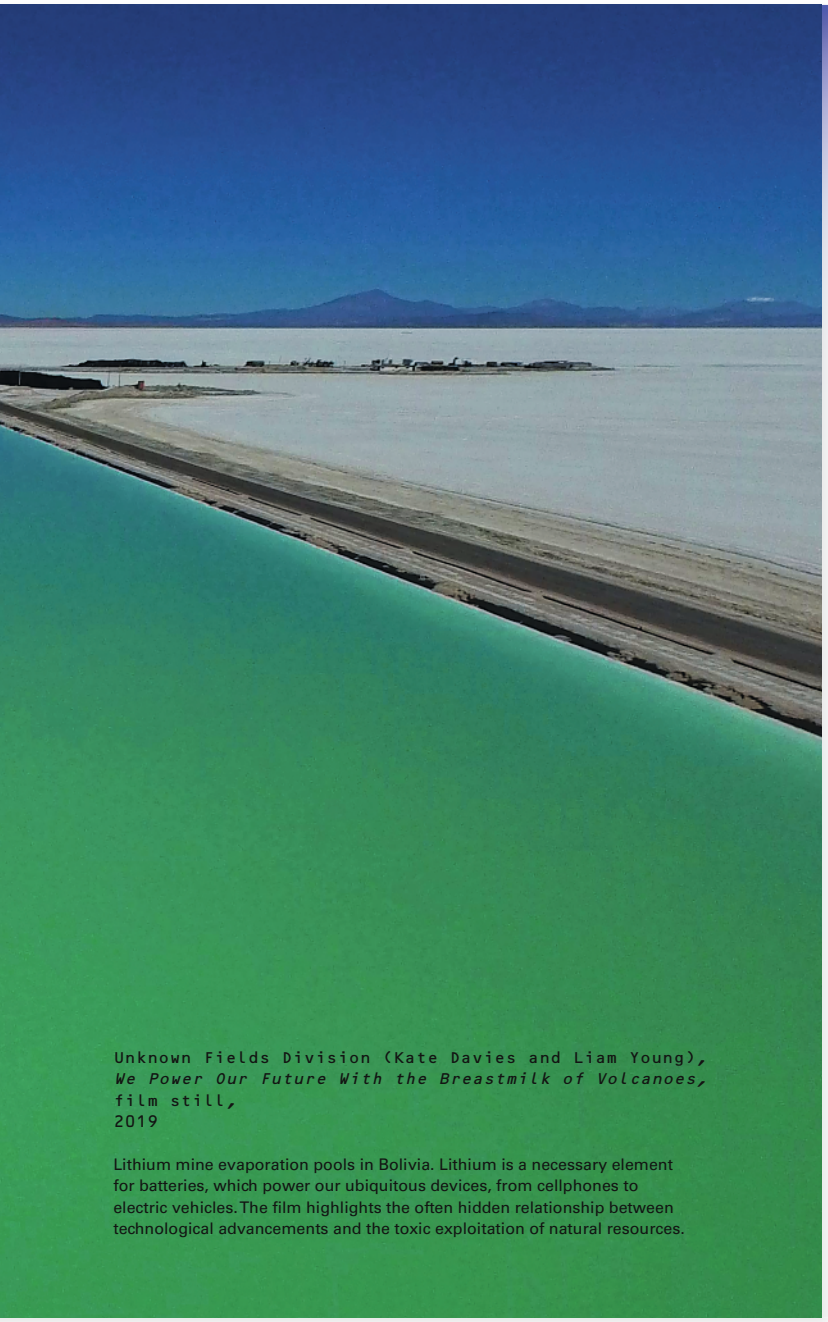
Andrew Culp

CHAOS, CREATIVITY, CHANGE

THE CYBERNETIC LOGIC OF LATE CAPITALISM



Unknown Fields Division (Kate Davies and Liam Young), *We Power Our Future With the Breastmilk of Volcanoes*, film still, 2019

Lithium mine evaporation pools in Bolivia. Lithium is a necessary element for batteries, which power our ubiquitous devices, from cellphones to electric vehicles. The film highlights the often hidden relationship between technological advancements and the toxic exploitation of natural resources.

Chaos theory is the motive force behind a wider cultural and artistic shift, not predicated by any overarching grand unifying narratives. Professor of Media and History at the California Institute of the Arts in Santa Clarita, **Andrew Culp** examines the contemporary destabilising condition of chaos and our decades-long pact with it.

Chaos conjures fearful images of uncertainty, turbulence and even destruction. But that is only the half of it – the story of the last five decades is also a tale of how scientists, designers, philosophers and many others learned to stop worrying and love chaos. But is there a new, darker or more alien chaos that still haunts our imagination?

Stalemate

Close examination of the tectonic shifts in economic policy provide a mirror into chaos as a period-defining concept. Only after shedding its categorisation as moral philosophy with the marginalist revolution of the 1870s did economics as we know it arise. A century later, the maxims of the grandfather of modern economics, Adam Smith, came under pressure. He had argued that markets and economic behaviour were the result of a human *natural* 'propensity to truck, barter, and exchange'.[1]

Liam Young,
Where the City Can't See,
film still,
2018

A futuristic city shot entirely through laser scanning technology. It is set in a near-future Detroit Economic Zone (DEZ) owned by China, in which mapping technologies like Google Maps, urban management systems and surveillance sensors are the primary means of governance.

But by then, new models coming on the heels of a neoliberal revolution took markets to be the emergent quality of various conditions. That is to say, thinkers adopted a *synthetic* outlook in which underlying conditions could be programmed and reprogrammed in an effort to construct new outcomes.

Using an ecological metaphor, economics since the Second World War remade national economies into tide pools. The pools are still fed by the ocean but are protected through partial separation from its vastness and violent surf. They came under threat, however, with the dissolution of the fixed global currency system in the early 1970s. While currency pegging had provided certainty by specifying the exchange rate, the provided stability became too costly. In turn, the new free-floating system provoked a paradigm shift in business thinking away from smaller predictable growth. The subsequent neoliberal revolution soon began, with the New York City debt crisis in the 1970s, and went national under the watch of Ronald Reagan and Margaret Thatcher. Foregoing calmer waters, chaos was welcomed as the force of creative destruction.

Risk suddenly replaced stability. And with it, chaos transformed from enemy to assistant. The associated mentality is famously captured in figures like Gordon Gekko in the film *Wall Street* (1987), with catchphrases like 'money never sleeps' to describe the new pact with chaos.[2] As early as the 1980s, the new business environment embraced it in the form of organisational restructuring and layoffs, mega-mergers resulted in ever-complex global divisions of labour, and globally coordinated supply changes began pinballing

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around. Chao's judgement – whether in the market or elsewhere – was a new god bestowing wealth and poverty.

Critical Chaos Theory

Economics was far from alone at this time. Similar transitions occurred across thought and culture, many of which under the sign of 'Postmodernism' in art, architecture, literature and more. Orit Halpern traces their cybernetic side in *Beautiful Data* (2014), such as through Kevin Lynch's *The Image of the City* (1960) and Nicholas Negroponte's *The Architecture Machine* (1970), further drawing out connections to design approaches like that of Charles and Ray Eames.[3] She sees it as a transition away from the organic utopia of Le Corbusier or Jane Jacobs

Unknown Fields Division (Kate Davies and Liam Young) and Toby Smith, *Madagascar Expedition Portraits*, film still, 2017

above: Unknown Fields is a nomadic design research studio directed by Liam Young and Kate Davies that uncovers the shadows cast by the contemporary city on landscapes, ecologies and lives elsewhere. In this film they explore the recent gemstone boom in Manalobe, Madagascar that brought foreign investors in the area to mine for sapphires. While modern-day mining can depend on machine assistance, local workers still get paid €2 per day for shovelling 5.6 tons of dirt.

Liam Young and Alexey Marfin,
Seoul City Machine,
film still,
2019

Seoul City Machine, a visual city-symphony of tomorrow. It is imagined as a love letter written by an administrative City Operating System to the people and things it effectively governs. Key structural elements, such as the narration and script, were decided by an AI chatbot which was trained on smart city data.

towards a new aesthetic perspective. The key characteristics of the new aesthetics: a shift of representation towards process and environment away from meaning and identity, a new observer characterised by behaviour and patterned interaction rather than perceptual experience or underlying truth, a media environment of instruments with screens depicting processes of communication and circulation instead of documents or objects, and a new structuralism of networked observer-subjects replacing social totalities like race or class. All became tools for finding the edge of chaos, that zone of indistinction between order and disorder typified by the techie phrase 'creative disruption'.

This was also a period of transition for the sciences. Roughly it coincided with what feminist theorist N Katherine Hayles identifies in a second wave of cybernetics that shifts its focus from homeostasis to self-organisation.[4] Whereas the first concerned itself with maintaining stability in a changing environment (eg W Ross Ashby's homeostat (1948)), the second understood order as actively self-generated (eg a frog's visual cortex).[5] The latter would lead to work on emergence, from the complex organisation of bird flocking to the structure of crystals. A key concept is Chilean biologists Humberto Maturana and Francisco Varela's autopoiesis, which describes the self-assembly of components into a closed system whose internal organisation is actively reproduced in the manner of a living organism.[6] A near cousin is Nobel Prize-winning chemist Ilya Prigogine and philosopher Isabelle Stengers's discussion of dissipative systems in *Order Out of Chaos* (1984), which considers the philosophical consequences of reproducible structural stability in thermodynamically open systems operating outside equilibrium.[7] Such post-cybernetic inquiry and experiments in computer modelling would prepare the ground for the rise of chaos theory.

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The explosion of interest around chaos theory arose from an interest in systems that seem to exhibit randomness or disorder. It defines systems that appear random but actually express patterned behaviour or are even governed by deterministic rules. In a technical sense, chaotic systems are those whose initial conditions are so sensitive that even slight changes will result in a radically different outcome – as in the famous butterfly effect whereby a butterfly flapping its wings in Brazil could provoke a series of atmospheric events that result in a tornado in Texas. An early observation of the phenomenon occurred when American mathematician and meteorologist Edward Lorenz was running computer simulations on weather in 1959 on a digital computer, discovering large changes after rerunning some calculations with rounded-off numbers.[8]

With only a few decades of hindsight, many of its applications are already taken for granted. Up-to-the-minute localised weather is consulted without a second thought, a computer-automated financial system is expected, and the many other predictive models that shape everyday life are mundane. Regardless of the specific models of chaos theory, its popularity represented the victory of uncertainty. Not only did chaos theory not exclude uncertainty, it did not even try to dampen it. A new column was added to the proverbial chart of all behaviour (human, animal, machine) in chaotic systems. While outcomes were still unknowable, general tendencies and abstract rules could be ascertained.

The Cybernetic Logic of the Contemporary Condition

Chaos provided philosophy with many splashy concepts. Grumpy scientists angry over the abuse of precise tools would pen screeds like physicists Alan Sokal and Jean Bricmont's famous 1997 denunciation of 'fashionable nonsense'.[9] But the allure of ideas like the spontaneous generation of order or the complexity of fractals proved too great for appropriation well beyond science. Through neologisms like 'chaosmos', thinkers would equate chaos with the generative movement of the cosmos.[10] As with the many others periodising the 'postmodern', Marxist critics like Fredric Jameson and David Harvey would categorise the shift through architectural references, opposing the Modernism of Der Scutt's Trump Tower in New York (1984) with the Postmodernism of Philip Johnson's AT&T Building in the same city (also 1984), and the Modernist shopping complex of Benjamin Thompson's The Gallery at Harborplace in Baltimore (1980) with the Postmodernist leisure of interior shopping of John Portman's Bonaventure Hotel in Los Angeles (1976).[11]

The canonical entry on Postmodernism remains Jean-François Lyotard's 1979 book *The Postmodern Condition: A Report on Knowledge*.[12] Many reduce it to a footnote defining Postmodernism as the 'rejection of grand narratives', which are often equated with Modernism's utopian impulse. By the rejection of grand narratives, he means a scepticism towards any one overarching explanatory system for how the world works, such as gradual refinement through Enlightenment progress, the slow march towards freedom of democratic liberalism, or mastery of the material world through state-

Liam Young,
In The Robot Skies,
film still,
2018

In the urban condition of mass surveillance, the film imagines two teenagers finding love in this new media ecology.

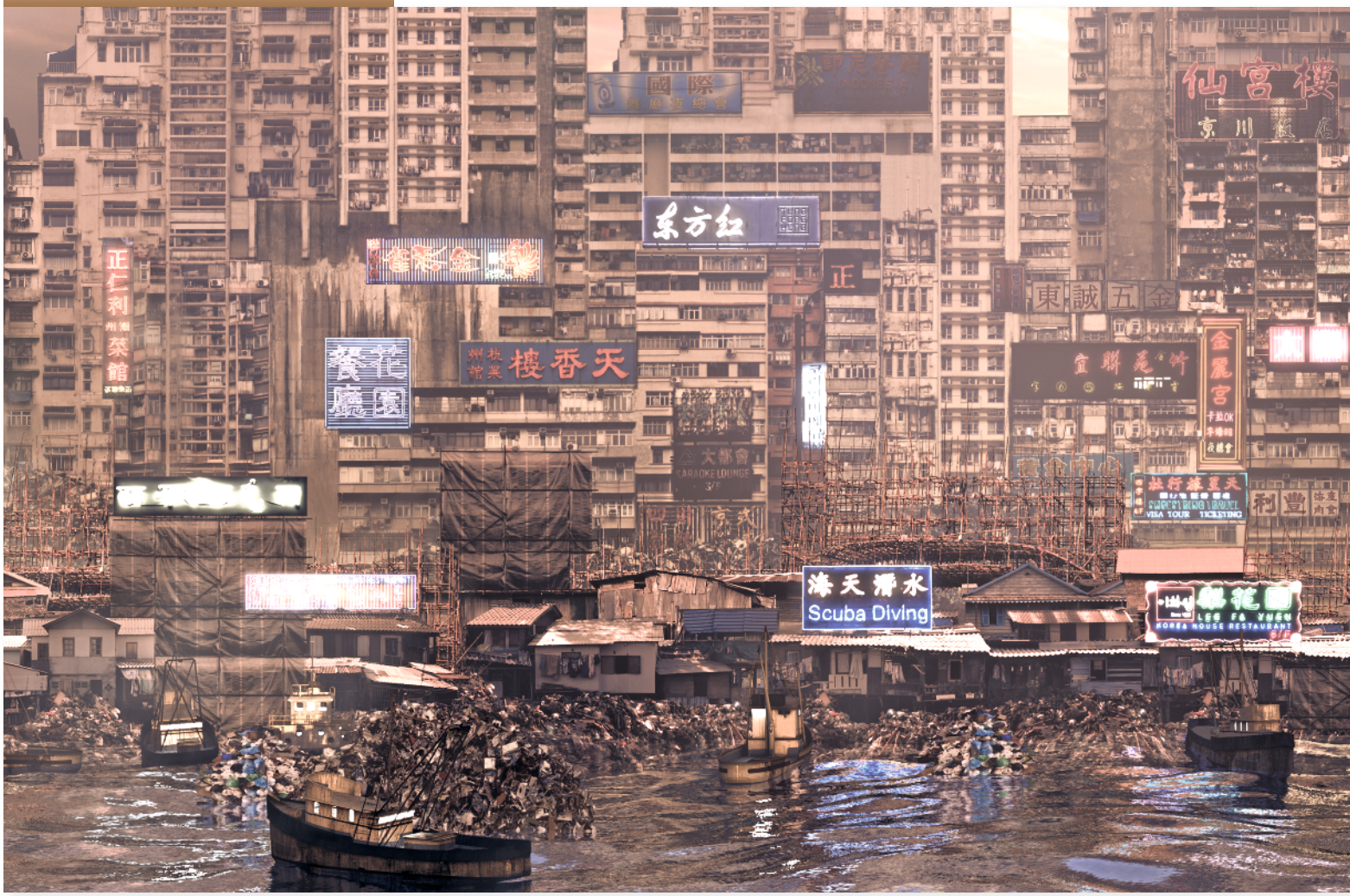
Marxist science. Their presence is replaced by a chaotic mix of knowledge coming from too many different places to be known.

Less discussed is the opening argument of *The Postmodern Condition*. The conditions that spawn Postmodernism, according to Lyotard, are quite specific: the 'computerisation' of society. He notes two major shifts in the role of knowledge since the early 1950s. First, the theoretical paradigm of cybernetics formalised the interaction between human, animal and machine through a mixture of engineering and mathematics; and second, the miniaturisation and commercialisation of computers made the world the object of encodable knowledge.

Thirty years before Web 2.0, Lyotard had already warned about the 'mercantilization of knowledge'.[13] He speculated about the rise of information-power and those who would profit from knowledge being exchanged, whereby its context is considered unimportant. The scandal is by no means limited to the internet, as the monetisation of knowledge and its associated social worlds was central to the extractive technologies of colonial sciences, with the manufacturing of people and things in the industrial age, and now through the ever-growing forms of media endemic to the information age. Today's platform capitalism layers on top of those older

Liam Young,
The New City: The City in the Sea,
film still,
2018

A speculative futuristic city. It has many of the characteristics promised by futurists – namely it is multicultural, high-tech, dense. But it is also polluted, full of trash, and in extreme disrepair.



processes, adding on newer and more abstract layers of knowledge-peddling. It affects everything from the extractive labour of coltan and lithium mining to the bundling of online retail behaviour into big data.

Life on the Edge

Computation has grown leaps and bounds since Lyotard's 1979 report. Algorithmic complexity now aids everything from rapid iteration to the 3D printing of unique objects. Yet cultural critics are struggling to name the trends of our period. Certainly it is something other than Postmodernism's long hangover.

The chaos theorists of sci-fi, the authors of cyberpunk classics such as *Neuromancer* (1984)[14] presaged the internet. The sprawling cities they imagined are much like the Songdo International Business District near Seoul, South Korea, completed in 2015, which Orit Halpern suggests as the culmination of the shift away from Modernism – a fully networked eco-city built on reclaimed land, so saturated by sensors that everything is meant to appear effortlessly automated to maximum efficiency. The irony, of course, is that the hyper-connected city appears eerie to visitors, who report it being strangely smelly, not really functional, and too expensive to attract many inhabitants.

The struggle to name the current moment might signal the final nail in the coffin for Modernism. Has Modernism's thirst for the new finally been extinguished? Maybe we finally have the distance from the initial event to evaluate the last half-century. In that time, Modernism's utopian impulse seems to have been replaced by different technical processes of change and confrontation, ones that can be recognised in the violent upheavals caused by creative disruption. Paradoxically, the consequence has been a steady stream of brilliant technological marvels but also a troubling narrowing of the possible to permutations of the familiar. Perhaps what we need now, more than ever, is a bit more chaos. ⍷

Notes

1. Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations*, vol 1, Strahan and Cadell (London), 1776, p 16.
2. *Wall Street*, directed by Oliver Stone, 20th Century Fox, 1987.
3. Orit Halpern, *Beautiful Data*, Duke University Press (Durham, NC), 2014; Kevin Lynch, *The Image of the City*, MIT Press (Cambridge, MA and London), 1960; Nicholas Negroponte, *The Architecture Machine*, MIT Press (Cambridge, MA and London), 1970.
4. N Katherine Hayles, *How We Became Posthuman*, University of Chicago Press (Chicago, IL and London), 1999.
5. W Ross Ashby, *Journals*, vol 11, 1948, p 2435: www.rossashby.info/journal/page/2435.html.
6. Humberto Maturana and Francisco Varela, *Autopoiesis and Cognition* [1972], D Reidel (Dordrecht, Boston, MA and London), 1980.
7. Ilya Prigogine and Isabelle Stengers, *Order Out of Chaos*, Heinemann (London), 1984.
8. Edward Lorenz, *The Essence of Chaos*, University of Washington Press (Seattle, WA), 1993, pp 134–6.
9. Alan Sokal and Jean Bricmont, *Fashionable Nonsense*, Picador (New York), 1997.
10. Gilles Deleuze and Félix Guattari, *A Thousand Plateaus* [1980], trans Brian Massumi, University of Minnesota Press (Minneapolis, MN), 1987; Gilles Deleuze and Félix Guattari, *What is Philosophy?* [1991], trans Hugh Tomlinson and Graham Burchill, Columbia University Press (New York), 1994.
11. Fredric Jameson, *Postmodernism: Or, The Cultural Logic of Late Capitalism*, Duke University Press (Durham, NC), 1989, pp 39–44; David Harvey, *The Condition of Postmodernity*, Blackwell (Cambridge and Oxford), 1990, pp 72–9.
12. Jean-François Lyotard, *The Postmodern Condition: A Report on Knowledge* [1979], trans Geoff Bennington and Brian Massumi, University of Minnesota Press (Minneapolis, MN), 1984.
13. *Ibid*, p 5.
14. William Gibson, *Neuromancer*, Ace (New York), 1984.