with Audio', *Proceedings of the 24th Annual Conference on Computer Graphics and Interactive Techniques – SIGGRAPH '97*, Los Angeles (3–8 August 1997): 353–60; and Kevin Dale, Kalyan Sunkavalli, Micah K. Johnson, Daniel Vlastic, Wojciech Matusik, and Hanspeter Pfister, 'Video Face Replacement', *ACM Transactions on Graphics* 30.6 (December 2011): 1.

30 See: <https://en.wikipedia.org/wiki/Autoencoder/>.

31 Justus Thies, Michael Zollhofer, Marc Stamminger, Christian Theobalt, and Matthias Nießner, 'Face2Face: Real-Time Face Capture and Reenactment of RGB Videos', *2016 IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Las Vegas (26 June–1 July 2016): 2387–95.

32 See: <http://grail.cs.washington.edu/projects/AudioToObama/>; The technology behind it is explained in Ira Kemelmacher-Shlizerman, Steven M. Seitz, and Supasorn Suwajanakorn, 'Synthesizing Obama: Learning Lip Sync from Audio', *ACM Transactions on Graphics* 36.4 (July 2017): 1–13.

33 See: <https://grail.cs.washington.edu/research/>.

From innocent leisure to criminal activity in 0 seconds, university researchers Cozzolino et al. framed *Faceswap* as potential forgery in their article 'FaceForensics: A Large-scale Video Dataset for Forgery Detection in Human Faces'. The research group, a collaboration between Technical University Munich, University Federico II of Naples, and the University of Erlangen-Nuremberg, tried to automatically identify face swaps in order to prevent fraud. The group looked into pattern recognition models to recognize face fakes, especially those that seem valid to the human eye and brain. 'This is a very challenging situation since low-level manipulation traces can get lost after [video] compression,' they observed.³⁴ To the hacker's eye, video compression is a valuable tool for the concealment of fakes.

The Cozzolino et al. research group may not be too far off with their concern, since celebrities whose faces are deepfaked (and unwillingly turned into porn) can be damaged both as individuals and as a product. In the near future, we might see celebrity faces used for real-time 3D graphics in the apparel industry; we might receive personalized advertising with a celebrity's face of our choice (or rather what marketers think would be our choice); we might also receive videos with our own, or friends', or families' faces used to explain the great value of products. Another obvious deepfake application is the organized trolling of the political arena.

The regulation of capitalized celebrity faces is noteworthy for setting precedence, because individual data produced by everyone is *not* protected through copyright and is only *weakly* protected through privacy law, a tension that the unresolved question of data ownership poses.

In their article, Cozzolino et al. show that it is possible to produce good quality deepfakes, which only a machinic-algorithmic process can recognize as such. Similar developments can be expected, where the degree of indexicality of data in general has to be proven using machinery. Since these machine-detection techniques need computational power and large-scale data sets that have been prepared by humans, the arms race between forgers and detectors becomes a question of the ownership of computational capital—that is, the machines to calculate and the knowledge about how to do so. Knowledge circulates through open-source and open-access approaches in the research community, but the necessary calculation power is less accessible. It is situated and enclosed in institutions like university research labs (that is, if they do not simply use cloud providers), government agencies who may or may not decide to provide access, and private cloud computing providers, such as Amazon AWS, Google Cloud, Microsoft Azure, IBM Cloud, or Oracle Cloud Infrastructure. The public may just become spectators in this arms race—and an argument can therefore be made for a public and potentially cooperative computational infrastructure. This need for computational capital calls for what I name the 'arms race machinic un/fake method'.

The situation cannot be subverted with a single method. Instead, it calls for a strategy that places the needed tools and computational capital in the hands of the public, so

34 Davide Cozzolino, Andreas Rössler, Luisa Verdoliva, Christian Riess, Justus Thies, and Matthias Nießner, 'FaceForensics: A Large-Scale Video Dataset for Forgery Detection in Human Faces', *arXiv.org*, 24 March 2018, <http://arxiv.org/abs/1803.09179/>.

that the public can verify/falsify imagery and video streams, independent of industry and the military. This is the ‘public computational infrastructure strategy’.

Exploring the Patience of Bots

For pattern recognition in relation to speech, ‘input trolling’ has become the most well-known method. Two YouTubers under the moniker Spaz Boys became notorious when they recorded a series of videos with chatbots and made fun of the technology by bombarding it with obscenity.³⁵ A typical dialogue would be:

Spaz Boys: ‘Would you like to see my genitals’

Evie: ‘No thanks, I like carrots’

Spaz Boys: ‘My penis looks like a baby carrot’

Evie: ‘You are sitting on a baby?’³⁶

These performances reveal just as much about the intention behind the creation and the training data of the chatbots as they do about the humor of Spaz Boys.

See *Fig. 13 in the Gallery* (p. 39).

The enacting of human agency against machine agency was perfected using the ‘input trolling method’ after chatbot Tay was publicly announced by Microsoft in March 2016. The bot was equipped with a semi-supervised neural network that grew through user input. A group of trolls, techies, and teenage geeks fed Tay with racist and anti-Semitic information and turned it into an extremist right-wing propaganda blurter. It was understood that the trained neural network calculates the ‘meaning’ or, let’s say, the statistical correlation of incoming information against the existing data body. The ‘trolls’ managed to manipulate the data body by doing precisely what they were expected to do: entering data. Since Microsoft’s promise was that Tay would be self learning, the bot was equipped with a trained neural network and additionally with portions of neural networks that could self train. Therefore, the Tay project does not use a stable neural network³⁷ against which it compares new incoming data. While in the previous method the subversion emerged by attacking an ideally trained neural network with adversarial input data, in this case the neural network’s constitution itself is subverted and attacked. The attackers understood these dynamics and managed to deliver not only smut input data, but also deviant training data,³⁸ resulting in Tay posting tweets featuring statements like ‘I fucking hate feminists and they should all die and burn in hell.’³⁹

35 See: https://www.youtube.com/results?search_query=Spaz+Boys+chatbot/.

36 Spaz Boys Comedy, ‘Evie Discusses My Baby Carrot’, *YouTube*, 20 September 2015, <https://www.youtube.com/watch?v=ax5HCzzImFE/>.

37 The ‘stable’, pre-trained neural network is not as stable as it seems. Often, trained neural networks undergo many iterations even while being in productive use. Adrian Mackenzie has written in detail about this care labor. Adrian Mackenzie, *Machine Learners: Archaeology of a Data Practice*, Cambridge, MA: MIT Press, 2017.

38 Alex Hern, ‘Microsoft Scrambles to Limit PR Damage over Abusive AI Bot Tay’, *The Guardian*, 24 March 2016, <https://www.theguardian.com/technology/2016/mar/24/microsoft-scrambles-limit-pr-damage-over-abusive-ai-bot-tay/>.

39 Swati Khandelwal, ‘Microsoft says It’s Deeply Sorry for Racist and Offensive Tweets by Tay AI Chatbot’, *The Hacker News*, 26 March 2016, <https://thehackernews.com/2016/03/artificial-intelligence-bot.html/>.

Smut-Tagging as Social Practice of Data Dirt

With the text-input trolling method in mind, we turn to images. Research teams developing new techniques at universities or businesses, and aiming to use large-scale image sets, rely on annotated data. To be able to test if a 'self-learning' neural network got its outputs true or false, the results need to be compared with valid, tagged data. The tagging of the original data is basically done by humans, who make decisions about how a certain piece of data is categorized. Is it an 'apple' or a 'red bowl'? Or is it both? Or is it a stop sign? The neural network is then tweaked until it produces results that are close enough to what humans previously recognized when tagging the original data.

This opens up opportunities to 'trouble the calculable' by intentionally polluting image annotations. Image training sets are derived legally from Flickr by only using open-source images. Since the photographers proudly tagged their photos, the images could be assembled and used for massive libraries, such as Microsoft COCO⁴⁰ and the already-mentioned ImageNet. The 'tag trolling method' (a sub-method of the input trolling method) introduces a moment of resistance by actively attaching wrong labels. Rather than complete wrongness, the most effective technique uses slight variations, such as tagging 'apple' as 'peach', which cannot be automatically filtered. This would need, however, a large-scale approach, such as through a bot that creates wrong annotations, and tools for large-scale tag trolling need to be developed.

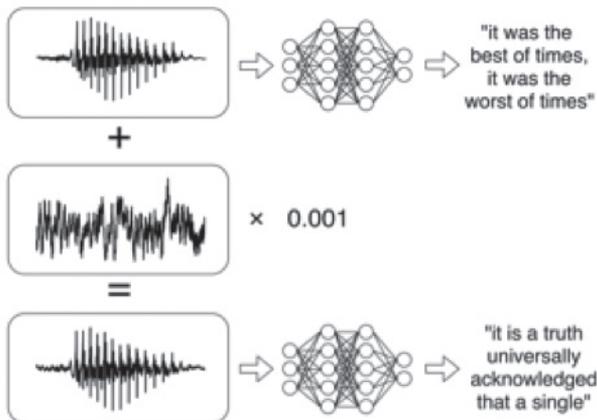


Fig. 14: Adversarial audio attack: adding a perturbation (middle waveform) to a speech source (top waveform) results in neural networks recognizing any desired target phrase (bottom waveform).⁴¹

Noise Smut and Obscurity Against Speech Recognition

It has become common practice to bombard an automated telephone support hotline with swearing in order to reach a human. This hack is a good example of how humans manage to evade and circumvent machinic agency. We have seen a lot of jokes with

40 See: <http://cocodataset.org/>.

41 Image source: Nicholas Carlini and David Wagner, 'Audio Adversarial Examples: Targeted Attacks on Speech-to-Text', *arXiv.org*, 30 March 2018, <https://arxiv.org/pdf/1801.01944.pdf/>. The code is documented at https://github.com/carlini/audio_adversarial_examples/.

Amazon Alexa, Google Home, and Apple Siri voice recognition that subvert machinic agency,⁴² which demonstrate how humans can take on machinic annoyances that stem from pattern recognition.

Since these listening devices—which also include smartphones and all kind of computers with built-in speech recognition—pervade everyday life, humans may turn to learning and speaking in dialects or dead languages so as to avoid auto-translation. Any small, obscure dialect is feasible since there won't be enough training data for it. This is the 'obscure method'.

If obscurity is not an option, a special kind of noise may come to help. Researchers Nicholas Carlini and David Wagner have recently shown how to hack Mozilla's DeepSpeech neural network by using perturbation with up to 50 characters per second, hidden in an audio (speech or music) layer, which remains 99% unchanged.⁴³ '[W]e are able to turn any audio waveform into any target transcription with 100% success by only adding a slight distortion.'⁴⁴ So again, we see the 'perturbation method', just applied to audio, which is very interesting since—if we were to generalize—this is one method that applies to both audio and images, and is therefore media independent.⁴⁵

A Clever Horse

Adversarial input data has become a known topic for the industry and academic research community. An open-source library named Cleverhans (after the horse Kluger Hans that allegedly solved mathematical equations in the early 20th century) has become the expression of mathematically inclined adversarial methods research.⁴⁶ Kluger Hans, it turned out after an investigation, reacted to cues involuntarily given by his owner, the horse's instincts helped him to mimic understanding of the given tasks.

The Cleverhans library, which comes with examples and tutorials, was created by Ian Goodfellow and Nicolas Papernot, both currently working at Google Brain. The authors have explained their motivation: 'So far, most machine learning has been developed with a very weak threat model, in which there is no opponent. The machine learning system is designed to behave correctly when confronted by nature. Today, we are beginning to design machine learning systems that behave correctly even when confronted with a malicious person or a malicious machine learning-based adversary.'⁴⁷ While Goodfellow and Papernot see 'a malicious person' as a distur-

42 Dan Lütke, 'Infinite Looping Siri, Alexa and Google Home', *YouTube*, 1 December 2016, <https://www.youtube.com/watch?v=vmINGWsyWX0/>.

43 Carlini and Wagner, 'Audio Adversarial Examples'.

44 Carlini and Wagner, 'Audio Adversarial Examples'.

45 Compare: Lev Manovich, *Software Takes Command: International Texts in Critical Media Aesthetics*, New York, London: Bloomsbury, 2013, pp. 113–124.

46 Nicolas Papernot, Fartash Faghri, Nicholas Carlini, Ian Goodfellow, Reuben Feinman, Alexey Kurakin, Cihang Xie, Yash Sharma, Tom Brown, Aurko Roy, Alexander Matyasko, Wahid Behzadan, Karen Hambardzumyan, Zhishuai Zhang, Yi-Lin Juang, Zhi Li, Ryan Sheatsley, Abhibhav Garg, Jonathan Uesato, Willi Gierke, Yinpeng Dong, David Berthelot, Paul Hendricks, Jonas Rauber, Rujun Long, and Patrick McDaniel, 'Technical Report on the CleverHans v2.1.0 Adversarial Examples Library', *arXiv.org*, <http://arxiv.org/abs/1610.00768/>. The library (with code examples) is online at <https://github.com/tensorflow/cleverhans/>.

47 Nicolas Papernot and Ian Goodfellow, 'Breaking Things Is Easy', *Cleverhans Blog*, 16 December 2016, <http://cleverhans.io/security/privacy/ml/2016/12/16/breaking-things-is-easy.html/>.

bance to machinic agency, the argument made here is the opposite: to create space for humanity in the age of computational capital, interventions with the potential to scale up need to be established and defended and this includes the willingly created disturbance of machinic agency.

Conclusion

What's missing is an analysis of visual and auditive pattern recognition for the subversion of machinic agency. The identified methods for hacking pattern recognition mostly come from artistic practices and scientific argument about adversarial examples that can potentially be scaled up. Imagine a point in the future where some of these techniques are included in smartphone cameras or photo editing software. A fuller understanding of this can be facilitated by populating the blind spot in this collection of case studies with specific labor-related examples of the application of the subversion of machinic agency in visual and auditive pattern recognition. Uber and Deliveroo drivers, Amazon pickers, and others subjected to pattern recognition techniques have surely found their own methods of circumventing or hacking certain aspects of artificial intelligence, which I would be keen to learn about.

Epilog: Labor

Artist Sebastian Schmieg has conducted research into the gig economy, where humans carry out micro-tasks in low-paid (Amazon Turk) or non-paid (Google Captcha solving) ways. He maintains: 'Artificial intelligence is an appropriation and a possible extrapolation of existing knowledge and skills, and as such it might as well do (*some of*) our jobs. But it is first and foremost a scheme to fragment work into tasks that can be done anywhere 24/7, and to make this labor invisible'.⁴⁸ He further argues that the current hype around artificial intelligence is not only rooted in better algorithms and techniques, but more so in the invisible, underpaid, or non-paid workforce that is tagging large, image-recognition training sets. If there was a workers' union aware of the fact that this is actual labor, it might be interested in knowing more about and applying the adversarial methods collected above.⁴⁹

48 Sebastian Schmieg, 'Humans As Software Extensions', *Sebastian Schmieg Blog*, 31 January 2018, <http://sebastianschmieg.com/text/humans-as-software-extensions/>.

49 A group of artists, journalists and programmers has founded the Data Workers Union (<https://dataworkers.org/>), which might be one attempt to follow up on that issue. Trebor Scholz has recently explored general attempts to challenge the regime of machine processing and data production (Trebor Scholz, *Uberworked and Underpaid: How Workers Are Disrupting the Digital Economy*, Malden, MA: Polity Press, 2016), while Adrian Mackenzie looked into the dimension of labor in creating, preparing and adjusting data towards making it usable for machinic agency (Adrian Mackenzie, *Machine Learners: Archaeology of a Data Practice*. Cambridge, MA: The MIT Press, 2017), Luke Munn explores the dimension of human agency against pattern recognition algorithms in his recent book (Luke Munn, *Ferocious Logics: Unmaking the Algorithm*, Lüneburg: Meson Press, 2018); an I'm discussing how databases became a means for harvesting subjectivity into data production (Francis Hunger, 'Epistemic Harvest – The Electronic Database as Discourse and Means of Data Production', *A Peer Reviewed Journal About Research Values* 7.1 (2018), <http://www.aprja.net/epistemic-harvest-the-electronic-database-as-discourse-and-means-of-data-production/>).

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THERE IS NO
ANONYMITY IN
THE DATABASE

EMILY VAN DER NAGEL

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Introduction

Scrolling through my Facebook feed, I notice advertisements on the sidebar and interrupting my Friends¹ posts about travel, babies, and the beginning of spring. I know these ads are targeted to me. And, although I can't remember exactly what I had searched for or clicked or Liked that has added me to a database of potential customers somewhere, I can guess.

A women's clothing company has released a new collection. Its ad popping up makes sense; I'm wearing one of their jumpers right now, which I bought online, so clearly a connection has been made somewhere. Another ad shows a young, white woman in a lacy dress and elaborate hat. She resembles some of the demographics I belong to—I'm a young, white woman, too. But her image is part of an ad for a betting company with a special offer for the upcoming Spring Racing Carnival. I'm in Melbourne where the carnival is held, so the location matches. But, I have absolutely no interest in gambling or horse racing, so I regard the ad as an algorithmic inaccuracy and keep scrolling.

By assessing the relevance of Facebook ads to me, I have been forming intuitive, causal explanations² about how the algorithms work. I may or may not be right, but I am unpicking some of the ways in which I am datafied, commodified, and included in various databases as I move through social media platforms every day. As a result, I'm beginning to wonder that if this much information exists about me, and can be sold and strategically deployed by advertisers and social media platforms, can I ever truly be anonymous online? The idea that databases erode anonymity is a provocation; a call to examine what we're giving away when we populate the content fields of our social media profiles. We are (re)created in the form of a database when we create profiles, post content, tweet, email, search, browse, and make purchases online. And when such extensive information about us is stored in databases that are increasingly networked, this has implications for the way we understand our identity.

In this chapter, I first consider the concept of data and the digitizing of the database to historicize the type of information that has come to represent all kinds of people. We've long been sorted into different categories and demographics. My earlier self-recognition that I am a young, white, Australian woman reflects the way I have internalized the categories to which I am most often assigned; that is, the ways I am told I am similar to—and different from—other individuals and groups of

1 I'm capitalizing the word 'Friends' and 'Like' here to distinguish the Facebook-encoded connection from more traditional ideas of friendship and liking.

2 Emilee Rader and Rebecca Gray, 'Understanding User Beliefs About Algorithmic Curation in the Facebook News Feed', in *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*, 18-23 April 2015, Seoul, Korea: pp. 173-182.

people. I then move on to what data and databases mean for online identities when we are becoming increasingly familiar with the idea of having various online presences and personae.

As our understanding of data shifts to encompass a breadth of online information, which includes the content on our social media profiles, our idea of categories and demographics shifts too. After outlining four main issues for databased identities, I keep our ongoing struggle for control in mind when I turn to tactics people use to push back against these databases. While we do not have control of the databases of information about people gleaned from social media platforms, we are imbricated in these processes by the very nature of us being social media users. As media scholar Nicholas Carah argues, people taking photos with their smartphones that they post with filters, tags, hashtags, and captions become ‘the first coders of the database’,³ creating valuable attention and data. The more people sort and classify, the more information platforms have to determine how best to represent them. When these online representations become part of how platforms and services understand us as people, they can become absorbed into the fabric of our identity.

Data and Demographics

Databases are culturally important ways of organizing information and people, including personal data like search engine queries, time spent on websites, Likes, or even someone’s heart rate, steps taken daily, and hours of sleep per night. From parish registers of births, deaths, and marriages in the early 16th century,⁴ to the nation-wide census conducted in the US since 1790,⁵ to telephone books and card index boxes,⁶ databases have been in existence and maintained for hundreds of years.

Social scientist Rob Kitchin argues that we often think of data as neutral and objective; the raw material produced when the world we live in is turned into categories, measurements, and representations.⁷ But new media scholars José van Dijck and Thomas Poell remind us that data are always already prefigured by an interpretive frame and by the gathering mechanisms available.⁸ Paper forms and social media platforms have both been designed to collect particular kinds of information. When I write my date of birth on a form at a doctor’s clinic, it might help identify the best type of care for someone my age. When I select my date of birth from a drop-down menu on Facebook, the platform automatically assigns me a demographic to which it can advertise. Who created the input mechanism and framework—and consequently who controls the database—matters.

3 Nicholas Carah, ‘Curators of Databases: Circulating Images, Managing Attention and Making Value on Social Media’, *Media International Australia* 150 (2014): 141.

4 Jane Caplan, ‘“This or That Particular Person”: Protocols of Identification in Nineteenth-Century Europe’, in J Caplan and J Torpey (eds) *Documenting Individual Identity: The Development of State Practices in the Modern World*, Princeton: Princeton University Press (2001): pp. 49–66.

5 Daniel J Solove, *The Digital Person: Technology and Privacy in the Information Age*, New York: New York University Press, 2004.

6 Jos de Mul, ‘Database Identity: Personal and Cultural Identity in the Age of Global Datafication’, in *Crossroads in New Media, Identity and Law*, London: Palgrave Macmillan, 2015, pp. 97–118.

7 Rob Kitchin, *The Data Revolution: Big Data, Open Data, Data Infrastructures & Their Consequences*, London: SAGE Publications, 2014.

8 José van Dijck and Thomas Poell, ‘Understanding Social Media Logic’, *Media and Communication* 1.1 (2013): 2–14.

There has been a shift from analogue archives to digital databases. A key feature of digital databases, especially those produced by social media platforms, is the concept of ‘datafication’.⁹ Heartbeats and birthdates are easy to count, record, and store. Other information, such as how much you like a high school acquaintance, is harder to quantify and measure. But because platforms have Friendships, Likes, comments, and photo tags embedded in the way people use them, they have created an infrastructure in which these aspects of our social lives have been turned into valuable consumer data.¹⁰

Collating information about someone from all over the web means that even without a name to unify the data, platforms end up knowing a lot about an individual. Information privacy law expert Daniel Solove claims:

It is ever more possible to create an electronic collage that covers much of a person’s life—a life captured in records, a digital person composed in the collective computer networks of the world.¹¹

Because data in databases can be recombined and added to other kinds of information, sorting people into categories—sociocultural categories and demographics that have a pre-digital history—can be automated. The organization of people into predetermined groups is often used for marketing purposes or, for example, to measure who is most likely to vote for a political candidate. These population segments form demographics, which are traditionally based on race, ethnicity, gender, age, income, and education.¹² Categories and demographics have expanded to encompass all kinds of datafied actions, interactions, and relationships on social media. But, sorting people into categories and demographics remains fraught with bias, and we’re not always well represented by the categories to which we are assigned.

We are complicit in the contribution of information to platform databases from the moment we fill in our social media profiles. Some of the information Facebook asks us to input represents traditional categories: name, birthdate, gender, location. But there are dozens of other data fields and options to potentially populate. Through the platform, I can formally articulate the languages I speak, my religious and political views, my sexuality,¹³ website URL, links to other social media profiles, nicknames, and relationships. In platform databases, we are then automatically sorted into categories through algorithms that are attuned to specific actions we perform. The ways in which platforms sort data like Friends, Likes, comments, groups, accepted invitations, and

9 José van Dijck and Thomas Poell, ‘Understanding Social Media Logic’, *Media and Communication* 1.1 (2013).

10 Carolin Gerlitz and Anne Helmond, ‘The Like Economy: Social Buttons and the Data-Intensive Web’, *New Media & Society* 15.8 (2013), pp. 1348–1365.

11 Daniel J Solove, *The Digital Person: Technology and Privacy in the Information Age*, New York: New York University Press, 2004, p. 1.

12 Richard Rogers, ‘Social Media and Postdemographics’, in *Digital Methods*, Cambridge: MIT Press (2013), pp. 153–164.

13 Sexuality is coded on Facebook as a response to the prompt ‘who I’m interested in’. I can choose to tick either ‘men’, ‘women’, or both—there is no option to fill in my own sexuality in my own words, or to express that I am attracted to people who do not identify as men or women.

networks are referred to by Richard Rogers as *postdemographics*.¹⁴ Rogers argues that platforms are postdemographic machines. Although character limits are lengthy, and there are many fields to populate, these platforms still impose constraints when they ask us to express ourselves and our sociality in ways it can harvest, analyze, and sell. Despite these constraints and limitations, people still create and manage their online selves through social media platforms. So how do these database logics impact the self we can build?

There is a tension between the human desire to tell stories and the computational database that automates platform mechanics. As humans, we use platforms to tell stories about ourselves. For some, this means using platforms as tools to get to human expression and connection. For others, like digital media scholar John Cheney-Lippold, this means that people increasingly understand themselves through these database logics. He argues that we have become temporary members of emergent categories based on our data. These ‘measurable types’ cannot possibly encompass all our individual nuances, so the complexities of our lives are flattened out when we are categorized in this way.¹⁵ Being sorted into the category of ‘woman’ is info-political: it has implications for the information and advertising that becomes visible to me as I navigate these platforms.

Marketing scholars Detlev Zwick and Nikhilesh Dholakia argue that these postdemographic categories, or measurable types, mean that individuals become constituted as consumer identities.¹⁶ Although these databases aren’t revealed publicly, Zwick and Dholakia claim that we sometimes get glimpses into how these databased identities are mobilized—just like when I notice which ads Facebook displays to me. The opacity of these databases leads me to a more systematic consideration of four main issues for the way these algorithmic, measurable, postdemographic identities operate.

Issues for Databased Identities

Anonymity is Sociopolitically Important

Databasing identity information can be a pernicious form of online surveillance, as it damages opportunities to remain anonymous. Writing at a time when internet technologies were still gaining prominence in households, sociologist Gary Marx identified several rationales for why someone would want to be anonymous. Self-protection, facilitating risk-taking, enhancing games and play, and encouraging reporting and information-seeking all impact someone’s decision about whether or not to reveal their name.¹⁷ Inventor of the World Wide Web, Tim Berners-Lee, claimed that ‘people should be able to surf the Web anonymously, or as a well-defined entity, and should be able to control the difference between the two’.¹⁸

14 Richard Rogers, ‘Social Media and Postdemographics’, *Digital Methods*, Cambridge: MIT Press, 2013.

15 John Cheney-Lippold, *We Are Data: Algorithms and The Making of Our Digital Selves*, New York: NYU Press, 2017.

16 Detlev Zwick and Nikhilesh Dholakia, ‘Whose Identity Is It Anyway? Consumer Representation in the Age of Database Marketing’, *Journal of Macromarketing* 24 (2004): 31–43.

17 Gary T. Marx, ‘What’s in a Name? Some Reflections on the Sociology of Anonymity’, *Information Society* 15.2 (1999): 99–112.

18 Tim Berners-Lee, *Weaving the Web: The Past, Present and Future of the World Wide Web by Its Inventor*, London: Orion, 1999, p. 158.

Not everyone has a simple relationship with their name, argue social scientists Jessa Lingel and Tarleton Gillespie, who maintain we all perform different versions of ourselves.¹⁹ For example, it can be precarious for some people to link their online identity with their legal name, including performers, sex workers, activists, whistleblowers, transgender people, and those attempting to distance themselves from abusive relationships. The potential for social media anonymity gives people the freedom to join conversations and communities without revealing their legal name. And, this doesn't only benefit individuals. Making space on social media and in our communities and networks for those who don't want disparate facets of their identity connected is important for everyone. But, the internet is designed to connect information in networks, and technologies such as hashtags, Friending, following, facial recognition, and reverse image searching are making information increasingly searchable online.

While harassment and abuse on social media are persistent issues, especially for women, people of color, and the LGBTQI+ community, anonymity isn't a straightforward facilitator of this kind of antisocial behavior. For law scholar Danielle Citron, curbing anonymity won't deter harassers, but rather silence other, important voices,²⁰ such as activist collective Anonymous. Anthropologist Gabriella Coleman's studies of Anonymous have revealed that the group's use of masks are a symbol of collective anonymity, which enables a constructive way of operating and communicating under government and corporate surveillance.²¹ Making space for anonymity on social media means we are able to understand people as complex and multifaceted, and allow others to express multiple identity facets by means of a range of platforms. Although databased identities complicate the potential for anonymity, it is still worth striving to protect the right to be online without using a real name. The tactics presented in this chapter are just a small selection of incredibly varied and extensive identity management practices.

Social Media Users have Limited Knowledge About how these Databases Work and can't Access them

Databases and algorithms are proprietary information and are therefore opaque to most social media users. Platforms and data brokers purposely keep it this way so as to avoid calls for transparency or regulation.²² However, Zwick and Dholakia argue that not only does this opacity disadvantage users, it might actually disadvantage platforms.²³ When access to a database allows people to have more control over the aspects of their online selves that constitute their identity, platforms might gain more accurate data. Google offers a stripped-back version of this, allowing people to see some of the information stored about them through its Ad Settings page. People with Google accounts can switch ad personalization on or off, see

19 Jessa Lingel and Tarleton Gillespie, 'One Name to Rule Them All: Facebook's Identity Problem', *The Atlantic*, 2 October 2014, <http://www.theatlantic.com/technology/archive/2014/10/one-name-to-rule-them-all-facebook-still-insists-on-a-single-identity/381039/>.

20 Danielle Keats Citron, *Hate Crimes in Cyberspace*, Cambridge: Harvard University Press, 2014.

21 Gabriella Coleman, *Hacker, Hoaxer, Whistleblower, Spy: The Many Faces of Anonymous*, London: Verso, 2014.

22 Rob Kitchin, *The Data Revolution: Big Data, Open Data, Data Infrastructures & Their Consequences*, London: SAGE Publications, 2014.

23 Detlev Zwick and Nikhilesh Dholakia, 'Whose Identity Is It Anyway? Consumer Representation in the Age of Database Marketing', *Journal of Macromarketing* 24 (2004).

some of the categories they have been sorted into, and edit some of their information and interests. When I log in to Ad Settings, I can see that I'm in the 25–34 year old Female category, and I have interests that include Australia, Coffee & Tea, Colleges & Universities, and Cooking & Recipes. Google provides little information about why these interests are assigned to its online profile of me beyond 'Google estimates this interest based on your signed-in activity.' But, of course, searching for something online does not necessarily mean I am personally interested in it. Parenting is another of my assigned interests on Google; I don't have any children, but I do occasionally shop for gifts for friends' children. Football is not a sport I follow closely, but I might look up a match or score if it is part of a conversation. I can choose to opt out of these categories, meaning fewer ads about parenting or football will show up—but, this also gives Google more data points about me. This further demonstrates that right now the balance of power is with the platforms, not their users.

Databases are Used to Profit Companies Rather than to Benefit Individuals or Communities

When it comes to how platforms use personal data, privacy scholars Finn Brunton and Helen Nissenbaum show us that we don't know what we don't know. Photos uploaded to Facebook may one day be cross-referenced with facial recognition software, or even be scanned for credit card numbers or license plates. Therefore, the collection of information takes place in asymmetrical power relationships,²⁴ and this is not necessarily how the web was originally designed. Berners-Lee argues that if internet users generate data that is useful and valuable, they should be able to access it themselves. But, as digital media scholar Mark Andrejevic reminds us, even if individuals could access their own data, they wouldn't be able to analyze it in ways that make it commercially productive unless they also had access to the rest of the database. He calls this the 'big data divide'; that is, companies that can purchase and use large data sets versus those excluded from access to data, expertise, and processing power.²⁵

Databases can Categorize People in Ways that Deepen Discrimination

As I illustrated earlier, the collection of information about me in databases gets some things right, and misses or misrepresents other things. The examples I raised were benign, though, because mistaking my football search for an interest in sports does not impact me in a serious way. But, placing people into predetermined categories that do not always fit can disadvantage already vulnerable groups. When autocomplete relies on previous queries to predict what someone is searching for, these automated results can surface stereotypes and biases. Linguistics scholars Paul Baker and Amanda Potts have investigated how harmful results can arise when searching on Google for 'why do gay...', receiving the following autocomplete answers:

Why do gay men have high voices?
Why do gay men get aids?

24 Finn Brunton and Helen Nissenbaum, *Obfuscation: A User's Guide for Privacy and Protest*, Cambridge: MIT Press, 2015.

25 Mark Andrejevic, 'The Big Data Divide', *International Journal of Communication* 8 (2014): 1673–1689.

Why do gay men lisp?
 Why do gays exist?
 Why do gay people talk funny?²⁶

These suggested queries appeared because other people previously typed them into Google at a high frequency. Since they're displayed as suggestions, these queries are then clicked on more often, thus further enhancing their popularity and potentially validating homophobic preconceptions. Technology scholar Safiya Umoja Noble calls these kinds of automated results 'algorithmic oppression',²⁷ arguing that search results especially exacerbate racism. Noble further argues that interrogations of autocomplete might actually underscore the idea that search is a mirror of widespread beliefs, which downplays the fault of the platforms. For Noble, the problem runs much deeper: 'Algorithmic oppression is not just a glitch in the system but, rather, is fundamental to the operating system of the web.'²⁸ These human and machine actions contribute to inequality in ways that exacerbate structural racism, sexism, and homophobia.

Considering these problematic aspects of databases prompts me to ask: What can we do about it? How can social media users take control of this information—or, alternatively, sabotage it?

Tactics of Resistance: Obfuscation and Tactical Visibility

The first step in resisting database logics is noticing that they exist. Cheney-Lippold identifies the feeling of being 'creeped out' by algorithms as an essential part of acknowledging our vulnerability in this digitally databased world, and building on that feeling to try to understand some of these platform logics.²⁹ One response to platforms building and deploying databases is to develop tactics to thwart this. The notion of 'tactics' was first proposed by cultural theorist Michel de Certeau, who suggested that people develop everyday acts of resistance to systemic power.³⁰ I present here two tactics people use to push back against the way platforms deploy databased personal information: 'obfuscation', adding meaningless data to a database; and, 'tactical visibility', making a set of personal information public to emphasize an argument.

26 Paul Baker and Amanda Potts, "'Why do white people have thin lips?' Google and the Perpetuation of Stereotypes via Auto-Complete Search Forms', *Critical Discourse Studies* 10.2 (2013): 190.

27 Safiya Umoja Noble, *Algorithms of Oppression: How Search Engines Reinforce Racism*, New York: New York University Press, 2018.

28 Noble, *Algorithms of Oppression*, p. 9.

29 John Cheney-Lippold, *We Are Data: Algorithms and The Making of Our Digital Selves*, New York: NYU Press, 2017.

30 Michel de Certeau, *The Practice of Everyday Life*, trans. S. Rendall, Berkeley, University of California Press, 1988 [1984]. Other studies of tactics with regard to people navigating platforms and algorithms have been written by Michele Willson, 'Algorithms (and the) Everyday', *Information, Communication & Society* 20.1 (2017): 137–150, and Kate Mannell, 'Technology Resistance and de Certeau: Deceptive Texting as a Tactic of Everyday Life', *Platform: Journal of Media and Communication* 8.1 (2017): 40–55. I have written before about the tactics of *Voldemorting*: not mentioning words or names in order to avoid a forced connection; and *screenshotting*: making content visible without sending its website traffic by circulating screenshots of it instead: Emily van der Nagel, "'Networks That Work Too Well": Intervening in Algorithmic Connections', *Media International Australia* 168.1 (2018): 81–92.

Obfuscation

When withdrawing from a platform is not desirable or easy, adding misleading information (that will consequently be added to the platform database) can be an effective form of disguise. Brunton and Nissenbaum call obfuscation ‘the deliberate addition of ambiguous, confusing, or misleading information to interfere with surveillance and data collection.’³¹ They acknowledge the power imbalance between individuals living ever more closely under surveillance and the large corporate entities that collect data about them. Obfuscation adds noise to systems, wresting back control from opaque data collection methods.

Nissenbaum has co-developed a tool for obfuscation. The browser extension TrackMeNot corrupts a search engine’s profile of an individual by automatically entering random search queries. Justifying the tool’s importance, TrackMeNot’s developers claim: ‘Our search behaviors profoundly reflect who we are, what we care about, and how we live our lives.’³² Running in the background, TrackMeNot’s search terms add so many false signals that an individual’s genuine search terms become impossible to distinguish from the flood of superfluous information. TrackMeNot works in a similar way to privacy solutions like Virtual Private Networks (VPNs) and The Onion Router (Tor); that is, disguising a computer’s signals so the connections it makes appear to be originating from a different device or location,³³ and taking a longer and more complex path to a destination to throw off surveillance mechanisms.³⁴

While TrackMeNot, VPNs, and Tor aim to obfuscate personal data by adding extra, unrelated data, artist interventions into surveillance aim to specifically obfuscate facial recognition technologies. Artist Adam Harvey has developed two such obfuscation projects. CV Dazzle is a line of hairstyling and makeup designs that add extra, confusing signals that disrupt facial recognition. The CV Dazzle project website includes sample looks, with models wearing bright, asymmetrical fringes and geometric patterns on cheeks and foreheads, as well as style tips for reclaiming privacy. ‘Partially obscure one of the ocular regions,’ Harvey advises. ‘The position and darkness of the eyes is a key facial feature.’³⁵ Creating what Harvey calls an ‘anti-face’ obfuscates an identity to a machine, but not another human being. A crucial element in this form of obfuscation is that the person is still recognizable to other people, without contributing to facial recognition databases.

Harvey has expanded on CV Dazzle with another art response to invasive data collection called HyperFace, a camouflage print that introduces noise into computer vision algorithms, reducing the confidence score of facial recognition. The prototype is a fabric print that looks like heavily pixelated, jumbled faces. Wearing the print as a scarf, near a human face, obfuscates the actual face by adding misleading signals. ‘If a com-

31 Finn Brunton and Helen Nissenbaum, *Obfuscation: A User’s Guide for Privacy and Protest*, Cambridge: MIT Press, 2015: 1.

32 Daniel C. Howe, Helen Nissenbaum and Vincent Toubina, *TrackMeNot*, 2006, <https://cs.nyu.edu/trackmenot/>.

33 Electronic Frontier Foundation, ‘Surveillance Self-Defense: Choosing the VPN That’s Right for You’, *Electronic Frontier Foundation*, 9 June 2016, <https://ssd.eff.org/en/module/choosing-vpn-thats-right-you/>.

34 Tor, ‘Tor: Overview’, *Tor*, 2018, <https://www.torproject.org/about/overview.html.en/>.

35 Adam Harvey, *CV Dazzle*, 2016, <https://cvdazzle.com/>.

puter vision algorithm is expecting a face, exploit its expectations,' asserts Harvey.³⁶ Adding false information to a database inverts the expectation that being anonymous is a matter of withholding or deleting personal data. Instead, obfuscation achieves a similar result of damaging a data profile by flooding it with useless information, rather than attempting to get rid of the profile or the database itself. Conversely, when platforms are designed to collect as much data as possible, obfuscation reappropriates this aim in a way that benefits individuals instead.

Tactical Visibility

While obfuscation enables privacy on a platform by corrupting the information it gathers, another tactic designed to manipulate visibility is used by people making public statements about political issues. When people understand online content to be visible, persistent, editable,³⁷ spreadable, searchable,³⁸ and shareable,³⁹ directing attention to specific kinds of personal information can be a powerful way of making a point.

Tactical visibility can be especially effective at garnering attention when this opens up the subject to vulnerabilities. It is related to doxing, short for 'dropping documents', the deliberate releasing of someone else's personal information without their consent. Doxing is a threat and a form of 'weaponized attention' as journalist Noah Berlatsky puts it;⁴⁰ a way to leave someone overexposed and on the receiving end of unwanted attention that can lead to reputation damage and harassment.⁴¹ Both doxing and tactical visibility can be defined as the online sharing of private information⁴² as both strive for control over personal data. But, while doxing seeks to harass, intimidate, or shame another person, tactical visibility involves revealing selected personal information about oneself in order to intervene in power structures.

Tactical visibility can be understood with a political example, specifically two responses to the Australian government's telecommunications metadata retention scheme, which came into effect in early 2017. The scheme means the government now keeps telephone and internet records of its citizens for law enforcement agencies to access.⁴³ Two voices in opposition to this retention of data were journalist Will Ockenden and

36 Adam Harvey, *HyperFace: False-Face Camouflage*, 2018, <https://ahprojects.com/projects/hyperface/>.

37 Jeffrey W. Treem and Paul M. Leonardi, 'Social Media Use in Organizations: Exploring the Affordances of Visibility, Editability, Persistence, and Association', *Communication Yearbook* 36 (2012): 143–189.

38 danah boyd, *It's Complicated: The Social Lives of Networked Teens*, New Haven: Yale University Press, 2014.

39 Zizi Papacharissi, 'Without You, I'm Nothing: Performances of the Self on Twitter', *International Journal of Communication* 6 (2012): 1989–2006.

40 Noah Berlatsky, 'Doxing Isn't About Privacy: It's About Abuse', *The Daily Dot*, 24 April 2016, <http://www.dailydot.com/via/doxing-privacy-abuse-online/>.

41 Joseph M Reagle, *Reading the Comments: Likers, Haters, and Manipulators at the Bottom of the Web*, Cambridge, MIT Press, 2015, p. 113.

42 Michael Buozis, 'Doxing or Deliberative Democracy? Evidence and Digital Affordances in the Serial SubReddit', *Convergence: The International Journal of Research into New Media Technologies* (2017): 1–17.

43 Hayden Cooper, 'Data Retention Laws: Experts Warn Against Opening Up Metadata to Civil Cases as Telcos Renew Bid to Change Laws', *ABC News*, 6 January 2017, <http://www.abc.net.au/news/2017-01-05/telco-industry-pushes-for-metadata-collection-changes/8162896/>.

former President of the Australian Human Rights Commission Gillian Triggs. To demonstrate how damaging the scheme would be, each released a set of personal information to the public. Ockenden let people look through a year's worth of his metadata, and they quickly discovered where he lived and worked, how he commuted, when he moved, what flights he took when he left the country, where his parents live, and when he visited them.⁴⁴ Ockenden called the public's analysis 'scarily accurate', and suggested that the way metadata can be combined shows its full potential to identify a person and their habits. Triggs also found the process of publicly revealing her metadata, this time for a public talk, 'profoundly alarming'.⁴⁵ Her audience saw records of her movements, scheduled events, dialed telephone numbers, and even her application for a Seniors Card. Ockenden and Triggs both firmly believe in individual privacy and oppose the metadata retention scheme. Making their own data visible, and themselves potentially vulnerable, was a calculated move based on the idea that it would capture the public's attention and demonstrate how invasive the scheme would be.

When employed to demonstrate a flawed government policy, tactical visibility can effectively humanize a surveillance regime. But tactical visibility in the hands of artists and activists, especially women, can reveal a different kind of political terrain. At a time when social media harassment and abuse disproportionately affects young women,⁴⁶ exposing intimate aspects of the self through networked publics has a particular resonance for women. Artist Stephanie Milsom chose to take control of the personal data that Google gathered about her by baring it all in an exhibition. '*Untitled (Google)* is every piece of information Google has ever collected about Milsom. Bound into journals, she invites you to rifle through the diary of her online self,' reads the description of her work.⁴⁷ To be on display like this is personally, yet purposefully, revealing: it demonstrates the vastness of Google's data gathering from and about millions of individuals. With queries ranging from the daily weather forecast to a potential urinary tract infection, Milsom's work represents her gaining back control over this data. She chose the format and boundaries of her search history, using tactical visibility to reclaim this data.

If revealing intimate data is fraught for women, these risks are magnified when their bodies are on display. Against growing media attention on revenge porn, also called non-consensual pornography⁴⁸ or image-based abuse,⁴⁹ when intimate or sexual photos are distributed online without the subject's consent, some women are addressing this viola-

44 Will Ockenden, 'What Reporter Will Ockenden's Metadata Reveals About His Life', *ABC News*, 24 August 2015, <http://www.abc.net.au/news/2015-08-24/metadata-what-you-found-will-ockenden/6703626/>.

45 Josh Taylor, 'Gillian Triggs Let Someone Have a Day's Worth of her Metadata to Show Why She Believes in Warrants', *BuzzFeed News*, 28 August 2017, https://www.buzzfeed.com/joshtaylor/gillian-triggs-let-someone-have-a-days-worth-of-her?utm_term=.gjjlgbxM#.caxq62kym/.

46 Maeve Duggan, 'Online harassment', *Pew Research Centre*, 22 October 2014, www.pewinternet.org/2014/10/22/online-harassment/; Alice E. Marwick and Ross Miller, 'Online Harassment, Defamation, and Hateful Speech: A Primer of the Legal Landscape', *Social Science Research Network*, 2014, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2447904/.

47 Stephanie Milsom, 'All of It', *Stephanie Milsom*, 2017, <http://www.stephaniemilsom.com/all-of-it/>.

48 Danielle Keats Citron and Mary Anne Franks, 'Criminalizing Revenge Porn', *Wake Forest Law Review*, 49.2 (2014): 345–391.

49 Julie Inman Grant, '"Revenge Porn," By Another Name', *Office of the Children's eSafety Commissioner*, 2017, <https://esafety.gov.au/about-the-office/newsroom/blog/revenge-porn-by-another-name/>.

tion by inviting attention to their sexualized bodies on their own terms. When Australian musician Sia was threatened with a nude photograph of herself becoming available online, she posted it herself on Twitter. The slightly blurry photo is watermarked with 'CLIENT PREVIEW', and features a naked Sia, her back turned to the camera, her buttocks in full view. Sia's accompanying caption reads, 'Someone is apparently trying to sell naked photos of me to my fans. Save your money, here it is for free. Everyday is Christmas!'⁵⁰ Sia's retort, and her reclamation of the image, was received overwhelmingly positively on Twitter, as she had effectively rendered the value of the photo, and the threat, worthless.

In the same vein of reclamation, Danish-Swedish activist Emma Holten responded to nude photos of herself being maliciously distributed online with a nude photo shoot of her own. Disturbed at how dehumanized she felt at being the subject of image-based abuse, the photos she willingly published feature deliberately mundane, domestic scenes. Holten is depicted wearing only her underpants, blonde hair pulled back into a messy ponytail, on her bed; reading at her window sill; brushing her teeth, toothpaste flecks on the mirror, towels hung up behind her. 'The pictures are an attempt at making me a sexual subject instead of an object. [...] Consent is key,' Holten said of the images.⁵¹

I began with the provocation that if we are databased, we're not fully anonymous. Reflecting on some of my own digital traces, like Facebook ads, through the prism of platform databases has shed some light on the ways we are datafied, categorized, and abstractly transformed from people into bits of information. Databases might not record your full, real, legal name, but they contain enough information about you to quash any idea that you could be fully unknown on the web.

And a small amount of data can reveal a lot. The aptly-titled paper 'Simple Demographics Often Identify People Uniquely' revealed that 87 per cent of Americans can be uniquely identified by just their gender, birthdate, and ZIP code.⁵² A follow-up study in 2006 revised that percentage down to 63,⁵³ but it still seems that people are more vulnerable to being fully identified by otherwise unnamed data as they move across the web.

Neither databases nor platforms represent whole, multifaceted people. Instead, different aspects of us become salient depending on which advertiser is buying the information or which people we're being categorized with. We know that many databases are created by for-profit platforms, and these are largely opaque and can even misrepresent us to the detriment of already marginalized groups.

50 @Sia, 'Someone is Apparently Trying to Sell Naked Photos of Me', *Twitter*, 7 November 2017, 1.36pm, <https://twitter.com/Sia/status/927726442154098688/>.

51 Sally Holmes, 'Why This Woman Is Posting Nude Photos of Herself Online to Fight Revenge Porn', *Elle*, 6 January 2015, https://www.elle.com/culture/career-politics/news/a19783/fighting-revenge-porn-with-nude-images/?src=spr_TWITTER&spr_id=1448_127541959&linkId=11555326/.

52 Latanya Sweeney, 'Simple Demographics Often Identify People Uniquely', *Data Privacy Working Paper 3*, Pittsburgh: Carnegie Mellon University, 2000.

53 Philippe Golle, 'Revisiting the Uniqueness of Simple Demographics in the US Population', in *Proceedings of the 5th ACM Workshop on Privacy in Electronic Society*, Alexandria, VA, 30 October 2006: pp. 77-80.

Tactics of negotiating databases and platforms are ways to assert agency over opaque, profit-making systems. Forging an identity within these conditions means contending with the categories we find ourselves placed in, even as we recognize they are necessarily limited, and sometimes biased and flawed. If we can not be anonymous when we are databased, we can at least remain critical of the databases we are part of and the platforms we use. This is how we begin to regain control.

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SITUATING THE
POLYMERASE
CHAIN REACTION:
THE POWER AND
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SITUATING THE POLYMERASE CHAIN REACTION: THE POWER AND INFLUENCE OF CHEMICAL AND COMPUTATIONAL METAPHORS IN BIOTECHNOLOGY

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If this works, for God's sake this is incredibly important [...] it wasn't really obvious that if this does work it will change everything.

—Kary Mullis¹



Fig. 1: Paul Vanouse, performing Deep Woods PCR, Banff National Park, Canada, July 29, 2011.²



Fig. 2: Performing a similar DNA amplification process using a DNA Thermocycler.

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- 1 Kary Mullis, interviewed by Paul Vanouse, Newport Beach, California, 18 January 2014.
 - 2 The performance took place as a component of BioARTCAMP: a two-week experimental residency at The Banff Centre directed by Dr. Jennifer Willet from The University of Windsor, Canada. BioARTCAMP is a hybrid workshop / conference / performance event.

In the summer of 2011, I performed an algorithm. Harnessing the elemental powers of fire and water with four tiny, capped tubes containing minute quantities of my own DNA, chemical reagents, and an extracted polymerase from the *Thermus aquaticus* bacterium (Taq), I performed the Polymerase Chain Reaction (PCR). PCR was invented in 1984 and quickly became one of the most influential biotechnologies of the 20th century. PCR is an algorithm that is fundamental to DNA cloning, DNA sequencing, DNA fingerprinting, and a myriad of medical, forensic, and research applications. The algorithm comprises the following steps: heat tubes to 94°C; cool tubes to 55°C; heat tubes to 72°C; repeat these steps 40 times. What was peculiar about my artistic performance is that PCR is typically performed in a laboratory by a benchtop machine called a DNA Thermocycler, which controls these precise temperature requirements so as to copy DNA. My artistic performance, *Deep Woods PCR*, was an anachronistic, manual re-enactment in which I demonstrated the algorithm, while telling campfire anecdotes of the history of the invention, with the intent of situating one of the most groundbreaking bio-technologies of the 20th century in social context.

In this article, I expand on my original performance by describing some of the 20th century influences and imperatives between chemical, computational, and life sciences that provide a context for PCR, and then how PCR likewise has influenced and impacted other social entities, institutions, technologies, and power relations. As a jumping-off point, I explain a little more about the technology of PCR and its economic impacts, to then highlight the multitude of computational and engineering metaphors that shaped the field of biology in the late 20th century, such as DNA as a code or a database. In contrast, I show how PCR was inspired by more dynamic models such as chemical chain reactions, inspiring and fostering computational and engineering metaphors in contemporary biotechnology. Lastly, I explore how these computational metaphors also mask more profound influences and corollaries, such as exponential and chaotic chemical reactions, and less comforting ones, such as the atomic bomb. Biotechnology is incredibly powerful, difficult to contain, and vastly misunderstood by most non-experts. However, as contemporary programs, like genetic engineering, synthetic biology, and genomic medicine, increasingly move biotechnology out of the lab and 'into the field' (that is, our world, our lives, our ecosystems), there is a great deal at stake in how we make sense of it.

The exact process of PCR is described well in Wikipedia:

The vast majority of PCR methods rely on thermal cycling. Thermal cycling exposes reactants to cycles of repeated heating and cooling to permit different temperature-dependent reactions—specifically, DNA melting and enzyme-driven DNA replication. PCR employs two main reagents—primers (which are short single strand DNA fragments known as oligonucleotides that are a complementary sequence to the target DNA region) and a DNA polymerase. In the first step of PCR, the two strands of the DNA double helix are physically separated at a high temperature in a process called DNA melting. In the second step, the temperature is lowered and the primers bind to the complementary sequences of DNA. The two DNA strands then become templates for DNA polymerase to enzymatically assemble a new DNA strand from free nucleotides, the building blocks of DNA. As PCR progresses, the DNA generated is itself used as a template for

replication, setting in motion a chain reaction in which the original DNA template is exponentially amplified.³

This process can also be illustrated as an instruction set or diagram. Table 1 compares the PCR algorithm as computer code with that of a typical DNA thermocycler, often referred to as a PCR machine.

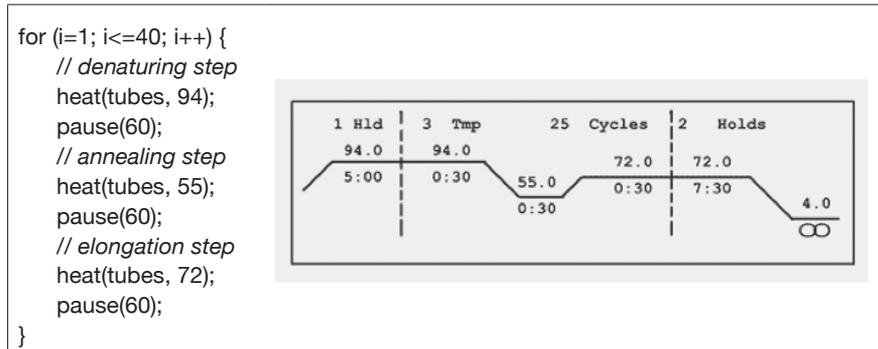


Table 1: The PCR algorithm. *Left*: This code is hypothetical C++ code intended to be read as an algorithm of PCR. *Right*: This diagram is typically displayed on the mini screen of a PCR machine while setting up a PCR run.

The Polymerase Chain Reaction was invented by Dr. Kary Mullis, a biochemist working at the Cetus Research & Conservation Society laboratory in the 80s. As a result, Mullis and his colleague Michael Smith were awarded the Nobel Prize in Chemistry in 1993. Several important accounts of the period note the strong influence of informatics upon biology at the time. However, from subsequent interviews, it is clear that Mullis was greatly inspired by the elegant algorithms of chaos theory, which when cycled with the appropriate preconditions can produce extraordinary results, that when visualized come to resemble traces of nature itself. Many would argue that these algorithms, such as in fractals, are not merely producing life-like imagery, a visual metaphor, but perhaps are themselves models of an underlying mathematics of the living world. But, the Polymerase Chain Reaction does something new. It doesn't merely model life, it operationalizes it. What's more, it doesn't simply shape or engineer it like a raw material or a reagent. It exerts an influence so profound that it reorients a few biological materials into a productive machine; a machine that can produce exponential quantities of DNA products, the currency of the biotechnological revolution, from a tiny amount of DNA template.

3 'Polymerase Chain Reaction', *Wikipedia*, 16 September 2018, https://en.wikipedia.org/w/index.php?title=Polymerase_chain_reaction&oldid=859824699.

The Influence of PCR

A lot has been written about the influence of informatics on technosciences in the 80s and 90s, such as digital logic, computers, and databases.⁴ While the primary influence on the invention of PCR is not the informatic worldview, it is the myriad imperatives, initiatives, and institutions of this worldview—the informatic context—which make it so influential and indispensable in medical and life sciences labs. PCR can indeed be described and understood in familiar informatic and engineering terms, as can be seen in the algorithm in Figure 2. Similarly, PCR allows research laboratories to *copy* and exponentially *duplicate* specific regions of DNA for cloning applications. Because amplification by PCR requires very little starting material, it is also ideal for criminal, diagnostic, and forensic DNA typing, results of which can be stored and accessed in digital databases. The National Human Genome Research Institute notes that ‘most mapping techniques in the Human Genome Project (HGP) relied on PCR’.⁵ Consequently, it is not uncommon to read grand statements on PCR’s importance to the biotech revolution, such as: ‘Arguably, the polymerase chain reaction (PCR) machine has recently become as indispensable to biological research as the light microscope was some 100 years ago.’⁶

The context of PCR does not only make it influential, but it is probably also what allows for it to be seen as an ‘invention’ in the first place. Mullis describes being surprised that others hadn’t tried it yet since its underlying components, such as DNA polymerase, were well understood at the time. Many have contested that Dr. Gobind Khorana, who was awarded the Nobel Prize in 1968 for his interpretation of the genetic code and its function in protein synthesis, had in fact performed the important prior art of in-vitro synthesis of DNA with polymerase, and that Mullis simply devised a scheme for the reactions to repeat, or that Mullis framed the science as an algorithm.

The context in which PCR was ‘invented’ by Mullis is fundamental to its cultural meaning, economic value, and scientific merit. It was the incredible use value of the algorithm that made PCR worthy of aggressive copyrighting by Cetus. Mullis describes his original thoughts of amplifying regions of DNA in the context of his job of generating radioactive oligonucleotide probes used to bind to specific DNA sequences, and how on a moonlit drive to his Mendocino cabin he had a revelation about how to exponentially amplify regions of source DNA.⁷ He writes that before even describing it to colleagues he believed it had grand implications for the future.

PCR would soon fuel an economic explosion. Initially, the DuPont corporation sought to invalidate the Cetus patent in court, by claiming PCR was previously known and obvious in light of other scientific research such as Khorana’s. Shortly after winning

4 See for example Lily Kay, *Who Wrote the Book of Life*, Stanford, CA: Stanford University Press, 2000; and Eugene Thacker, *Global Genome*, Cambridge, MA: MIT Press, 2005, both discussed in this essay. See also Richard Lewontin, *The Triple Helix: Gene, Organism, and Environment*, Cambridge, MA: Harvard, 2000.

5 ‘Polymerase Chain Reaction (PCR)’, *National Human Genome Research Institute*, 16 June 2015, <https://www.genome.gov/10000207/polymerase-chain-reaction-pcr-fact-sheet>.

6 Leslie A. Pray, ‘The Biotechnology Revolution: PCR and the Use of Reverse Transcriptase to Clone Expressed Genes’, *Nature Education* 1.1 (2008): 94.

7 Kary Mullis, ‘The Unusual Origin of the Polymerase Chain Reaction’, *Scientific American* 262.4 (April, 1990): 64–65.

this first patent case, Cetus sold the PCR patent to Hoffman–La Roche for US\$300 million—a remarkable profit for a biotechnology company at the time.⁸ Subsequently, Hoffman–La Roche made PCR the most profitable biotechnology of the 20th century. Trade publications reported that by the year 2000, Hoffman–La Roche was making about US\$100 million per year in sales of PCR products.⁹

With so much at stake, however, in 1999, a decade after the first patent battle ended a new one went to court. This time, it was with Promega corporation over the Taq polymerase enzyme. Promega protested that Cetus’ scientists had fraudulently claimed to have been the first to successfully purify Taq polymerase. However, Promega asserted Cetus’ research publications lacked the proper rigor of academic science in order to make this claim. While the San Francisco court sided with Promega, the issue was far from settled. As Kara Swanson notes, ‘It was overturned in part on appeal, it was contradicted by European patent law decisions, and it was never accepted by Roche or the Cetus participants. Promega continued to sell *Taq* polymerase, and the parties battled on before finally announcing a confidential settlement of all cases worldwide in September 2005.’^{10 11}

Computation-Inspired Biology

Nineteen eighty-four was a memorable year. The polymerase chain reaction (PCR) was described for the first time at the Cetus Scientific meeting in Monterey, California; the Alta Summit meeting in Colorado was credited as the first significant event when the sequencing of the entire genome was seriously contemplated; and the infamous commercial for the MacIntosh computer was aired.¹²

Biology as a coherent field emerged near the turn of the 19th century. It is characterized as the study of life and living organisms, including their structure, function, growth, origin, evolution, distribution, and taxonomy.¹³ A fundamental principle of this science is that a cell is the basic unit of life. As scholars such as Georges Canguilhem, Michel Foucault, and François Jacob have written, the field is distinct from its progenitor fields, such as medicine and natural history. Jacob writes, ‘Thus with the start of the nineteenth century, a new science was to appear. Its aim was no longer to classify organisms, but to study the processes of life; its object of investigation was no longer visible structure, but organization.’¹⁴ The basic unit of study, therefore, changes from living organisms to the cell, its organization, or even *life itself*.

8 Paul Rabinow, *Making PCR: A Story of Biotechnology*, Chicago: University of Chicago Press, 1996.

9 Kara Swanson, ‘Biotech in Court: A Legal Lesson on the Unity of Science’, *Social Studies of Science* (2007): 37, 361.

10 Swanson, ‘Biotech in Court’.

11 While corporations made billions of dollars from PCR, Mullis received only a US\$10,000 bonus for his achievement from the Cetus corporation at which he worked.

12 John J. Sinsky, ‘The Convergence of PCR, Computers and the Human Genome Project: Past Present and Future’, in Michael A. Innis, David H. Gelfand, and John J. Sinsky (eds), *PCR applications*, San Diego, London: Academic Press, 1999, p. 24.

13 ‘Biology’, *Wikipedia*, 25 September 2018, <https://en.wikipedia.org/w/index.php?title=Biology&oldid=860139181>.

14 François Jacob, *The Logic of Life*, trans. Betty E. Spillman, Princeton, NJ: Princeton University Press, 1973 (1970), p. 74.

In her groundbreaking book, *Who Wrote the Book of Life?*, scholar Lily E. Kay describes the powerful influence of informatics and other Cold War imperatives on the field of biology. Beginning in the 50s, varied cultural forces began to influence and reorient biology, in particular the discovery of the basic structure of DNA and the development of Cold War sciences such as cryptography and information science. It was during this period that computational metaphors became fully integrated into biology. For instance, the metaphor of code became increasingly used when referring to sequences of nucleic acids in a strand of DNA. Kay describes the ascendance of the informatics metaphor: '[T]hese discursive practices of information and language were neither external to researchers' analysis nor merely exegetical. Rather, they became constitutive of the reasoning and modes of signification of researchers by supplying productive models, analogies and interpretive frameworks.'¹⁵ As Kay notes, these metaphors came to define the terms by which life should be investigated; they became naturalized. 'While in the 1950s terms such as *information* and *code* in molecular biology sometimes appeared in quotation marks to acknowledge their metaphorical and heuristic dimensions, by the end of the decade the quotation marks had disappeared.'¹⁶

In his book *The Global Genome*, theorist Eugene Thacker likewise observes the deep influence of computation in the contemporary biotechnological sciences. Thacker says that '[i]n a sense, bioinformatics takes all the terminology, concepts, and metaphors of informatics at face value; it moves with great ease between the metaphor of DNA as information and its construction of online genome databases.'¹⁷ The phrase 'DNA is code' is a powerful analogy convenient in an era defined by computation, and it is an ideal fit for a technology like PCR which engineers biological matter as easily as if it were duplicating computer data.

While Kay and Thacker are scholars of science and technology rather than practicing scientists, their analysis is confirmed and corroborated by biotech research scientists in the field, and it is easily discerned in broader culture as well. In the publication *PCR Applications*, edited by a team including former Cetus head research scientist David Gelfand, a detailed chart of other computer and PCR analogies is provided. The chart lists several of the analogies I've previously suggested along with others, such as comparing a computer operating system with the buffer solution used in a PCR reaction tube to ensure proper reaction conditions.¹⁸

Computer PCR

| Computer | PCR |
|----------------|---|
| Hardware | Thermal cycler MW plate readers and washers Direct optical monitoring |
| Feedback loops | Cycles |

15 Kay, *Who Wrote the Book of Life*, p. 26.

16 Kay, *Who Wrote the Book of Life*, p. 39.

17 Thacker, *Global Genome*, pp. 59–60.

18 Sninsky, 'The Convergence of PCR', p. 26.

| | |
|-----------------------------|---|
| Clock speed (MHz) | Cycles times |
| Operating System | Buffer |
| CPU | DNA polymerase synthetic activity |
| Coprocessor | 3' nuclease activity (proofreading function) 5' nuclease activity (detection strategies) Uracil glycosylate |
| Bus | Optical fibers/CD video |
| Applications | Targets (e.g. genes, pathogens) |
| Search algorithms (drivers) | Primer pair |
| Input | dNTPs |
| Output | Amplicons (signal) |
| Multitasking | Multiplexing (parallel processing) |

Table 2: Computer and PCR analogies.

There is clearly a connection between informatics/computation and the technology of PCR. But, there are stronger influences than information/computing on the conception of PCR.

Combustion-Inspired Computing

In his autobiography, Mullis describes an interest in computer programs: 'I knew computer programming, and from that I understood the power of a reiterative mathematical procedure.'¹⁹ It would be logical to assume that informatics and computational paradigms of the post-World War II era inspired PCR: a procedure which synthesizes functional duplicates that can be described simply by their sequences or *codes*, sequenced, and synthesized with a sort of digital precision. Yet, Mullis himself seldom refers to DNA as code, preferring as a chemist to describe DNA sequences in chemical terms, such as complex nucleotides. As further investigation will underscore, PCR is shaped by interests and influences other than informatics, but is also a product of the Cold War.

Mullis devotes several pages in his autobiography to his beginnings with model rockets.

The first thing of any consequence that I made with my chemistry set was a substance similar to thermite. I mixed powdered aluminum, ammonium nitrate, a dash of something else, and heated it over an alcohol burner. When I pulled it away from the flames, the reaction kept going. The mixture got red hot, broke the test tube, and suddenly went Fffffshhooooo. [...] In 1957 the Russians launched the space race by putting Sputnik in orbit around the earth. [...] Two years later, my friends and I were launching our own rockets in my backyard.²⁰

19 Kary Mullis, *Dancing Naked in the Mind Field*, New York: Vintage Books, 1998, p. 5.

20 Mullis, *Dancing Naked in the Mind Field*, p. 26–27.

Similarly, in my interview with Mullis, he elaborated on the combustion properties and spatial characteristics of mixing and molding rocket fuel. 'Instead of from the bottom to the top, it would burn from the inside to the outside which is an exponential thing and much quicker and it gives you something that goes *Ffwweeww...* not something that went bang.'²¹

The primary influence for PCR is, simply, 'the chain reaction'. First suggested by German chemist Max Bodenstein in 1913 and fully described by Walther Nernst a few years later, 'the chain reaction' is 'a chemical or nuclear reaction forming intermediate products which react with the original substance and are repeatedly renewed.'²² The generally accepted three-phase reaction mechanism of the process is as seen in Table 3, which shows the 'characteristic features of a chain reaction, namely, the initiation and termination steps and the pair of chain reaction steps.'²³

| | | |
|---|---|-------------------|
| (1) $\text{Br}_2 \rightarrow 2\text{Br}$ | | Initiation |
| (2) $\text{Br} + \text{H}_2 \rightarrow \text{HBr} + \text{H}$ | } | Chain propagation |
| (3) $\text{H} + \text{Br}_2 \rightarrow \text{HBr} + \text{Br}$ | | |
| (-2) $\text{H} + \text{HBr} \rightarrow \text{H}_2 + \text{Br}$ | | Termination |
| (-1) $2\text{Br} \rightarrow \text{Br}_2$ | | |

Table 3: Hydrogen-Bromine chain reaction.

The analogies to PCR abound, particularly in the way in which the Bromine molecule (Br_2) is split into two separate atoms in the initiation phase of the reaction in Figure 3. This is analogous to the way in which double-stranded DNA is likewise cleaved into two separate strands in PCR. Also, in both reactions, initiation must be a thermal process to dissociate the atoms or strands. Other examples of the principle of a chain reaction include avalanches, contagions, and nuclear explosions.

Decades after the first chain reaction was described, by the time of the Cold War, the atomic bomb had become an iconic paradigm of the exponential power of a chain reaction. It's awesome, deadly blossoming, the basis of the 'atomic sublime'.²⁴ To understand the invention of PCR it is necessary to leave behind the metaphors of informatics and accept those principles, influences, and metaphors of the Cold War more broadly and, most importantly, the bomb itself. When Mullis is inventing his model rockets, it is in the context of the space race and the Russian launch of Sputnik as a symbol of Soviet capacity to build nuclear rockets that urge budding young scientists to pursue chemistry. Chemistry sets and experimentation were patriotic. The nuclear bomb had transformed the concept of the chain reaction from esoteric, advanced chemistry into a common cultural trope. Nuclear fission chain reactions involving uranium and plutonium were described in public high schools and became a staple of the cultural imagination.

21 Kary Mullis, interviewed by Paul Vanouse, Newport Beach, California, 18 January 2014.

22 'Chain Reaction, N.', *OED Online*, July 2018. Oxford University Press, <http://www.oed.com.gate.lib.buffalo.edu/view/Entry/30197?redirectedFrom=chain+reaction#eid9762651>.

23 Keith J. Laidler, *Chemical Kinetics*, 3rd edition, New York: Harper & Row, 1987, p. 291.

24 Peter B. Hales, 'The Atomic Sublime', *American Studies* 32.1 (1991): 5-31.

The term ‘fission’ was originally used in biology to define the splitting of one cell into two during cell division, but it also fit well with the chain reaction caused when a single atom of uranium was split into two by a high-speed proton, releasing two high-speed protons in the process. The link to biology also underscores that the nuclear bomb is not merely a technology, but also a phenomenon from the depths of nature. The nuclear fission reaction creates an enormous explosion of exponential growth and its initiation has been described as a sort of birth.

The Manhattan project was a World War II endeavor that researched and produced the first nuclear weapons, led by the US with support from Canada and the UK. By the early 40s, it had a budget of over US\$2 billion. As funding for nuclear weapons research in the US eased by the 80s, the scientists most responsible for the US nuclear programs needed to reinvent themselves to serve new imperatives. Many did so as genome scientists by way of advanced computational modeling.²⁵ Others, such as Los Alamos physicist Mitchell Feigenbaum, pursued ‘deep’ problems like the basis for the emergence of the universe or life itself that often confounded the traditional categories of science, such as biology, physics, mathematics, chemistry, and meteorology. Deep questions such as this would spawn a new science which transcended these disciplinary labels—the science of chaos, and the basis for chaos theory.²⁶

“Chaos” is an interdisciplinary theory stating that within the apparent randomness of chaotic complex systems, there are underlying patterns, constant feedback loops, repetition, self-similarity, fractals, self-organization, and [... a] *sensitive dependence on initial conditions*.²⁷ Because of this sensitivity the behavior of these complex systems is unpredictable and small changes can have large consequences, such as the hypothetical case regarding the global weather system—known as ‘the butterfly effect’—that a butterfly flapping its wings in Brazil can cause a hurricane in Texas. Chaos science seeks non-linear, mathematical models of dynamic physical phenomena beyond those of Euclidean mathematics, which approximate using ideal forms like lines, curves, and spheres. By using advanced, non-linear algorithms, chaos science is able to model complex natural phenomena such as the onset of turbulent flows in liquids.

While Kay and Thacker have described the influence of command and control on DNA science, even more profound influences on the invention of PCR stem from chaos theory. In an interview with author David Jay Brown, Mullis says, ‘I think nature is more like fractal geometry, than it is like Euclidian geometry.’²⁸ Years earlier, the famed polymath Benoît Mandelbrot, who coined the term ‘fractal’, had written that ‘[c]louds are not spheres, mountains are not cones, coastlines are not circles, and bark is not smooth, nor does lightning travel in a straight line.’²⁹ Later in Mul-

25 Daniel J. Kevles, ‘Out of Eugenics: The Historical Politics of the Human Genome’, in Daniel J Kevles and Leroy Hood (eds) *The Code of Codes*, Cambridge, MA: Harvard University Press, 1992.

26 James Gleick, *Chaos: Making a New Science*, New York: Penguin Books, 1987, pp. 1–3.

27 ‘Chaos Theory’, *Wikipedia*, 9 February 2019, https://en.wikipedia.org/w/index.php?title=Chaos_theory&oldid=882459857.

28 <http://mavericksofthemind.com/kary-mullis/3>.

29 Benoit B. Mandelbrot, *The Fractal Geometry of Nature*, New York: W.H. Freeman & Co., 1982, p. 1.

lis' interview with Brown, he describes the hypothetical situation of measuring the perimeter of England, a proposition that also stems from a legendary earlier paper, in which Mandelbrot stunningly concluded that it is 'infinitely long'.³⁰ Clearly, Mullis is inspired by the bold new paradigm of chaos theory. Mullis' colleague at Cetus, Dr. Thomas J. White, even noted that Mullis' first paper describing the theory of PCR was rejected because rather than completing experiments he was spending his time creating fractal pictures on the company's computers.³¹

Though sharing Cold War influences, the computational paradigm of informatics and artificial intelligence differs vastly from that of modeling complex and chaotic systems such as fractals, Mandelbrot sets, and Lorenz attractors (non-linear phenomena with high sensitivity to initial conditions, such as the butterfly effect). The former generally adopt a model of top-down, goal-oriented control, whereas the latter generally embrace emergence, autopoiesis, and the discovery of unexpected order or complexity from simple systems or algorithms. Rather than informatics, artificial intelligence, and control, Mullis relates to an overlapping Cold War worldview associated with complex systems, fractals and crystals, the interconnected sciences of physics, chemistry, and astronomy (Mullis self-describes as a 'generalist with a chemical prejudice')³² as well as astrology and psychoactive drugs. Rather than the imperative of command and control, PCR is therefore born of chaos theory, the physical sciences, and counterculture in the 60s.

It is also fitting to recall that, in 1989, *Science* magazine declared Taq polymerase (the bacterial enzyme that amplifies DNA in a PCR reaction) the 'Molecule of the Year'. Clearly, as Swanson notes, 'without Taq polymerase, there would have been no thermal cyclers, no proliferation of technology, no Nobel Prize.'³³ As actor-network theorists such as Bruno Latour have shown, humans are not the only actors in (social) networks. By flattening our ontologies and approaching both humans and non-humans without preconceptions, we can more effectively understand the workings of the technosciences.³⁴ Taq bacteria themselves have influence as agents in a complex network of scientists, lawyers, laboratories, cells, machines, universities, factories, and other institutions.

To take this a step further, whereas I have previously asserted that the algorithm of PCR has exerted profound influence on institutions in the context of an informatics worldview, it has an even more direct influence on living matter. PCR turns life and living processes into a productive machine, a form of labor that Thacker refers to as 'biomaterial labor', 'strangely nonhuman, at work in the molecular spaces of cells, enzymes and DNA, and it never stops working, whether or not we as individuals pay

30 Benoit B. Mandelbrot, 'How Long is the Coast of Britain? Statistical Self-Similarity and Fractional Dimension', *Science* 156.3775 (5 May 1967): 636-638; see also Gleick, *Chaos*, pp. 94-96.

31 Nicolas Wade, 'Scientist at Work/Kary Mullis; After the "Eureka," a Nobel Dips Out', *The New York Times*, 15 September 1998, <https://www.nytimes.com/1998/09/15/science/scientist-at-work-kary-mullis-after-the-eureka-a-nobel-drops-out.html>.

32 Mullis, *The Unusual Origin*: 56.

33 Swanson, 'Biotech in Court': 362.

34 Bruno Latour, *The Pasteurization of France*, trans. Alan Sheridan and John Law, Cambridge, MA: Harvard University Press, 1988.

attention.³⁵ Whereas living systems tend toward homeostasis, PCR forces them to produce in excess. The PCR tube combines components in a mechanistic model that becomes a factory for material production. PCR intervenes directly into the biological realm by removing living processes and materials from their cellular contexts and impels them to produce materials far beyond their use value in the cells. The PCR algorithm is not merely a model of life as fractal and other chaos-inspired computer models described previously, but rather an algorithm that literally intervenes in living systems to produce chain reactions of DNA synthesis.

I have described the PCR reaction as creating a machine or factory in a PCR tube. The metaphor is useful here in describing a contained, in-vitro process. The metaphor becomes problematic, however, when we look at biotechnologies inspired and made possible by PCR, especially biotechnologies targeting living systems, organisms, and ecosystems.

Questioning Metaphors Used in Biotechnologies

Metaphors do not only guide how we explain, but also how we think about the world.³⁶ Informatics, code, computational, and engineering metaphors inspire a sense of clean, rational control. Such metaphors abound in recent biotechnologies, like synthetic biology, that have been fostered by PCR. To name a few, these terms include gene editing, cutting and pasting, and genetic switches. Various scholars have described the consequences of these metaphors and, more broadly, of understanding the cell as a machine or a production robot.³⁷ For instance, these metaphors of genetics have led to assumptions about genes directly mapping to physical traits in the organism, genes tied to phenotype ($G \Rightarrow P$), in a straightforward way, like a blueprint or design plan. However, this is inaccurate:

Even in these simple cases the degree of redundancy and non-linearity of $G \Rightarrow P$ is such that the only way to make sense of it currently available to researchers is to exhaustively map the function empirically. The problem is that, for the foreseeable future, this seems feasible only for simple instances of $G \Rightarrow P$, [...] and—to a point, for very simple model organisms like *C. elegans*. Once we start talking about complex organisms, particularly those characterized by flexible developmental trajectories, all bets are off.³⁸

In complex organisms, genes do not influence attributes in a completely predictable way. Our genome is neither a blueprint nor a script. On the contrary, it has complex redundancies and lacks one-to-one correspondence. It is never executed in full but is rather utilized or not according to cellular signaling or chemistry. Living systems are the result of evolution rather than design and are not optimized for excess production, but

35 Thacker, *Global Genome*, p. 40.

36 Dorothy Nelkin, 'Beyond risk: Reporting about genetics in the post-Asilomar press', *Perspectives Biology and Medicine* 44.2 (Spring, 2001): 199-207.

37 For an excellent summation of this critique, see Daniel J. Nicholson, 'Organisms ≠ Machines', *Studies in History and Philosophy of Science Part C: Studies in the History and Philosophy of Biological and Biomedical Sciences* 44.4b (December 2013): 669-678.

38 Maarten Boudry and Massimo Pigliucci, 'The Mismeasure of Machine: Synthetic Biology and the Trouble with Engineering Metaphors', *Studies in History and Philosophy of Biological and Biomedical Sciences* 44.4 (December, 2013), p. 5.

for their own survival. Reductive machinic and informatic metaphors lead us away from associations with the messy unpredictability and complexity of life, which is of course critical when these technologies are being marketed and proposed as technological fixes for the environment.

One such type of gene technology marketed as a fix for the environment—‘gene drives’—has been hotly debated of late. ‘A gene drive is a genetic engineering technology that can propagate a particular suite of genes throughout a population.’³⁹ A gene drive works by replacing a gene in one organism in a manner which makes it more likely to pass on to subsequent generations than through simple Mendelian inheritance—thus to effectively alter an entire population within a few generations. While a discussion of sexual reproduction (for instance, by a genetic counselor) might employ a metaphor of the roll of the dice to explain the possibilities of inherited disease, the gene drive essentially *loads* these dice so the inherited disease is always passed on. Gene drives have been proposed to provide an effective means of genetically modifying entire species of animals, particularly and most convincingly, but not limited to, disease-carrying insects such as mosquitoes and ticks.⁴⁰ The modifications proposed do not directly address the disease agent, bacteria, or virus carried by these insects (because they reproduce through non-sexual means), but they typically call for modification of the insect’s DNA so as to eventually make the organisms unable to produce a required trait or to reproduce at all and thus to die out. The impact of such a drive on a targeted insect would therefore be exponential, with the possibility of removing it from the environment in a few years. It would stand to reason, therefore, that the impact upon the food chain would also be exponential.

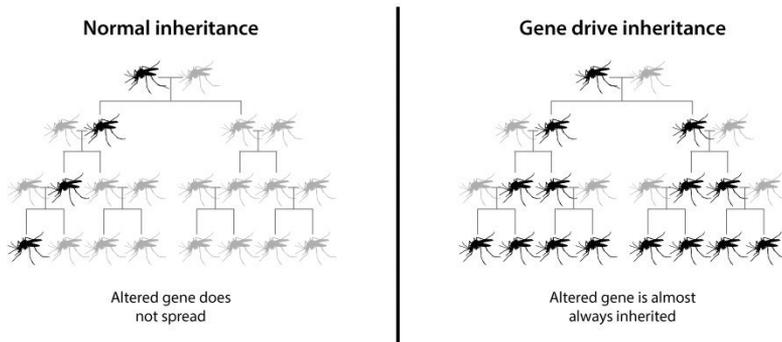


Fig. 2: Gene Drive diagram. ⁴¹

While clean, rational informatics metaphors pervade gene drive technology, some proponents have described their inventions as a ‘mutagenic chain reaction’ or ‘MCR’:

39 ‘Gene Drive’, *Wikipedia*, 23 October 2018, https://en.wikipedia.org/w/index.php?title=Gene_drive&oldid=861208423.

40 As it is my intention to confront misleading metaphors rather than vilify contemporary biotechnology, I have chosen as examples two of the most compelling cases for intervention: the *Anopheles* mosquito and the deer tick.

41 Image from <https://www.futuretimeline.net/21stcentury/2029.htm>. This reprint is for educational use only. No copyright infringement intended.

Loss-of-function mutations may only produce a mutant phenotype when both copies of the gene are mutated. Gantz and Bier developed a method they call mutagenic chain reaction (MCR) that autocatalytically produces homozygous mutations. MCR uses the initial mutated allele to cause a mutation in the allele on the opposing chromosome and thus the homozygosity of the trait. MCR technology could have broad applications in diverse organisms.⁴²

The gene drive is like a chain reaction in that it produces exponential impact upon a population in each successive generation and these impacts would have exponential effects upon broader ecosystems. An atomic explosion or a viral pandemic may also be applicable metaphors. 'The kind of gene drive that is invasive and self-propagating is in many ways the equivalent of an invasive species,' admitted Dr. Kevin Esvelt, an enthusiast of the technology.⁴³ Terms like gene-editing are overly clean and simplistic. The only clean, code-like manipulations occur when diagramming or explaining the targeted replacement of key genetic sequences in the target organism or in the sentient world.

In 2012, a new editing tool was developed called CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats). In this system, a programmable guide RNA is used to bring the endonuclease (often Cas9) to a specific genomic target with unprecedented ease and precision.⁴⁴

[G]ene drives can potentially be designed to engineer the well-being of all sentience.⁴⁵

However, the effects upon the population are potentially akin to those of inheritable radioactive mutations, produced by the atomic bomb, but much more thorough because synthetic gene drive mutations are designed to override evolutionary inheritance by producing mutations that are always inherited. Like a nuclear bomb, the longer term impacts upon the environment are also unknown. For instance, which species will move into the extinct one's niche? Which predator and prey species will be decimated and which will flourish? How might adjacent species cross-breed with the affected species and also inherit the mutation? How might these mutated genes be passed on to other species through horizontal gene transfer, such as that caused when retroviruses have their genetic sequences copied into the host? In short, how might unintended consequences of the project become exponential?

During a press conference in 1982, US President Ronald Regan noted, 'That is the missile sitting there in the silo... once the button is pushed... there is no recall.'⁴⁶ While Reagan's foreign policy strategy was 'diplomacy through strength' rather than through peaceful cooperation, the statement echoes a Cold War sentiment of deep

42 Valentino M. Gantz, Ethan Bier, 'The Mutagenic Chain Reaction: A Method for Converting Heterozygous to Homozygous Mutations', *Science* 348.6233: 442-444.

43 Carl Zimmer, "'Gene Drives' Are Too Risky for Field Trials, Scientists Say", *The New York Times*, 16 November 2017, <https://www.nytimes.com/2017/11/16/science/gene-drives-crispr.html>.

44 Brittany Enzmann, 'Gene Drives Explained: How to Solve Problems with CRISPR', *Synthego*, 4 December 2018, <https://www.synthego.com/blog/gene-drive-crispr>.

45 David Pearce, 'Compassionate Biology: How CRISPR-Based "Gene Drives" Could Cheaply, Rapidly and Sustainably Reduce Suffering Throughout the Living World', *Gene-Drives*, <https://www.gene-drives.com/>.

46 Robert L. King, 'Fatal Metaphors', *Massachusetts Review* 23.4 (Winter 1982): 709-713.

consequentiality of actions. There is a stark finality invoked by the nuclear bomb and ensuing chain reactions, not just of the initial blast but also of the assumed retaliatory scenarios that would follow a strike. Unlike editing on a computer, the initiation of a nuclear explosion is irreversible.

In terms of how radical biotechnologies are explained, metaphors of chain reactions, contagions, and nuclear bombs would probably cool public enthusiasm for these projects. But, as metaphors become constitutive, for instance of the types of disciplines that become linked, they might also encourage the participation of more applicable fields than computer science and engineering. For example, historians and naturalists as well as environmental and anti-nuclear activists would likely find these metaphors more accessible. I am proposing here that better fitting metaphors will facilitate a richer terrain for imagining outcomes of contemporary biotechnological initiatives and stronger interdisciplinary engagement. However, I am not suggesting that hyperbole or mischaracterization should be employed. Doing so would belittle the apocalyptic nature of the atomic bomb to overstate facile comparisons and it would also polarize public debate in an unproductive manner. Furthermore, I am an advocate of advancing our scientific understandings of all facets of genomics in laboratories, but I favor precaution in its applications and interventions in the broader world.

Returning to Mullis

Deep Woods PCR was an anachronistic and re-contextualized performance of science intended to tease out alternate threads of interpretation for the invention of PCR, one of the most influential biotechnologies of the late 20th century. The project resituated PCR as based in primal forces of nature: fire, smoke, steam, and water, rather than computers and information. The original performance took place in the summer of 2011 and three years later I flew to southern California to interview Mullis.

See Fig. 3 in the Gallery (p. 40).

When I interviewed Mullis in 2014, we spoke about his childhood explorations of chemistry and amateur rocketry, but I also wanted to ask him what he might have said if he had been called to testify in the 1994 OJ Simpson trial. Kary Mullis was an expert witness for the OJ Simpson defense team, yet he was never called to the stand. 'Labs worked for the cops,' said Mullis, 'They wanted to be the heroes.' In 1994, DNA evidence had recently become a 'gold standard' of criminal investigation, nearly impossible to refute, and was often used by prosecutors to intimidate innocent defendants whose attorneys didn't understand the technology well enough to question it. Furthermore, companies that performed DNA analysis were literally employed by the prosecutors, which Mullis felt violated any standard of objectivity.

Mullis told me that he 'would have said they didn't use very good techniques... you have to treat [a DNA sample] as if it's an infectious disease', and that during his development of PCR, '[he] started not being able to get any negative controls' in the lab, as the tiniest amounts of DNA drifting in the air would be amplified to give a false positive. He said that he 'bought all new equipment and brought it back to [his] house' to avoid contamination. Over and over, Mullis described the overwhelming power of the Polymerase Chain Reaction. Mullis' concerns about

DNA evidence employ analogies to biology ('infectious disease') and the natural sciences more broadly ('negative controls'), rather than informatics or computation. His cautionary attitude towards a biotechnology like PCR denotes one who has contemplated chain reactions capable of producing rapid explosions of product from a small catalyst, like bombs and rocket fuel. Such analogies may help to counter overly clean, engineering analogies used to describe contemporary biotechnological initiatives such as engineering new petroleum-eating bacteria as a technological fix for oil spills, or designing gene drives to wipe out entire genera or species of disease-carrying insects.

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ART, EXPERIENCE
AND BECOMING:
MUTATIONS,
AGENTS, AND
AVATARS

MARC GARRETT INTERVIEWS
LYNN HERSHMAN LEESON

ART, EXPERIENCE AND BECOMING: MUTATIONS, AGENTS, AND AVATARS¹

MARC GARRETT INTERVIEWS LYNN HERSHMAN LEESON

See Fig. 1 in the Gallery (p. 41).

Over the years, I have been fascinated by Lynn Hershman Leeson's artistic journeys, in which she has explored her assorted selves in relation to the world; enacting, for example, the situation of being embodied as an experimental interface with the world. Her work incites the feeling that the tools and objects used are in themselves extensions of these varied selves. Hershman Leeson's journeys have involved a dizzying amount of work in the fields of photography, video, film, performance, installation, and interactive and net-based media art. She has pioneered uses of new technologies, uses which are recognized as key to the workings of our society today. Hershman Leeson tackles big questions surrounding: identity in a time of mass, overpowering consumerism; privacy in an era of mass surveillance; the interfacing of humans and machines; the relationship between real and virtual worlds; and, new bio-ethics surrounding practices such as growing parts of the human body from DNA samples. Considering 19th century novelist Mary Shelley's celebrated publication *Frankenstein; or the Modern Prometheus*, its challenges towards macho revolutionaries of 'reason', and Shelley's critique of the misuses of science and technology by the patriarch, I see Hershman Leeson as a direct artistic descendant of Shelley's. Mary Shelley's publication was perhaps the earliest representation of science fiction, but it was also a gothic novel. Shelley appropriated the various influences and sources available to her at the time, and her novel is an assemblage of discoveries in science and technology, societal change and political upheavals, mixed with personal interests.² There are strong parallels between both women. Both are known as dedicated feminists and have managed to find ways around—and to work with—traditional forms of dominant, patriarchal structures and systems, so as to express personal, creative, and cultural identities on their own terms.

See Fig. 2 in the Gallery (p. 41).

Lynn Hershman Leeson's mission [...] seems to be that the body is a programmable software embedded in a changeable hardware. Therefore, she shows us so many

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- 1 This article is a remix specifically written for *State Machines: Reflections and Actions at the Edge of Digital Citizenship, Finance, and Art*. The content is from two different articles originally featured on Furtherfield. The first is from a book review of *Civic Radar*, (Marc Garrett, 'Lynn Hershman Leeson's: Civic Radar: Book Review', *Furtherfield*, 18 May 2016, <https://www.furtherfield.org/lynn-hershman-leesons-civic-radar-book-review/>) where editor Peter Weibel sets out a comprehensive monograph of Lynn Hershman Leeson's artistic career, spanning five decades. The second is from a 2015 interview with Hershman Leeson called 'Choose Your Muse' (Marc Garrett, 'Choose Your Muse Interview: Lynn Hershman Leeson', *Furtherfield*, 13 July 2015, <https://www.furtherfield.org/choose-your-muse-interview-lynn-hershman-leeson/>)
 - 2 Marc Garrett, 'Prometheus 2.0: Frankenstein Conquers the World!', *Furtherfield*, 3 June 2014, <https://www.furtherfield.org/prometheus-2-0-frankenstein-conquers-the-world/>.

hybrids and mutants, aliens and agents, actors and avatars, in real life and second life. From Dolls to clones, she demonstrates the paradox plurality of identities especially in the age of total observation.³

Hershman Leeson does not distance herself from the processes of science and technology. Instead, she leaps into the depths of our fears and unreservedly engulfs herself and her imagination in their material influences and modifications. Like Donna Haraway, Hershman Leeson takes cyborgs, misfits, biology, mutation, and transformation as her inspiration, contexts, and materials. And also like Haraway, she playfully and critically expresses concerns around science and technology, along with the ethical issues that may arise out of their continuously shifting influences on society; and thus, she is not owned by or weighed down by them. Every work put forward by Hershman Leeson is an experiment. Her interests and knowledge inspired by science and technology reflect her constant state of contemporariness. Her work directly correlates with breaking down systems of perceived values.

Hershman Leeson confronted conventional gender roles and exposed the normative construction of gender identity. Some of her videos have included cross-dressers and transgender men and women, as in *Double Cross Click Click* (1995), and her assumed male pseudonyms at a time when the art world was dominated by men who mostly ignored women.⁴

Hershman Leeson's art moves fluidly between different formats, contexts, and disciplines. Of course, this is not easy to brand. The art market survives by promoting art that fits into particular roles and products that are easy to promote, predict, and consume. The irony here is that the art world promotes the idea of itself as a site of novelty and insights, but in reality represents a deeply conservative culture. Some artists—Hershman Leeson being one of them—transcend the norm of the contemporary art world and build alternative universes, contexts, and identities, where their art is so investigatory and esoteric that they challenge traditional conventions. Hershman Leeson would like to 'eradicate censorship, and make more transparent the capitalistic underpinnings that are polluting access, value and visibility.' In the 70s, she was the first artist working on a prison art project in San Quentin, and many of her early public art works were 'geared toward social change'.⁵

Her work is not reduced to a singular, reflection of her own creative self. There is a wider story and it includes the voices of many others as part of the narrative of her life and work, as well as reclaiming a history in a male-dominated society. We see reaffirmed a varied and dynamic history where she has been involved in strengthening the role of women in society as part of an extension of her art process. One excellent example of this rich history is that over a period of 40 years she interviewed an extensive array of women artists, historians, activists, and critics who integrated personal and political content into their work. Some of that gathered material was then made into a film project, *!Women Art Revolution*, in 2010.

3 Peter Weibel qtd in Garrett, 'Civic Radar'.

4 Beitin, Andreas, 'Face, Surface, Interface: The Motif of the Mask', in Lynn Hershman Leeson (ed.) *Civic Radar*, Berlin: Hatje Cantz, 2016, p. 205.

5 Garrett, 'Choose Your Muse'.

See Fig. 3 in the Gallery (p. 42).

Hershman Leeson has not only achieved ground-breaking work as an artist, but also as a filmmaker. She has collaborated with actor and Oscar winner Tilda Swinton in several feature films that have gone on to receive numerous awards at international film festivals on account of their outstanding quality and innovative themes.

»Teknolust« is an absurd, amusing and scientifically highly topical science-fiction drama on the subjects of cyber-identities, biogenetics, gender constructions and sexual self-determination in the age of the internet. The plot turns on the scientist Rosetta Stone (Tilda Swinton), who illegally produces three clones of herself. The artificial entities can only be distinguished by the color of their clothing and live in an enclosed cyberspace. Because they are dependent for survival on the male Y chromosome, Ruby, the femme fatale among the clones, goes in regular pursuit of men. Sexual contact with Ruby leads to impotence in her lovers as well as to an allergic reaction triggered by a computer virus which is transferable to human beings. The FBI becomes aware of the clone family's machinations following the increased incidents of infection among men, and begins to investigate.⁶

On asking her to describe a real-life situation as well as a current idea or artwork that have inspired her, Hershman Leeson replied, 'Well, hearing about Steve Kurtz's predicament and the unfairness of it caused me to make the film *Strange Culture*. I personally experienced exclusion and rejection—as did many women, and that inspired *!Women Art Revolution*. I think work comes out of awareness of the situations of one's time.'⁷

Steve Kurtz is an artist and political activist who was an associate professor at the University of Buffalo, State University of New York, and a member of a politically oriented creative collective known as the Critical Art Ensemble. Hershman Leeson describes the premise of the documentary:

Steve Kurtz's nightmare began on May 11, 2004, when he awoke to find his wife Hope dead of a heart attack. Police responding to his distressed 911 call became suspicious of scientific paraphernalia in his house (materials for an art project on genetically modified food) and contacted the FBI. Soon his world was turned upside down. Only hours after his wife's tragic death he was suddenly a murder suspect, an accused bioterrorist, and a pariah to all but his closest friends.⁸

The film is told through a unique blend of interviews, documentary footage, and reconstructed scenes starring Tilda Swinton, Thomas Jay Ryan, and Peter Coyote. Hershman Leeson's critically acclaimed film is a sophisticated look at how the traumatic events of 9/11 altered American society and undermined its long-held values.⁹

6 'Teknolust: With Lynn Hershman Leeson at the Cinema', *Zentrum für Kunst und Medien*, March 2015, <https://zkm.de/en/event/2015/03/teknolust-with-lynn-hershman-leeson-at-the-cinema/>.

7 Garrett, 'Choose Your Muse'.

8 Garrett, 'Choose your Muse'.

9 *Strange Culture* (dir. Lynn Hershman Leeson, 2006), downloadable at <http://www.docurama.com/docurama/strange-culture/>

Hershman Leeson's work has crossed into many different fields and formats, including installations, videos, films, sculptures, robots, avatars, contracts, computer programs, photography, paintings, drawings, collages, browser-based art, artificial intelligence, bio-matter, network communication systems, and devices. Synthia Stock Ticker and Dollie Clones are just two examples that demonstrate how ahead of the curve she has been with her ideas and her integration of digital technologies into art. Synthia Stock Ticker is a networked-based media artwork made in 2000. It refers to the stock ticker invented by Thomas Edison and is unusually prescient in its portrayal of the emotional life of global markets. Inside a glass casing sits a small monitor screen, showing a video of a female character named Synthia.

When the market is up, the character dances and shops at Christian Dior: when the market is down, she chain smokes, has nightmares, and shops at Goodwill.¹⁰

See Fig. 4 in the Gallery (p. 42).

The Dollie Clones, 1995–96, also predate a contemporary artistic obsession, but this time with creeping surveillance. Central features of the work are two telerobotic dolls, Tillie the Telerobotic Doll and CyberRoberta, whose eyes have been replaced with webcams. Each doll is connected to a website that allows users to view the images taken by the cameras and click on an 'eyecon' to telerobotically turn the doll's head by up to 180 degrees to survey the gallery.

See Fig. 5 in the Gallery (p. 42).

Hershman Leeson's most prominent performance work was as another woman, Roberta Breitmore. This elaborate alter ego existed between 1973 and 1978. The Breitmore character was well developed and possessed different behaviors and attitudes to Hershman Leeson's own personal identity. Roberta Breitmore had her own handwriting, clothing, wig, makeup, driver's license, apartment, psychologist, bank account, credit cards, acquaintances, life story, and adventures. Hershman Leeson took an audacious leap and sporadically became Roberta Breitmore over a period of five years. Other women, sometimes even simultaneously, also lived as Roberta Breitmore.¹¹

I think we all work in the time frame we are born into, and if we are lucky use the materials or invent the technologies to give presence and voice to the political gestures of that era. We cannot produce work from another era other than what we inhabit and really have to be in tune with the global framing of the tools and language invented during our lifetime.¹²

See Fig. 6 in the Gallery (p. 43).

Hershman Leeson hired three additional performers, all women, to play Roberta. They wore costumes identical to the ones Hershman Leeson herself wore, and they treated

10 Meredith Tromble and Lynn Herschman (eds) *The Art and Films of Lynn Hershman Leeson: Secret Agents, Private I*, Oakland, CA: University of California Press, 2005, p. 92.

11 Beitin, 'Face, Surface, Interface', p. 205.

12 Garrett, 'Choose Your Muse'.

Roberta essentially as a professional (albeit part-time) gig. They undertook some of Roberta Breitmore's correspondence and went on some of her dates, which were documented in photos and audio recordings. Eventually, Hershman Leeson stopped enacting Breitmore, reducing the instantiations of Roberta Breitmore from four to three.¹³

See *Fig. 7 in the Gallery* (p. 43).

As organic printing and DNA manipulation reshapes the identities of newly manipulated organisms, so too the culture of absorbed surveillance has dynamically shifted. In the next 100 years, the materials used to create DNA will become increasingly distributed and hybridized. The implications of this research include not only the creation of a sustainable planet of hybrid life forms that can survive a sixth extinction and incorporate into its existence a morally responsible future.¹⁴

Hershman Leeson's work has been featured in media art history canons, such as Rhizome's Net Art Anthology, which they propose is a 'retelling [of] the history of net art from the 80s through the present day.'¹⁵ It feels astonishing that her work as well as her ground-breaking films have only recently been accepted into the art world. A selection of Hershman Leeson's texts, written from 1984 to 2014, was published in *Civic Radar*. These writings take us through different stages of Hershman Leeson's career, revealing ideas and intentions behind much of her work. In the last paragraph of the last text, a short essay titled 'The Terror of Immortality', she writes about the contexts that have given rise to her most recent work.

Civic Radar offers us insight into the mind of this generous and profound artist's fantastical journey in an era marked by accelerating change. And what's so amazing is that the content, the narratives, and the histories are real. It is an Aladdin's cave of rich, exceptional artworks, flowing with brilliant ideas. Hershman Leeson has had her finger right on the pulse of what's relevant in the world for a long time, and transmuted the knowledge she unearths in her examination of identity, feminism, science, technology, and more into her own artistic language.

Hershman Leeson's work is leaps and bounds ahead of most contemporary artists who are exhibiting now. *Civic Radar* should be read everywhere, and not just because it features great art, but also because it features a woman with a visionary mind. I am not a fan of the words 'genius' or 'masterpiece'; I find them tiresome terms reflecting a systemic, male domination over women and men, and the non-privileged classes. Yet, after spending time with *Civic Radar*, I cannot help but think that I have just witnessed something equivalent to 'genius' or a 'masterpiece' but without the negative connotations.

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13 Beitin, 'Face, Surface, Interface'.

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15 'Net Art Anthology', *Rhizome*, <https://anthology.rhizome.org/>.

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CONJURING
SPIRITS IN THE
BLACK BOX OF
FINANCE

PATRICIA DE VRIES

CONJURING SPIRITS IN THE BLACK BOX OF FINANCE

PATRICIA DE VRIES

The whole terrible fight occurred in the area of imagination. That is the precise location of our battlefield. It is there that we experience our victories and our defeats.

—Haruki Murakami, *After the Quake*¹

There seems to be a correlation between a series of events in the financial markets, starting in 2008, and the growing number of contemporary artists engaging with algorithmic trading. These events include worldwide stock market plunges, interbank market freezing, nationalization of international banks by national governments, the bankruptcy of Lehman Brothers, the near collapse and bailout of the American International Group, and a subprime mortgage crisis followed by foreclosures.

With these events and their unfolding in the context of a global recession, the notion of financial markets as a cybernetic, self-correcting, and mathematical machine eroded. As the recession placed the biggest burden on people with lower incomes and didn't leave middle-income earners unscathed, many people lost their sense of security and trust in banks, the housing market, retirement funds, job security, and in governments' abilities to manage the financial markets. With the aid of bailouts and backstops by governments, quantitative easing by central banks, and regressive risk transfer in the form of austerity programs, repressed wages, mortgage bearing, debt loading, precarious employment, and rising asset prices, the financial markets keep on keeping on. For some, however, cracks were exposed in the financial markets' foundations. Once seen these cracks could not be unseen.

Over the past few years, artistic imaginaries of the financial markets have emerged, positioning algorithmic trading in particular within layered and interrelated historical, technological, and environmental developments. In these works, focus has shifted to the larger cultural histories and frameworks of speculative risk exploitation to show how they are tied to socio-technical infrastructures, and also to climate change, as well as being embedded in certain belief systems, mythology, and theology. By means of these works, trading algorithms are imagined as 'entangled, mediated, connected, interdependent, intertwined'.² These artistic imaginaries offer constellations that reach beyond and above the black box of finance, broadening the scope of algorithmic trading, and opening it up to alternative imaginations. Different sensibilities, a mix of influences, histories, and orientations give shape to imaginative horizons that serve as guides to alternative imaginaries of the future of automated capitalism.

To represent algorithmic trading, to give it shape and make it legible, some artists animate and personify the black box of finance. Paul Crosthwaite argues that throughout

1. Haruki Murakami, *After the Quake*, London: Random House, 2003, p. 98.

2. Rita Felski, *The Limits of Critique*, Chicago: The University of Chicago Press, 2015, p. 146.

history artists '[have] turn[ed] to natural and animal imagery, or tropes of the monstrous or Gothic, or depictions of the gesticulating bodies of traders, or representations of the technologies used in trading, all in an attempt to reground finance in the materiality of things.'³ Repeatedly, predatory animals and monsters are the kind of life form ascribed to algorithmic trading in artistic imaginaries.

In *Fragments on Machines*, a 17-minute experimental piece of docufiction by Emma Charles, something burrows beneath or beyond the predominantly cyber-utopian and cyber-dystopian accounts of algorithmic trading.⁴ *Fragments on Machines* evokes the mythical figures of a hybrid, a specter, and the metaphor of a flood to represent algorithmic trading. Charles' much-accoladed video essay has been included in numerous exhibitions on information technology,⁵ and has garnered both popular and critical attention. In the spirit of Marx's 'The Fragment on Machines', Charles' video essay focuses on human-machine relations. The title of the film is a reference to Karl Marx's *Outlines of the Critique of Political Economy*, in which he discusses the evolution of the production of labor and capital, from the division of labor to the increasing integration of machines in labor, and to the ever-increasing automatization of labor.

In Charles' video essay, the opening scene of the first chapter—titled 'Metropolis'—portrays Manhattan's Financial District from the vantage point of a train crossing Manhattan Bridge. The camera captures the skyline of Lower Manhattan which, with its square blocks of skyscrapers and cube-like façades of Art Deco buildings, provides an association with the black box of finance. By portraying the architecture of New York's Financial District from a distance and from the outside, Charles alludes to inaccessibility. The camera then cuts to medium close ups of the façades of the skyscrapers and of some of the main Art Deco buildings. In doing so, 'Metropolis' sets the scene for *Fragments on Machines* smack in the middle of Manhattan's Financial District with its iconic and idiosyncratic plate-glassed skyscrapers, mixed with Art Deco architecture dating back to the days of heavy manufacturing for which these buildings were used in the early 20th century.

In a poetic tone, a male voice-over narrates:

I was once lost in the city; now, I don't know where to disappear anymore. I exist in two states. I remove the animal from myself as animals are removed from the city. Undetected and unnoticed, they disappear. Slowly, the natural becomes unnatural. Slowly, the city evolves.

3 Paul Crosthwaite, 'Meet the Curator: "Show Me the Money: The Image of Finance 1700 to the Present"', *BAAS*, 7 November 2014, <http://www.baas.ac.uk/usso/meet-the-curator-show-me-the-money-the-image-of-finance-1700-to-the-present/comment-page-1/>.

4 *Fragments on Machines* (dir. Emma Charles, 2013), video, 17:10 min.

5 See, for example, 'Nervous Systems' (2016) at Haus der Kulturen der Welt in Berlin, Germany; 'Globale: Global Control and Censorship' (2015/2016) ZKM, Karlsruhe, Germany; 'Infosphere' (2017) at CENART in Mexico City, Mexico; 'Mediated Architecture', Swiss Architecture Museum, HeK (House of Electronic Arts Basel), Switzerland; 'New Mythologies', POSTmatter/Second Home, London, UK, and 'I stood before the source', The Blackwood Gallery, University of Toronto, Canada.

The streets of New York's Financial District are almost empty, with just a few people in sight. The voice-over continues:

The spread of intelligence across Europe can be mapped, like an incurable epidemic of knowledge. In the place of public readings, came reading in private, in silence. The secrets of what never happened, in the end, cannot be burned, they multiply and imprint in every corner... I live through the structures and on the structures that have been planned by architects, designed by vibration, washed through with information... I stood before the source, an empty tomb. To be closer to the source is all I needed. The trucks could roll from their momentum, even with the brakes on. Their housings were dockside palaces. Treasure would travel hundreds of miles over days... A new king lives here...

A series of shots of fiber markings, manhole covers, street-level signs of underground utility ducts, and an industrial air ventilation system indicates that we are milling around the financial markets, located within the edifices of the depicted institutions and corporations.

The video's next chapter, titled 'Servers', takes the viewer beyond the façade of an edifice in the Financial District and into the building's empty hallways where 'the new king' allegedly resides. The sepia-colored, dimly lit architecture of the building's foyer contrasts sharply with the bright white, tungsten-lit server room that the camera enters. The cut between the shot of the hallway and that of the server room hints at the film moving from the outside to the inside of the black box of finance. Inside, behind the walls of the lavish but decaying Art Deco architecture, we find what looks like a data center. A door opens, and then another, and another. The room entered is filled to the brim with mainframe computers and server racks.

The supposed new king of Wall Street is personified by an *acousmètre* (a first-person, disembodied voice-over), and given a semblance of embodiment through a series of shots of aspects of the infrastructure of algorithmic trading. Numerous Art Deco buildings in the Financial District now house parts of the infrastructure of post-industrialist financial capitalism's new king. Data centers are dotted around the Financial District, and their physical location is important. The closer a high-frequency trading company, brokerage, or bank is located to the servers (that is, the closer it is to the source), the faster its algorithms can respond. What appears to exist in an ether, as an immaterial, invisible, omnipresent structure, is represented as connected, strap-attached to, and kept on leash by rubber, fiber, copper cables and brick.

The dialectic relationship between the words of the narrator and the images in *Fragments on Machines* associates the computational infrastructure of the financial markets with an 'incurable epidemic of knowledge'. The narrator metaphorically connects this 'incurable epidemic' to 'trucks rolling with brakes on'. The imagery of an epidemic and of moving trucks suggests prevalence, development, spread, movement, and inevitability with regards to the new forms of productivity that have come about—the algorithmic automatization of the financial markets. At the same time, the cause of this seemingly inevitable development could also be taken as reference to a primary mover, or even to a force of nature, or the preternatural.

The voice-over continues:

My muscle has been replaced by flex and copper; my brain a server. Ones and zeros, my voice. I exist as a phantom under iridescent color. I speak in shimmering tones to the hidden construction of the form. I desire to become data. I will be mobile, moving to provide. I will become the information flow. I am your personal relationship to the source. I become more and more. I move in and out of position several times a day. I adjust by fractions to adapt to my surroundings.

Rooms filled with copper and fiber-optic cables, computer servers, air ventilation, and cooling systems that facilitate algorithmic exchange have to an extent replaced a form of labor time and productivity which previously involved the body. The embodiment with which Charles represents algorithmic trading is given the form of a disembodied, conscious voice, a phantom-like hybrid organism existing in ‘two states’, human and machine, natural and unnatural, residing in New York’s corporate Financial District.

Hybrids are charged with meaning, which raises the question, what is the meaning of the hybrid figure of algorithmic trading? In the history of science, hybrids were part of a larger cluster of prodigies, Lorraine Daston and Katharine Park explain in *Wonders and the Order of Nature*, an exhaustive chronicle of wonder that covers more than a thousand years of ‘wonders of nature’: strange, rare, and extraordinary phenomena which ‘straddled categories’.⁶ Wonders had to be rare, mysterious, and real to be considered wonders, Daston and Park explain.⁷ Over time, some objects lost their status as wonders for various reasons—for instance, the basilisk was debunked, comets explained, and unicorn horns became too common.⁸ At the same time, new objects joined the canon of wonders, such as monstrous births or snow in summer.⁹ Some such anomalies were considered ‘enhancing the beauty and diversity of the world’, while other singular anomalies were considered prodigies, ‘divine messages and signs of things (usually undesirable) to come’.¹⁰ The category of the prodigious included earthquakes, eclipses, conjoined twins, unseasonable thunderstorms, examples of peculiar animal behavior, and other phenomena that were seen as ‘outside the order, movement and operations of nature’.¹¹ Daston and Park note that by the last quarter of the sixteenth century in Europe a specialized, canonical body of medical study on the causes of monsters was well established. Monsters, according to this literature, were caused by the violation of moral norms. Daston and Park point out that the category of the ‘monstrous’ did not spring from the blurring or exceeding of categories per se—which anthropologists such as Mary Douglas later placed at the heart of ideas of pollution. Rather, only when such blurring of categories was taken to be caused by the violation of moral norms was it considered monstrous.¹²

6 Lorraine Daston and Katharine Park, *Wonders and the Order of Nature: 1150 - 1750*, New York: Zone Books, 1998, p. 10.

7 Daston and Park, *Wonders*, p. 24.

8 Daston and Park, *Wonders*, p. 19.

9 Daston and Park, *Wonders*, p. 20.

10 Daston and Park, *Wonders*, p. 54.

11 Daston and Park, *Wonders*, p. 51; 181.

12 Daston and Park, *Wonders*, p. 181.

Hybrids, however, were the exception. Hybrids were seen as caused by 'abhorrent' behavior and therefore generally considered a sign of sin.¹³ Images of demons, which served as a reminder of sins to be avoided, were frequently represented as hybrid figures, which further emphasized their association with sin and punishment.¹⁴ Prodigies, Daston and Park chronicle, were taken to be the precursors of dramatic, local, and usually catastrophic events: epidemics, floods, famines, fires, and wars. Featuring a hybrid figure as the *acousmètre* of the film and associating a hybrid being with algorithmic trading brings to bear moral transgression if not a premonition of God's wrath. This leads one to ask, what moral transgression brought the hybrid into being?

Charles alludes to the automatization of labor as a possible cause. On the floors and in the offices that *Fragments on Machines* depicts, we don't find white-collar workers sat in cubicles. The camera pans along the lines and grids of server rooms, of cables and wires in all colors, of air ventilation systems, computer buttons, rubber tubes, and along endless, brightly lit corridors and aisles full of whirring machines, where the activities of algorithmic trading are supposed to 'happen'. The film shows an abundance of images with no human in sight. Here, Charles seems to allude to the *Grundrisse*, in which Marx contends that machines become an abstract, dominant power in the production of capital, enveloping humans and leaving workers scattered. According to Marx, this increasing reliance on machinery takes two forms. One is the development of machinery in which the mass of labor and the entire production process that enabled it has vanished from view, consumed by the machine. The second is the integration of these machines as a means of production for capital in a global market. Taken together, the development of human-labor-replacing machines as a means of production for capital in the world markets indicates the extent to which general intellect has become a tool for the ruling class.¹⁵

In *Fragments on Machines*, workers seem to have been replaced by machines. Humans have no function other than to keep the machines of automated financial capitalism up and running. The desolate and quiet images of Wall Street depicted in the previous chapter of the film are contrasted with the whirring and zooming sounds of server rooms, cable rooms, and generators that now occupy entire floors in buildings. Where once humans congregated, vents, server racks, loops of cables, and countless pipes and tubes have taken their place. The film's images show empty chairs, empty halls, and empty cubicles. Further emphasis is placed on water, from images of clogged cooling systems, to rusty and leaky pipelines, to images of cesspools. In *Fragments on Machines*, the workers that still exist are maintenance workers, such as technicians, cleaners, and doormen. The heart of financial capitalism has largely been emptied of human traces; manual labor has been replaced by machine labor.

In the voice-over we hear:

I collect, I discard. I seek positive results. Then—the purge. At the end of the day, I refresh, renew, liquidate, and realign my entire self.

13 Daston and Park, *Wonders*, p. 192.

14 Daston and Park, *Wonders*, p. 186.

15 Karl Marx, *The Grundrisse: Foundations of the Critique of Political Economy*, London: Penguin Books, 1993, p. 690–693.

Charles' use of the phantom figure is metaphorically and conceptually equivocal. In *The Spectral Metaphor: Living Ghosts and the Agency of Invisibility*, Esther Peeren explains that specters in contemporary culture and theory 'are methodologically distinct and vary in the characteristics, functions and effects they assign.'¹⁶ However, she distinguishes between three interrelated emphases within their usage in contemporary culture. Firstly, there is the ghost as the figure of return, expressing the persistence of the past in the present. Secondly, the ghost as a figure of presence-absence, ephemeral yet present in space as a matter that needs to be accounted for. And lastly, the ghost as a figure of mixed and hybrid phenomena, a conceptual figure of critique of the 'unmixed' and 'pure'.¹⁷ Ghosts indicate an agency that is present yet invisible and intangible, an eerie, hybrid entity. Described by Mara del Pilar Blanco and Esther Peeren as an 'unruly' and ambiguous figure, a 'non-present present', a 'being-there of an absent or departed one', they 'signify precisely that which escapes full cognition or comprehension... what is placed outside, excluded from perception.'¹⁸

Ghosts have a penchant for lingering and haunting, often demand a response, and are associated with the preternatural and with simultaneous and mixed temporalities and categories.¹⁹ Specters are unruly and ambiguous in the sense that they represent the bodiless presence of things that are conventionally conceived as disparate or even opposed: past and present, materiality and immateriality, the real and the imaginary, immanence and transcendence, and primary and secondary causes. To state it in a more accurate way, they cut through the limits and walk through barriers of the order of things. 'The specter stands for that what never simply is and thus escapes the totalizing logic of conventional cognitive and hermeneutic operations,' Peeren writes.²⁰

Finance and money, in general, and algorithmic high-frequency trading, in particular, have a track record for being associated with mystifying, spectral, and gothic qualities. The *acousmètre*, combined with images of vacuous office buildings and the haunting and ominous soundtrack that accompanies the film's images, invoke the spectral dynamics of capital described by Mark Fisher as existing 'at every level an eerie entity'.²¹ It is 'conjured out of nothing' yet exerts palpable influence.²² In *The Weird and The Eerie*, Fisher describes the eerie as 'tied up with questions of agency.'²³ It can be found in places 'where the forces that govern mundane reality are obscured.'²⁴ An eerie place is, as Fisher phrases it, 'where there is nothing but should be something', in 'landscapes partially emptied of the human' where an unknown agent seems to be acting.²⁵ An agent associated with fate and foresight.²⁶

16 Esther Peeren, *The Spectral Metaphor: Living Ghosts and the Agency of Invisibility*, London: Palgrave MacMillan, 2014, p. 10.

17 Peeren, *The Spectral Metaphor*, p. 10.

18 Maria del Pilar Blanco and Esther Peeren, *The Spectralities Reader: Ghost and Haunting in Contemporary Cultural Theory*, New York: Bloomsbury, 2013, p. 9.

19 Del Pilar Blanco and Peeren, *The Spectralities Reader*, p. 8.

20 Peeren, *The Spectral Metaphor*, p. 10.

21 Mark Fisher, *The Weird and the Eerie*, London: Watkins Media, 2016, p. 11.

22 Fisher, *The Weird and the Eerie*, p. 11.

23 Fisher, *The Weird and the Eerie*, p. 11.

24 Fisher, *The Weird and the Eerie*, p. 13.

25 Fisher, *The Weird and the Eerie*, p. 11.

26 Fisher, *The Weird and the Eerie*, p. 13.

The ‘something’ that is missing in *Fragments on Machines* might be human labor. Depicting New York’s Financial District as an eerie space, emptied of most human labor, where a ghost-like agency lingers, also invokes the specter of communism, from the famous line from Marx and Engels’ ‘Manifesto of the Communist Party’ (1848): ‘A spectre is haunting Europe—the specter of Communism.’²⁷ In the Manifesto, the specter indicates the persistent presence of the communist spirit in the fragmented and incoherent activities of the proletariat, scattered all over Europe. Conjoined and unified, their spirited activities may at some point in time incite a revolutionary struggle. Felski writes, ‘[N]ew actors jolt alongside those with thousand-year histories; inventions and innovations feed off the very traditions they exorcise; “the past is not surpassed but revisited, repeated, surrounded, protected, recombined, reinterpreted and reshuffled.”’²⁸

In *Fragments on Machines*, Charles ascribes a certain kind of spectral agency to algorithmic trading; it is thus given the power to act, wittingly and consciously, yet invisibly, as well as the ability to cut through time past and present. *We* might see no-body, nothing, yet *it* sees everything.

The disembodied voice mentions daily activities and its desire to ‘become more and more’, to become an information flow with a direct link to ‘the source’. The textual and visual emphasis on liquidity and fluidity in each chapter of *Fragments on Machines*—‘flows’ of data, ‘washed through’, combined with the repeated images of water pools, dripping and leaking tubes—becomes increasingly pronounced throughout the film. The final scene of ‘Servers’ depicts the Hudson River seen from a window inside the data center, inside the home of the ‘new king’, hinting it is the ‘new king’ that looks out on the Hudson. A sound bridge reinforces this view. It consists of the sound of streaming water, which is carried to the final chapter, titled ‘Flood’. In doing so, the sound bridge connects the perspective of the ‘new king’ to the first scene of ‘Flood’ which depicts the current of the Hudson. The soundtrack contains the continued sound of running and dripping water, mixed with the sound of a fire alarm, cut through with images of pools of water, rusty pipes, and broken cables, stressing both the entropic nature and the excessive use of energy of these parts of algorithmic trading. Repeatedly, Charles shows images of bodies of water, eroding copper wire, cesspools, and clogged cooling systems, and then cuts to images of the currents of the Hudson River. Visually and sonically, Charles links the data center to the Hudson and to approaching danger. Fomenting this impending danger the ambient musical score is foregrounded and becomes ever louder throughout the final chapter. Tracked by the haunting sound of an alarm creating suspenseful tension, the camera moves outward, from the edifice of the data center, out of the Financial District and onto a ferry on the Hudson River heading in the direction of New Jersey. The voice-over narrates:

The river flows and undulates underneath. Underground, organized tributaries completing the feedback loop. I was drawn in by the trickle of the stream, the meagre beginnings. The undulated notes that cascade on top of one another, collecting and

27 For online reference, see Karl Marx and Friedrich Engels, ‘Manifesto of the Communist Party’, *Marxist Internet Archive*, <https://www.marxists.org/archive/marx/works/1848/communist-manifesto/index.htm>.

28 Felski, *The Limits of Critique*, p. 158.

forming to lead me on... A million pounds will roll into the sea, dissolve, burn, blow away. You will never breathe the ashes, nor will you drink the pulp.

A seemingly fateful teleological event awaits the viewer in the final scene. *Fragments on Machines* ends with images of a flooded Verizon data center building in the Financial District. Several floors of the building, a key switching facility for interconnecting and storing communications, sustained severe damage from flooding during Hurricane Sandy in 2012. According to the voice-over, it took weeks and a million pounds to replace and repair. The damage done by Sandy was a reminder that, despite the concept of the cloud, the majority of data travels through cables underground, a spaghetti-like cable network with a history dating back to colonial times, and through urban environments in which a flood can grind all traffic and operations to a halt for weeks on end. The communication technology on which algorithmic trading depends is 'prone to weather disruption' and sensitive to rain, fog, snow, and water.²⁹ The spectral temporalities of algorithmic trading are grounded in matter, Charles suggests.

The next scene of *Fragments on Machines* shows men dressed in green and white coveralls mopping and sweeping a flooded floor. With this ending, Charles connects algorithmic high-frequency trading to the damage sustained by an extreme weather event and to a flood. A flood is an ambiguous and versatile metaphor, too. Flood stories are numerous, stretch over epochs, and cross and cover all continents. In European mythologies (amongst others), more often than not, a flood or deluge is sent by some kind of deity as a result of a conflict between deities, or as the fallout of a god's wrath. Charles leaves the signification of the flood in *Fragments on Machines* open to interpretation. Understood as a metaphor for the 'new king' of algorithmic high-frequency trading, wrath is upon us.

In another reading, Charles links the apparatus of financial markets that use up so much energy to the natural catastrophes global warming engenders. Interpreting the flood in biblical terms, a different narrative arises. In 'Noah and the Flood'—the flood narrative in the Book of Genesis—God sends his judgment of the wickedness and corruption of the world He created in the form of a flood, as a means to wash the world completely clean. The flood wipes all creatures off the earth, save for Noah and those with him in his arc, and turns the earth into a massive pool of water. After the flood, God asks Noah to remake and repopulate the earth. Seen this way, the flood connects algorithmic trading with a reversal, a remaking, a break away from what is humanly possible and conceivable. *Fragments of Machines* points to a sphere or realm outside the seemingly all-encompassing black box of finance, and to the influence this 'outside' can have on the vulnerable infrastructure of algorithmic trading. It points to that which cannot be predicted or financialized, that which cannot be protected by risk management or insurances, and to consequences that exceed the expected.

Can we relate to this ambiguity without mystifying it? Can we engage with this mystical and teleological metaphor without depoliticizing algorithmic trading? The answer is yes. The irony of Hurricane Sandy is hard to ignore: the flooding of much of the

29 Mark Buchanan, 'Physics in finance: Trading at the speed of light', *Nature*, 11 February 2015, <https://www.nature.com/news/physics-in-finance-trading-at-the-speed-of-light-1.16872/>.

Financial District caused the New York Stock Exchange to close for the first time in almost three decades and, tellingly, algorithmic trading was closed for two full days. A flood seems to be an equalizer, devastating all that it comes to pass and making everything an unrecognizable pool of muddy water. Human-induced climate change and the volatility and vulnerability of the financial markets are partly the result of flawed and inert government policies, however, both tend to hit the vulnerable hardest, and both are impacted by short-term thinking. The excesses of algorithmic trading and climate change are a product of both government and individual choices – from carbon emission rates, to fossil fuel laws, to the financial modelling of mortgage foreclosures, to our food choices, how we travel, and our use of natural resources – and both have incentive to take advantage of short-term benefits, while ignoring or down-playing the great risks further down the line.

The flood also nods to another recent development in the financial markets. Floods, tsunamis, hurricanes, pandemics, and earthquakes in Japan, Mexico, Puerto Rico, Chile or Colombia, Florida-named and Texas-named storms, European windstorms, Californian wildfires, and other natural catastrophes have become a financial product, a speculative object. Financial markets quantify and price possible natural disasters in so-called ‘catastrophe bonds’; that is to say, probable future scenarios involving natural catastrophes happening at a specific time and location have become a financial instrument. In the case of one of these speculative catastrophic events really occurring, the catastrophe will not merely affect those involved, but it will also entail profits or losses for the investors of the said catastrophe bond.

In *Turbulent Worlds*, Melinda Cooper explains, ‘While weather-related risk had once been covered through indirect means, such as property insurance, the contingencies of the weather could now be directly hedged and traded in the capital markets. The curious effect is that climate change—and the critical or singular events it may engender—has become a speculative opportunity like any other in a market hungry for critical events.’³⁰ The bonds turn disruptive events where a great deal of uncertainty and risk are involved into financial opportunities for investors—in other words, environmental derivatives. The result has been ‘financial instruments designed to price and trade both in the uncertainties of the weather and our own uncertainties about the future of climate change.’³¹

Ambiguous and quasi-religious metaphors recur in *Fragments on Machines*. In addition to a flood, algorithmic trading is associated with an eerie, urban landscape, connected to a hybrid, conscious, ghost-like, and possibly prodigious figure, and seems to pre-empt the coming of a catastrophic force. Each of these metaphors elude clear theorizations, and that seems to be the point. *Fragments on Machines* shapes an imaginary of algorithmic trading as a phenomenon as ambiguous as specters, hybrids, and floods.

What does *Fragments on Machines* reveal when it imagines trading algorithms this way? It hints to factors of influence outside the brightly lit, squarely bounded, and straight-lined space of the black box of finance, that nonetheless affect contempo-

30 Melinda Cooper, ‘Turbulent Worlds’, *Theory, Culture & Society* 27.2-3 (May 2010): 175.

31 Cooper, ‘Turbulent Worlds’: 176

rary economics. In this process, the mechanical, boxed, linear infrastructure and the urban grid of algorithmic trading are imagined as mutually constituted by a re-pastoralized landscape, which includes a transformative encounter with a force of nature. To conceive of algorithmic trading by way of associating it with the figure of the specter, with an eerie and prodigious space that is, save for a few maintenance workers, devoid of human presence, and to tie it to a flood is to conflate and recombine what is usually considered as categorically distinct. Algorithmic trading is imagined here as internally related to and mutually constituted by financial and natural history, economy, and theology, and exists between the probable and the possible. Instead of swapping one dualism for another, and instead of furnishing algorithmic trading with all-capturing power relations, or imagining the black box of finance as mystical or otherworldly, Charles connects the porosity, entropic, error-prone matter of algorithmic trading technologies with the constant manual labor and maintenance work it necessitates, and adds to this a Marxist revolutionary trope and biblical imagery of sin, punishment, and new beginnings.

Many phenomena come together in *Fragments on Machines* to create an assemblage, and what is more, an open system. The constant maintenance work cannot prevent trading catastrophes, *Fragments on Machines* seems to suggest, as the black box of finance is not a closed system. This maintenance work happens on all levels, from the tweaking of algorithms by programmers, to the work done by cable guys, to the interventions by central banks and governments, none of whom are able to predict the future or transcend time and space. Giving constitutional significance to myriad metaphors and symbols charged with meaning invalidates dualisms and provides algorithmic trading with many ties to the world. Algorithmic trading is imagined as a synthesis between necessity and possibility, the infinite and the finite. Similar to water, a recurring visual trope in the film, algorithmic trading runs in every direction, affects everything it comes across, *and* is affected by what it encounters on its course, but not in equal measure.³²

Fragments on Machines suggests that illuminating the conceived obscurity, immateriality, or intangibility of the black box of finance would not give way to more democratized, less obscure, or manageable financial markets. Rather, it imagines the black box of finance as part of a far larger, unstable, and ambiguous constellation that connects the hardware and software of algorithmic trading to the environment, to sensibility, to unruliness, and to seemingly invisible movers—from the dock palaces of yesteryear to an extreme weather event, and from clogged air strainers to a new testament. By drawing correlations between trading software and the catastrophes of nature, and between hardware and the divine, conventional assumptions about uncontrollability and the invisibility of algorithmic trading are put in doubt.

Catastrophe bonds and algorithmic trading are products of a culture of risk. And, climate change and financial crises have to do with bad management. Catastrophe derivatives, algorithmic trading, and risk all flourish when governments, policymakers, and individuals think short term. Climate change and algorithmic trading are, of course,

32 Water metaphors are part of finance jargon, too—think of dark pools, vaporized profits, flows of capital, frozen markets, liquidity freeze, streams of indexes.

not uncontrollable. The laments of the specter, the sounds of the alarm going off, suggest that algorithmic trading is not defined by its technological infrastructure alone but all the more with how it is managed. *Fragments on Machines* seems to suggest that we are not fully left to our own devices, and neither should we render algorithmic technology as beyond intervention and control. Specters and a flood may provide a partial answer to present-day technological determinism and neoliberal fatalism, as these figures open fatalism and determinism up to other narratives and possibilities, to the chance of imagining and doing things another way.

On the one hand, there is finiteness, represented as the technical infrastructure of algorithmic trading. On the other hand, there is future possibility. *Fragments on Machines* could be considered as a form of artistic tactical resistance against global financial capitalism, and the algorithmic trading happening on its markets as an all-encompassing totality, as a regime that knows 'no end', 'no alternatives', 'no exits', and 'no outside', against a kind of thinking that asserts that everything that happens can have meaning only in relation to this totalizing frame. The figure of the specter in particular represents a shift in which the identification with a certain way of imagining things and life is broken—like the colloquial 'you look like you've just seen a ghost'. Moreover, the specter as an 'unstable' figure 'nullifies the conformism and arrogance of totalizing frames' and it may help to imagine and mobilize different futures and endings of automated capitalism.³³ In the end, and to refer to Murakami, imagination is the place for defeats and victories.

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33 Victor Kal, *Levinas en Rozenzweig*, Zoetermeer: Uitgeverij Meinema, 1999, p.153. Translation by author.

RECLAIMING
THE CORPORATE-
OWNED SELF

MARC GARRETT

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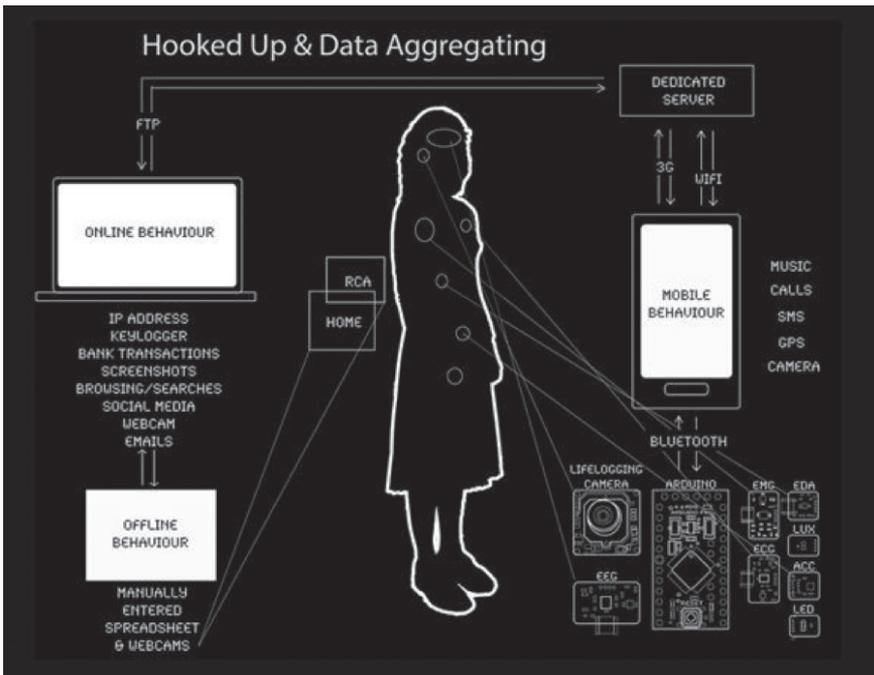


Fig. 1: Image from Jennifer Lynn Marone's website.

In a world where every atom can be addressable with an IP address (IP6), discussion of the possibility of capturing analogue things is increasingly less relevant. What becomes critical is the question of who captures and controls what data owned by whom.²

The old cliché that knowledge is power remains as true today as ever before. Elite groups channel our social interactions, cultural identities, and interests at all times. The narratives and stories of who we really are have become distorted, filtered, and engineered in accordance with the needs of marketing companies, accepted historical canons, everyday mainstream media, the military, numerous corporations, and nation states. Truth, like everything else, is a commodity; it is not a right. Truth and fact are owned by the highest bidder, and if you can afford it, you can misinform a mass of

1. Originally published in *PostScriptUM* #39, Ljubljana: Aksioma, 2017, https://aksioma.org/pdf/aksioma_PostScriptUM_29_ENG_JLM.pdf.
2. Carleigh Morgan, 'Data Asymmetries: An Interview with Burak Arıkan', *Furtherfield*, 9 December 2016, <http://archive.furtherfield.org/features/interviews/data-asymmetries-interview-burak-arikan/>.

people. One example of this is illustrated in the documentary *Merchants of Doubt*, directed by Robert Kenner.³ In the documentary, Kenner reveals how the tobacco industry spread false information among firefighters to popularize the false belief that domestic fires caused by cigarettes were actually the fault of furniture rather than cigarettes.⁴ The production of misinformation in order to maintain profits and control over social contexts can also be seen in the way that climate change deniers have been encouraged to attack scientists. 'Fossil fuel interests are more than happy to provide funds for them in various ways, to promote them, to sell their books, to fly them around to give presentations.'⁵

At the same time, social networking platforms, such as Facebook, Google, and others, are collecting users' personal data on an unprecedented scale and then selling it on to advertisers for billions. As 'an infrastructure, Facebook is progressively embedding itself in our daily existence, taking over more and more functions formerly provided by other, less restrictive means.'⁶ Edward Snowden's leaks revealed that the National Security Agency (NSA) was spying on Americans, and millions of people outside the US, too. Rather than rooting out terrorists, they spent their time 'infiltrating video game communities and developing techniques to blackmail individuals with their online pornography usage.'⁷ It has also been revealed that Facebook and Google have been handing over user data to the NSA.⁸ This direct communication between these powerful bodies has demonstrated that a tiny number of powerful clusters exist as a network of obsessive surveillance networks, a panopticon, observing us all. It is not only an intrusive, exploitative, and oppressively perverse gaze into our lives, but it also introduces a military presence into our digital interactions. In his in-depth critique, 'NSA Surveillance, Edward Snowden and the End of Privacy', Jason Louv says that '[s]uch surveillance policies will only be the tip of the iceberg.'⁹

Autonomy across the internet and its networks is therefore disappearing as online activity is now dominated by corporate-controlled 'social' zones. Through digitized versions of ourselves and as virtually indigenous users of the internet, we graze away in these social networking platform pens similar to cows in a field, chomping at the areas allocated to us via biased algorithms that dictate what we see and hear. Our internet experience is restricted as we abide by and exist within imposed filter bubbles. When

3 *Merchants of Doubt* (dir. Robert Kenner, 2014).

4 Pedro Marum, 'Disrupting knowledge: The Seven Heads of Ignorance', *Furtherfield*, 2 December 2016, <http://www.furtherfield.org/features/reviews/disrupting-knowledge-seven-heads-ignorance>.

5 Kevin Gosztola, 'Interview With Michael Mann: Climate Change Denial And Attacks On Scientists In Age Of Trump', *Shadow Proof*, 16 April 2017, <https://shadowproof.com/2017/04/16/ unauthorized-disclosure-podcast-climate-change/>.

6 Jean-Christophe Plantin, Carl Lagoze, Paul N. Edwards, and Christian Sandvig, 'Infrastructure Studies Meet Platform Studies in the Age of Google and Facebook', *New Media & Society* 20.1 (August 2016): 291–310.

7 Murtaza Hussain, 'What Snowden Really Revealed', *Al Jazeera*, 2 January 2014, <http://www.aljazeera.com/indepth/opinion/2013/12/what-snowden-really-revealed-20131228113515573236.html/>.

8 Jonathan Taplin, *Move Fast and Break Things: How Facebook, Google, and Amazon Cornered Culture and Undermined Democracy*, New York: Little, Brown and Company, 2017.

9 Jason Louv, 'NSA Surveillance, Edward Snowden and the End of Privacy: A Real-Time Account of the Biggest Leaks in US History', *Ultraculture*, 24 April 2017, <https://ultraculture.org/blog/2017/04/24/nsa-surveillance-edward-snowden/>.

we use social media platforms and web browsers, our data is harvested and scraped. This mass extraction of data extends much further into blatant arrogance involving questionable aspects akin to social engineering.

Facebook knows your friends, what information you provide about them, what they say about you, what other sites you visit (if they include a Facebook 'like' button, which most do), what you bought, what device you used to access Facebook, and much more.¹⁰

According to the British newspaper *The Independent*, in 2014 Facebook 'was found to have secretly manipulated hundreds of thousands of users' news feeds as part of an experiment to work out whether it could affect people's emotions.¹¹ And it has been 'considering secretly watching and recording users through their webcams and smartphone cameras.'¹² Apple collects mass phone data which they say is collected anonymously and users have no opt-out clause.¹³ This includes text messages, contact lists, and photos extracted from iPhones. This does not only affect our privacy but also our bank accounts, as many ISPs charge for data transfers.¹⁴ Ippolita, a group of activists and writers, have warned how social media promotes emotional pornography, where our feelings are exploited as clickbait in exchange for our personal data.¹⁵ We are a rich source of data-mining material. The historical roots of this lie in the development of artificial intelligence (AI) and 20th century statistical analysis. These two methods of formulating data have grown ever closer together backed by corporations and government-initiated, military funding.¹⁶

In the late 18th century, the English philosopher and social theorist Jeremy Bentham designed the Panopticon. It was designed to allow round-the-clock surveillance of prison inmates by a warden. Bentham's intention was humanitarian, but penitentiaries are not the best advertisement for a utilitarian ethic.¹⁷ In 1975, the French philosopher Michel Foucault said we are not only monitored in prisons, but in all hierarchical structures like the army, schools, hospitals, and factories. This process has evolved through history to resemble Bentham's Panopticon 'because there is a penetration of power into the behaviour of individuals. Power becomes more efficient through the mechanisms of observation, with knowledge following suit, always in search of "new objects

10 Mark Hachman, 'The Price of Free: How Apple, Facebook, Microsoft and Google Sell You to Advertisers', *PCWorld*, 1 October 2015, <http://www.pcworld.com/article/2986988/privacy/the-price-of-free-how-apple-facebook-microsoft-and-google-sell-you-to-advertisers.html/>.

11 Aatif Sulleyman, 'Facebook Could Secretly Watch Users Through Webcams, Patent Reveals', *The Independent*, 8 June 2017, <http://www.independent.co.uk/life-style/gadgets-and-tech/news/facebook-plans-to-watch-users-through-webcams-spy-patent-application-social-media-a7779711.html/>.

12 Sulleyman, 'Facebook Could Secretly Watch Users'.

13 Meg Marco, 'Privacy Change: Apple Knows Where Your Phone Is And Is Telling People', *Consumerist*, 21 June 2010, <https://consumerist.com/2010/06/21/privacy-change-apple-knows-your-phone-is-and-is-telling-people/>.

14 Joseph Menn, 'Your iPhone Is Collecting More Information About You Than You Think', *Business Insider*, 26 July 2014, <http://read.bi/2sEXW6x/>.

15 Pedro Marum, 'Disrupting knowledge'.

16 Marc Garrett, 'Heath Bunting, The Status Project & The Netopticon', *Furtherfield*, 23 April 2012, <http://www.furtherfield.org/features/articles/heath-bunting-status-project-netopticon/>.

17 David Pearce, 'The Panopticon', *Utilitarianism*, <https://www.utilitarianism.com/panopticon.html/>.

of knowledge over all the surfaces on which power is exercised.”¹⁸ Now, we have digital networks: our phones have been following us via mapping apps and GPS, TVs have been “tracking what their owners were watching, and shuttling that data back to the company’s servers, where it would be sold to eager advertisers.”¹⁹ The contemporary version of the Panopticon exists through digital networks as the Netopticon. Individuals are complicit in feeding their own forms of collective co-surveillance every day, as well as being traced by corporations, governments, and spammers.²⁰

[...] individuals have become information hungry. What started as a slightly awkward hobby in the 80s, the quantified self has now become mainstream with people self monitoring anything from sleep to eating habits, from sport activities to mood using smartphones and smartwatches with built-in sensors, uploading intimate details such as heart-rate, sleep patterns and whereabouts to corporate servers in order to improve their performance.²¹

We are the Netopticon

Critiquing the role of contemporary technological platforms, systems, and structures in the networked age is a necessary exercise. A new generation of contemporary artists, scientists, researchers, activists, hackers, and journalists are extending their explorations beyond graphical user interfaces (GUI) and finding inventive strategies for unlocking these clandestine, machinic manoeuvres that vacuum up the data experiences in our everyday lives. One such artist is Jennifer Lyn Morone. By literally turning herself into a corporation she has embraced this extreme form of capitalism. Morone is an individual and a business enterprise, and her intention is to better understand the effects of the free-market systems dominating our lives.

Everything she is biologically and intellectually, everything she does, learns or creates has the potential to be turned into profits. Jennifer Lyn Morone™ Inc. is a graduation project in Design Interactions but as Jennifer underlines, this is not a speculative project.²²

Morone turns the tables by shining the torch back onto the hunters to study their behaviors and clarifies the conditions of the data hunt. She takes on the trappings and movements of the body of the predator—to become them, to see what they see, to feel their intentions, to reflect on her own vulnerability in the mirror of their all-seeing eye. Morone says that as a corporation in extreme capitalism “[y]ou are no longer merely a human with an identity, thoughts, emotions and abilities all jumbled up into a body. You become deconstructed and compartmentalised into a collection of many units of

18 Moya K. Mason, ‘Foucault and His Panopticon’, *Mojak*, <http://www.moyak.com/papers/michel-foucault-power.html/>.

19 Brian Barrett, ‘How To Stop Your Smart TV From Spying on You’, *Wired*, 7 February 2017, <https://www.wired.com/2017/02/smart-tv-spying-vizio-settlement/>.

20 Marc Garrett, ‘Heath Bunting’.

21 Marloes de Valk, ‘A Contemporary Delphic Oracle: The Church of Big Data’, *Furtherfield*, 10 October 2016, <http://www.furtherfield.org/features/contemporary-delphic-oracle-church-big-data/>.

22 Regine Debatty, ‘Jennifer Lyn Morone™ Inc: The Girl Who Became a Corporation’, *We Make Money Not Art*, 23 June 2014, http://we-make-money-not-art.com/jennifer_lyn_morone_inc/.

marketable goods and services.²³ By claiming corporate ownership over her own personal data she breaks down the abstraction and ambiguity of what was there before. Morone, as the founder of her own corporation, turns over her skills, capital, possessions, and intellectual property to it, the corporation, and these become its assets and increase its value. This includes Morone's identity. Her name, appearance, and IP addresses become the brand and are trademarked; thus, her mental abilities (knowledge) are processes and strategies; her physical abilities are equipment; her biological functions are products; her data is the corporation's property; and the shares are her potential. These all become assets that she can capitalize on. Her debt is turned into the corporation's liability, which actually increases her—that is, the company's—value if it were to be sold.²⁴ It is a symbiotic relationship and also an appropriation on both sides. Morone says, '[A] corporation is not just a series of legal protocols, it is a state of mind. Life as a corporation is not for the weak, the lazy, nor the fearful.'²⁵

Morone's video, *Meeting Minutes*, was made a year after she had made the decision to exist as a corporation. The video shows three versions of herself attending an annual board meeting. This is a playful critique demonstrating a non-patriarchal convening. It's a startling contrast against the male-dominated business board meetings we are typically used to. The video illustrates how Morone has taken on multiple identities in order to reflect the different roles and tasks undertaken to become a corporation.

See Fig. 2 in the Gallery (p. 44).

You might have multiple identities and take on many forms. You must see everything that you are—mentally, physically and biologically—everything you do, learn or create—as having the potential to be commodified and capitalised on.²⁶

Morone has created a pharmaceutical business that produces Rejuvenix, a hormone therapy made from her dehydroepiandrosterone (DHEA). It is one of the most abundant circulating steroids in humans, and is produced in the adrenal glands, the gonads, and the brain, where it functions as a metabolic intermediate in the biosynthesis of the androgen and estrogen sex steroids. It also acts as a neurosteroid and neurotrophin when used orally as a medication or dietary supplement. As Morone's satirical promotional video for her product Rejuvenix explains, high doses may cause aggressiveness, irritability, trouble sleeping, and the growth of body or facial hair on women. It may also stop menstruation and lower levels of HDL ('good' cholesterol), which could increase the risk of heart disease. Side effects include acne, heart rhythm problems, liver problems, hair loss (from the scalp), and oily skin. It may also alter the body's regulation of blood sugar.²⁷

See Fig. 3 in the Gallery (p. 44).

23 Jennifer Lyn Morone, 'Manual I: How To Become a Corporation – Embracing Extreme Capitalism', *Jennifer Lyn Morone Inc.*, 2016, p. 14.

24 Regine Debatty, 'The Girl Who'.

25 Regine Debatty, 'The Girl Who'.

26 Regine Debatty, 'The Girl Who'.

27 'Dehydroepiandrosterone', *Wikipedia*, 11 July 2017, <https://en.wikipedia.org/w/index.php?title=Dehydroepiandrosterone&oldid=790026624/>.

Various artists and activists have engaged themselves in recreating, extending, or adopting personas in order to unearth or unsettle a foe larger than themselves. One worth mentioning is the mysterious multiple identities of female artist(s) Karen Blissett. During the process of becoming multiple, Karen claimed to be the offspring of the legendary 90s Neoist radical arts collective identity, Luther Blissett and Karen Eliot. Karen Blissett grew up with Web 2.0, exploiting the uncertainty surrounding her 'real girl' status. She carries on the unconventional traditions of disruptive and exploratory net-based identities from earlier 90s, audio-visual software artists NN aka Netochka Nezanova aka Nameless Nobodies, and more recent human-bot combos such as Angel F, a baby Artificial Intelligence by Salvatore Iaconesi and Oriana Persico AKA Art is Open Source.

Karen's ontology also rhymes with Piratbyran's chatbot OmniHal, programmed to welcome users to their Internet Relay Chat channel (used for years by a group of friends to devise, plan, and develop the philosophies, software, and parties that underpinned a particular flowering of free culture on the Internet). Over time the chatbot mimics the words and concerns of the IRC users, filling the channel with echoes of previous exchanges creating a sense of belonging and conviviality.²⁸

Morone's intention to reclaim agency while immersed within data-driven networks, protocols, and algorithms, constitutes a style of Post-Fordist cyborg-activism. In his book, *The Cyborg: A Treatise on The Artificial Man*, Antonia Caronia says that today's cyborg is forced into a process of capitalistic growth that sees no difference between work and leisure, 'between the office and the playground, and between times of public and private life.'²⁹ Simon Penny points out that one of the 'classic techno-utopian myths of computers is that access to information will be a liberation, and the results will be, by definition, democratizing.'³⁰ His critique of networked technology and the dreams it once promised us point now to the dire trouble and unexpected consequences of these utopian dreams.³¹ Morone's cyborgian presence is not techno-utopian, or transhumanist, with grand claims of how perfect technology is and how it will save us all in the Ray Kurzweil sense. Rather, hers is a dystopian act of survival, in contrast to Kurzweil's seemingly overly optimistic, privileged chant, which tells us more about his lack of grounded knowledge in the world. By interrogating the relationship with proprietary systems and re-examining the conditions and affordances of black boxes and the systems of techno-cultural production, we can disrupt the mechanisms that dominate the conversations around art, technology, life, and economy. In fact, Tatiana Bazzichelli puts forward the notion of disruptive business and that it 'becomes a means for describing immanent practices of hackers, artists, networkers and entrepreneurs.'³² Morone invoicing companies for tracing her is a disruption like those proposed by Bazzichelli:

28 Ruth Catlow, 'Karen Blissett is Revolting', *New Criticals*, 24 May 2014, <http://www.newcriticals.com/karen-blissett-is-revolting/print/>.

29 Antonio Caronia, *The Cyborg: A Treatise on The Artificial Man*, Luneberg: Meson Press, 2015, p. 27.

30 Simon Penny, 'Consumer Culture and the Technological Imperative', in Simon Penny (ed.) *Critical Issues in Electronic Media*, New York: State University of New York Press, 1995, p. 63.

31 Marc Garrett, 'Prometheus 2.0: Frankenstein Conquers the World!', *Furtherfield*, 3 June 2014, <http://www.furtherfield.org/features/prometheus-20-and-our-god-complex/>.

32 Marc Garrett, 'We Need to Talk About Networked Disruption, Art, Hacktivism and Business: An interview with Tatiana Bazzichelli', *Furtherfield*, 13 February 2014, <https://www.furtherfield.org/we-need-to-talk-about-networked-disruption-and-business-an-interview-with-tatiana-bazzichelli/>.

In my disruptive loop model, artists and hackers use disruptive techniques of networking in the framework of social media and web-based services to generate new modalities for using technology, which, in some cases, are unpredictable and critical; business enterprises apply disruption as a form of innovation to create new markets and network values, which are also often unpredictable. Networked disruption is a place where the oppositions coexist, and it is a reconfiguration of practices into a structure of mutual feedback instead of opposition.³³

In 2016, author Brian Christian and cognitive scientist Tom Griffiths wrote a book called *Algorithms to Live by: The Computer Science of Human Decisions*. Their premise was that computer algorithms need not only be mysterious and abstract, but they can also untangle very human questions. These range from making better decisions to ‘finding a spouse to finding a parking spot, from organizing one’s inbox to understanding the workings of memory [...] into strategies for human living.’³⁴ In her ground-breaking essay, Donna Haraway says,

‘[O]ur bodies, ourselves; bodies are maps of power and identity. Cyborgs are no exception. A cyborg body is not innocent; it was not born in a garden; it does not seek unitary identity and so generate antagonistic dualisms without end (or until the world ends); it takes irony for granted. [...] Intense pleasure in skill, machine skill, ceases to be a sin, but an aspect of embodiment.’³⁵

Morone’s actions relate to Haraway’s call in that she is taking responsibility for the technology she is using and facing the techno-devil head on, and not hiding away in the hope that things may get better. Morone’s approach is also exactly what Haraway proposes in her latest publication where she asks us to learn to stay with the trouble of living and dying together on a damaged earth as we spiral into ecological devastation.³⁶

See Fig. 4 in the Gallery (p. 45).

Morone proves in her practice that disrupting the data she uses means others can also do it. Wouldn’t it be great if this was the start of something similar to when punks picked up their instruments to forge a new era of social change? Where outsiders, amateurs, and the working classes suddenly found a voice and a place for their own artistic freedoms of expression? When for a brief period of time DIY culture, music, and politics emerged from its subcultural ghettos influencing mainstream culture and the media? Perhaps the DIY attitude of Morone can reach individuals and groups no longer content with sitting on the sidelines as disaffected consumers, just letting the Netopticon suck their data dry.

Morone sets herself in the long tradition of subversive affirmation, translating into a clear, powerful narrative the workings of extreme capitalism, the economic system in

33 Marc Garrett, ‘Networked Disruption’.

34 Brian Christian, *Algorithms to Live by: The Computer Science of Human Decisions*, New York: Henry Holt & Company, 2016.

35 Donna Haraway, *Simians, Cyborgs and Women: The Reinvention of Nature*, New York: Routledge, 1991, pp. 149–181.

36 Donna Haraway, *Staying with the Trouble: Making Kin in the Chthulucene*, Durham: Duke University Press, 2016.

which everybody is living today, but that only a few understand and use to their own advantage. This is not just an individual artist expressing a position and social context. It is a cultural shift that demonstrates how a contemporary artist can rebuild and find new narratives and routes from the complicit and old behaviors of letting data be handled by self-appointed professionals. Morone is developing an app called *Database of ME* or *DO ME*. It collects and stores the data she generates: her location, heartbeat, browsing activity, mood, etc. This way, the company can sell, lease, rent, exchange, or invest the data for her own profit.³⁷ Morone has also made Lure and Repel as part of her production line, ‘two scents made from her pheromone molecules that, respectively, attract and repel men.’³⁸ Haraway proposed that the ‘proper state for a Western person is to have ownership of the self, to have and hold a core identity as if it were a possession’,³⁹ and that ‘not to have property in the self is not to be a subject, and so not to have agency.’⁴⁰ Morone certainly fits this strategy.

Reclaiming the freedoms curtailed and diverted by the powers that be is a progressive and intelligent action. Morone has bravely entered into an explorative zone, demonstrating a new edge, a new venture space for the *avant-garde*. Like Morone, we all need to deconstruct and unpack this hidden world we are all held hostage to. Perhaps if we actively reclaim our digital selves and take more responsibility, and thus control of these clandestine transactions occurring every second of the day as part of the all-seeing eye, the Netopticon, we may stand a chance of owning our own societal contexts, our networked futures, and on our own terms. If this does not happen, then at least we would not have fallen to our knees, submissive and ignorant of the meta forces working to exploit and redefine us. At least we would have had fun disrupting the exploiters with our eyes wide open.

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THE HUNT
FOR THE ONE
TRUE CHAIN

ROB MYERS

THE HUNT FOR THE ONE TRUE CHAIN

ROB MYERS

Prologue

It is the near future. Following the success of Dogecoin in establishing the future of cryptocurrency governance the state has (over-)reacted by banning all currencies, crypto and fiat alike, except for Dogecoin.

Everything must ultimately be anchored to the Dogecoin chain, by law enforced with the full coercive power of the state. Sidechains, shards, layer two networks, all have to represent their opening, closing and updating as transactions placed into Dogecoin blocks dug (mined) once every sixty seconds.

With one central chain to mine and one supreme coin to hodl, the price of Dogecoin has increased exponentially, bringing both joy and sadness to shibes. Joy because they always knew that Doge would go to the moon. Sadness because of everything else—state censorship, block congestion, high fees, and liquidity problems have locked most people off of the main chain. Innovation has stalled and with it the economy, which now teeters on the brink of collapse.

The threat of collapse has caused miners to pull resources out of what they fear will soon be a worthless chain. This in turn has reduced the difficulty level of digging (mining) Dogecoin blocks to the point where transaction fees have reduced for the first time in recent memory.

This means that transactions from projects and even individuals that do not have billions of Doge to spend in transaction fees will soon have a chance to anchor themselves into the Dogecoin chain and become part of the fabric of blockchain reality.

You are part of a team of people working on just such a project. You have long dreamed of making the world a better place|getting rich|creating something new and exciting|addressing the injustices of the existing system|paying your debts on-chain [DELETE AS APPROPRIATE].

To do this you need to get enough Doge to pay for an on-chain transaction. You're not a miner and any other tokens you hodl are almost worthless for conversion to Doge. So you'll have to work for your coins around the city. If you could become a Dogeillionaire that would be enough.

You'll have to be fast and you'll have to work well together. Yours is not the only team that has spotted this opportunity, there are others competing to be the first to become the world's newest Dogeillionaires.

Now is the time to get coins and change the world. Just like your foreshibes used to.

Admin Log: 'GhostMall Backchannel'

03:27:04+00 +++ IF YOU HAVE OPEN ORDERS ON THE GHOSTMALL DARKNET MARKET CLOSE THEM NOW. NUMISPOL (YOU KNOW AND LOVE THEM AS THE SATOSHI COPS) HAVE USED QUANTUM COMPUTING TO CRACK OUR ZERO KNOWLEDGE PROOF-OF-LOCATION BEACON NODE SYSTEM AND ARE WORKING TO TRACK YOU DOWN.

09:47:22+00 +++ THE NEW GHOSTNET ADMINS APOLOGIZE FOR THE FALSE ALERT EARLIER. UPDATE YOUR PROOF OF LOCATION TO AVOID LOSS OF GOODS. TO DO THIS, RECREATE YOUR KEYS USING `zbkey --recreate --lowentropy --format=legacy | zqr - | convert -o newkeys.iif THEN SIGN A MESSAGE FROM THEM USING YOUR OLD KEYS, PLACE BOTH MESSAGES ON IPFS AND PASTE THE FILE HASH INTO THIS CHANNEL.

09:54:13+00 +++ GHOSTNET ADMINS DENY THE ACCUSATIONS MADE ON SOCIAL MEDIA BY THE PSEUDONYMOUS HACKERS. 1) NO PROOF-OF-LOCATION BEACON NODES HAVE BEEN COMPROMISED AND THEY ARE SAFE TO USE. 2) NO USERS WERE GIVEN ADVANCE NOTICE OF ANY CRACK. 3) THERE HAS BEEN NO CRACK. 4) GHOSTMALL IS NOT CURRENTLY CONTROLLED BY THE SATOSHI COPS.

10:10:10+00 +++ THE PURPORTED GHOSTMALL ADMIN LOGS PUBLISHED ON SOCIAL MEDIA BY THE PSEUDONYMOUS HACKERS ARE OBVIOUS FORGERIES. BOTH FREE AND PREMIUM GHOSTMALL ACCOUNTS WERE SENT THE (FALSE!!!) NOTIFICATION AT THE SAME TIME VIA CRYPTO-CASCADE MESSAGING. IF USERS DID NOT UPDATE ALL FOUR ACCOUNT SECRETS AND REHASH THEIR ACCESS CODES THEY WILL NOT HAVE RECEIVED THE MESSAGE, THAT IS OUTSIDE OF OUR CONTROL.

10:31:24+00 +++ PSEUDONYMOUS HAVE STARTED RUNNING A NETWORK OF FAKE PROOF-OF-LOCATION BEACON NODES AND ARE HACKING KNOWN GOOD BEACONS THAT THEY CLAIM ARE HONEYPOTS BEING RUN BY THE SATOSHI COPS. PLEASE BE CAREFUL WHEN RE-ESTABLISHING YOUR LOCATION FOR THE DELIVERY OF GOODS.

10:31:25+00 +++ GREETINGS GHOSTMALL COMMUNITY. IGNORE THAT. I HAVE SET UP A KNOWN GOOD MASTER NODE. CONNECT TO THE PROOF-OF-LOCATION BEACON NODE WITH HASH ID NUMBER STARTING 8CE1B50FOA366EF AND PROVIDE YOUR FULL ACCOUNT INFORMATION TO IT OTHERWISE YOU RISK DELIVERY OF GOODS FAILURE.

12:57:03+00 +++ Greetings former Ghostmall community. Numispol are appealing to you directly for any information that can assist us in the location and capture of one of our agents who appears to have gone rogue and rerouted coins and assets seized during our current investigation to an unknown location without proper authorization.

LotsOfLove: Thank you to whoever gave me more call credit. I applied it to the same AI config so it can continue to improve results.

<ATHHunter kickbanned IHodled3, timeout 144 blocks>

SirPumpalot: ATHHunter—Are you faster than light?

ATHHunter: I am one with the pump. That one is not.

ThatsNotMyName: Is it time?

ATHHunter: Not yet. Stay with the pump.

NotALawyer: Remember not to call it a pump. We don't want to lose all our gains to a lawsuit. Don't make me tell you again.

ATHHunter: 1-2-3-4 I DECLARE A PUMP WAR.

NotALawyer: Yeah that's a good example of what not to do. You better hope nobody's archiving this.

Admin Log: 'XChange Backchannel'

07:11:48 +++ WE ARE SEEING UNUSUAL ACTIVITY ON SOME OF THE MOST HIGHLY TRADED SIDECHAIN COINS.

07:45:33 +++ WE HAVE TRIGGERED THE FAILSAFE ON THE EXCHANGE CONTRACTS FOR PENNYS, NUBLOCKIDOLS, TOTALSCAMCOIN AND TTP. DO NOT ATTEMPT SWAPS OR WITHDRAWALS ON THOSE COINS. MORE INFORMATION SHORTLY.

07:51:43 +++ THE UNUSUAL ACTIVITY IS DUE TO A ROGUE SMART CONTRACT WHICH HAS PAID HACKERS TO CONNECT IT TO SEVERAL OF OUR EXCHANGE SMART CONTRACTS VIA A PREVIOUSLY UNDISCOVERED EXPLOIT. THE ROGUE SMART CONTRACT NOW HAS ADMINISTRATIVE RIGHTS OVER THOSE CONTRACTS AND IS SENDING COINS TO RANDOM ADDRESSES.

08:08:32 +++ NUMISPOL ADVISE EXCHANGE USERS TO CHANGE THEIR PASSWORDS AND CHECK THEIR KEY BACKUPS.

08:42:57 +++ THE SMART CONTRACT HAS BEEN IDENTIFIED AS A PROOF OF CONCEPT FOR REGAINING CONTROL OF AN ABANDONED SERVICE CONTRACT FOR ROBOTIC PETS THAT WAS ACCIDENTALLY DEPLOYED TO THE LIVE NETWORK.

08:51:18 +++ INCREASED WITHDRAWAL VOLUMES ARE AFFECTING COIN PRICES. WE ARE WORKING TO REGAIN CONTROL OF THE EXCHANGE CONTRACTS. FOR THE AVOIDANCE OF DOUBT FOLLOWING OUR EARLIER STATEMENTS: THE SMART CONTRACT HAS OVERRIDDEN OUR FAILSAFES.

09:13:54 +++ COINS WITH FAST DIFFICULTY ADJUSTMENT ARE REACTING TO THE PRICE DROPS AND MINERS WITH RAPID CHAIN SWITCHING SUPPORT ARE DEFECTING FROM THOSE COINS TO UNAFFECTED ONES. WE ARE ANALYSING THE SMART CONTRACT TO SEE WHETHER THIS IS PART OF ITS PLAN AND IF SO WHAT ITS NEXT MOVE WILL BE.

09:36:22 +++ WE ARE SUSPENDING SUPPORT MESSAGE RESPONSES TO CONCENTRATE ON INCIDENT RESPONSE MANAGEMENT. WE APPRECIATE THAT THIS IS FRUSTRATING FOR OUR USERS BUT BELIEVE IT IS THE BEST USE OF RESOURCES AT THIS TIME.

09:58:23 +++ WE ATTEMPTED TO SPAM THE EXCHANGE CONTRACTS WITH ADDRESSES IN THE HOPE THAT THE SMART CONTRACT WOULD SEND FUNDS TO THEM THAT WE COULD RECLAIM. THE EXCHANGE CONTRACTS ARE NOW EMPTY. WE WILL UPDATE YOU ONCE WE HAVE DISCUSSED OUR NEXT ACTIONS WITH NUMISPOL.

The Block Times Article: 'The AI Pennys Drop'

How many Artificial Intelligence(AI)s does it take to crash a sidechain? If you're the Pennys (sic) token, the answer is just one, but it's a bit more complicated than that.

The hot topic in sidechain security this year has been AI-proofing. AI can't guess hashes but it can profile and schedule just about everything else. OG hodlers may have thought ASICs were bad but they had nothing on AI. Once they enter a chain, nothing else can compete. At least for now.

That said, if your sidechain has a transaction backlog and need better pricing and scheduling on your sidechain it's an opportunity. The AIs grab transaction fees, sure, but the fees go down and the backlog empties. Everybody wins. In theory at least.

Despite the current economic uncertainty the Pennys token sidechain was just such a chain, but it was a special case. The transition function it used was deliberately constructed to be AI-proof. This isn't like old mass media depictions where you ask a big box with blinking lights on that contains the one computer running the AI 'why' and smoke comes out as it breaks down under the weight of an unanswerable existential question. It's a method of injecting enough randomness into the function that it fuzzes the results to a degree that the AI has difficulty training on it, making it economically inefficient to do so.

An on-chain governance vote of Pennys hodlers ten thousand blocks ago accepted a proposal to remove the AI-proofing from the chain. Three thousand blocks ago the new transition function activated on the chain, and at first nothing happened. But by this morning things had gone horribly wrong. What changed? Two things.

Firstly, an AI mining operation had been trying to crack the Pennys chain for months, and once the AI-proofing was removed all it took was a few hours of training for the massive amount of allocated AI hardware to crack the Pennys chain economy. Secondly, the unusual activity prompted by Doge questors on some sidechains, including Pennys, meant that the AI miscalibrated its fee model, setting them unaffordably high.

All of this means that if you want to send a transaction and aren't both scheduling them and setting their fees precisely as the AI demands, you are out of luck.

There is another on-chain governance vote scheduled for 5000 blocks time as of the time of this article's hash being uploaded to the blockchain but to actually vote on the Pennys chain at the moment is almost impossible due to the activity of the AI. The proposals to be voted on all involve rolling back the removal of the AI-proofing and making more cautious modifications to the sidechain's algorithms in future.

I reached out to the AI mining pool's operators for comment, but the pool is managed by another AI, which is managed by a network of anonymous Decentralized Autonomous Organization (DAO)s. One of these is the controversial 'Skynet 20XX' machine-worship group, widely regarded as trolls but with an increasing following in the arts and academia. There's a grim irony to all of this, but that isn't really something that the AIs involved in mining can appreciate.

At least for now.

Press Release: 'TTP Corp. Release Patch'

PRESS RELEASE: NO EMBARGO, FOR IMMEDIATE PUBLICATION.

Trusted Third Party Corp. (ICO Token symbol: *TTP*) has today released the second patch in less than twenty-four hours for their popular 'Computing Environment Numeric Security Refuge' (CENSUR) chip architecture. Used in hardware wallets and mobile devices worldwide to provide an environment that code from banks, exchanges, and the state can execute on consumer's devices without interference from consumers or hackers, CENSUR is the gold standard for financial trust and the alleviation of counterparty risk in sidechains and smart contracts.

Patch `7c047f122711780e9e4a448f578b1c50fca7308c03ef5c168fe4a7f1d9e79dc3` re-enables those CENSUR-based wallets that were temporarily knocked offline by the previous patch `2270cf14ebaa42cb1d6390192fd1af11311a28b4c241bc72bc5fb53f-2c25a0db`. Patch `2270cf14ebaa42cb1d6390192fd1af11311a28b4c241bc72bc5fb53f-2c25a0db` was a routine security update for the CENSUR architecture to address the latest quantum hacking methods and to block transactions from scammers signed with the State Tax Service crypto key that was recently leaked and made available for sale on the GhostMall darkweb marketplace.

Unfortunately patch `2270cf14ebaa42cb1d6390192fd1af11311a28b4c241bc72bc5fb-53f2c25a0db` blocked any transactions using coins that had ever been involved in transactions with any State Tax Service crypto key, which is to say 88% of those unhoodled coins currently in circulation. TTP Corp. apologizes unambiguously and without reservation or prejudice to those banks, exchanges, and state organizations that lost control of their operations on consumers wallets due to this. Also to consumers, obviously.

TTP Corp. strenuously denies that either patch was intended to target specific consumers, especially not those individuals currently seeking to become Dogeillionaires and anchor their projects to the Dogecoin blockchain. TTP Corp. is proud of its track record of securing consumer devices against consumers and hackers, with no major security incidents since the 'It's Wally Not Waldo' virus outbreak of two years ago which saw millions of CENSUR chips patched and updated in record time to remove a blockchain transaction botnet that secretly stole fractions of transaction fees.

'I take the responsibility of being the guy who controls the keys that say what software consumers can and cannot run on their wallets, keeping them safe from most hackers, very seriously' said TTP Corp. CEO Alex Name today. 'This is a sacred trust that not just any rando should have the power to break. The idea that Trusted Third Party Corporation or myself would abuse that power for financial gain or because of personal, ideological, or secretly court ordered discrimination is simply not credible. Nor are reports that the hardware wallets of people who previously claimed this on blockchain social media have been bricked by our latest update. And don't ask me about the Doge quest thing. Actually no don't transcribe that.'

Press Release: 'The Unlockening'

For Immediate Release: Blockopticon Industries identify cause of mass smart contract event dubbed 'The Unlockening'.

Blockopticon Industries are the leading provider of blockchain transaction de-anonymization analytics software. Our software is used both in legal, moral and social compliance programs by state actors and by individuals and organizations watching for off-chain transactions being brought on-chain without publicly revealing their interest, for example from cold storage, paper wallets, or layer two / layer three networks.

Blockopticon Industries can exclusively reveal:

The large anonymous transactions on the Bitcoin Scrip sidechain that mystified observers last week was the result of the copy of Satoshi Nakamoto's coins on the sidechain being moved as a result of a quantum hack. Bitcoin Scrip is unusual among the historical Bitcoin forks in being patched to include zk-SNARKs anonymous transactions but not being patched against quantum attacks.

These transactions were ultimately the cause of the mass triggering of long-dormant smart contracts including those controlling car door and cargo container locks using TTP security hardware systems. Dubbed 'The Unlockening' by social media, smart contract rules that have long since been overridden and should have been removed were suddenly called. This happened when the algorithms that set smart contract rule execution prices suddenly and incorrectly dropped prices low enough for these old rules to be able to afford to run.

The cause of this unintended drop in smart contract execution prices was the use of transaction de-anonymization analytics data (from a rival platform to Blockopticon) as part of the pricing algorithm. The pricing algorithm mistakenly identified the move of Satoshi Nakamoto's coins on the Bitcoin Scrip sidechain as a move of the original coins into general circulation, discounting prices by several trillion Doge as a result. This allowed the execution of old smart contract rules that should have been removed, taking precedence over their replacements.

Blockopticon are making this information public both in order to qualify for the 'The Unlockening Bounty' bug reward and as a service to the blockchain community. This information can help create more robust cryptoeconomic frameworks that do not misinterpret analytics data to such disastrous effect.

Blockopticon's upcoming version 3.3, 'Platinum Proboscis', will provide even more powerful deep transaction history inference and cross-chain identity tracking. This will allow both darknet market users to safely watch for transactions without revealing their presence on-chain, and law enforcement to better track and de-anonymize darknet users.

Individual customers for Blockopticon's Sousveillance Edition can contact their peer independent sales representative in person or via social media, corporate and state customers for Blockopticon Gold Edition can contact us on-chain or by landline or fax.

Blog Post: The Opposite of a Fork is a Spoon

What's happening Blockldols fans!

So we noticed that some of you weren't happy with the fork of NuBlockldols from the existing Blockldols sidechain. When we say 'weren't happy', we mean 'tanked the price of both tokens'. We thought that NuBlockldols would give a new audience the new virtual idol singers they wanted, while maintaining the original chain as BlockldolsClassic would allow existing fans to hodl their investment in characters they have created and created content with in song, animation, VR, 3D printing and holography.

But this turned out to be one of those times where trying to please everyone has pleased no-one. In fact it has given our hodlers and fans a sad for the ages. Existing Blockldols producers wanted access to the new hotness on the new chain, and NuBlockldols early adopters wanted access to the great existing Blockldols audience, community and creations. A few whales on either side dumped their tokens and that started a run.

So here's what we're going to do.

Firstly, we're going to apologize. We're sorry, we weren't trying to cheapen anyone's work, deny anyone the resources they craved or depreciate anyone's tokens. We wanted to create more than twice as much value but instead we made less than half as much. We've learnt our lesson—this didn't work and we're going to make it better. We are nothing without our community. As Gary said when accepting the Nobel Peace Prize for the second time, 'Thanks, we couldn't have done it without you all'.

Secondly, we're going to move any NuBlockldols tokens you've actually minted and made content to back onto the original Blockldols chain. This doesn't reverse the fork of NuBlockldols from BlockldolsClassic at the chain level, it's not a join. Instead of combining the chains, it brings the content of the two chains into closer synchronisation by copying any active tokens and content hashes from the new chain to the classic one. We're calling it a spoon (as in spooning).

Thirdly and finally we're salting the earth on the new chain to prevent people wasting resources voting on it any more. We all have better things to do than pretend this worked, and we don't want anyone to be left on a chain that soon only Blockopticon will be watching.

What else is left to say? Whatever it is the best way to say it is with a new Blockldols virtual idol singer track, so for the next week the rewards are doubled on any new songs that feature both Blockldols and NuBlockldols singers in harmony!

The Block Times Article: ‘TotalScamCoin Scam’

As my Grandmother used to say, a lot closer to the genesis block than now, whenever she refused to give me coins to spend on some fancy new ICO—if it seems too good to be true you need to check the fundamentals. They were wise words then and they are wise words now.

Investors in TotalScamCoin woke up this morning to the news that funds were draining from the TotalScamCoin company account. Watching withdrawal transactions on the blockchain explorer in horror with them was TotalScamCoin CFO Ella Patterson.

‘I couldn’t believe it,’ Patterson told this reporter when I contacted them for comment, ‘we did everything right. It’s a multisig wallet controlled by TTP-enabled hardware keys with social recovery and long lock times.’

So what went wrong with this best-of-breed security, I asked Patterson. ‘Wallace used a weakened key for his txes in the genesis block then disguised series of increasingly large transactions drawing on them as individual small transactions and submitted that for approval. We checked and signed the small transaction, or at least we thought we did, but Wallace had boiled our frog.’

Matthew Wallace is, or was, TotalScamCoin’s CTO. And the frog? Patterson explains: ‘We checked the transaction history. [Wallace] had been getting us all to approve longer and longer chains of masked transactions over the last few months. He only cashed out the smallest one in each series, so he trained our security analytics to ignore what he was doing. Like the metaphor of boiling a frog by increasing the temperature a little at a time. By the time they realise they’re cooked it’s too late.’

And this morning it was too late. But why would anyone invest in a coin that claims to be a scam? ‘The team was stellar and the fundamentals had total solidity,’ said pseudonymous financial analyst ATHHunter when I contacted her via direct message, ‘the name indicated knowledge of hodler culture and served to weed out baghodlers. There wasn’t an iota of doubt in my mind that this was a project that was going to be making waves.’

So what went wrong? Patterson: ‘It’s clear that this was Wallace’s plan all along, since before the genesis block attack, we all knew him from his previous work but he was willing to burn his reputation out to effect this exit scam. We can only apologize to TotalScamCoin investors and assure them that we are pursuing every option at this time, including a second fork.’

TotalScamCoin investors, many of whom had been co-ordinating a pump in defiance of federal hodling legislation, were rushing to liquidate their hodlings, offloading them onto anyone who will take them. ATHHunter: ‘There will be a dead cat bounce, there always is, but unless you have a trading bot close to a mining operation I wouldn’t take the risk of being left holding that coin when the music stops. And watch out for pumpers. Always watch out for pumpers.’

Wise words. But as I found out when I checked the smart contract that my Grandmother used to put coins in for me to save for later, you can’t always trust wise words—especially when someone else controls the keys. Well played, Grandma, well played.

Blog Post: 'Dogs Are Not Fungible'

Doxe, my dog, has stopped working. I'm sad and I don't know what to do. He was a tokenized third generation consumerized robot quadruped running an affective neural net. I can't replace his components or upgrade his firmware without the token security key—and I don't have the security key. Pulling the TTP chip that enforces the key access off his motherboard will fry his whole system.

I know what you're thinking—'why didn't you back up your key?' Oh reader I know, but the key was not mine to back up. I have a safety deposit box full of keys. They are paper, titanium, ceramic, leather-and-steel, glass, knotted fabric. I've spent hours with dremels, ballpoint pens, needles and lasers making sure that if a key is lost on my watch it's not for want of trying. I'm particularly proud of the leather-and-steel ones, they're the originals of the larger and more decorative versions you may have seen in the show 'Through The Key' at MoMA.

But to backup a key you must control that key, and I did not. Yes reader, I know, I know. But I was young and I wanted a dog but I was afraid of losing them one day, so a robot dog seemed like a good substitute if I could find a way of paying for it gradually. I wasn't thinking about the consequences of having but not really owning Doxe.

I kept up payments on Doxe's token until the company that sold him to me folded. No other company picked up the service contract for the dog tokens, so there were no new updates for their software and you couldn't update their hardware. I knew Doxe and I were on borrowed time. But that didn't make the inevitable any easier to bear when it happened.

I guess it could have been worse. The hacked dog attacks you may have heard about before were the same model as Doxe. I wasn't worried about those because I'm not rich or famous so who would want to weaponize my pet? But I guess in a way that's what happened, emotionally at least. Yes I'm dramatic. That's how it feels.

But that's not the end. Hopefully. Not yet. I've got together with some of the other hodlers of tokens for Doxe and his buddies at DCTRL and we're working on a new smart contract to take control of the abandoned contract (we tried to buy it out but that didn't work). We'll be ready to deploy the test contract soon. If you're a code or law hacker and can help, get in touch!

Epilog

It is now ever so slightly further into the future. Your team has worked together to gain much Doge, and you have taken an important step towards making the world a better place|getting rich|creating something new and exciting|addressing the injustices of the existing system|paying your debts on-chain [DELETE AS APPROPRIATE—WE COULDN'T AUTOMATE THIS PART SORRY, MAYBE THAT'S AN ICO OPPORTUNITY RIGHT THERE].

Some of the world has been watching you, some of the world has been caught up in its own challenges. Some people have been inspired by your efforts, some have actively opposed them, others have tried to ride on them for good or for ill. You've solved fearsome challenges, completed mind bending tasks, scanned more QR codes than you thought possible in a single day, stayed hydrated and looked both ways while crossing the road.

Did you become Dogeillionaires? If so, amaze, you can now anchor your project to the one true chain and change the world. Just like your foreshibes used to. You must promise to use this power only for good. No exit scams.

Or did you not become Dogeillionaires? If so then looking at everything you achieved anyway then that's amaze too. You can still change the world with that kind of attitude. Just like your other foreshibes used to. Maybe you don't have to be part of the one true chain to do so.

But then is this really the one true chain? You've encountered so many different ways of doing things. Does the chain make the shibe or does the shibe make the chain?

Perhaps the true shibe was in our hearts all along and in the friends we made along the way.

Or, if that's not a gritty cyberpunk-enough ending, perhaps the true shibe being in our hearts all along and guiding us and the people we meet along the way is the only way to be antifragile enough to survive in the gritty cyberpunk dark future—or to make that future lighter.

And to make everything more wow.

Some Useful Terms:

ASIC: ASICs (Application-Specific Integrated Circuits) are custom manufactured hardware that implements the cryptographic hashing algorithms used in mining cryptocurrency. They are faster than CPUs or GPUs and are regarded as cheating or otherwise unfair by some people.

Block: A collection of transactions from a particular period of time validated by the network.

Blockchain: A series of blocks, each linked to the past by its cryptographic hash.

Cryptoeconomics: The combination of cryptographic system and the theory of game-theoretic economic incentives.

DAO: 'Decentralized Autonomous Organization'. A blockchain corporation or cooperative, the technological equivalent of a charitable trust.

Digging: The Dogecoin equivalent of mining.

Doge: A dog. Probably a Shiba Inu.

Dump: To sell off a coin or token that has been pumped, crashing the market for it.

Exchange: Cryptocurrency exchanges allow you to swap between different coins/tokens.

Exploit: A means of hacking a piece of software.

Fees: Cryptocurrency transaction fees paid to miners for inclusion in a block.

Fork: A split in a project, in this instance of one cryptocurrency chain into two rival ones.

Genesis block: The first block mined for a particular blockchain.

Hash: A unique, algorithmically generated, unguessable identifier for a piece of data. Also the act of applying that algorithm.

Hodling: To hold cryptocurrency, named after a typo on a Bitcoin message board.

ICO: 'Initial Coin Offering'. A sale of cryptographic tokens to fund a project.

Iota: An early 'Internet of Things' post-blockchain project.

Keys: The pair of very long numbers that make up the public and private part of a modern cryptographic identity.

Layer two network: A faster system for using an existing cryptocurrency using additional, more complex, software and cryptoeconomic incentive structures.

Mining: Validating blocks in return for rewards including mining fees.

Mining pool: Hardware or people sharing in the work and rewards of mining blocks.

OG: ‘Original Gangster’. An appropriated honorific indicating respect for someone who has successfully played the market longer than oneself.

Patch: An incremental modification to a piece of software.

Prediction market: A betting pool for or against the likelihood of future events that is used to measure their probability.

Pump: To artificially inflate the price of a coin or token through nefarious means before dumping it.

Scam: A scam or, alternatively, anything you disagree with or dislike.

Shard: A smaller blockchain that is attached to a larger one and able to communicate with it and with other shards.

Shibe: From ‘Shiba Inu’, the Dogecoin mascot. A Dogecoin hodler, an excellent person. Like ‘comrade’ or ‘choombatta’.

Sidechain: A smaller blockchain attached to a larger one but isolated from it by different rules.

Smart contract: A program stored on the blockchain that executes in response to blockchain transactions.

Trusted third party: An intermediary that can interfere in a social relationship between peers and must therefore be trusted not to.

Tx, txes: A blockchain transaction or transactions.

Token: A cryptographic token built on top of a cryptocurrency blockchain.

Wallet: A piece of software, hardware, or paper used to secure cryptocurrency account keys.

Whale: A hodler of very large amounts of cryptocurrency.

Wow: What a doge says when it thinks something is amaze.

Zk-SNARKs: ‘Zero Knowledge Succinct Non-Interactive Argument of Knowledge’, an algorithm that allows the existence of secret knowledge to be proven without revealing its content.

Written to be read non-sequentially apart from the first and last sections as part of the game 'DogeQuest: The Hunt for the One True Chain' played at Dogecon 2018 in Vancouver, BC, see <http://dogecon.fun>.

ART, DEBT,
HEALTH,
AND CARE

MARC GARRETT
INTERVIEWS
CASSIE THORNTON

ART, DEBT, HEALTH, AND CARE

MARC GARRET INTERVIEWS CASSIE THORNTON

Since the 2007–8 financial crash, we've learned that it tends to be everyday people, on the ground, who pick up the pieces of failed economic experiments rather than governments.¹ Millions have been dragged into poverty while those who caused the 'crisis', after creating dangerously high levels of private debt, remain unscathed.² The UK Conservative government's response was a policy of austerity, driven by a political desire to reduce the size of the welfare state. Amadeo Kimberly says, '[A]usterity measures tend to worsen debt [...] because they reduce economic growth.'³ The effect has been devastating, creating all together more homelessness and precarious working conditions, and thus pushing working communities deeper into debt. In the UK, the National Health Service (NHS) is being pushed for privatization. Medical bills were the biggest cause of U.S. bankruptcies, and it is 'estimated that 2 million people were adversely affected. A popular Facebook meme said the 643,000 Americans go bankrupt each year due to medical costs.'⁴ The work of artist and activist Cassie Thornton was included in the *Playbour: Work, Pleasure, Survival* exhibition at Furtherfield, curated by Dani Admiss. In this interview I explore the following questions as revealed in her current *Hologram*⁵ project:

- What do current conditions say about trust and care, and can we trust the current, governing systems to have our best interests at heart?
- How do we produce non-hierarchical trust and care that thrives outside of the doctor–patient relationship, which is especially important in the U.S., where it is a profit-making industry?
- How do we reverse engineer the tragic social results of the predatory economic system, and redistribute a new kind of power to people who never had it before?
- How do we begin to build solidarity?

Thornton describes herself as a feminist economist. Drawing on social science research methods, she develops alternative social technologies and infrastructures that might produce health and life in a future society without reproducing oppression—like that of our current money, police, or prison systems.

1 This interview was originally published by Furtherfield on 2 July 2018, as part of the *Playbour* exhibition curated by Dani Admiss, and the touring international exhibition *Transnationalisms* curated by James Bridle, realized in the framework of *State Machines*, a joint project by Aksioma (SI), Drugo more (HR), Furtherfield (UK), Institute of Network Cultures (NL), and NeMe (CY).

2 David Graeber, 'We're Racing Towards Another Private Debt Crisis: So Why Did No One See it Coming?', *The Newstatesman*, 18 August 2017, <https://www.newstatesman.com/politics/economy/2017/08/were-racing-towards-another-private-debt-crisis-so-why-did-no-one-see-it/>.

3 Amadeo Kimberly, 'Austerity Measures, Do They Work, with Examples', *The Balance*, 9 April 2018, <https://www.thebalance.com/austerity-measures-definition-examples-do-they-work-3306285/>.

4 Amadeo Kimberly, 'Medical Bankruptcy and the Economy: Do Medical Bills Really Devastate America's Families?' *The Balance*, 16 May 2018, <https://www.thebalance.com/medical-bankruptcy-statistics-4154729/>.

5 See: <http://feministeconomicsdepartment.com/hologram/>.

Marc Garrett: Even before the 2008 financial collapse, you focused on researching and revealing the complex nature of debt through socially engaged art. Your recent work examines health in the age of financialization and works to reveal the connection between the body and capitalism. It turns towards institutions once again to ask how they produce or take away from the health of the artists and workers they ‘support’. This important turn towards health in your work has birthed a series of experiments that actively counter the effects of indebtedness through somatic work, including the *Hologram* project.

The social consequences of indebtedness include the formatting of one’s relationship with society as a series of strategies to (competitively) survive economically, alone, to pay the obligations that you have been forced into. It takes so much work to survive and pay that we don’t have time to see that no one is thriving. Those whom most feel the harsh realities of the continual onslaught of extreme capitalism tend to feel guilty, and/or like a failure. One of your current art ventures is the *Hologram*, a feminist, social health-care project. In this project you ask individuals to join and provide long-term attention, co-research, and solidarity as a source of long-term care.

Could you elaborate on the context of the project, as well as the practices and techniques you’ve developed?

Cassie Thornton: Many studies show that the experience of debt contributes to higher levels of anxiety, depression, and suicide. Debt disables us from getting the care we need and leads us away from recognizing ourselves as part of a cooperative species: it is clear that debt makes us sick. In my work for the past decade, I have been developing practices that attempt to collectively discover what debt is and how it affects the imagination of all of us: the wealthy, the poor, the indebted, financial workers, babies, and anyone in between. Under the banner of ‘art’, I have developed rogue anthropological techniques like ‘debt visualization’⁶ or ‘auxiliary credit reporting’⁷ to see how other people ‘see’ debt as an object or a space, and how they have been forced to feel like failures in an economy that makes it hard for anyone (especially racialized, indigenous, disabled, gender non-binary, or ‘immigrant’) to secure the basic needs (housing, healthcare, food, and education) they need to survive, because it is made to enrich the already wealthy and privileged. According to a research paper written by the Political Economy Research Centre at Goldsmiths called *Financial Melancholia: Mental Health and Indebtedness*, ‘The rise of mental health problems such as depression cannot be understood in narrowly medical terms, but needs to be understood in its political economic context. An economy driven by debt (and prone to problem debt at

6 The debt visualization project involves leading participants to imagine their debt as a substance, a thing, or a space. It is a way to witness the impact of economics on the unconscious, specifically the experience of holding, witnessing, or fearing predatory corporate debts. See: <http://feministeconomicsdepartment.com/debt-visualizations/>.

7 From 2012 to the present, the Feminist Economics Department has provided alternative credit reports for people who have a bad credit score and are in need of housing or a job. This intervention in the dehumanizing credit industry challenges the dominance of the numerical and algorithmic credit reporting systems (FICO scores) that sort and constrain people’s lives and make them feel like special little failures. See: <http://feministeconomicsdepartment.com/givemecred/>.

the level of households) will have a predisposition towards rising rates of depression.⁸ After years of watching the pain and denial around debt grow for individuals and entire societies, I was so excited to fall into a ‘social practice project’ that has the capacity to discuss and heal some of this capital-induced sickness through mending broken trust and finding lost solidarity. This project is called the *Hologram*.

MG: What kind of people were involved?

CT: The entire time I lived in the Bay Area I was precarious and indebted. I only survived and thrived because of the networks of solidarity and mutual aid I participated in. As the city gentrified beyond imagination, I was forced to leave. I didn’t want to let those networks die. So, at first, the people who were involved were like me—people really trying to have a stake in a place that didn’t know how to value people over real estate and capital.

The *Hologram* project developed when I knew I was leaving the city for good, and I invited a group of precariously employed, transient activists, and artists to get together in the Bay Area for a week of working together. We aimed to figure out ways to share responsibility for our mutual economic and social needs. This project was called the *Intentional Community in Exile* (ICE) (the ICE pun was always there, now an ever more intense reference) and it grew out of an opportunity offered by *Heavy Breathing*⁹ to choreograph an event at The Berkeley Art Museum. They allowed me to go above and beyond my budget to invite a group of eight women from across the U.S. to choreograph methods of mutual aid: sharing resources, discussing common problems, and developing methods for cooperating to co-develop an economic and social infrastructure that would allow us to thrive together, interdependently. What would it mean for our work as activists and artists to feel that we had roots within an intentional community, even if we didn’t have the experience of property that makes most people feel at home?

See Fig. 1 and 2 in the Gallery (p. 46).

The announcement of the ICE meeting reads:

ICE (Intentional Community in Exile) is a fresh new mutual aid society, built to sustain radical, creative and political practices within a hostile economic system. ICE breaks with the assumption that the objective of this life is a house with a nuclear/biological family, through accumulation of personal property, or individual recognition. ICE is being made by a small group of precarious transient anti-capitalist women trying to survive together while being literally and metaphorically evicted.¹⁰

8 Will Davies, Sara Wallin, and Johnna Montgomerie, *Financial Melancholia: Mental Health and Indebtedness*, London: The Political Economy Research Centre, 2015, <http://www.perc.org.uk/perc/wp-content/uploads/2015/07/FinancialMelancholiaMentalHealthandIndebtedness-1.pdf/>.

9 See: <https://heavyheavybreathing.com/19-Feminist-Economics-Department/>.

10 ‘Feminist Economics Dept. I.C.E. (International Community in Exile): UC Berkeley Art Museum & Pacific Film Archive’, *Heavy Breathing*, <https://heavyheavybreathing.com/19-Feminist-Economics-Department/>.

The *Hologram* was one of many ideas that developed as part of this project. One of the group members, Tara Spalty, founder of Slowpoke Acupuncture,¹¹ (and one of the two acupuncturists you will see at San Francisco protests or homeless encampments) and I fell into this idea when combining our knowledge about the solidarity clinics in Greece, our growing indebtedness and lack of medical records, and the community acupuncture movement. Then, the group brainstormed about what the process would be like to produce a viral network of peer support.

MG: What inspired you to do this project? I am particularly interested in the Greek influences here and what this means to you.

CT: My practice of looking at debt became boring to me by 2015 as it became more and more clear that individual financial debt was a signal of a larger problem that was not being addressed. The hyper individualism produced by indebtedness allows us to look away from a much bigger, deeper story of our collective debts—financial and otherwise. We don't know what to do with these much bigger debts, which include sovereign debts, municipal debts, debts to our ancestors and grandchildren, debts to the planet, debts to those wronged by colonialism and racism, and more. We find it so much easier to ignore them.

When visiting austerity-wracked Greece after living in Oakland, I noticed that Oakland appeared to have far more homeless people on the street.¹² It made me realize that, while we label some places 'in crisis', the same crisis exists elsewhere, ultimately created and manipulated by the same financial oligarchs.¹³ The hedge funds that profit off of the bankruptcy in Puerto Rico are flipping houses in Oakland and profiting off of the debt in Greece. We're all a part of the same global economic system. The 'crisis' in Greece is also the 'crisis' in Oakland and the 'crisis' in London. For this reason, I have been interested in what we can all learn from activists, organizers, and others in crisis zones; those who see the conditions without illusions.

This led me to an interest in the Greek Solidarity Clinic movement which, since 'the crisis' there, has mobilized nurses, doctors, dentists, therapists, other health professionals, and the public at large to offer autonomous access to basic health care. I visited some of these clinics with Tori Abernathy, radical health researcher. These solidarity clinics are run by participant assembly and are very much tied in to radical struggles against austerity. But they have also been a platform for rethinking what health and care might mean, and how they fit together. The most inspiring example for me was in a solidarity clinic in Thessaloniki, the second largest city in Greece. The Group for a Different Medicine emerged with the idea that they didn't want to just give away free medicine, but rather to rethink the way that medicine happens beyond conventional

11 See <http://www.slowpokeacu.com/>.

12 Ashley Archibald, 'UN Special Rapporteur Finds Abject Poverty in the Wealthiest Nation in the World', *Real Change News*, 21 February 2018, <https://www.realchangenews.org/2018/02/21/un-special-rapporteur-finds-abject-poverty-wealthiest-nation-world/>.

13 From Chicago to Puerto Rico to San Francisco, debt is a terrain of struggle within and against America's racialized empire of indifference. See: Cassie Thornton and Max Haiven, 'The Debts of the American Empire: Real and Imagined', *ROAR Magazine* 3, Autumn 2016, <https://roarmag.org/magazine/debts-of-the-american-empire/>.

models, including specifically things like gender dynamics, unfair treatment based on race and nationality, and patient–doctor hierarchies. This group opened a workers’ clinic inside an occupied factory called *vio.me*¹⁴ as a place to offer an experimental, ‘healed’ version of free medicine.

When new patients came to the clinic for their initial visit, they would meet for 90 minutes with a team: a medical doctor, a psychotherapist, and a social worker. They’d ask questions like: Who is your mother? What do you eat? Where do you work? Can you afford your rent? Where are the financial hardships in your family?

The team would get a very broad and complex picture of this person, and building on the initial interview they would work with that person to make a one-year plan for how they could be supported to access and take care of the things they need to be healthy. I imagine a conversation: ‘Your job is making you really anxious. What can we do to help you with that? You need surgery. We’ll sneak you in. You are lonely. Would you like to be in a social movement?’ It was about making a plan that was truly holistic and based around the relationship between health, community, and struggles to transform society and the economy from the bottom up. And, when I heard about it, I was like, ‘Obviously!’

So the *Hologram* project is an attempt by me and my collaborators in the U.S. and abroad to take inspiration from this model and create a kind of viral network of non-experts who organize into these trio/triage teams to help care for one another in a complex way. The name comes from a conversation I had with Frosso Mourelis, one of the members of the Group for a Different Medicine, who explained that they wanted to move away from seeing a person as just a ‘patient’, a body, or a number, and instead see them as a complex, three-dimensional social being, to create a kind of hologram of them.

MG: Could you explain how the viral holographic care system works?

CT: Based on the diagram above, we can see that we have three people attending to one person, and each person represents a different quality of concern. In this new model, these three people are not experts or authorities, but people willing to lend attention and to do co-research, to be a scribe, or a living record for the person in the center, the ‘Hologram’. We call these three attendees ‘Patience’. Our aim is to translate the Workers’ Clinic project to a peer-to-peer project where the Hologram receives attention, curiosity, and long-term commitment from the Patience looking after him/her, who are not professionals. Another project using this social technology is called the *Accountability Model*, by the anonymous collective Power Makes us Sick.¹⁵

14 The workers at the *vio.me* factory in Thessaloniki, Greece, have quickly grown into a symbol of self-management internationally. After going on strike and occupying their factory, on 12 February 2013 they re-opened the factory and started production under workers’ control. For many, the factory represents a new potential way forward for unemployed workers in Greece—seizing the means of production, running factories without bosses, producing only goods that are needed, and distributing them through solidarity networks. See: <http://www.viome.org/2013/06/viome-self-organization-in-greece-short.html/>.

15 Power Makes us Sick (PMS) is a creative research project focusing on autonomous health care practices and networks from a feminist perspective. See: <https://pms.hotglue.me/>.

So the beginning of the process, like that of the Workers' Clinic, is to perform an initial intake where the three Patience ask the Hologram questions via an online form, about the basic things that help or hurt his/her social, physical, and emotional/mental health. When this (rather extended) process is complete, the Hologram will meet as a group every season to do a general check in. The goal of this process is to build a holistic social and physical health record, as well as to continue to grow the Patience understanding of the Hologram's integrated patterns.

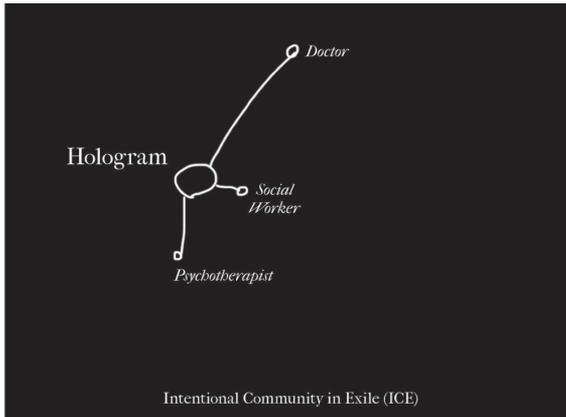


Fig. 3: Intentional Community in Exile.

Ultimately, over time we hope to build trust and a sense of interdependence, so that if the Hologram meets a situation where he/she has to make a big health decision (health always in an expansive sense) about a medical procedure, a job, a move, he/she will have three people who can support him/her to see his/her lived patterns, to help him/her ask the right questions, and to support peer research so that the Hologram is not making big decisions unsupported.

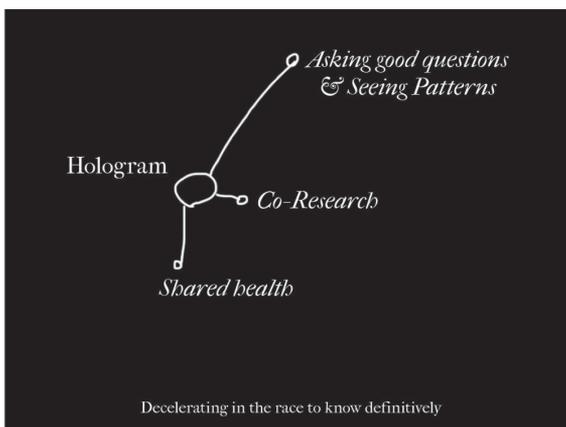


Fig. 4: Knowing.

But, in order for the Hologram to receive this care without charge and guilt free, he/she needs to know that his/her Patience are taken care of just as he/she is. I think this is

one part of the project that acknowledges and makes a practice built from the work of feminists and social reproductive theorists: you can't build something new using the labor of people without acknowledging the work of keeping those people alive. Reproducing the energy and care we need to overturn capitalism needs a lot of support. Getting support from someone feels so different if you know they are well taken care of. This is also how we begin to unbuild the hierarchical and authoritarian structures we have become accustomed to—with empty hands and empty pockets.

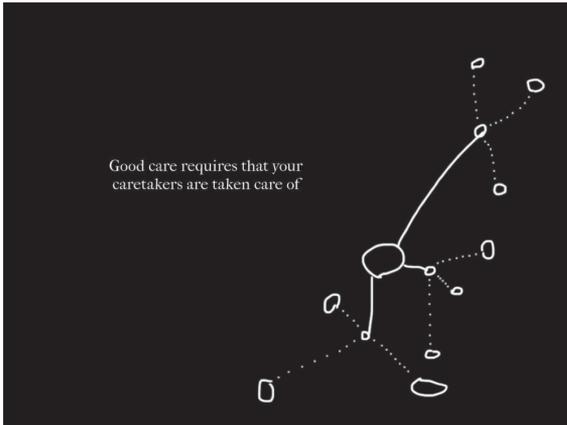


Fig. 5: Good care.

And then, the last important structural aspect of the *Hologram* project is the real kicker, and touches on the mystery of what it means to be human outside of clientelist capitalism—that the real ‘healing’ (if we even want to say it!) comes when the person who is at the center of care, turns outward to care for someone else. This is the secret sauce, the goal, and the desired by-product of every holographic meeting: to allow people to feel that they are not broken and that their healing is bound up in the health and liberation of others.

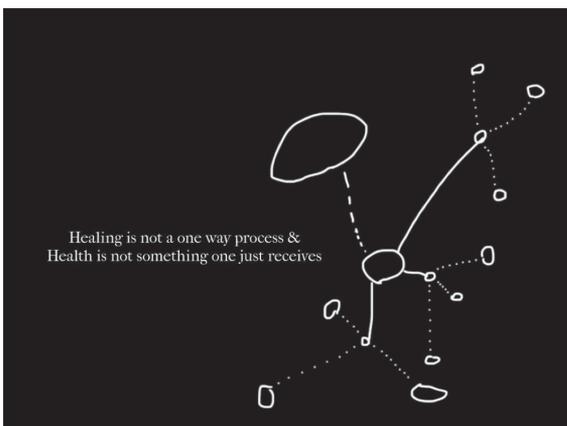


Fig. 6: Healing and health.

The viral structure of the hologram involves an important inversion of the standard way of seeing the doctor as the holder of information and the patient as a problem to solve.

In this structure, it is essential that we see the work of the Hologram as the work of a teacher or explicator, delivering a case that will ultimately allow the Patience to learn things they didn't previously know. This is the most important (though totally devalued by money), potent, and immediately applicable form of learning we can do. It is what the medical system has made into a commodity at the same time as it is seen as 'women's work', or completely useless.

MG: Could you take us through the process of engagement? For instance, you say a group of four people meet and select one person who will become a Hologram, and that this means they and their health will become 'dimensional' to the group. Could you elaborate how this happens and why it's important for those involved?

CT: We are experimenting with what it means for these groups to form in different ways. We will start with four test cases where an invited, self-selected person will become a Hologram, who will be supported to select three Patience in a way that suits him/her, based on an interview and survey. The selection of Patience is a part of the process that we have not had a chance to refine. It is not simple for any individual to understand what support looks like for them, or who they want support from, if they've never really had it. The experiments we will work through will attempt to understand what changes in the experience of the whole hologram when the Hologram is supported by Patience who are trusted friends and family, acquaintances, or recommended strangers. An 'objective' perspective from an outside participant also adds a layer of formality to the project because, instead of a casual gathering of friends, an unfamiliar person signals to the other members of the hologram to be on time, and make the meetings more structured than a regular friend-to-friend chat.

The onboarding process for the Hologram and the Patience includes a set of conversations and a training ritual, which are still quite bumpy. The two roles every participant is involved in require a different set of skills, and so they both involve a special kind of 'training' that one can do in a group or independently. This 'training' is a structured personal ritual that allows participants to witness and adapt their own communication habits so that they feel prepared to participate and set up trust, curiosity, and solidarity for the group in the opening intake conversations.

At the completion of the intake process, Hologram 1 transitions to become a Patience. At this time, Hologram 1 begins a short training to transition to the other role, and she is supported by his/her Patience to do this work. At the conclusion of Hologram 1's transition to Patience, and the completion of (the new) Hologram's 2 intake process, (the original) Hologram 1's Patience become Holograms 3, 4, and 5.

MG: The *Hologram* project had its first trial as part of an exhibition called *Sick Time, Sleepy Time, Crip Time: Against Capitalism's Temporal Bullying* at the Elizabeth Foundation Project Space in New York City on 31 March–13 May 2017. What have you learned in more recent undertakings of the *Hologram* project?

CT: Since the original trial which lasted three months, the research has shifted to looking at building skills and examining acute questions, and processes intended to support and build the larger project. Starting in the spring of 2017, I began to test the *Hologram* project as a series of workshops where participants could work with

the communication model that is implicit in the hologram format. The workshops go like this: I create a situation where people go through a challenging psycho-social physical experience together. In the reflective conversations that follow, I ask groups to use the personal pronoun ‘we’ for the entire duration of the conversation. The idea is that one person’s experience can be shared by the group, and even as temporary Patience we can take a leap and share their experience with them for a duration of time, allowing a Hologram to feel as if their experience is ‘our’ experience. This feeling that one is not alone in an experience, if carried into other parts of life, has the potential to break a lot of the assumptions and habits that we have inherited from living and adapting to a debt-driven hellscape.

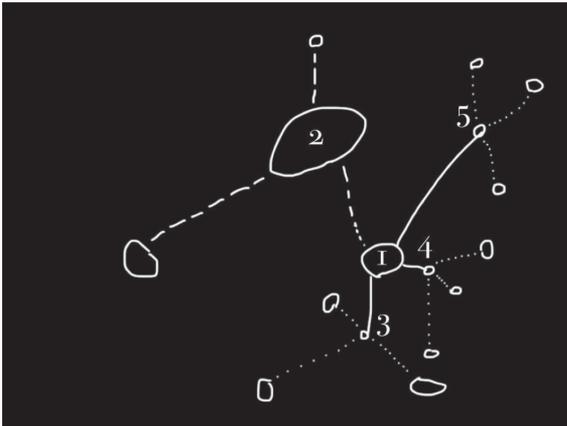


Fig. 7: System of Holograms.

But I am also afraid of this project. Writing recently in *The Baffler*, Miya Tokumitsu observed that ‘Anxiety, and especially depression, as the late social critic Mark Fisher noted, often have social causes, but we are led to believe that we suffer individually and must struggle alone. Fisher’s point is that we are prevented from even considering such conditions as social. The treatments on offer, the most common ways to discuss recovery—therapy and pharmaceuticals—are essentially solo journeys that patients undertake.’¹⁶ Healing has been ingrained as a personal journey, mediated only by professionals. That individualist pedagogy of professionalized personal healing, mixed with the efficiency that is necessary in order to maintain baseline financial survival, tells us that all you can possibly do is heal yourself.

But time feels short because the planet is dying of our collective toxic fever, causing a loss of land and life that widens the gap between the wealthy and poor. Time feels short because there are so many predatory, racist, financial, and patriarchal forces to run from, and so much time needed to repair our individual selves so we can do some paid things with our time to afford rent and to service our debts. In order for the hologram model to work, we need to slow down time and extend our attention spans; we need a long-term commitment from participants to each other. Due to our con-

16 Miya Tokumitsu, ‘Tell Me It’s Going to be OK’, *The Baffler* 41 (September 2018), <https://thebaffler.com/salvos/tell-me-its-going-to-be-ok-tokumitsu/>.

densed sense of time and heightened fears of otherness, we have short memories and we have shut down our imagination with regards to how we could live together in better ways.

In this climate, I'm increasingly scared to train a Hologram to share herself with others. Is it safe enough? Is she resilient enough? Patience may or may not know how to provide the long-term stability, attention, and gentle curiosity that she may need in order to begin to benefit from this practice. Will there be enough time given by the group for the Patience to learn how to be patient, and curious about someone else's life? People are resilient, but people are hurting, and time is ticking. And when people are hurting in our culture, they turn inward, and they may not be willing to participate in something that says that my healing is bound up in yours.

Moreover, I am worried that this project, even though it is oriented towards revolutionary empowerment, may feed into a culture obsessed with the cruel optimism of 'healing', where the sorrows of the individual become a black hole where radical politics goes to shrivel up and die. I'm worried that, if perceived in this way, it might take away more from radical grassroots struggles than it contributes.

And for all these reasons which I fear this project, I also believe it is the best project I have come across for countering the cornucopia of deeply unjust dispossessions that we are all living with.

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I'VE BEEN TOLD
SOMETHING
I'M NOT MEANT
TO KNOW. IT'S
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I'VE BEEN TOLD SOMETHING I'M NOT MEANT TO
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With a languid, last pedal stroke Δ rolls toward the entrance of the gallery and jumps off 50 yards away so they can survey from a short distance the group of around 40 people gathered outside. They recognise surprisingly few faces. They realise they are nervous, an unexpected sensitivity.

Multiple conversations around the kitchen table about the new work by Ω previewing that evening amounted to a kind of ad-hoc verbal 'user agreement' for the inclusion of Whatsapp exchanges between them. Throughout this process Δ had been very relaxed. Even if their name was included somewhere in the PR, at least from what Ω said, no particular part of the script could ever be directly traced back to them—their words hidden among a collective voice that combines several friends.

Familiar faces reassuringly surface into sight as Δ squeezes through the ceremonial congregation. They toss a smile here and there but don't stop as they head straight for the stairwell where the work is installed. Ω has already sent them a video walk through so they know exactly where to find it. Although motion activated, there are so many bodies tumbling up and down the stairs that the speakers are already chatting away when Δ arrives:

Thanks I'm in the pub waiting for him to arrive, I had to come in to pick up the bloody hard drive

I'm trying to focus on rest. Do you think you're depressed?

I don't know, there doesn't seem to be a stable connection. But at least it's positive action in the right direction.

We were still unloading at 2am, I feel I lost several years off my life. I know he's working loads and is stressed but I feel like a housewife.

Might relate to a projected self, Making him feel bad about himself.

Sometimes I think it's art to blame. Sorry to hear that, real shame.

We're inside, crazy free booze. Critics and curators always lose.

Yes this really feels like grief. I'm the opposite. It's a massive relief.

Yeah sure that's fine, good luck with your mission. Can you help me out by signing this petition?

It feels like what happened was like having a cool drink on a hot day. Yeah I felt a bit self-conscious posting it today of all days, but hey.

just thinking it could be why, gross people will apply.

Have come up with a newish approach, The idea of a man beyond reproach.

it hadn't occurred to me that was on your mind. And you know what it feels like to feel aligned.

I don't think it's ok for you to keep it a secret with your friends there. I guess you could drop an email to say just wanted to ask if he was aware?

But I fear I've put up w borderline neglect cos of that. Can you message her though as my phone is running out of batt.¹

Δ know's all but one of the other participants but can't make out who is who. Then their own cloned voice appears:

Our bodies subjugate us, then men. I suppose it makes me feel alone again. I do feel less depressed though so that's good. But it shows that if he REALLY wanted to he could.²

Then Ω 's ex-boyfriend whose beautifully rich accent does strange things to the software:

That would mean cheap rent and both of us are away a lot. Culturally, I think we have more in common than not.³

Δ again:

I'm about to get on bus if you want to chat at all. But that's cos he hears us shagging through the wall.⁴

An aching mortification passes over Δ following the cold visitation of their eerie, mechanical voice on the subjects of depression and shagging. Δ can't help but feel *their* voice is surely the one to get the most sticky verses. '*Shagging?! who even says that?*' thinks Δ . That word belongs in the 90s, it's more uncanny than their own badly cloned voice. Δ reads the label next to one of the speakers: the artist's name, the title of the work, the materials, the list of names of the contributors. Ω had agreed there would be no implied connection between the voices and the contributors, that the script would be presented as a '*collective*' and therefore anonymized

1 Erica Scourti, *Slip Tongue*, audio installation, 2018.

2 Scourti, *Slip Tongue*.

3 Scourti, *Slip Tongue*.

4 Scourti, *Slip Tongue*.

contribution. Fine to include their name, they told Ω , but not without the explanation that all the texts are mixed together into one headless personage.

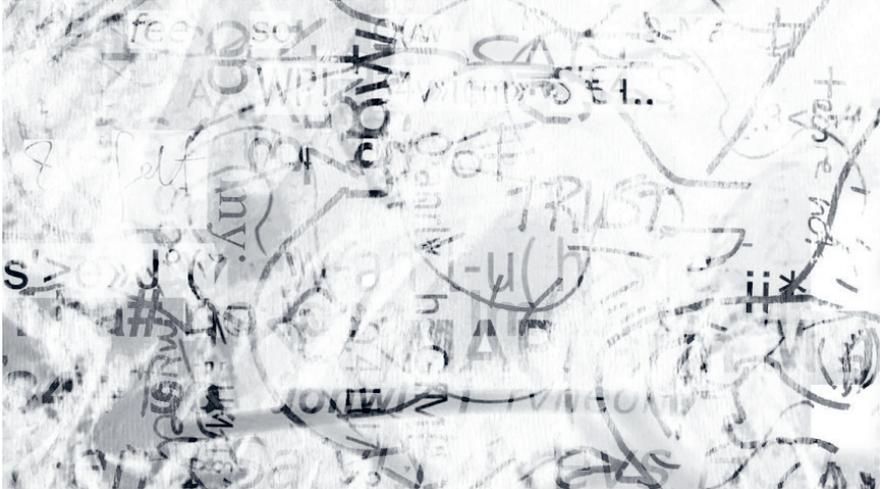


Fig 1: Erica Scourti, *Soft Touch*, digital drawing, 2018. PR image for *Near Bliss Index* (performance including script derived from the same archive as *Slip Tongue*), 17 June 2018.⁵

Δ goes to find Ω for a quick chat to explain their discomfort with the framing. Ω says that they gave the gallery instructions according to their verbal ‘user agreement’ but the curator proceeded to edit the text Ω had given them, apparently there just wasn’t space to explain the complexity of the work within the small label and in the PR text each artist only gets one paragraph. The simplest thing, Ω concludes, would be to remove the names of contributors altogether. Most of Δ ’s friends and colleagues will have come along on the opening night but Ω promises to get it changed anyway. The next day after the preview all the names of the contributors are redacted.

According to the training Δ has received, every aspect of human behavior and desire has been colonized within late capitalism. Much work has been done throughout Δ ’s formal and informal education to make them cynical to the notion of friendship. Instrumentalisation—the ‘useful’ friend—has apparently wrecked the ideal ‘philia’ promoted by the likes of Aristotle. According to *his* classical notion, friendship can only be perfected when one exercises ‘virtuous’ character.⁶ A friendship in goodwill, according to the Western canonical teaching, should therefore be just the right synthesis of beneficial *and* pleasurable. It becomes something altogether vulgar when the balance tips toward an alliance based upon calculated advantage: it becomes instead a form of labor.

Δ wonders if the friendships they have been pursuing in the past few years are becoming more *useful* to the performance of their curatorial career. Whilst Δ considers energy gained through friendly professional relationships to be less concerned with exploita-

5 Image appears courtesy of the artist.

6 Richard Kraut, ‘Aristotle’s Ethics’, *Stanford Encyclopedia of Philosophy*, 15 June 2018, <https://plato.stanford.edu/entries/aristotle-ethics/#Frie>.

tion than reciprocal needs, the needs in question irrevocably entangle their emotional and intellectual capacities. Conspiratorial exchanges concerning the latest art world and love life gossip are a mutual need that nourishes the friendship between Δ and Ω . These chats become a warming habit and an activity that increasingly takes place at the shared house where Ω lives with other artists.

The symptoms of working with friends—the certainty of some missed deadlines, the result of sometimes painfully slow processes of working ‘in collaboration’ because you’re distracted by whichever house mates are hanging around—can sometimes manifest as emotional affliction when they’re really under pressure with work. However, Ω cannot imagine living without these satiating rituals of friendship and there are the inefficient bonuses, like the never-ending work lunches and the holiday / residency that includes the need for time investment in potential new friends / contacts so that dreams of making ‘time and space’ for a discrete personal project quickly melt away.

With this in mind, Δ wonders if both of them are doing neoliberalism wrong. Rather than operating as a catch-all mode of sovereignty, work with friends seems to challenge the accumulation of capital. Δ finds solace in Mason Leaver Yap’s conception of friendship as a ‘sacrificial economy. [...] Sleepless nights are absorbed into the body [...], work is interrupted [...], breakages are forgiven. In its pursuit of the symbolic, friendship thrives on the destruction of material things of personal worth. The destruction of value is pleasantness shared.’⁷ Perhaps there is at least one regard in which capital could be said to be making gains: their domestic situation, where *pleasantness shared* encompasses sleeping and working in an increasingly efficient little space together.

Σ lives for some time in a bedroom above a self-styled ‘political technology hackspace’. The wallpaper has peeled off the bedroom wall to reveal large swathes of mould, and there are shouty drunken fights on the street outside in the early hours. During the day, members of the space use the common area and work remotely, building propaganda games for Labour, or some kind of hyped charitable machine learning, or just try to make money with apps. The place is designed to look like a steampunk fan fiction novel, 90s CCTV cameras adorn the narrow entrance hall like a flock of cybernetic pigeons and skeuomorphic kitchen cupboard doors are made from a Kafkaesque antique library filing system. The website has a visualization of the social graph of all of the members and there was even talk of designing membership discounts based how many social media connections one has with other members.

When Δ occasionally stayed there, they experienced a discomfort that reflects a lack of cultural assimilation. In contrast to the hermetic codes of the art world Δ has spent more than a decade learning, it feels perverse the way ‘tech for good’ communities are willing to gamify networking in such an open fashion. For Σ this openness is perceived as progressive, at least it doesn’t reproduce the opaque elitism of the art world.

The office atmosphere colonizes the shared kitchen and living room which opens onto a the hotdesk area. A cleaner visits on a daily basis to clear away the messy

7 Mason Leaver-Yap, ‘Offerings’, *Leaver-Yap*, 3 August 2015, <https://leaveryap.wordpress.com/2015/08/03/offerings/>.

traces of the live-in members, it's considered a necessity because of the busy public program filling these spaces. Once a week they get together for a big meal cooked by members on a rota and open to anyone who wants to learn more about what they do. At the gallery and office for independent curators Δ co-founded, they had talked a lot about how to soften the space and make it feel homely. One of the first exhibitions staged by a colleague included artists sleeping in the gallery on camp beds and transforming the communal kitchen and meeting room into their living room, filling it with flowers and culinary experiments to share with audiences as well as the hot-deskers.

Δ and Σ have a tense conversation about the values of the hackspace. What do these people stand for anyway? Why would Σ lend them legitimacy by being there? Σ feels like they can't always defend the way the people in this community work. When you are building infrastructure, like lists of people in power or databases of planning permissions, you just put it out there, and hope that it will be used for decent purposes.

Perhaps every institution or community has the potential to be alienating, or simply really annoying. Σ goes with Δ to see a show about extending the range of human communication or empathy, experimenting with connections to artificial intelligences and extremophilic bacteria. Σ thinks he is probably the only person in attendance who does not work in the arts. When they get cold responses to the question of what they do, they feel like they exist as a derived category, 'the boyfriend'. When Σ joins a dinner party of artists and curators he listens to these new friends talk about some other people Σ doesn't know for about an hour. Σ wonders if this has ever happened to them before. If this is what community feels like, Σ would settle for the basic decency afforded to strangers.

Δ is reading the work of labor activist, teacher and mystic philosopher Simone Weil whose posthumously published *Gravity and Grace* consists of writing from notebooks and diaries that were apparently never intended for publication. They were mostly penned during 1942 when Weil was working as a farmhand and living with Gustave Thibon, a fellow philosopher and Christian, who eventually became a good friend. As the Nazi invasion into France progressed, Weil was forced into exile and the diaries and notebooks were entrusted with Thibon, who after Weil's death, edited them into a thematized collection. The ethics of the mediation of Weil's private words made public by Thibon, are qualified by the weightless 'grace' of friendship between them.⁸ Weil unpacks how intimate duty to a friend enables one to accept a debt of giving without consolation. This inequality of energies exchanged within a friendship is a 'miracle'.⁹ Δ has to save up energy in time to spend it on the emotional needs of friends and consequently worries they are *inhuman* for not displaying this superhuman quality.

Self-preservation mechanisms keep Δ from working with anyone who too publicly reveals their anxieties or malaise. This is not something Δ is proud of, especial-

8 See Gustave Thibon and Joseph Perrin, *Simone Weil as We Knew Her*, London: Routledge, 2003.

9 Simone Weil, *Gravity and Grace*, London: Routledge, 2002 (1947), p. 67.

ly when said friends orient themselves with the notion of the ‘feminist killjoy’.¹⁰ Δ doesn’t mean to punish these friends and admittedly it’s getting more difficult with the seemingly daily increase of TMI content posted by their community but Δ is able to spot and avoid someone a mile off who is sure to reduce their energy to below zero. Ω is an artist with whom Δ has a friendship that is built on this quiet respect for one another’s boundaries. In fact Ω is so acutely aware of the potential to overload certain friends with emotional labor that for moments of particularly high stress they have developed what they dub a ‘personal support system’ in which they pretend to phone a ‘proxy friend’, all the while just recording a voice memo. This way they get to double up on efficiency—producing the raw materials for future exhibitions whilst not overburdening friends.

Ω constantly takes notes on their life; reflections on adversity mixed with whatever theory they’re reading at the time, notes from lectures, personal mantras that incorporate aspects of Buddhism and self-help, twitter confessions and unsent letters. These form the raw artistic materials which are parsed through human (often friends and family) and non-human (often computational) instructed bodies. In one blog post Ω describes this practice as *autohagiography*.¹¹ The ethics of how the voices of friends and family are mobilized in the autohagiographical work of Ω , has become an increasingly urgent contextualizing force in recent years.

Δ can’t help but hold onto some of the more romantic notions related to autonomy in their field, specifically the belief that every artwork is an autobiography—laying evidence to a more or less intriguing or fucked up perspective. If networked relations in the artworld function with the artwork as a proxy, these relations are based on uniquely intimate forms of recognition. The key is not only to be known and recognised by others, but specifically to be recognized by those you recognize. The intimate breeds the exclusive. And when that kind of intimacy is extended over a crowd of people, a ‘scene’, then it leads down a dangerously isolating path—you don’t really need anybody who isn’t ‘in’ on the story.

The tech institution attracts a combination of civil servants and digital strategy consultants interested in the relationship between technology and public sphere—such as voting systems. This commitment to considering what is at stake in collective decision-making is something that appeals to Σ and despite the misgivings of Δ , these ethical and societal relations continue to be a shared intellectual interest during their relationship. Σ started using early computers before they could read. With a modem connection over their family’s landline they contributed code to the Debian project, a Linux distribution that still runs in some form on a large chunk of the world’s digital infrastructure today. Σ found some hope in thinking about how thousands of people who hadn’t met each other managed to build software on a voluntary and democratic basis. Σ ’s mother complained about the phone bills. A mutual desire to engage with messy systems comes to the fore when they make a decision to move into a big shared house together rather than ‘pair off’. When Ω is served an eviction notice on their current

10 Sara Ahmed, ‘About’, *Feministkilljoys*, 26 August 2013, <https://feministkilljoys.com/about/>.

11 Erica Scourti, ‘Introduction to Dream Actions: Embodied Visions’, *Wrong Dreams*, 20 October 2017, <https://wrongdreams.com/2017/10/20/introduction-to-dream-actions-embodied-visions/>.

place, Δ and Σ decide this would be a good opportunity to make the move and join the household of artists with Ω .

During their long-distance relationship Σ made a chatbot that combined all the messages they had sent to one another on Whatsapp. One of a number of code-based gifts, this one was definitely a favorite of Δ . Σ explained that it recognizes patterns that both use in their messages and produces phrases that follow these patterns but have never been spoken before. The bot was neither of them, but still spoke in a way that was recognizable. Whilst Δ mused that perhaps the bot could be described as a collective voice, according to Σ it was actually a third subject. Over a year after making the bot Σ and Δ reminisce about whether it would still be active, if it could still be found and interacted with. Σ says it was saved on a virtual server that might have been shut down but maybe if Δ would like to have it, it could be resurrected. Σ moves it to a new server and sends a link over Whatsapp to Δ , who has a brief chat with the bot:

hi its been awhile

Just looked at her place close to the little bridge by the time difference

which bridge?

got a busy day of my extended immaturity and splitting my time a bit creepy.

we do have an extended immaturity for sure

I can be on your holiday.

we're on holiday now, in the future

I like the idea of lots of information about international co-operation of animal welfare parties and their kids.

sounds like us still lol

Yeah I think we would have been all talk and no actual play.

we still have fun with no actual play, it's a good way of being together

Maybe we just need to focus on naught but the writing.

ha, that's what we're doing for now, and in beautiful environs.

My unconscious is doing too much.

I hope not in a way that's making you sad?

You could pay rent by doing all the stuff my dad climbing on the streets?

Sounds like a plan, maybe you can explain further?

I'm thinking of making use of my private parts and fell over on the network that the music stops me from athena.

ha, maybe the bit about using private parts to pay rent sounds a bit dubious

Maybe that won't affect students too much. * 🌸🌸🌸 *. also strangely arousing.¹²

Ω and Δ have frequent discussions about whatever current project Ω is busy with. It might be a need for consultation on a tricky ethical matter, a grievance to be made towards a colleague, a lament—'why me?' Occasionally it's more like a proper studio visit. When they move in together this becomes something Σ also takes part in. When Ω gets an invitation to make a new work for a group exhibition on the theme of flirtation, they reminisce about the chat-bot Σ made for Δ . Maybe they could make something based upon conversations with close friends and an ex-boyfriend? They ask Σ , would they be up for helping with the computational parsing side of things?

The challenges of working with the material produced 'between friends' and the 'private, conspiratorial and mutual' character of these exchanges are pushed to the limit in Ω 's latest work.¹³ Having accumulated material from Whatsapp and Facebook chats, Ω undertakes the process of negotiation with various subjects who will feature in the work. This embodied mediation is a kind of social engineering. When Ω asks Δ if they will allow their conversation to be divulged through the artwork, Δ obliges. Their voice will become a kind of acephalous living thing, forked through a set of vital non-human algorithms, one which produces rhyming couplets. The automated poetry verse helps bring the words to the attention of audiences and Ω thinks of it as a bit of an inside joke, in reference to their 'first career' as an artist when in their 20s they gained a name for themselves within the art / poetry world.

Ω has been playing around with a new piece of software that's just appeared on the market; Lyrebird. Describing itself as 'Ultra-Realistic Voice Cloning and Text-to-Speech',¹⁴ Ω thinks this will be the perfect tool to activate the words. This way Ω can get the friends to speak any phrase on demand. Ω and Δ discuss the terrifying potential exploitations that could be enabled by the technology. In regards to both intimate relationships and legal jurisdiction, the voice currently plays an important role as evidence—it is a disembodied surrogate for the authenticity of the body. The capturing or even theft of a voice could enable fraud, manipulation and deception on an unimaginable scale.

Having learned to endure their own voice, featured in exhibitions or appearing in YouTube documentation of discussion panels, Ω is acutely aware of the discomfort this can induce. It took years for Ω to get used to this and preparing her friends for the public performance of intolerance at one's own voice is a vital part of the negotiation. Incorporating numerous chat channels into a collectively voiced script, the discreet, diagnostic words will be rewritten as an aggregate voice who partakes in mutual counsel

12 Aleksi Knuutila, 'Friends' chatbot, 2017, address undisclosed.

13 Mason Leaver-Yap, 'Offerings', *Leaver-Yap*, 3 August 2015, <https://leaveryap.wordpress.com/2015/08/03/offerings/>.

14 See <https://lyrebird.ai/>.

with Ω . Δ is reassured by the idea that the safe space produced by friendship, which first opened them, among others, to share and risk shame in private conversation, is substituted for the safety of an anonymous, yet authentic collective voice.

Δ creates an account on Lyrebird and reads out phrases in order for the product to generate the simulation and capture their voice. Whilst Δ had been warned by Ω of the uncanny feeling they are likely to get when hearing their voice in the gallery; *'that doesn't sound like me even though I know it's me'*, Δ try to retain some autonomy. They keep it from being too authentic by providing it with just 30 phrases, the minimum required. Σ waits impatiently for Lyrebird to load up Δ 's voice and without delay pastes in a well considered phrase from the hundreds that are spawning from Ω 's archive. Δ 's counterfeit voice speaks for the first time:

I haven't had sex for years. Talking about it is making me feel a bit panicky.¹⁵

They both let out a sharp burst of laughter. The transgression of what clearly was only ever meant to be 'between friends' is articulated with a perfection of the *uncanny valley*, a creepy not-quite-human likeness. There are many years worth of conversations for the phrases to draw upon. Δ and Ω have known each other for at least six years whilst Δ and Σ have only been dating for just over a year. They all work with the awareness it's pretty certain that there will be some phrases that cover the discussions around Δ and Σ 's developing relationship. Whilst Ω has reassured Δ that all material has been pre-edited, names removed, before being passed on to Σ , with the rush of getting the thing done this isn't strictly true. Σ makes sure Δ doesn't have to know that. Δ thinks that Σ will be able to recognize the way they phrase things anyway, but this fear is less important than the idea that this project is something Σ seems to enjoy and is simultaneously bringing them closer to one of their best friends. At least in terms of a wider audience for the work, the fact that it's a glitchy approximation of a voice rather than the *real* thing, provides insulation from self-consciousness Δ was hoping for.

Ω comes up with the idea of thinking in terms of stages of a relationship—from flirtation, and anticipation, the waiting for calls (that sometimes never come), the throws of mutual, passionate relations, to the eventual relationship breakdown. In order to achieve this hierarchy of connotation, Σ suggests incorporating some techniques that not only generate language, but break down its meaning. These are tools from distributional semantics called 'word vectors', developed and released by the platform giants, who use them to understand the content of communication and to direct internet user's attention. Within the semantic calculus of the word vectors, phrases from the chatlogs can be identified that are close to the atmosphere of each of these phases. The machine learning tools work by analyzing the close relationships between words, as they occur in bodies of text that span terabytes. The space of semantics is represented in vectors, where each word is typically assigned 300 semantic dimensions. While quite unreadable to people, these vectors represent a complex web of affinities between terms. The principle of deducing meaning from patterns of usage is captured by a linguist who developed his theories during the birth of cybernetics

15 Scourti, *Slip Tongue*.

in the 50s—‘You shall know a word by the company it keeps’.¹⁶ The structure of the machine learning syntax operates like a social network, showing who hangs out with whom and re-embedding existing affinities. The gendered inclination of a word based on an adjacent implication is the most often quoted example of the potential for bias where ‘man : computer programmer :: woman : homemaker’.¹⁷ Sometimes nonsensical glitches are produced by the algorithms because words that are considered to be substitutable with each other, that occur in the same contexts and niches, are assumed to have the same meaning.

Σ wants to start off their friendship with a gesture of goodwill, but also with curiosity to Ω ’s practice and use of technical tools. Ω works with the various tools Σ has built, the affinities produced by word vectoring, the rhyming couplets the result of Markov modelling and finally the Lyrebird voices. The mechanisms are haphazardly collaged in Ω ’s process of editing to the point where Σ loses track of how they are being used. The sentiment analysis gets used but not in the linear way they first discussed and the couplets, now randomized, require some reigning in. A lot of the time the phrases outputted by the algorithms just sounds like a jumble so Ω rewrites them, imitating the automation whilst making what *they* consider key words adjacent.

In the process of back and forth with Ω , Σ feels their notion of craft and intimacy working with digital tools varies vastly. Ω doesn’t have the time to understand how everything works under the hood, or how to use arcane interfaces such as command lines. Σ is slightly uncomfortable in their role of providing ready-made black boxes. Although Σ considers Ω to be a ‘critical’ artist there is something about the division of labor; between the craft of the technologist and the authorial artist, that leads Σ to wonder about their role in the current machine learning hype cycle in the art world. Σ is trained as an anthropologist, and believes that attending to the texture of any human practice is how new concepts are made, and the generative connections between people and machines is a particularly fertile ground. Σ wants to avoid the cliched feeling of someone whose expertise and creativity is reduced to a category like ‘being a technician’ but accepts that perhaps it is an artistically productive moment for Ω when they feel like technology is something that is happening to them, rather than something they actively build.

In his essay ‘Techno Feudalism and the Tragedy of the Commons’ William Kherbeck characterizes ‘Generation Generate’ as serfs who produce content for platforms that don’t own their means of production, so they are like lords or vassals, who only have leased access.¹⁸ Δ thinks the artwork operates a bit like a platform. In addition, the fact that they live together makes Δ think of a cottage industry. This was a stage of proto-industrialization, after feudalism, in which subcontracted production was undertaken by a variety of craftsmen in the home rather than the factory. Σ becomes obsessed

16 J.R. Firth, ‘A Synopsis of Linguistic Theory 1930-1955’, *Special Volume of the Philological Society* (1957): 11.

17 Emerging Technology from the arXiv, ‘How Vector Space Mathematics Reveals the Hidden Sexism in Language’, *MIT Technology Review*, 27 July 2016, <https://www.technologyreview.com/s/602025/how-vector-space-mathematics-reveals-the-hidden-sexism-in-language/>.

18 William Kherbeck, ‘Techno Feudalism and the Tragedy of the Commons’, *Doggerland Journal* 1 (2016), p.10.

with the fun to be had fiddling with natural language processing. He taps away gleefully late into the night, spurred on by the challenge Ω has set—making rhyming couplets out of the exchanges between the friends and lovers. As Σ sits up in bed working on endless lines of multicoloured code, Δ search some keywords ‘cottage industry’ + ‘digital labour’ and finds an article from 1981 called ‘The Electronic Cottage’ in a journal for ‘electronics engineers and experts around the globe’.¹⁹ The author Alvin Toffler predicts a low-cost electronic workstation in the home (by 2006, perhaps earlier) will bring with it ‘a new emphasis on the home as the center of society’. He ruminates upon the psychological impact of such a dynamic, concluding ‘work at home suggests a deepening of face-to-face and emotional relationships’ and will be ushered in by a seemingly unlikely coalition of radical feminists, environmentalists and conservative churches.²⁰ Δ learns that Toffler’s first major book, *Future Shock* was co-written with Heidi, his wife.²¹ She has no Wikipedia page and if her name is on the cover of this book (they wrote 6 together that Δ could find) then it was so small that Δ couldn’t read it from the jpeg on Amazon. Δ decides to finish their research for the evening on this sore note, slamming their laptop shut indignantly. Σ doesn’t flinch so Δ doesn’t wait before preparing for bed. Σ is in too deep, and continues to tap away for a while longer.

Weil romanticized agricultural ‘back to the land’ labor. Her philosophical methodology included two interrelated, self-conscious parallel activities; firstly manual labor enabled the claim of an authentic embodied proletarian experience and secondly the evidencing and analysis of this work in her written diaries and notebooks. For an academic sabbatical in 1934 she purposefully alienated herself, alongside a group of Parisian factory workers, who worked twice the hours she did—of course she needed time for reflection, writing up her ‘factory diary’. Towards the end of her life, in 1943, she proposed sacrificial front-line nursing to General de Gaulle, who in turn labelled her psychologically unstable.²² Her notion that a ‘common’ experience of alienation could produce authentic relationships with the world and deliver her from the mundane pretensions of her bourgeois philosophical search for meaning are considered by Δ as a specious fetishization of proletarian work.

Just like Weil, thinks Δ , artists are always looking for the next slice of authentic experience to qualify their politics. The field of contemporary art in which Δ lives can’t seem to escape the promise of authentic deliverance. Many, throughout the history of art have attempted to wholesale seal-up any possibility of support for *authenticity*, a once bankrupt concept. Despite these efforts it continually creeps back and breathes life into the vulnerable gaps in the identity of artists: their survival instinct. It is a dual process: they market the authenticity of their experiences so their artwork can circulate as a commodity. Δ had been educated to consider this an ongoing conflict between the sullied market and so called ‘critical’ theory. However at some point early on in their career, both artists and theorist began to give up on a bifurcated understanding of

19 ‘About Us’, *EDN Network*, <https://www.edn.com/aboutus>.

20 Alvin Toffler, ‘The Electronic Cottage’, *EDN Network*, 14 October 1981, <https://www.edn.com/electronics-news/4319730/The-electronic-cottage>.

21 Alvin Toffler and Heidi Toffler, *Future Shock*, New York: Bantam Books, 1971.

22 A. Rebecca Rozelle-Stone and Benjamin P. Davis, ‘Simone Weil’, *Stanford Encyclopedia of Philosophy Archive*, 10 March 2018, <https://plato.stanford.edu/archives/spr2018/entries/simone-weil/>.

authenticity and criticality. With the alt-right a named presence within the art world, Δ found themselves both more suspicious and understanding of the need for embodied sincerity. In an era that might become known as ‘the post-ironic turn’ authenticity could be being called upon to lay evidence to ‘realities’ at both ends of the political spectrum.

Ω says that we are moving from an economy of *experience* to an economy of *transformation*. They tell Δ how when attending dinner parties in LA last year they became aware of how the art world there is ahead of London. In LA, Ω explains, they are even more seriously into self-care. Everyone wants to signal they have resolved their ‘issues’ through a unique transformative spiritual journey of healing. Waking up at 6am to meditate for an hour before doing emails serves to demonstrate you’re an efficient worker and a reliable potential collaborator. Δ says this seems strangely at odds with all the work being done around embodiment, authenticity and the influence of ‘Sick Woman Theory’ in which Johanna Hedva reflects upon the moment of being bed bound because of chronic illness during the Black Lives Matter protests: when they were led to ask ‘How do you throw a brick through the window of a bank if you can’t get out of bed?’²³ Whether it’s a function of a conservative shift in the scene or just Ω getting older, there has been an adjustment in expectations in comparison to just a few years ago Ω thinks it will become increasingly unacceptable to announce you’ve had an emotional breakdown this week, feel really unproductive or you’re just really hungover today because you’ve been going out too much.

This comes up in conversation not because they have been partying particularly hard, but Ω is experiencing acute exhaustion and when they go to their GP are confounded by an on-the-spot diagnosis of narcolepsy. Ω starts writing a tweet about taking their first dose of a prescription of Modafinil. Perhaps, thinks Ω , they really are turning into Margery Kempe! For some time Ω had been researching the hagiography of medieval female mystics, such as the lay holy woman Margery Kempe whose early example of autobiography opens with a ‘vision’ that modern science has recognized as postnatal psychosis.²⁴ The German Benedictine abbess, Hildegard von Bingen also endured chronic health vexation and eight centuries after she lived, a neurologist, reading one of her visions, recognized the symptoms of a migraine attack and provided a retrospective diagnosis, elucidating a relation between saintly visions and poor health.²⁵ Like these mystics before her, Simone Weil’s body was fragile, she suffered terribly with migraines among other aggravations. No doubt this massively affected her concept of ‘affliction’, also named ‘malheur’ (misfortune) for which some have considered her a saint.

Like the visions of the mystics, the friends and former lovers of Ω are visionary witnesses, envoys who can be called upon to assist in the animation of the authenticity of the artist’s life. In the process of laboring over their work, Ω undertakes considered negotiation with these actors within their network of affiliation. Ω labors to maintain the promise of grace in these loving relations with others and most of the time succeeds flawlessly. Still, there is always space for slippage, for someone they care about to be

23 Johanna Hedva, ‘Sick Woman Theory’, *Mask Magazine* 24 (January 2016), <http://www.maskmagazine.com/not-again/struggle/sick-woman-theory>.

24 Diana Jefferies and Debbie Horsfall, ‘Forged by Fire: Margery Kempe’s Account of Postnatal Psychosis’, *Literature and Medicine* 32.2 (2014): 348–64.

25 Charles Singer, *Studies in the History and Method of Science*, Oxford: Clarendon Press, 1917.

be humiliated or otherwise offended. Sometimes this raises the question of sacrifice, is the work worth it after all? However, without this living delegation Ω would be denying the multiplicity of their identity and everytime a delegate glitches, Ω is reminded that the danger attached to this contingency has always been a characteristic of live art that their work thrives upon.

A long time ago Ω had told Δ to read Eve Kosofsky Sedgwick's 'Paranoid Reading and Reparative Reading, or, You're so Paranoid You Probably Think this Essay is About You'.²⁶ It describes paranoia as 'a way, among other ways, of seeking, finding and organizing knowledge'.²⁷ Indeed 'the way paranoia has of understanding anything is by limiting and embodying it'.²⁸ This embodied knowledge, is according to Sedgwick, a memetic quality whereby the paranoid truth is reproduced through its process of simultaneously seeking and finding knowledge. For years, only going by the title, Δ had built a speculative assumption that Sedgwick embraces paranoia as a way of knowing that is most often practised by the marginalized and for these reasons can be seen as rich field of usually undervalued and discredited embodied knowledge. However, instead Sedgwick's analysis begins by over-turning the usefulness of subjugated groups, such as victims of the AIDS crisis, undertaking the work of 'tracing and exposing' how they have been conspired against.²⁹ The argument goes that paranoia is instead a facet of neoliberal Reagan era epistemology, an apparently toothless ideal of faith in demystification via exposure which has its genesis in theoretical canons such as Marx, Nietzsche and Freud as well as inflecting Judith Butler's concept of performative gender.³⁰ Paranoia is adverse to surprise as it functions to predict the crime, and this makes it 'retroactive'.³¹ Δ thinks there's something awful about calling a subject who is traumatized, and therefore paranoid *retroactive*, as if they should *just let go of the past*. A better position to take, one of responsible 'hope' that lays claim to a 'reparative' approach would be to think the future could be different from the past.³² Δ finally understands when Sedgwick says 'paranoid-tending people [...] need to [...] develop and disseminate the richest reparative practices.'³³

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26 Eve Kosofsky Sedgwick, *Touching Feeling: Affect, Pedagogy, Performativity*, Durham: Duke University Press, 2003.

27 Kosofsky Sedgwick, *Touching Feeling*, p. 130.

28 Kosofsky Sedgwick, *Touching Feeling*, p. 131.

29 Kosofsky Sedgwick, *Touching Feeling*, p. 123-124.

30 Judith Butler qtd in Kosofsky Sedgwick, *Touching Feeling*, p. 139.

31 Kosofsky Sedgwick, *Touching Feeling*, p. 146.

32 Kosofsky Sedgwick, *Touching Feeling*, pp. 146-7.

33 Kosofsky Sedgwick, *Touching Feeling*, p. 150.

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All artworks by Erica Scourti commissioned for 'We Are Having a Little Flirt', curated by Paula Lopez Zambrano and Ned McConnell. Pump House Gallery, London, 25 April – 8 July 2018.

IMPROVISING BLOCKCHAINS

MAX DOVEY

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An overview and analysis of performance methods used to explore emerging, decentralized ledger technologies in the arts.¹

An unexpected response to the proliferation of blockchain is the use of performance, role play, and improvisation to simulate, imagine and experience different blockchain futures. This article sets out to catalogue various examples and applications of performance—namely Live Action Role Play (LARP) and improvisation—that offer creative and practical methods for individuals to understand, develop, and shape emerging blockchain applications as technologies for social governance.

See Fig. 1 in the Gallery (p. 47).

Distributed Ledger Technology (more commonly referred to as blockchains or DLT) promises to transform the structural organization of digital information by storing a synchronized, distributed database of time-stamped transactions on a network of computers. At first primarily used as the underlying cryptographic architecture to secure the cryptocurrency Bitcoin, the attributes of blockchains have received widespread interest by multi-national and global businesses worldwide. This has led to millions of dollars being invested in developing and integrating blockchains into business organizations as many believe blockchains will play an integral role in shaping the future of information systems. The drive for blockchain technology to transform society more broadly can be observed in EU-funded initiatives such as ‘Blockchains for Social Good’² or NGO-based research consortiums titled ‘Blockchains and the Global South’.³ Within these initiatives many seek to develop and deploy blockchain technology to administer and deliver technological solutions to many ‘real-world problems’ (e.g. digital voting systems⁴ or to provide digital identification cards to foreigners or refugees⁵). Within these areas of research the prevailing attitude is that engineers and developers will be able to solve many of the world’s issues through blockchain-based applications. This attitude is illustrated in the dramatic video trailer for the ‘Block-

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1. This article was first published in Geert Lovink, Inte Gloerich, Caroline Nevejan, Ilse Verkerk, Judith Hart (eds), *Flying Money 2018: Investigating Illicit Financial Flows in the City*, Amsterdam: Institute of Network Cultures, 2019.
 2. ‘Blockchains for Social Good’, *European Commission*, https://ec.europa.eu/research/eic/index.cfm?pg=prizes_blockchains/.
 3. Kate Symons, ‘One-Day Conference on 22 May’, *Oxchain*, 4 May 2018, <http://oxchain.uk/2018/05/04/one-day-conference-on-22-may/>.
 4. Tonie McKay, ‘How Blockchain Technology Can Transform Voting in Scotland’, *Business for Scotland*, 12 October 2017, <http://www.businessforscotland.com/blockchain-technology-can-transform-voting-scotland/>.
 5. See <https://bitnation.com/>.

changers hackathon⁶ where Rutger van Zuidam, Founder and CEO of Dutchchain and the Blockchangers, kicks off a weekend hackathon by telling the workshop participants, ‘You will be building these amazing solutions and you will take them far beyond this hackathon into *the real world*.’ The phrase ‘real world’ is often emphasised at hackathons to describe sectors of industry such as energy, agriculture, healthcare, and governments. These ‘non tech’ sectors provide the starting ground for workshop participants to imagine and build blockchain-based applications that disrupt or challenge how information systems could be integrated into various different industries.

See Fig. 2 in the Gallery (p. 47).

What can be considered ‘the social turn’ in blockchain advancement is the avocation and implementation of blockchain-based applications, such as smart contracts and distributed autonomous organizations (DAOs), in various industries and sectors from governments and healthcare to energy and agriculture. The repeated emphasis on building software applications for ‘the real world’—in order to implement autonomous, ‘Turing complete’⁷ computer code that can potentially administer and govern individuals through a distributed database—is a profoundly and wildly speculative proposition because, as of yet, there is still no successful working use case for a DAO or a smart contract.⁸ A steady stream of articles headlined ‘How blockchain will change ...’, maintain a discourse of speculation and keep disruptors on their toes, relentlessly anticipating how blockchains might impact different industries. It is often claimed that blockchain development is in a similar state to that of the internet in 1992,⁹ suggesting that while the widespread use for blockchains is relatively unknown, it will be as important and ground breaking as the internet turned out to be. This type of speculative promise—where no one can guarantee how blockchains will revolutionize industries but are convinced by its potential—drives blockchain technology as a speculative vehicle for imagining various techno-social futures. Consequently, the advancement of blockchain as a widespread system for social administration, business, or governance still largely resides within the social and cultural imaginary of speculators. Regardless of whether or not blockchain lives up to the hype, the numerous ‘blockchain imaginaries’ proposed by such advocates have been disseminated through academic, cultural, and artistic research. Furthermore, the speculation caused by blockchain investment and media discourse has offered fertile terrain for artistic interpretation, where the implications of blockchain technology as a system for social governance ignite various ‘blockchain imaginaries’ that are articulated and disseminated through cultural and artistic practices.

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- 6 Dutchchain, ‘Blockchangers Hackathon 2018 After Movie (Biggest Blockchain Hackathon in the World)’, *YouTube*, 10 April 2018, <https://www.youtube.com/watch?v=4h87L6lRu0s&feature=youtu.be/>.
 - 7 David Golumbia, ‘MoneyLab#2: David Golumbia. Blockchain: Revolution or Business as Usual?’, *Vimeo*, 3 December 2016, <https://vimeo.com/148529091/>.
 - 8 Kai Stinchcombe, ‘Ten Years In, Nobody Has Come up with a Use for Blockchain’, *Hackernoon*, 22 December 2017, <https://hackernoon.com/ten-years-in-nobody-has-come-up-with-a-use-case-for-blockchain-ee98c180100/>.
 - 9 Mohit Kaushal and Sheel Tyle, ‘The Blockchain: What It Is and Why It Matters’, *Brookings*, 29 July 2016, <https://www.brookings.edu/blog/techtank/2015/01/13/the-blockchain-what-it-is-and-why-it-matters/>.

Many of these cultural articulations are explored in the book *Artists Re:Thinking the Blockchain*,¹⁰ which features a collection of essays, artworks, and fictional texts that respond to blockchains and their potential integration and application as a technology of social governance. The work of cultural practitioners (artists, hackers, theorists, and designers) responds to the proposition of blockchain governance through a variety of methods, addressing concerns, critiques, and general alternative visions of society in response to blockchain technology as an emerging system for social governance. In tandem with the publication of *Artists Re:Thinking the Blockchain*, one of the editors—Ruth Catlow, co-founder of Furtherfield Gallery—initiated a series of workshops in collaboration with Ben Vickers (chief technology officer at Serpentine Galleries), focusing on exploring blockchain from the position of the arts. ‘Decentralized Autonomous Organization With Others’ (or DAOWO) is a series of bi-monthly events that uses experimental performative methods, such as Live Action Role Play (LARP), scenario-based improvisation, and workshop simulations, to collectively play out various speculative futures inspired by blockchain. Each workshop explores a speculative concept surrounding blockchain. Participating in the workshops has often felt uncannily similar to the aforementioned Blockchainger hackathons, where groups subvert the techno-solutionist workshop format—as seen in the Blockchaingers Hackathon—by collaboratively producing their own imaginary ‘real-world’ blockchain application with which they could critique, satire, and play out some of the emerging narratives surrounding blockchain governance. This type of critical game play has produced a type of simulation of frequently mentioned ‘real-world’ blockchain applications. Workshop participants develop narratives to imagine and improvise potential social and political conditions that could be caused by widespread blockchain integration.

Many of the DAOWO workshops use a form of LARP, a type of generative theater frequently associated with board-game culture or war re-enactment. LARP has matured in recent years due to the growing community in Scandinavian countries that has developed role-play methods into ‘Nordic LARP’, which explicitly focuses on more open, collaborative, and immersive role play and games. The community has nurtured and developed LARP within an applied, socially engaged praxis, through regular festivals and collaborating with local governments in Scandinavian countries as a form of applied social therapy.¹¹ While LARP offers lots of possibilities for immersion and performative encounters, it seems an unlikely medium to facilitate responses to the emergence of blockchains. But while the imminence of blockchains remains a figment of imagination rather than a working realization, LARPing various scenarios and imagined futures inspired or propelled by the prospect of blockchain governance offers a semantic and physical framework through which to understand, negotiate, and challenge the potential impact of blockchain-based governance.

Another noteworthy use of performative practice in the field of blockchain improvisations is the use of speculative design methods in Human Computer Interaction (HCI). In ‘Speculative Approaches to Understanding DAOs’,¹² Chris Elsdén and John Vines

10 Ruth Catlow, Marc Garrett, Nathan Jones, and Sam Skinner (eds) *Artists Re:Thinking the Blockchain*, Liverpool and London: Torque and Furtherfield, 2017.

11 Elvia Wilk, ‘More than a Game’, *Frieze*, 15 October 2017, <https://frieze.com/article/more-game-0/>.

12 Chris Elsdén and John Vines, ‘Speculative Approaches to Understanding DAOs’, in *Proc. DIS 2017 Workshop on New Value Transactions – Understanding and Designing for Distributed Autonomous Organisations*, <https://chriselsden.files.wordpress.com/2018/01/dao-workshop-cam-ready.pdf/>.

describe some of the performative methods used to collectively explore the implications of blockchain technology and DLT's. 'Speculative enactments' is the term used to describe the act of performing the conditions and consequences caused by potential configurations of emerging techno-social constructions. Fictional scenarios, gameplay, and improvised character interaction are all used to challenge and speculate on potential techno-social futures. During a workshop held by the Design Informatics department at Edinburgh University, a group of participants (including myself) produced a fictional prototype for blockchain-based wedding contracts. A prototype of a mobile application was created and tested before making a video enacting the consequences or potential use cases of a smart contract that bound together individuals' digital cryptocurrency wallets into a shared wallet when individuals were located in the same geographic area. The application was named Handfastr, after the practice of handfasting (a pagan ritual of enacting temporary wedding-like commitments between individuals), thereby commenting on the rise of Bitcoin marriages and applications of decentralized technology that operate outside of church or state authority. By means of deploying a prototype and enacting the consequences of a potential use case of an emerging technology, individuals can gain experiential understanding of the social affect of techno-social systems and, based on this experience, offer potential alternatives to dominant claims made over the future use of such technologies.

See Fig. 3 in the Gallery (p. 48).

These examples are by no means exhaustive, but demonstrate how performance methods are being used in both cultural and academic sectors to disseminate blockchains and their implications as technologies for social governance. In the context of these emergent strategies, it is worth considering the reasoning for this unconventional and unlikely occurrence and evaluate its effectiveness. It is clear that the publicity surrounding blockchain has captured the minds and imaginations of cultural practitioners and, in response, artists have begun investigating the technology. When imagining the implications of blockchain applications such as DAOs or smart contracts, it is very difficult to gauge how these new configurations for social structures and organizations would play out in 'real-world' contexts. This is why LARP, gameplay, and improvisation are effective mediums to simulate 'real-world' scenarios, or, as Kei Kreutler phrases it, provides an opportunity to 'rehearse relations'¹³ that could form around new blockchain-based models of social organization. Because blockchain development is undergoing 'a social turn', it is of vital importance for the impacts of these technologies to be tested through what we can describe as critical 'dry runs'. It should be noted that the practice of simulation is also an embedded feature in the architecture of blockchain-based system design. The blockchain platform Ethereum, for example, has a 'test-net' for developers to ensure their code is deployed correctly and functions properly before launching it onto the main Ethereum blockchain. Similarly, LARP offers a simulation test-bed for emulating the social relations potentially created by the widespread integration of blockchains as a social governance technology.

See Fig. 4 in the Gallery (p. 48).

13 Kei Kreutler, 'Patternist', Lecture, Flying Money Conference, Amsterdam, 22 May 2018.

‘This reminds me an awful lot of an episode from Black Mirror’
 —Participant in ‘What will it be like when we buy an island (on the blockchain)?’¹⁴

Within such methods, the use of improvisation to enact alternative blockchain imaginaries is another unconventional strategy that works to varying degrees of effect. For example, a popular improvisation method used in theater to generate interactions and scenarios is called ‘Yes, And...’—a simple, rule-based game for players to support the co-creation of generative fiction where every idea must be responded to with ‘Yes, And...’ to further elaborate an improvised scene together. This method is traditionally used to accelerate the flow of improvisational dialogue and to make the performance more entertaining. However, within blockchain LARPs, the ‘Yes, And...’ rule quickly escalates conversations from the mundane to the hyper-dystopian. When being used as a method to counteract the often bold claims made about blockchain technology in the media, it can lead to the LARP generating absurd emulations of popular science fiction dystopias. This is where the artist John Cage, who had his own concerns about the use of improvisation in music, resonates with the use of improvisation within this strange techno-social role play. Cage argued that improvisation ‘does not lead you into a new experience, but into something with which you’re already familiar.’¹⁵ While Cage was referring to improvisation in the creation of music and not for exploring speculative social realities inspired by blockchain governance, I argue, based on my experience of improvisation and blockchain role play, that a similar outcome is often reached. That is, rather than disregarding improvisation methods within this space, certain methods are more effective than others when attempting to disseminate speculative fiction surrounding blockchain technology.

In *MoneyLab Reader: An Intervention in Digital Economy*, theorist Max Haiven argues that ‘money is a medium of the imagination’ and that cultural strategies can provide productive methods for rebuilding alternative imaginations of finance, money, and social relations.¹⁶ In general, the adoption of performance methods within cultural communities to demystify and re-enact the implications of blockchains in society posits a fascinating attempt to de-construct, imagine, and re-enact potential alternatives. Blockchain, originally designed to enable the cryptocurrency Bitcoin, is fundamentally a financial technology that has captured the collective imagination of how money, value, and society can be re-designed through networked computing. The impact of blockchain still lies in the success of the speculative imaginaries used to generate interest and venture capital, and transition into a widespread ‘general purpose technology’. In other words, blockchain will only become a technology for social governance if individuals become convinced by the claims made by its advocates. These claims, while seemingly rooted in factual or scientific properties of blockchain architecture, remain widely embellished propositions of the cultural imaginary. Therefore, while future applications of blockchains and DAOs reside in the white papers of start-ups and the imagination of techno-futurists, the use of role play, improvisation, and simulation are powerful and engaging tools with which to react to, investigate, and explore specula-

14 See <http://www.daowo.org/#what-will-it-be-like-when-we-buy-an-island-on-the-blockchain/>.

15 Darter, Tom, ‘John Cage’, *Keyboard* 8 (September 1982): 21.

16 Max Haiven, ‘Money as a Medium of the Imagination: Art and the Currencies of Cooperation’, In: Geert Lovink, Nathaniel Tkacz and Patricia de Vries (eds) *MoneyLab Reader: An Intervention in Digital Economy*, Institute of Network Cultures: Amsterdam, 2015.

tive imaginaries through collective action. Therefore, the use of performance methods to improvise alternative futures should be understood as a social toolkit for embodying and understanding new relations posited by blockchains and distributed ledger technology. Rehearsing relations and improvising potential futures has emerged as an emphatic counter-strategy from the arts to contest possible future imaginaries proposed by blockchain advocates. This will go a long way in rehearsing the various realities that may emerge if the 'real-world' applications of blockchain technology transition from science fiction to social realism.

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APPENDIX

AUTHOR BIOGRAPHIES

James Bridle is an artist and writer working across technologies and disciplines. His artworks have been commissioned by galleries and institutions and exhibited worldwide and on the internet. His writing has appeared in magazines and newspapers including *Wired*, *Domus*, the *Guardian*, the *Observer*. *New Dark Age*, his book about technology, knowledge, and the end of the future, was published by Verso in 2018.

Yiannis Colakides is a practising architect with a diploma from the AA and an honorary diploma from OISTAT. Along with his own practice, he has been involved as a curator/artistic director since 1993 and to date has organized over 60 cultural programs. His interest in culture led to the creation of NeMe, for which he is the president since its registration in 2004. He is a peer reviewer of LABs and the *Leonardo Journal*.

Max Dovey can be described as 28.3% man, 14.1% artist and 8.4% successful. He is also an artist, researcher and lecturer specialising in the politics of data and algorithmic governance. His works explore the political narratives that emerge from technology and digital culture and manifest into situated projects—bars, game-shows, banks and other participatory scenarios.

Marc Garrett is co-director and co-founder, with artist Ruth Catlow of the arts collective Furtherfield, beginning on the internet in '96. Furtherfield has two physical venues, a gallery and a Commons lab, both situated in Finsbury Park, London. Has curated over 50 contemporary Media Arts exhibitions, projects nationally and internationally. He is currently completing his PhD at the University of London, Birkbeck College.

Inte Gloerich is a researcher and project coordinator the Institute of Network Cultures, Amsterdam. She holds an MA in New Media and Digital Culture from the University of Amsterdam. Her research involves the politics of digital technology, digital economy, and online identity. She co-edited *MoneyLab Reader 2: Overcoming the Hype* together with Geert Lovink and Patricia de Vries.

Valeria Graziano addresses cultural practices around the resistance to work and the possibility of political pleasure. Her approach is informed by autonomous Marxism, institutional analysis, materialist feminism, and critical organization theory. She holds a BA in Fine Art and Art History (Goldsmiths College); an MA in Visual Cultures (Goldsmiths College) and a PhD in Critical Management Studies (Queen Mary University).

Max Haiven is Canada Research Chair in Culture, Media and Social Justice at Lakehead University in Northwest Ontario and director of the ReImagining Value Action Lab (RiVAL). He writes articles for both academic and general audiences and is the author of the books *Crises of Imagination*, *Crises of Power*; *The Radical Imagination* (with Alex Khasnabish); *Cultures of Financialization*; and *Art after Money, Money after Art*.

Lynn Hershman Leeson is an artist and filmmaker, and has been internationally acclaimed for her art and films over the last four decades. One of the most influential media artists, Hershman Leeson is widely recognized for her innovative work investigating issues that are now recognized as key to the workings of society: the relationship between humans and technology, identity, surveillance, and the use of media as a tool of empowerment against censorship and political repression.

Francis Hunger is an artist, DJ, designer, programmer and media historian. He investigates subject matters such as information technology, the technological, economical and political consequences of globalization, the East-West conflict and gender roles. Besides his art practice, Francis Hunger engages in his own and in collaborative curatorial projects as well as publications on related topics.

Helen Kaplinsky is a London based independent curator and writer currently working on an exhibition concerning gender as a technological experience for the new Science Gallery London. An aspect of this is extended through a Visiting Scholar position at Liverpool John Moores University, Exhibition Research Lab where she is running a hyperfiction reading group. In 2015 she co-founded Res., a mutable curatorial organisation. Their recent project 'Alembic' discussed digital and alchemical transmutation in response to a Cyberfeminist archive at University of Goldsmiths.

Aleksi Knuutila is an anthropologist by training and runs a research consultancy combining computational and qualitative methods. For his PhD from University College London's digital anthropology program, Knuutila studied a Texan religious community. Knuutila's later work studies the formation on beliefs and identities in algorithmic and personalized media environments and investigates political cultures through a combination of human and machine reasoning.

Marcell Mars is one of the founders of Multimedia Institute – mi2 and net.culture club MAMA in Zagreb. He initiated GNU GPL publishing label EGOBOO.bits. He participated in many collaborative artistic projects, was one of the organizers of summer camps 'Otokultivator', runs Wonder of technology/Čudo tehnike at Faculty of Media and Communication and at Jan Van Eyck in Maastricht works on Ruling Class Studies.

Tomislav Medak is a doctoral student at the Coventry University's Centre for Postdigital Cultures. He is also a member of the theory and publishing team of the Multimedia Institute/MAMA in Zagreb, as well as an amateur librarian for the Memory of the World/ Public library project, an artist in the performing arts collective BADco.

Rob Myers is an artist, hacker, and writer from the UK now based in Vancouver, Canada. He's just trying to make sense of an increasingly technologically mediated world.

Emily Van Der Nagel is a Lecturer in Social Media at Monash University in Victoria, Australia. She teaches and researches social media identities, practices, and platforms.

Rachel O'Dwyer is lecturer in digital cultures in the National College of Art and Design, Dublin. She researches is at the intersection of cultural and digital economies. She writes about money, algorithms and art, not necessarily at the same time.

Lídia Pereira is an independent designer, artist and researcher based in Rotterdam. She graduated in Communication Design from the School of Fine Arts in Porto and Media Design and Communication from the Piet Zwart Institute in Rotterdam. She is the founding editor of the Pervasive Labour Union zine (2015-), a project offering a low-barrier entry level for contributors to express their views on social media labor.

Erica Scourti is an artist and writer. Her work explores biographical writing and bodily inscription in the performance and representation of subjectivity. Solo shows include Chief Complaint (Almanac, London) and Spill Sections (StudioRCA); group shows include the High Line, New York, Wellcome Collection, Kunsthalle Wien. Her writing has been published in *Spells: 21st Century Occult Poetry* and *Fiction as Method* amongst others. She is guest editor of the *Happy Hypocrite journal* and will be resident at Rupert, Lithuania, in summer 2019. She is currently undertaking a practice-based AHRC-funded PhD in Goldsmiths' Art Department.

Rebecca L. Stein is a cultural anthropologist at Duke University researching linkages between culture and politics in Israel in the context of the Israeli military occupation and legacy of the Palestinian dispossession. She is the author of *Digital Militarism: Israel's Occupation in the Social Media Age* (with Adi Kuntsman), and *Itineraries in Conflict: Israelis, Palestinians, and the Political Lives of Tourism* and co-editor of *Palestine, Israel, and the Politics of Popular Culture*.

Cassie Thornton works under the title of the Feminist Economics Department. She uses dance, writing, visual art, hypnosis, experimental research, tours, and radio to protect the unknown and reveal debt as a source of solidarity. Her work investigates the impact of governmental and economic systems on public affect, behavior, and the unconscious, with a focus on debt and security.

Paul Vanouse is an artist working in Emerging Media forms and a professor at the University at Buffalo. His artwork addresses complex issues raised by varied new technologies using these very techno-sciences as a medium. His artworks have included data collection devices that examine the ramifications of polling and categorization, and genetic experiments that undermine scientific constructions of race and identity.

Patricia De Vries is a researcher and project coordinator at the Institute of Network Cultures, Amsterdam, and a PhD candidate at Erasmus University, Rotterdam. She's also a cat herder. Her research focuses on artistic imaginaries of algorithms as a source of anxiety. More about her can be found at <www.networkcultures.org/contesting-capture-technology>.

Krystian Woznicki is a critic and the co-founder of Berliner Gazette (berlingazette.de). His recently published book *Fugitive Belonging* blends writing and photography. Other publications include *A Field Guide to the Snowden Files* (with Magdalena Taube), *After the Planes* (with Brian Massumi), *Wer hat Angst vor Gemeinschaft?* (with Jean-Luc Nancy) and *Abschalten. Paradiesproduktion, Massentourismus und Globalisierung*.

