



D A T A L O A M

**SOMETIMES HARD
USUALLY SOFT**

**THE FUTURE OF
KNOWLEDGE SYSTEMS**

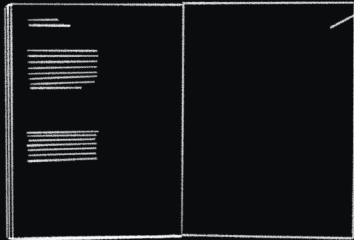
Johnny Golding Martin Reinhart Mattia Paganelli Eds.

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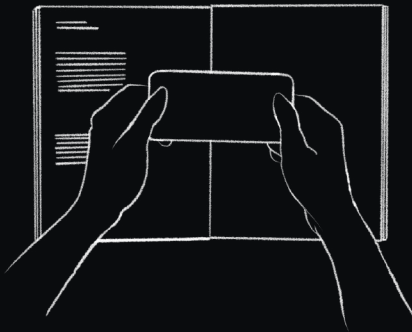


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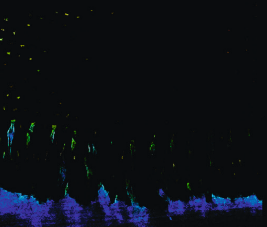
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Data Loam

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Universität für angewandte Kunst Wien
University of Applied Arts Vienna

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JohnnyGolding MartinReinhart MattiaPaganelli Eds.

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THE FADING IS DELIBERATE

Introduction

Data Loam: Sometimes Hard, Usually Soft.

The Future of Knowledge Systems

Although the Data Loam project officially started on 1 March 2017 with a successful PEEK grant award from the Austrian Science Fund (FWF), its roots run much deeper into the past. Like so many considerations, this one also started with a discontent that was at first dim, but which, with growing urgency, became more concrete over the years.

We, who still come from a world of books, libraries and archives, expected a fruitful explosion of knowledge from the ‘world wide web’. Along with its inventor Tim Berners-Lee, knowledge, we thought, would be available to all at any time in the future, unrestricted and free of charge. This accessible and literally bottomless resource would finally help put an end to misconception, ignorance and deliberately launched ‘alternative facts’. The generous circulation and exchange of unfettered information would at last enable all to partake in different forms of pedagogy, become acquainted with new stylistics of existence, enter into differing political practices, forge better forms of governmentality and open systems, foregrounding reason, science, poetics, art. After decades of a grey and very cold Cold War, finally an age of freedom, acceptance and peace would begin to emerge.

Perhaps there were just too many early Marvel comic book influences, perhaps there were not enough. But as naïve as these hopes might have been, it has nevertheless been painful not only to have witnessed how they have remained unfulfilled—and in many arenas, actively snuffed out; that is how, in the face of exponentially proliferating information systems, the collective promise to inhibit curiosity, curtail experimentation, reduce collective empathy and destroy the rule of law seems to grow stronger by the day. Coupled with this has been the rise of autonomous systems whose algorithms of machine learning / artificial intelligence are deeply entangled with dubious and disintegrating forces—forces that by no means wish to make possible the prosperity and happiness of all, on the basis of the ability to learn and share knowledge. At best, there seems to be an endless undermining of established knowledge-structure-production sites, including universities, art schools, science labs, although more often than not, the move is closer to a total destruction of these centres of creativity—targeted willingly and perhaps even eagerly.

The initial questions arising quite naturally from such a world view were the obvious: who generates and manages knowledge; who has access to it and what mechanisms are there to protect it? The institutions traditionally responsible for this have been constantly losing visibility and the will to finance them has decreased. As a result, what we initially began to develop in the Data Loam project was an exposition of the way in which universities and national libraries had become suppliers of insatiable data hordes, with the knowledge created and managed there as just another resource to be mined. But what also became clear was that many of the knowledge-based environments mentioned above (and we could add Google and other search engines platforms) did not have a particular political agenda as such. It was as if the knowledge business had spectacularly taken off in some sinister way, which in turn was (and remains) able to provide raw material for something even more devastating. It was not too difficult to find that the algorithms established for popular search engine enquiries always led to a single peak landscape of knowledge, one wherein the periphery was always-already forcibly deserted. To put this slightly differently, by following certain algorithmic codings which sought to categorise into manageable, indexical assemblages vast bits of data, more often than not, they were underwritten by the best placed corporate bids or the highest amount of 'hits' or engaged by faceless trolls and their bots.

In this context, the overriding problem for Data Loam was to see if we could rethink search engine codings in such a way that the exponential explosion of data would be a 'good problem'. Could we create a system that, rather than trying to dampen down this exponential proliferation, required it. Rather than attempting to straightjacket / cut-down information into tiny packages of manufactured truth-bits, might there be some other way to work with, rather than against, this contemporary explosion of information? What we came to realise was that by our decision to go with the (multi-directional, infinite) flow, a completely different understanding, method, and eventually also, cataloguing and retrieval system framing different fields of knowledge, new and old, was possible and desirable.

At one level, this was nothing less than a holistic, discursive approach, one without distillative categories or a homogeneous, overarching set of definitions. Not only was this crucial, because the old systems were collapsing under a tsunami of information, but also because the process of information retrieval, circulation and exchange no longer

simply ‘belonged’ only to humans. More often than not, it was now a distributive affair, proliferating via machine learning, and operating beyond the threshold of perception and linear temporality. Future knowledge systems could, depending on certain functional processes, not only infinitely expand but also, and importantly, self-organise whilst simultaneously circulate, plateau, dissolve or morph.

Instead of getting lost in the concepts of the post-human, data mining and some loose understanding of ‘the network’, Data Loam favoured a more practical move. This entailed shifting the focus away from the so-called hard sciences towards art, art making and the open ended propositions entrenched in the world of ‘making’. This was in part because we wished to maintain and indeed privilege the role of curiosity, wonderment, and the logics of sense, where series, recursivities, fractals, slices of intensity, colour, tone, energy, movement were crucial to the meaning and magic of the everyday.

What unfolds in this book, then, is a more detailed love affair with knowledge and intelligence, meaning and making, one that is intimately acquainted with the digital, the artificial and the wild proliferation of data. It is not just a fabulous romp with art and its technologies, new and old (though it is at least that). In retrieving and highlighting sensuous making, particularly in tandem with (and as an expression of, though sometimes quite distanced from) digital systems, autonomous, machinic, internet or otherwise—a whole new chapter re-focussing the Enlightenment away from its 18th century moorings around reason and the rise of the individual and relocated into the 21st around distributed intelligence and the proliferation of data—begins to surface. Profound methodological implications emerge, not only for political theory, philosophy, poetics, literature and contemporary art, but also for the heretofore separated knowledge systems of science, technology, engineering, each now enlivened by their ‘sticky cohesions’ with each other. To put this slightly differently: the loam—a residue sometimes hard, mostly soft—when expressed via the rampant acceleration of data proliferation, circulation and exchange, is a rather precious, albeit strange, entity. Vibrant and disruptive, flowing and yet at times steadfast, both segment and infinite plane, it names a kind of dynamic discourse, closer to that of a living, breathing, shape-shifting mesh. Its connections are self-organising complexities, which require the practical activities of distributed intelligences. We reclaim this as nothing less than art.

Johnny Golding, Martin Reinhart, Mattia Paganelli
London / Vienna

Know Your Name:

A Short History of Occidental Knowledge Systems since the Renaissance

Martin Reinhart

* 1967 Vienna, Austria | Vienna, Austria

Martin Reinhart is a filmmaker, historian and inventor. He studied at the University of Applied Arts Vienna. He is a trained film technician and his company Indiecam has pioneered digital moviemaking since the 2000s. Together with Thomas Tode and Manu Luksch, he co-directed the documentary *Dreams Rewired* (2015) that won the prize for best director at the Moscow International Documentary Film Festival. In 1992 Martin developed *tx-transform*, a film technique which made it possible to restructure space and time in a way that challenges visual recognition of movement. He has continued to refine this process ever since. Consequently, in 2019, together with Virgil Widrich they made the 360° film *tx-reverse* which set new industry standards for immersive engagement.



In Judeo-Christian mythology, there are at least two narratives that revolve around the hazards inherent in knowledge. The first of these concerns Eve, who is incited by the serpent to taste from the fruit of the tree of knowledge and thereby provokes the expulsion from paradise. The second, which is more central to my reflections, deals with the concept of an original language and the profound disorder that came upon humankind when it was deprived of the ability to understand it.

¹ Gerda Haßler and Cordula Neis (2009), *Lexikon sprachtheoretischer Grundbegriffe des 17. und 18. Jahrhunderts*, (Berlin: De Gruyter), 544–46.

Legions of scholars who tried to interpret this biblical story could never agree whether the original language was the language of God or the one genuinely used by Adam to name all things. This was also the subject of century-long debates as to whether remnants of this language had survived in Hebrew, the language of the chosen people, or in Latin, the official language of the Christian church.¹ The essential point of agreement, however, was the alleged fact that in this original language there was no difference between an object and its name, and it therefore represented a self-consistent and perfect system of meaning through which the genius of God's creation would be reflected. In this understanding all natural phenomena and all their names were connected by a dense and God-given web of similarities. The true form of a thing could thus be recognised by its true name—just as each thing was originally inscribed with its true name. This divine symmetry of words and things was lost to the human as punishment for building the sacrilegious Tower of Babylon, and was followed by centuries of scholastic discourse and argument in an effort to restore what had been lost.

² Haßler and Neis, *Lexikon sprachtheoretischer Grundbegriffe*, 514.

Until the early Middle Ages, the Babylonian confusion of language was mainly considered to be a moral allegory and the just penalty for the hubris of defying God. In this interpretation, all humans spoke the same language which, in the eyes of God, gave them too much power. Unlike the Noachian flood, God countered this case of human overreaching with a more strategic punishment: ending their unity and confounding people by making the common language unintelligible. In the 13th century, a change in this scholastic interpretation became apparent.² Babel would have resulted less in a confusion of languages and more in a rearrangement of principles of order and hierarchies. Since then the tendency of the preferred narrative has been seen as a

absurdity [əb'sɜːdɪti]

to give the void its colours. a question of not explaining and not solving, but experiencing and describing. as chantal faust recommends: to call present reality into question. exemplified by the dadaists, the embodiment of absurdity continues to be called upon by artists and writers as a response to global anxiety and indolence.

coherent explanation for the origin of different languages, a view that eventually led to the first nation-based language tendencies and early dialectologia such as *De Vulgari Eloquenti* by Dante Alighieri.³ But it was commonly held that all post-Babylonian languages would remain unable to represent adequately the true nature of the world. The belief that the hidden essence of things could be revealed by scholastic discourse slowly lost its significance and the ambition to decode the spiritual unity between the word and the world increasingly shifted towards the obscure fields of alchemy, cabalistic and Lullist mysticism. Then, in the Renaissance, the unitary concepts, which urged a reversal of Babel by reconstructing the original language collided with the urge to create a modern scientific language and caused an irreconcilable split.

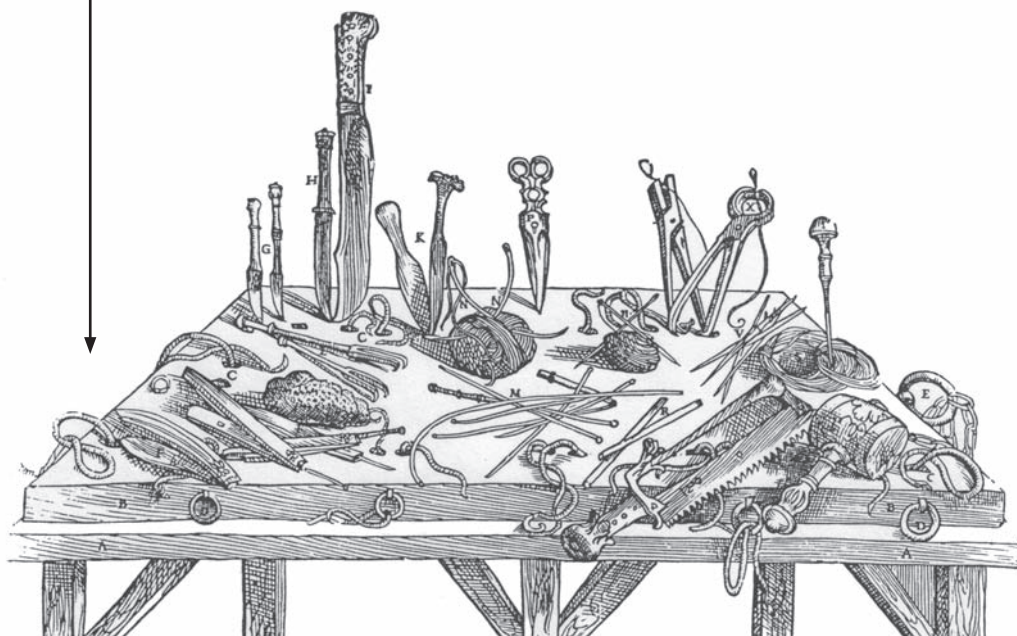
The book of nature

In 1543 two important works were published in the same year. In time, these were to provide a fundamental impetus to modern sciences: *De revolutionibus orbium coelestium* by Polish astronomer Nicolaus Copernicus and *De humani corporis fabrica* by Flemish anatomist and physician Andreas Vesalius.⁴ By praising the empirical approach and introducing an inherent lexical system, both books changed the position of how human beings related to God. In this respect, Vesalius's work was the more radical since he made a single-handed attempt at translating the corporeality of a living human body into a quasi-hermeneutical system. The significant point here is that Vesalius peremptorily broke with scholastic tradition and spoke of a 'Book of Nature' in which divine order is expressed. In his view a thing is not explained by its relationship to the cosmic whole or by the means of an intellectual discourse, but carries the seed of its meaning within itself. In order to be able to read the language of nature, everything must first be named anew and then described representatively in every detail. This distinguishing of meanings requires a specific form of observation that reveals connections which otherwise would remain hidden. In this respect, the term 'empirical' is not entirely appropriate for Vesalius's method, since it is less about an unprejudiced investigation and more of a quest for coherent principles or models that are capable of constituting an emergent ideal.

³ Dante Alighieri (2018 [1302]), *De Vulgari Eloquentia*, (Madrid: Ediciones Cátedra).

⁴ Nicolaus Copernicus, (1999 [1543]), *De revolutionibus orbium coelestium* (*On the Revolutions of the Heavenly Spheres*), translated by A. M. Duncan, (Norwalk: Easton Press) and Vesalius Andreas (1543), *De humani corporis fabrica libri septem*, translated as *On the Fabric of the Human Body in Seven Books*, (Basel: Johannes Oporinus).

Fig. 1: Cover illustration from the second book of Andreas Vesalius *On the Fabric of the Human Body in Seven Books*. Woodcut by Jan Stephan van Calcar, 1543. An anatomist's instruments to explore the truth beneath the surface laid out on a table.



The means of uncovering this are, on the one hand, connected to the various techniques of seeing—especially with the aid of instruments: scalpels, microscopes, telescopes, etc.—and, on the other hand, the use of a differentiated and unequivocal language which clearly separates specific instances. The demands and aspirations of this programme meet both metaphorically and practically in the activity of anatomists. They dissect the body, resolving it into its component parts according to the grammar of its physiological and morphological context, naming its individual elements. Language replaces the causalities lost in the process and once again postulates a whole even when only fragments remain. As a result, a discourse of exclusion generates a model of reality in which cosmology is replaced by a notion of the ideal. In the case of the *Fabrica*, a universal model was thus constituted from within the individual body, though it had to be first distilled from a variety of misleading meanings and forms. Illness and deformity were no longer stigmas imposed by a punitive divine authority, nor were they reflections of cosmic disharmony; instead they are aberrations—deviations from a distinct set of rules. The most interesting features in this context are the lavish 663 large folio and 300 smaller illustrations of the *Fabrica* and their close relation to the descriptive text. In contrast with medieval anatomical diagrams, which were all textual schemata, this new kind of illustration signified a fundamental change in the methods of creating and communicating scientific knowledge.

In keeping with the conceptual basis of Vesalius's own methods of research and teaching, the illustrations had to replace the dissected corpse and transform it into the single, delicate, human body through which nature spoke truth from within. The image was no longer the symbolic carrier of meaning; rather, the text spoke through the picture about the body animate. The skill of the engraver in this context was not only to meet the requirements of the knowledge formulated in the description but to create the impression of sentient life, too. While this form of representation may be derived from the postulated premise that anatomy should also make statements about the physiology of the human body, it also serves to obscure the fact that the insights about life have been won from the corpses of executed criminals.⁵

⁵ Cf Martin Reinhart (1994), *In via Vir-tuti Nulla Est Via—Thatkraft kennt kein Hinderniss. Idealisierung und Marginalisierung in den Darstellungen von 'De Humanis corporis fabrica' des Andreas Vesalius. Betrachtungen zur Anatomie als medizinische Praxis im 16. Jahrhundert*, unpublished thesis, (Vienna: University of Applied Arts Vienna).

accident [ˈæksɪdɪnt]

in newtonian reality, two objects cannot occupy the same space at the same time – and if they do, we call this an 'accident'. however, sometimes the very fact of accident, error, mistake, failure or glitch may establish a certain kind of freedom, a certain kind of new knowledge, practice, engagement.

Leaving aside any of the technical, legal or practical obstacles that Vesalius had to overcome in order to produce and publish his *magnum opus*, it is safe to say that the *Fabrica* can be seen as an early and prototypical example of a modern knowledge system, which can be understood as a set of interconnected ontologies with permeable borders. In other words it is, and proposes, a specific kind of organisation rooted in the traditional fields of logic, hermeneutic and semiotics but nevertheless still incorporates some of the fibrous flesh from which it originates.

In this context, therefore, a knowledge system appears to be more like a living organism that reacts and shifts with interaction. Here the fundamental difference to reductionist or idealised forms of data organisation is that its certainty only exists relative to, and dependent on, a dynamically changing system (in Vesalius's case: the body). On the other hand, such a system always needs a moderator, or translator, because knowledge can only rarely be a factual value in itself, since it always interacts with adjoining fields and—like Schrodinger's cat—it only exists at the exact moment it is consulted.

Conquering worlds of plenty

Apart from Vesalius's description of the human body, the Renaissance also drove at least two other aspects of the human quest for knowledge. One of these was the close reading of classic sources and the growth in distribution of new knowledge via the letterpress. Another was Europe's eagerness to conquer new territories in order to colonise and exploit them. In both cases the understanding and relevancy of text and images evolved in radical ways.

Taking possession of the world soon proved to be a worthwhile undertaking for the great powers of Europe, which fought century-long battles for supremacy over colonial territories. Missionaries, traders, settlers and scientists came in close conjunction with the occupying powers. They soon acquired knowledge of the properties of the local resources and searched for suitable methods to report back on their newly gained intelligence. This produced maps, drawings and descriptions along with living and conserved specimens, which were shipped home by the millions. While the idea here was clearly to document as much as humanly possible and not simply to find the one precious needle in the haystack, there was also a drive to trace things back to their origins. This was nothing less

than the optimisation of looting by metrics. This, of course, required documentation procedures to take on yet another character, one that was precise enough to describe the appearances of a subject in detail and to provide a system of categories indicating its position within a group that shared similar properties. These collections were refined over centuries and, as the blank spots were gradually resolved, they became the foundation on which modern sciences such as geology, biology and chemistry were built.

Elsewhere, the rediscovery of Greek, Latin and Hebrew texts from ancient times provided a drastic demonstration of how knowledge could be lost, as well as the methods by which it could partially be recovered even after more than a thousand years. The strategy of the mediaeval period was to translate important manuscripts into hand-written Latin. Organisation was normally alphabetical and, since monastic libraries that were the contemporary repositories were operated by different orders of the Catholic Church and only loosely interconnected, there was no central or comprehensive listing of all the documents and books kept there.

Due to the economic and cultural strengthening of the European cities in the 14th century, universities re-emerged and began to build up their libraries, giving substance to and advancing the basis of their teaching and research with both contemporary knowledge and that gained from the ancient world. The spirit of the Renaissance saw these institutions systematically searching for ancient documents or copies that had survived in European archives. At the same time, a significant number of original texts considered lost were re-translated from Arabic sources.

For the first time in modern history human thought manifested in text had re-emerged after centuries in oblivion. These were seen as essential resources capable of contributing to what was now understood to be an evolving humanity. However, those texts were also a warning that cultural achievements would not necessarily endure. So multiplying and distributing knowledge through printed books was regarded as a valid strategy to protect knowledge, but also as a way to inscribe one's own position into canonical knowledge systems. This new awareness was embodied *inter alia* by universal polymaths who were able to assemble the knowledge of the time, and by printers who were in many cases highly educated intellectuals.

alchemy [ˈælkɪmi]

forerunner to modern science, art, design philosophy and the humanities. changing common metals (for example) into something precious; fuzzy logics, ritual, spell, and a certain understanding of power. also known as queer non-instrumental feedback loops.

6 Conrad Gessner (1545), *Bibliotheca Universalis, sive Catalogus omnium Scriptorum locupletissimus, in tribus linguis, Latina, Græca, & Hebraica; extantium & non extantium, veterum et recentiorum in hunc usque diem ... publicatorum et in Bibliothecis latentium* (Zurich: Christophorum Froschouerum).

The result was that Renaissance libraries were filled with such a wealth of books and manuscripts that librarians were needed to plan and organize this accumulated knowledge. Here is where we find the first library catalogues emerging. By publishing his *Bibliotheca universalis* in 1545, just two years after the publication of the *Fabrica*, the Swiss scholar Conrad Gessner made one of the early attempts to create a comprehensive listing of all the books from the first century of printing.⁶ The extensive work aspired to be a complete survey of all known writings in Latin, Greek and Hebrew and included approximately three thousand authors as well as a subject index.

It is order that gives light to memory

With printed books, the availability and distribution of knowledge soon increased exponentially. A Baroque library such as the one still existing in the Admont Abbey in Styria (Austria) was built to hold some 70,000 copies in its central book hall. An even more impressive example is Étienne-Louis Boullée's neoclassical project for the *Bibliothèque royale* in Paris with a reading room about a hundred metres long and thirty metres wide. This would have been the largest in Europe holding more than 300,000 volumes. One beautiful feature of these two libraries dating from the 1780s is that all the books were organised in shelves within the same hall, assembling in plain sight all available ken of its time. Although one theoretically still could physically reach every single copy, this size of collection already demanded more sophisticated forms of organisation than a simple alphabetical order or a division into subjects.

7 Gabriel Naudé (1663 [1627]), *Advis pour dresser une bibliothèque* (Leipzig: VEB Edition Leipzig) and Louis Jacob (1645), *Traicté des plus belles bibliothèques publiques et particulières qui ont été et qui sont à présent dans le monde* (Paris: Rolet le Duc).

It becomes understandable when, in and around 1630, first treatises were published reflecting the organisation and improvement of libraries. One of them was Gabriel Naudés's widely circulated *Advis pour dresser une bibliothèque* and Louis Jacob's *Traité des plus belles bibliothèques*—not to mention the even greater number of *historiae literariae* and catalogues of public and private libraries that also started to circulate at this time.⁷ In this very influential work on library science, French librarian and scholar Gabriel Naudé promoted the idea of the universal library, which was to contain all human knowledge regardless of provenance or subject.⁸

8 In his *Advis*, Naudé writes: "And therefore I shall ever think it extremely necessary, to collect for this purpose all sorts of books, (under such precautions, yet,

as I shall establish) seeing a Library which is erected for the public benefit, ought to be universal; but which it can never be, unless it comprehend

all the principal authors, that have written upon the great diversity of particular subjects, and chiefly upon all the arts and sciences; [...] For certainly there

is nothing which renders a Library more recommendable, then when every man finds in it that which he is in search of ..." Naudé (1663 [1627]), 19–20.

At about the same time English philosopher and science theorist Francis Bacon claimed that any classification of knowledge should be universal and the access to educational resources must be provided for the public. To organise all types of knowledge Bacon proposed three general groups—history, poetry, and philosophy—and he also introduced the three ways in which this knowledge could be processed, namely by memory, imagination, and reason.⁹ Among the next generation of librarians, German philosopher Gottfried Wilhelm Leibniz was without doubt one of the most visionary and innovative. In the late seventeenth century he continued to promote the notion of the universal library, actively trying to implement it during his service as a librarian for the Hanoverian court and later for the Bibliotheca Augusta at Wolfenbuettel. In both cases he had a constant struggle with a lack of funds, intrigues and ignorance and never actually was able to realize his ambitious plans to their full extent. The extant correspondence with his employers and his own reflections convey a detailed picture of his struggle for adequate acquisition budgets but also of his distance from the traditional figure of a court librarian.¹⁰

Unlike his colleagues and precursors, Leibniz's approach did not end with the idea of gathering, storing and cataloguing all available books. Instead, he envisioned a universal concept of knowledge based on the principles of reason. In his writings, Leibniz compares the state of human knowledge to a storehouse that contains a multitude of precious goods but lacks both order and a proper inventory.

“Humankind therefore wanders with difficulty and confusion in the dark, without guidance or precise direction, without a possible object and even without knowing its present state. Real advancement, therefore, necessarily requires a *filum Ariadnaeum* to serve as a guide through centuries of reflection, observation, and discoveries made by our ancestors—a heritage that is at risk of being erased from our memory.”¹¹

Another aspect that arose from a similar mindset is that of completeness. This was manifest not only in the universal library but also in the concept of the encyclopaedia which were, to Leibniz's mind, almost synonymous. As he wrote to Duke Johann Friedrich in 1679: “It is necessary for a library to be an encyclopaedia.”¹²

⁹ Francis Bacon (2017 [1620]), *The Novum Organum*, (Scotts Valley, US: Create Space).

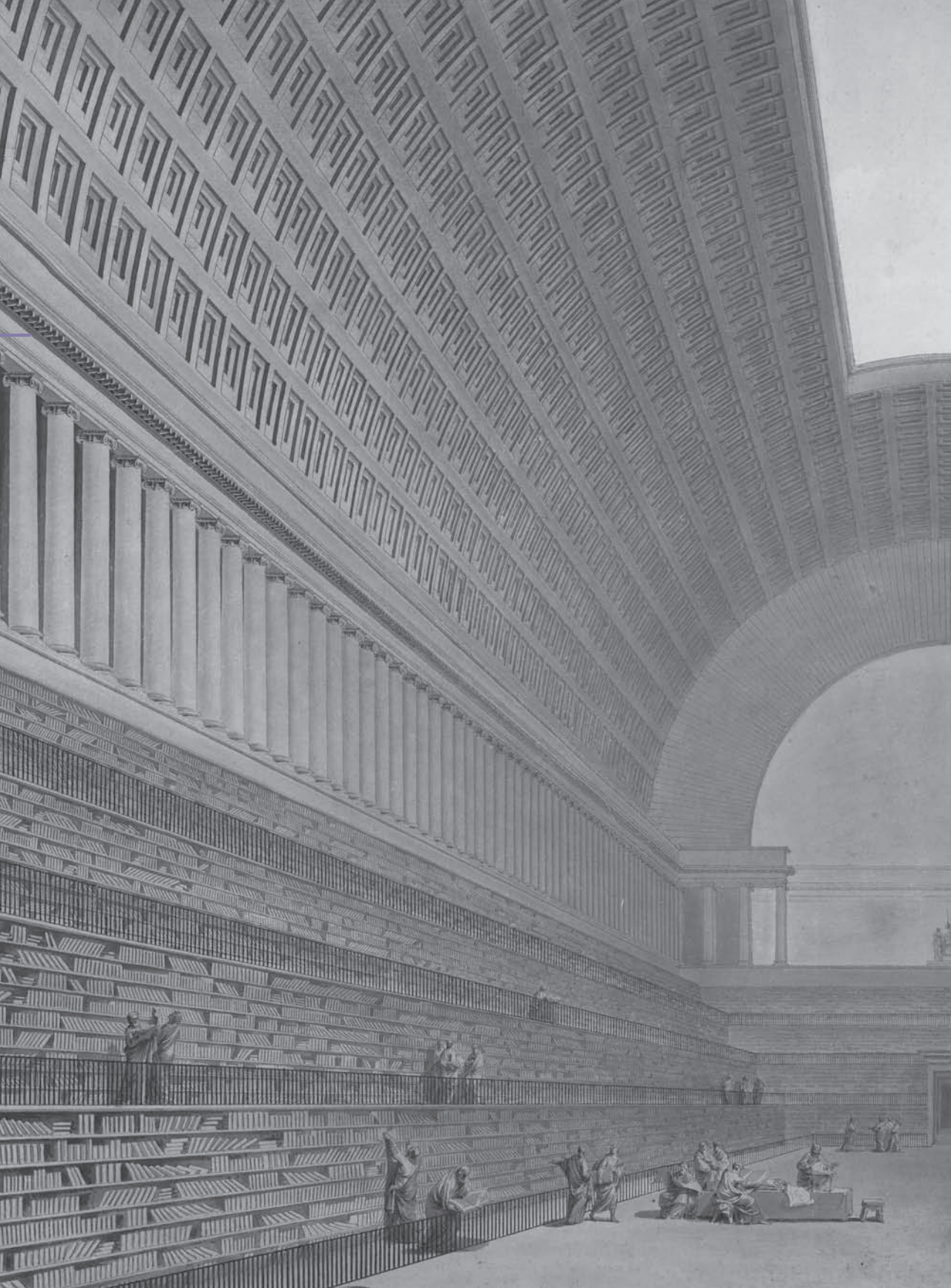
¹⁰ Cf Margherita Palumbo (2018), “Leibniz as Librarian,” in Maria Rosa Antognazza, *The Oxford Handbook of Leibniz*, (Oxford: Oxford University Press), 609–22.

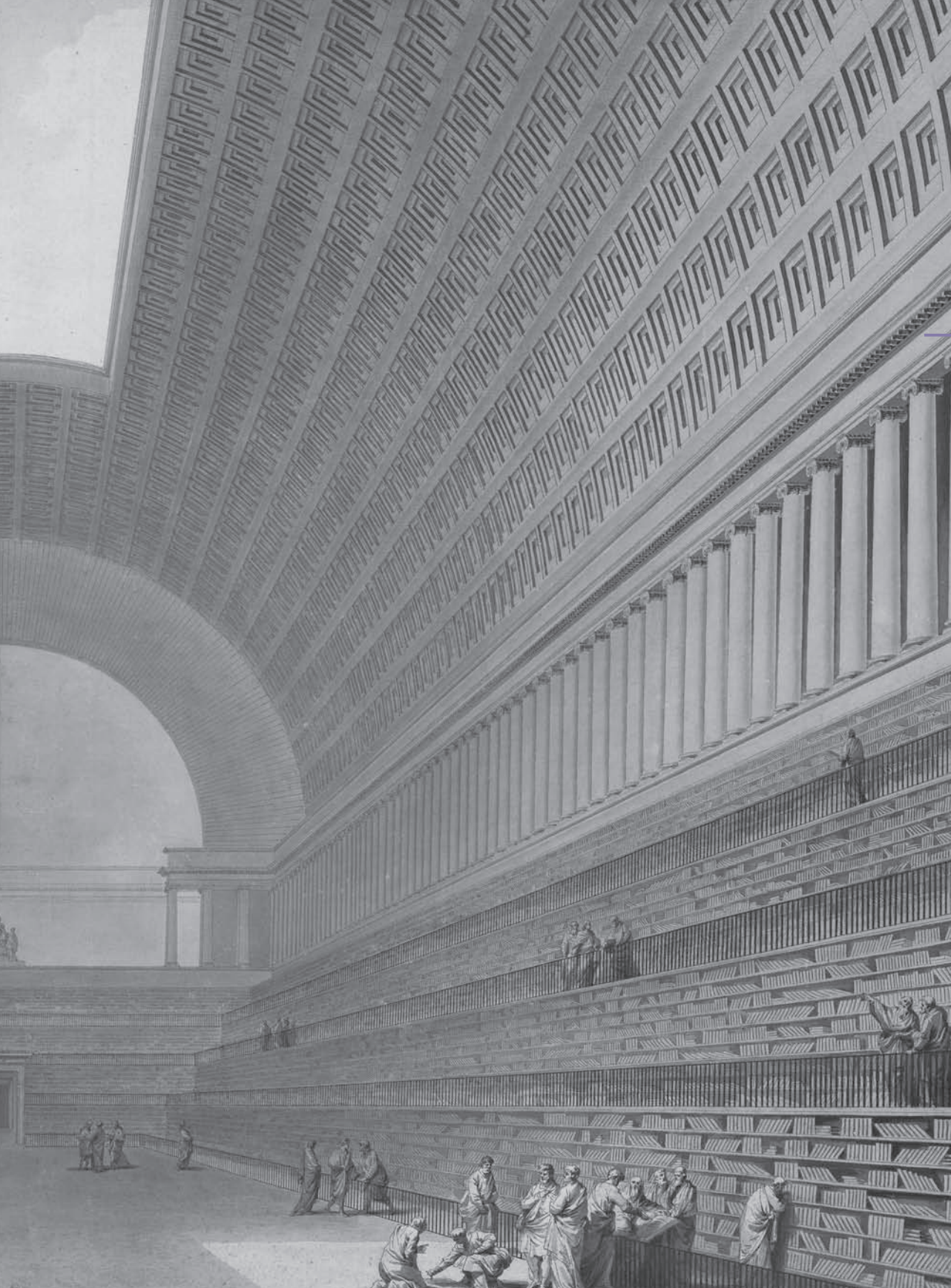
¹¹ Cf Leibniz as quoted in Palumbo (2018), *Ibid*, 621.

¹² Neue Deutsche Biographie [NDB] (1953), *Historische Kommission bei der Bayerischen Akademie der Wissenschaften (Ed.)*, (Berlin: Duncker und Humblot), Vol. 10, 478.

Fig. 2: Interior view of the new hall planned for the extension of the King's library in Paris. Ink drawing with sepia wash by Étienne-Louis Boullée, 1784 (Bibliothèque nationale de France). The exponential growth of human knowledge is represented as the geometrical vanishing point of virtually endless bookshelves.







How to navigate the jungle of all knowledge

For Leibniz a library never appeared as something static, but rather as “an animal, a living being that necessarily requires constant and adequate alimentation for its survival.”¹³ This analogy might be extended to his entire concept of knowledge since in his view the three foundations of an ideal system of classical knowledge were the establishment of scientific societies and the development of an encyclopaedia of the sciences, coupled with a universal library. In order for all these vessels and sources of knowledge to communicate and condense information into undisputed truth, Leibniz introduced his concept of the *characteristica universalis*—a universal system of signs capable of representing all objects and ideas as well as the relationships between them.

One question that arose in this context was whether common signs, like letters or numbers, could be flexible enough to describe and formalise the known universe. In order to make this possible, it was believed that one would need to come up with a set of even more abstract signs, which then would allow the translation of everything in existence into one universal language. Leibniz found a solution for this requirement by introducing a binary system which reduced the number of signs to exactly two.¹⁴ According to him, the symbol 1 denotes the singular unit or the number one, the symbol 0 (*nullum*) denotes the inability to divide and its lack of existence. Leibniz further argued that if, in accordance with the Pythagorean doctrine, everything is a number, and with the Aristotlean thesis that the essence of things are numbers, then the binary number system, in which all numbers are constructed from 0 and 1, can only be understood as a symbol of the divine creation: God or absolute oneness creating everything from nothing.¹⁵

This belief interconnects with the much more comprehensive concept of the universe Leibniz had developed; namely, the theory of the monads, which he described in a letter to French philosopher Nicolas François Rémond (1714) two years prior to his death. According to the metaphysics that he developed, there is one original monad, which is God. All the others are its descendants. Everything is made from these infinitely small units, which can have all kinds of properties as well as the ability to aggregate. They are very much like atoms but are indestructible and, at times, follow their own agenda.

¹³ Cf Letter from Leibniz to Fredrich Wilhelm von Görtz, January 26 1706 (A I, 25 N, 236: 532), as quoted in Palumbo, “Leibniz as Librarian,” 615, fn 15.

¹⁴ Cf G.W. Leibniz (1989 [1666]), “Dissertatio de Arte (Dissertation on the Art of Combinations),” in *Philosophical Papers and Letters*, edited by Leroy Loemker, (Berlin: Springer), 73–84. It should be noted that there remains strong debate as to whether Leibniz was the original inventor of the binary system. See for example, J. Ares et al (2018), “Who Discovered the Binary System and Arithmetic? Did Leibniz plagiarise Caramuel?” at doi.org/10.1007/s11948-017-9890-6

¹⁵ Cf Herbert Breger (2009), *Leibniz' binäres Zahlensystem als Grundlage der Computertechnologie*, in: *Jahrbuch der Akademie der Wissenschaften zu Göttingen*, (Berlin: Walter de Gruyter), 385–91.



Gravé par C. N. Cochin le Jeune d'après le Dessin de M. de Lamoignon 1774

Gravé par P. T. LeClerc d'après le Dessin de M. de Lamoignon 1774

FRONTISPICE DE L'ENCYCLOPEE.

¹⁶ Anna Holterhoff, (2009), "Naturwissenschaft versus Religion? Zum Verhältnis von Theologie und Kosmologie im 18. Jahrhundert", as part of TOPOI-The Formation and Transformation of Space and Knowledge in Ancient Civilizations, (Berlin: Freie Universität Berlin and Humboldt-Universität zu Berlin) at www.fu-berlin.de/en/sites/inu/research/clusters-alt/topoi/index.html

As the original monad, only God is able to judge and regulate the degree of harmony in which the world 'is', but as the monads are also able to self-organize, this, for Leibniz explains the fuzzy and confusing reality of the human world. The idea that both monads and binary systems have in common is that anything can be divided over and over again unless a conceptual element is revealed (God or the 0), which in turn serves as the universal building block. And just as all words in a language can be represented by the letters of the alphabet, so the whole world of nature and human thought can be considered in terms of a number of fundamental elements. Leibniz hoped that ultimately the combination of a perspicuous thought language of pure concepts would be combined with formalised processes and methods akin to those used in mathematics and thereby lead to the mechanisation and automation of reason itself.

Without being able to go deeper into Leibniz's achievements and thoughts, one can say at this point that although not all the implications of his visionary projects have proved fruitful, his notion of the mathematisation of knowledge not only inspired subsequent generations but, in the long run, has had a fundamental impact on how we process data today. As the inventor of the first mechanical binary calculating machine, Leibniz is often regarded as essential to the foundation of modern techno-science because his contribution reflects the analytical and generative possibilities of rendering the world computable. However, this retro-logic is misleading since it follows the idea of linear development and excludes the historical context in which his idea was originally conceived.

Turn of an era

Leibniz and many other scholars and scientists of his time shared the belief that God's creation was based on a set of eternal rules, which God gave to humanity the gift of reason so that eventually the beauty and genius of this divine creation would be comprehended. The combination of these two concepts—the religious belief in God's will and the secular belief in human free will—might seem contradictory to us today. Very likely this misunderstanding might also be a reason why the late 17th century and most of the 18th century have long been regarded as an era of consolidation and elaboration of already existing knowledge, offering little in the way of innovation.¹⁶

algorocracy [ˈælgəʊˈkreɪzi]

the rule by algorithm relying on political, mainly neo-liberalist, positions that are expressed by and help to express a current state of affairs. collective decision making based on functionalist propositions. see the important blog [algorocracy](#) and the transhuman project, led by [john danaher](#) and [pip thorton](#).

Without wanting to go further into the role of religion, nevertheless it is important to indicate that at that time the scientific understanding of the world was less involved in the idea of utilisation and optimisation and instead had an entirely different concept of progress than that of the following centuries. In fact the turn of the 18th to the 19th century was much more radical in the way that society changed than that of the Middle Ages to the Renaissance. This was simply because change occurred in almost every facet of life and at the same time was compressed into an incomparably shorter period. This fundamental change would soon affect all of Europe—if not the entire planet—in one or another way. It essentially dis-ordered the world and unhinged the structure of society in unseen ways. In this context Karl Marx's famous quote "all that is solid melts into air" is not only true for commodities and capital, but for almost every other certainty humanity had conceived up to this point.¹⁷

The 18th century ended with a world-shattering and momentous event: the French Revolution, which occurred between 1789 and 1799. The abolition of the feudal-absolutist corporative state and the propagation and implementation of fundamental values and ideas of the Enlightenment were, as objectives of the French Revolution, among the reasons for far-reaching changes in societies throughout Europe. It also had a decisive influence on the separation of State and Church as well as on the separation of science and religion—connections that were previously undisputed.

Leaving aside the enormous impact the French Revolution had in almost every other field, two interconnected aspects that seem comparatively minor, but which were eventually to become of great importance for the entire 19th century, need to be addressed. The first is the standardisation of units of measurement and the other is the introduction of the metric system—or, to be more precise, of decimal fractions. Neither of these achievements was a contemporary invention nor the direct result of the Revolution, though its radical political programme did make their implementation possible, first in France and then later in many other countries.

Today we are so used to these achievements, it is hard to imagine a world where literally every large town had its own measurements of length and weight—a situation that not only promoted manipulation and fraud, but also hindered scientific exchange and progress.

¹⁷ Karl Marx and Friedrich Engels (1848), "Chapter 1," *The Communist Manifesto* at www.marxists.org. For a deeper elaboration on this point, see also Marshall Berman (2010 [1981]), *All That is Solid Melts into Air: The Experience of Modernity*, (London: Verso).

The very same problem that Vesalius solved almost single-handedly in the case of medical nomenclature was now a challenge in all other fields of science. An initial step to address this challenge was the standardisation of measurement in order to make results reliable and comparable. The new and universal units of measurement were chosen in such a way that subunits were always decimal multiples and fractions of these universal units. The struggle for this seemingly simple solution took centuries and, as a matter of fact, the process has not yet been completed outside the scientific context.

It is very instructive to understand that these important steps towards the rationalisation of knowledge were only taken comparatively late in European history and it is surprising to see the obstacles they had to overcome before finally prevailing. The incredible technological acceleration that started at the end of the 18th century and was at full throttle around 1850, seems deeply interconnected with these profound reforms.

It is not surprising that this rational premise also had a fundamental influence on how the world was viewed from then on. One peculiar paradox in this context concerns the latent opposition encountered from the beginning of the 19th century to the unification and specialisation in the sciences. On one hand, the standardisation of terminology and measurements was pushed in both scientific research and in industry, which was growing explosively. On the other, the exponential growth of knowledge led to an ever-finer differentiation of branches and disciplines. As a result the unitarian concepts of the cosmos increasingly fell apart. While in the 18th century an attempt at a comprehensive and complete description of the world was still conceivable, less than a hundred years later the idea bordered on the delusional.

A good example of this shift is the enterprise of Denis Diderot and Jean-Baptiste le Rond d'Alembert, who worked on their *Encyclopédie* between 1751 and 1772, attempting nothing less than a comprehensive list of all aspects of human existence. Contemporaries saw the richly illustrated work as ground breaking and it appeared self-evident that with sufficient effort it could be extrapolated into a future of infinite detail. A hundred years later, however, Alexander von Humboldt's attempt to put his life-long research into a coherent compendium failed gloriously.

His *Kosmos* was published between 1845 and 1862 in five volumes.¹⁸ But by that time it was beginning to dawn on those in the scientific community that the figure of the polymath coupled with the ideal of universal knowledge was outdated and had to give way to a new kind of fragmented specialisation.

The terror of ten

By the mid 19th century, the industrialisation of letterpress printing brought more books at decreasing prices onto the market, which included scientific treatises, technical books and patents. This data helped the acquisition of up-to-date knowledge that would transcend national borders and in turn would promote worldwide scientific and technical progress. It is therefore not surprising that library systems had to adapt to new demands in managing this flood of new information. In his 1876 paper American entrepreneur Melvil Dewey proposed a faceted library classification system which would eventually become the blueprint—in the Anglo-Saxon world at least—for the organisation of large bodies of data.¹⁹

The basic idea of the Dewey Decimal Classification (DDC) was not new at the time and can be traced back to a similar system proposed by Leibniz.²⁰ Unlike his prominent predecessor, however, Dewey had no philosophical ambitions; his thinking was strictly business oriented. He was an enthusiastic supporter of the decimal metric system and established the Boston based Metric Bureau in 1876. It was one of the first providers of supplies for libraries in the USA. The company closed in 1881, but Dewey seamlessly continued to do business under another company, the Library Bureau, in Cambridge Massachusetts, which he headed for the next 25 years.²¹

The DDC grew out of the specific demands of physically finding one book among millions of others, a challenge that was substantial for libraries worldwide. Up to the 19th century most library stacks were generally closed to the public and only librarians were allowed to organize and browse the shelves. Normally each book was assigned a permanent shelf position based either on its height, the date of its acquisition or the first letter of the author's name. Of course these characteristics only allowed ineffective forms of organisation, which became more and more inferior with the exponential growth in numbers of books.

¹⁸ Alexander von Humboldt, (2015 [1845–1862]), *Der Kosmos – Entwurf einer physischen Weltbeschreibung* (Cosmos: A Sketch of a Physical Description of the Universe) in 5 volumes, (Stuttgart and Tübingen: J.G. Cotta).

¹⁹ Originally published as Melvil Dewey (1876), *A Classification and Subject Index for Cataloguing and Arranging the Books and Pamphlets*, (Hartford Connecticut: Case, Lockwood & Brainard). See also Melvil Dewey (2015 [1876]), “Melvil Dewey’s Bibliographic Decimal System and its Proposed Application for the Arrangement and Rapid Search of Scientific Subjects Contained in *Bee-journals*,” (London: Blackwell Palala Press).

²⁰ Cf Hans G. Schulte-Albert (1971), *Gottfried Wilhelm Leibniz and Library Classification*, in: *The Journal of Library History*, Vol. 6, No. 2 (Apr., 1971), 133–152.

²¹ Alex Wright (2014), *Cataloging the World: Paul Otlet and the Birth of the Information Age*, (Oxford: Oxford University Press), 41.

The implementation of the DDC came with a high initial investment since the library stock had to be reordered according to Dewey's standardised system of categories. Once rearranged according to these criteria, however, the library functioned like a well-organised warehouse of knowledge.

The rigid DDC system originally featured nine main 'classes', which were divided again into nine divisions. A final division was then made by separating each subset into nine sections, also numbered with the nine digits. In this way, a high number of increasingly differentiated categories could be created—all identified with a three-digit code or a 'call number' which indicated both the book's subject and its exact location. In addition to the listing of the general classes and their subsets, Dewey also provided a separate subject table and an index of authors that also pointed towards the matching coordinates within the DDC matrix.

Even Dewey's very first concept dating from 1873, set the number zero to indicate—depending on its position in the DDC code—that a book was non-specific in relation to a class, division or section. This addition also became necessary to guarantee the integrity of the three-digit number code. In the first issue of his catalogue all of the zero main categories were, as yet, unassigned placeholders. Today some of these numbers are used for subjects that in the late 19th century did not yet exist: 000 – *Computer science, knowledge & systems*, for example.

As efficient as the initial system might have been, it also raised immediate and serious questions, some of which haunt us today. The first one relates to the limited and predetermined set of main categories themselves. Since the DDC was standardised and had a monopoly position from the beginning, it was biased towards an Anglo-American worldview, mirroring the values and moral standards of Western culture. As a result it has been very difficult, if not impossible, to change a category once it has been introduced—a fact, which, over time, has produced unwanted distortions, artefacts and some dead-ends. Finally, and most important, the DDC is not able to deal with ambiguity or plurality. Its core was designed to subdivide knowledge into a strict set of limited vertical hierarchies that raise serious problematic issues on multiple levels.

The archaic structure and limited adaptability of the DDC and the attempt to eliminate its conceptual flaws (and similar rigid systems such as the Library of Congress Classification introduced in 1890), have been constantly evolving over the last century. The DDC categories have grown from a few hundred to some 36,000 today and, with later extensions adding further subdivisions, it is now hypothetically possible to envisage up to one-billion classifications. On first sight this increase in granularity seems to characterize an open system capable of integrating any number of new data—but unfortunately this is not the case. This is because information based on paradigm changing new knowledges can only be added at deeper levels in the hierarchy and, therefore, it leaves the pre-existing order substantially unaltered. It is also worth noting that Leibniz’s vision of the mechanisation of knowledge could never actually be applied to this kind of cataloguing system, because the predetermined position of a book and its attributed class does not add any useful information, other than making it physically traceable and showing its contiguous fields. Leibniz’s quest for a universal particle achieved by endless division, subdividing knowledge into ever finer classes ultimately leads to the most individualised element of all: a useless category represented by a single entry.

The quest for universality

Next to his classification system, Dewey also commercialised another important instrument that was not of his own invention: the card index catalogue. It has been asserted that Swedish botanist, zoologist and physician, Carl von Linné, first used a similar ordering system around 1760 so as to keep his lifelong attempts to classify all known species as flexible as possible. On an institutional level the first card catalogue was installed around 1780 at the Austrian court library in Vienna by its prefect, Gottfried van Swieten. However, it was Paul Otlet who brought these two innovations together and developed a modern system for organising information that was both universal and flexible enough to map the diversity of human knowledge. Otlet, offspring of a wealthy Belgian family and a trained lawyer, began to take an interest in bibliography during his studies and eventually developed doubts as to the usefulness of the book and with it the library as general guardians of knowledge.

alignment [əˈlaɪnmənt]

something meeting point-for-point with its other. in a modernist world, this requires an agreement. in a postmodernist world, it requires only a pluralised encounter that for whatever reasons ‘cohere’.

²² Paul Otlet, (1990 [1891–92]), “*Un peu de bibliographie (Something about Bibliography)*,” in W. B. Ray (Ed.), *The International organisation and dissemination of knowledge: Selected Essays of Paul Otlet*, (Amsterdam: Elsevier), 11–24.

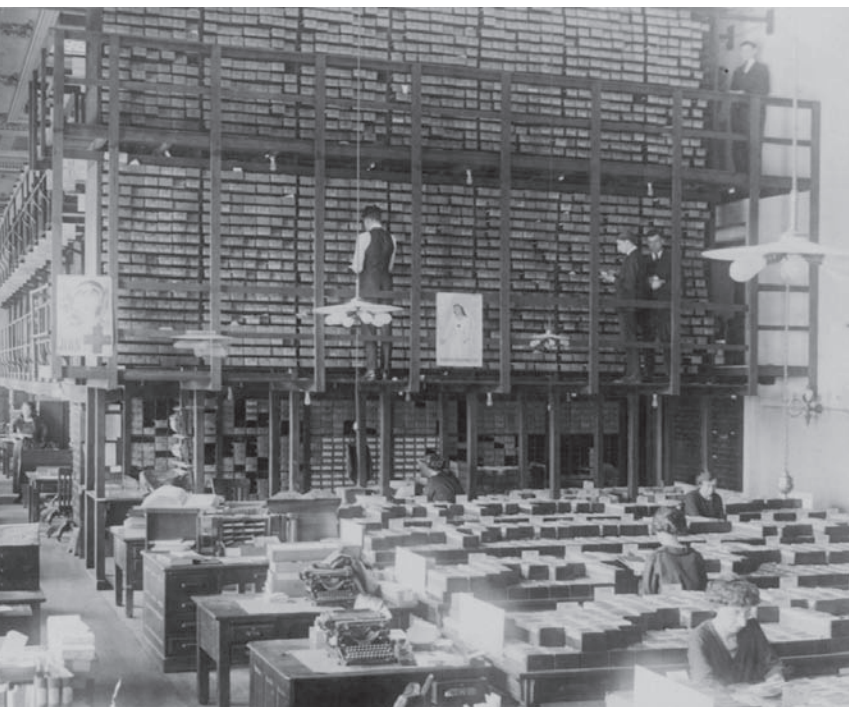
²³ Scott Hamilton Dewey (2014), “*The Continuing Relevance of Paul Otlet, the International Institute of Bibliography/ International Federation for Documentation, and the Documentation Movement for Information Science and Studies*,” in *InterActions: UCLA Journal of Education and Information Studies*, 10(2), at escholarship.org/uc/item/5pq3v1cp

²⁴ Alex Wright, *Cataloging the World*, 82–83.

²⁵ *Ibid*, 165.

In his first essay in 1892, Otlet expressed the belief that books were an inadequate way to store information because they were hard to update and based more on the author’s own biases than on checkable facts.²² In his opinion, a far more effective approach would be to distil a book’s substance, its sources and conclusions and connect all elements using a system of cards pointing to distinct units of information or—as he would later call it—documentation.²³ In 1895 he and his life-long associate and future Nobel Prize winner, Henri La Fontaine, established the International Institute of Bibliography in Brussels and announced plans to create a *Universal Bibliographic Repertory* that would serve as a global clearinghouse for bibliographical data.²⁴ It was the initial intention to create a comprehensive classified index of all published information worldwide. As part of their research, Otlet and La Fontaine learned about the *Dewey Decimal Classification*, which they wished to adapt for their own purposes.²⁵ After obtaining permission to translate the DDC into French, they immediately started to deconstruct and rebuild it in a most ingenious and surprising way.

Fig. 4: Card Division at the Library of Congress. Photograph by Underwood & Underwood around 1919 (Library of Congress)



Having grasped the fundamental restrictions of Dewey's original concept, they overcame the purely enumerative classification, transforming it into one that allowed for synthesis and cross-connection. By 1905 the system had been further refined by introducing interlinking and aspect-free tables containing general notions such as place, language and physical form. In addition, a system of algebraic notation and syntax rules was introduced that referred to the intersection of connected subjects. In creating an inquiry-oriented stock of knowledge that was structured and described by means of a proper documental language, the UDC was able to express an unlimited combination of attributes and relationships per subject. With its highly elaborated subject arrays, its auxiliary tables and a number of compounding mechanisms, the *Repertory* was designed to enable the creation of systematically structured number codes that could specify in minute detail extremely complex statements of what a document was about. The algebraic notation for such a formalisation would for example read 31:[622+669](485) referring to the statistics of mining and metallurgy in Sweden.

Otlet's and La Fontaine's thinking was also ground-breaking for another reason. They radically questioned the unchallenged authority of books by proposing that the narrow limits of text-based information should be expanded to include the spoken word, artefacts, maps, photographs and all other kinds and mediums of expression. In order to include this expanded scope of relevant sources they introduced the concept of what they called the 'Universal Book' and, with it, the new discipline of documentation sciences. These sciences are characterised today as the study of the recording and retrieval of information.²⁶ As unimpressive as these proposals may seem, their consequences were far-reaching and soon went well beyond the scope of library science. They raised the general question about which kind of information should be considered relevant and valuable enough to be stored and integrated. This immediately led to the next issue as to how human knowledge should actually be described, stored and distributed. Since then these questions have retained their profound relevance up to and including the present day.

²⁶ Rayward W. Boyd (2013), 14–17

A radiant library

²⁷ Cf *Universal Bibliographic Repertory* at archives.mun-daneum.org/en/universal-bibliographic-repertory

Following Otlet's concept, all relevant information was collected worldwide and processed in his central repository, the *Palais Mondial* (World Palace) founded in Brussels in 1910 with the help of the Belgium government. There, each source had to first be identified, then documented on 3 × 5 inch index cards and interlinked according to the UDC. This tedious decision making and classification process was manually performed by anonymous experts—mainly women, as one can see in historical photographs—under Otlet's direction and supervision. Their role was fundamentally different from the librarians of the past since they were no longer keepers of the knowledge, but also readers, indexers, coordinators, abstractors, summary writers and, therefore, ultimately synthesizers.

²⁸ Paul Otlet (1906), "Les aspects du livre: conférence inaugurale de l'exposition du livre belge d'art et de littérature organisée à Ostende par le Musée du Livre," in *Publication No. 8* (Bruxelles: Musée du Livre), 34.

In this way Otlet's catalogue developed into a remarkable resource, which, in the period before World War I, grew to more than 11 million index cards and peaked in 1934 at 15.6 million.²⁷ His visionary aim however was not to silo or monopolize knowledge, but to make it accessible so as to democratise the dissemination of culture and information. An ardent pacifist, Otlet was convinced that long-term world peace would be supported by an international and unbiased knowledge base open to everyone. One of the main obstacles to this knowledge exchange was, however, the fact that at the time there was no simple way to duplicate and transmit the physical records generated and archived in the *Palais Mondial*. In order to overcome this problem Otlet was constantly looking for new technical solutions and was enthusiastic about every new invention that seemed to bring him closer to his goal. As early as 1906 he claimed that the book of the future would be "the photographed book, the telephoned book, the projected book, [...and] the Broadcast Book".²⁸

²⁹ Robert B. Goldschmidt and Paul Otlet, Paul (1906). "Sur une forme nouvelle du livre: le livre microphotographique," in *Publication No. 81*, (Bruxelles: Institut international de bibliographie).

That same year Otlet began collaborating with Belgian chemist and radio pioneer Robert Goldschmidt to explore the possibilities of microfilm as a new archival storage medium. In their 1906 *Essai sur une forme nouvelle du Livre: Le Livre Microphotographique*, Goldschmidt and Otlet argued that an inflammable sheet film the size of an index card could contain the contents of 72 book pages and would not be limited to text information alone, but capable of reproducing any kind of pictorial content.²⁹

ambiguous [æm'bigjuəs]

conviction destabilised by choice.

Although the technical realisation of a miniaturised and reproducible library could not be achieved at the time, the concept already incorporated an interesting idea that would eventually be put into practice in the late 1920s. One of these implementations, not directly connected to Otlet's visionary work, merged a lot of his ideas and, to some extent, exceeded them.

The *Statistical Machine* was initiated and constructed by Emanuel Goldberg of Zeiss Ikon in 1927 and can be considered the first document retrieval system using electronics.³⁰ The function of the machine was surprisingly sophisticated for its time: microfilm records were stored as single images on rolls of 35 mm cine film and each record was indexed with a binary code in the form of a specific black and white pattern. A technical solution, this was basically a further development of the mechanism used in punch card sorting machines since the 1900's and is echoed in the QR codes of today.³¹ By using microfilm in this way, one could then create a search key featuring a similar black and white pattern enabling the retrieval of documents based on certain defined criteria. During the search process the film ran at high speed between a light source and a photocell and once it passed a frame with an identical code, it stopped. This target detection instantly triggered a second process in which a copy of the found record was printed onto a separate piece of film. The result of such a query was a newly composed microfilm containing all results in the sequence they had occurred.

³⁰ Cf Michael Buckland (2006), *Emanuel Goldberg and His Knowledge Machine: Information, Invention, and Political Forces*, (London: Libraries Unlimited).

³¹ The first electromechanical punch card sorters and tabulating machines were introduced around 1900 by the American Hollerith Company, which later was amalgamated with three other companies to form the International Business Machines Corporation (IBM). The Hollerith machine allowed the evaluation of a large number of punched cards in a short time and was therefore often used for national censuses. In order to process digital data, it had to be presented in the form of standardised punch cards with holes in predefined positions. Unlike punched cards, the printed pattern is scanned by optical sensors.

Fig. 5: *L'univers, l'intelligence, la science, le livre*. Illustration by Paul Otlet published in *Traité de documentation*, 1934. Insight from the universe and the human mind is according to Otlet ordered by dividing knowledge into scientific grids and materialised into a book. Each fact and each idea kept in every book is isolated and converted into an individual document that is inventoried in a card catalogue. From this catalogue dossiers and maps are made condensing and objectifying the retrieved information. This collected and generated knowledge forms the basis for the constantly growing and increasingly differentiated classification system.



³² Cf Frank Hartmann (2012), *Vom Buch zur Datenbank: Paul Otlets Utopie der Wissensvisualisierung*, (Berlin: Avinus). See also Alex Wright (2014).

³³ "World Brain" in this context refers to a collection of essays by H.G. Wells, dating from the period of 1936 – 1938 with which Otlet was familiar. Throughout the book, Wells describes his vision of a synthetic, authoritative and permanent "World Encyclopaedia" that could help world citizens make the best use of universal information resources thus contributing to world peace. See H.G. Wells (2016 [1957]), *World Brain*, (London: HG Wells Library Press).

³⁴ Paul Otlet (1934), *Traité de documentation: le livre sur le livre*, (Brussels: Editiones Mundaneum), Paul Otlet (1935), *Monde, essai d'universalisme: connaissance du monde, sentiment du monde, action organisée et plan du monde*, (Brussels: Editiones Mundaneum).

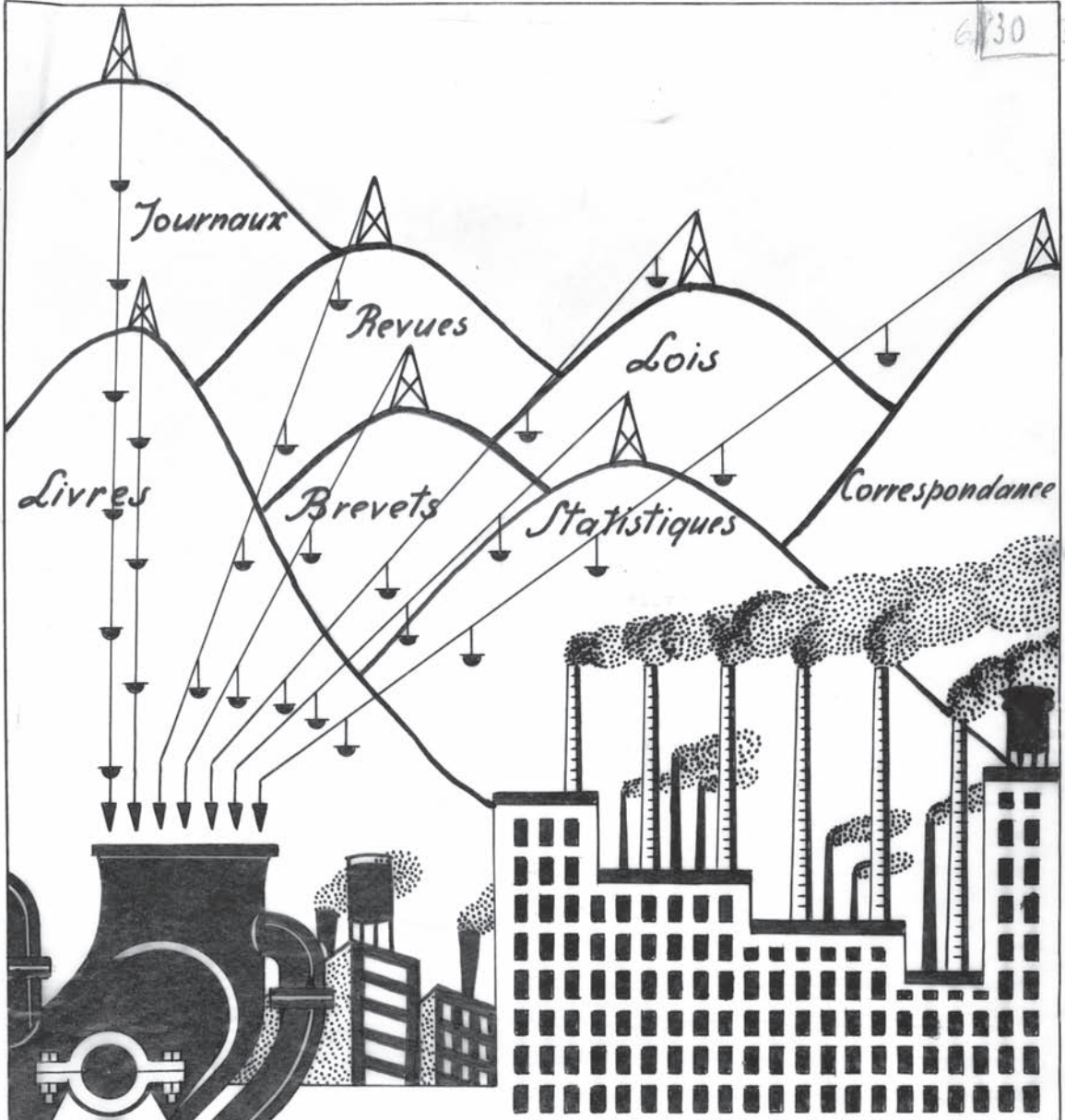
³⁵ Paul Otlet, *Traité de documentation*, 429.

One reason for mentioning this long forgotten technical solution lies in the ingenious idea of skipping the level of index cards and automating the search in a way that the document as such is presented. The retrieval process for its part is driven by a machine readable and highly formalised descriptor such as the one used in the UDC. Although Emanuel Goldberg had to leave Nazi Germany in the early 1930s and for this reason his *Statistical Machine* never went into production, it would have been an intriguing possibility of realising and enriching Otlet's vision. The important point here is that even in an analog society a machine existed that could construct a search engine easily recognised today. This puts a different perspective on the idea that the use of computers automatically led to a qualitative advance in the complexity of knowledge systems. That was not the case, at least until very recently.

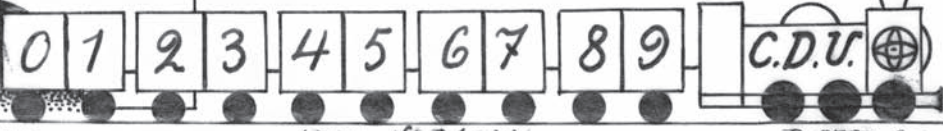
After a long time in oblivion, Paul Otlet is now seen as a pioneer of information sciences and the Internet.³² Nevertheless, references nowadays are made mainly to his later publications and not to the previous decades of hard work on his vision of the "World Brain."³³ In his recently rediscovered and not yet translated works from the mid-1930s, *Traité de documentation* and *Monde: essai d'universalisme*, he did not only summarize a lifetime of thought about the organisation of knowledge, but also interpolated some of his utopian ideas, through which we recognize the world of today.³⁴ In his *Traité de documentation*, for example, Otlet predicted that future instruments would automatically capture data without direct human intervention and that these instruments would also be able to detect all sense-based perception and even qualities beyond them. He further suggested that there would be mechanisms corresponding to each form of perception, ultimately leading towards a shift whereby all reality would be recorded in a process he called *Hyper-Documentation*.³⁵

Fig. 6: Laboratorium Mundaneum. Ink drawing by Paul Otlet, 1940 (Collections Mundaneum). Yet another way of gathering knowledge according to Paul Otlet: all kinds of information, from different sources, is transported by cable cars to an industrial complex where it is collected and processed in an enormous furnace. The product of this intellectual mining operation is the UDC code. The text below explains that mountains of documents extract the pure materials useful to civilisation.





Laboratorium Mundaneum



C. Platounoff. DELIN.

(Doc. N° 8694)

P. OTLET Conc.

LA CENTRALE DE DOCUMENTATION // DES MONTAGES DE DOCUMENTS EXTRAIRE
 ORGANISEE EN GRANDE MACHINERE INTELLECTUELLE MONDIALE // LES PURES MATIERES UTILES A LA CIVILISATION

Future as past participle

At this precise point I would like to return to some thoughts laid out at the beginning of this text; namely, the paradisiacal conception of God's own language in which there is no difference between the descriptor and its referent. Very recently we have entered a new phase in data retrieval and modelling whereby, with the aid of neural machine learning and increasing sensory networking, we materialize an 'internet of things' that for the first time automatically and continuously generates data. In this way the relations between the world and the model of the world are shaped according this continuous generating of data. Machine-generated data is produced in such volume and speed that conventional modelling and classification techniques are bound to fail. Instead 'artificial intelligence' is used to transform this permanent flow of input into books and libraries as self-describing data formats which, on the fly and in real time, themselves dictate the underlying multi-dimensional models. From a dystopian point of view, this process can be regarded as the ultimate loss of control or the final surrender of humanity to machines. This is a view that I do not share. Instead it merely indicates that once again have reached a crucial point of epochal paradigm shift.

With the help of these new technologies, knowledge and all forms of human expression finally can be recorded, correlated and understood in the universal sense that Otlet proposed in his late writings. Very clearly he came to the conceptual point where the distinction between the meaningful and the coincidental started to blur and the only consequence he saw was to integrate everything that could be described and captured. After a lifetime of trying to bring order to the diversity and unpredictability of life, it must have dawned on him, that knowledge systems by their very nature do not have to be instrumentalised or closed. There can never be a strong curator or moderator—or not for long anyway—if knowledge is going to wear garments that flow, multiply, proliferate, whilst simultaneously bolstering or even foregrounding curiosity.

animal [ˈæɪnɪmə]

In the grip of the anthropocene, it is crucial to re-remember that the universe does not revolve around (a) earth and (b) the human species. sentient beings with or without backbones, often without humanly discernable communication systems, are sometimes so odd that they can appear as aliens from another planet / deep time zones. see also cephalopods, paying close attention to their armpit-mouth-genitals and wry sense of wonderment, play, cruelty and humour.

The final consequence of this wilful overflow carries a strong spark of openness within it, which leaves no space for narrow ideological or moral judgement and is irreducible to instrumental logic. Instead it allows a complex and ambiguous mesh of diverse information to emerge. In contrast to the pure knowledge of the enlightenment, these future systems are infinitely impure, compounded as it is by ever proliferating data, whilst simultaneously cohering as a living distribution. It is certainly not a given that such utopian and shape-shifting systems would make humans ‘God-like’—but they would name everything, expressing it within an inherently limited and fluctuating web of intersecting data.

This is precisely what the Data Loam project has been about: the encounter of meaning formation and the fight for the right to keep encounters ‘flowing’. Data Loam foregrounds diversity and shows precisely how to make that diversity ‘work’. Hopefully this will help to form the basis of a new democratic intelligence.

artificial [ɑ:tiˈfiʃ(ə)l]

the fullness of reality, augmented, distributed, emboldened by the zero.

Science Fictioning Singularities: The Diagrammatic Imaginaries of Physics

David Burrows

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Diagrams are in a degree the accomplices of poetic metaphor [...] Like metaphor they leap out to create spaces and reduce gaps [...] Unlike the metaphor the diagram cannot be exhausted. (François Châtelet)¹

Fictioning singularities through diagrammatic imaginaries

Science fiction commonly presents physical and social worlds shaped from science fact, often integrating fantastic natures and cultures to conjure alternative realities; a fictioning of the potential transformations of everyday and future life, or of the seemingly impossible, presented through the exploration of scientific ideas and technologies. Why is this a fictioning rather than a fiction? The latter term, a noun, names something generally thought to be made up—the anthesis of reality. The former term, a verb, refers to a practice which subverts, intervenes in or transforms a given or existing account of reality through fictional presentations. More than this, the concept of fictioning challenges the idea that fiction and reality are opposed to each other. While not asserting they are the same thing, this concept approaches fiction as an agent that changes, instantiates or produces worlds.² By tracking this agent in scientific presentations, models and diagrams, this chapter argues that scientists can be seen to engage in science fictioning in ways similar to writers and artists. A question may arise here, what exactly is meant by the term reality?

In attending to the sciences, and in particular astrophysics, this chapter certainly engages with various models of reality but without any attempt at assessing their veracity (sorry if this is disappointing). The focus remains throughout on the role fiction and the imaginary play in apprehending reality or understanding nature. This is not a new problem. Scholars point to Plato's anxiety concerning fiction and fictioning, present in diegetic and descriptive narratives, and a distrust of the imaginary can be found in many university and rule bound disciplines, precisely because the imaginary is not considered a reliable register.³ One contention of this chapter is that an imaginary register has often been called upon by the sciences to fiction worlds and realities. Indeed, while the sciences might be thought to counter the fictional, they can also be said to call upon the imaginary to refute human-centred or folk points of view. For example, neuroscientists, biologists and astrophysicists all present

¹ François Châtelet (2000), *Figuring Space: Philosophy, Mathematics and Physics*, translated by R. Shore and M. Zahga, (Dordrecht: Kluwer Academic Publishers), 10.

² A more detailed development of this point can be found in David Burrows and Simon O'Sullivan (2019), *Fictioning: Myth Functions of Contemporary Art and Philosophy*, (Edinburgh: Edinburgh University Press).

³ See in particular Jeffrey A. Bell (2006), *Philosophy at the Edge of Chaos: Gilles Deleuze and the Philosophy of Difference*, (Toronto: University of Toronto Press). Cf Max Statkiewicz (2009), *Rhapsody in Philosophy: Dialogues with Plato in Contemporary Thought*, (University Park PA: Pennsylvania State University Press), respectively. See also Burrows and O'Sullivan, *Fictioning*, 2–3.

belonging [bɪ'ɒŋɪŋ]

the a=a of parmenides, where identity has first to do with connection of the same to each other (belonging). heidegger exploits the a=a move, emphasising the = sign and not the end points (a, a). without that = (the bridge linking and separating the 'a's), all 'a's would collapse onto the 'other' a. thus 'belonging' is both an attraction and, simultaneously, the need 'just to be' (alone).

realities not apparent to the human senses, using images, models and narratives to do so. Here, we only have to think of Einstein's tale about gazing out of a window and observing the (imaginary) body of a human in free fall; an image that facilitates an insight concerning gravity and the reason why the unlucky human does not feel their own weight as they plunge to the ground.⁴

⁴ Albert Einstein (1972 [1917]), "The Fundamental Idea of General Relativity in Its Original Form," unpublished essay, documented as "Excerpt from an Essay by Einstein on 'Happiest Thought' in His Life," (New York: *The New York Times*) Tuesday, 28 March 1972.

There is perhaps nothing special about this. As suggested above, fiction abounds in human presentations and discourses and, furthermore, an imaginary register allows humans to correlate images, symbols and words with an experience or an understanding of reality. It is the imaginary that conjures worlds that are not close to hand or that do not yet exist, and which registers a snap of a twig (an indexical sign) as an approaching predator, an evolutionary trait shared by humans and other animals. A difference can be marked here though. Humans, unlike many animals, have the capacity to imagine events across times and spaces, and pasts and futures. Furthermore, scientists may draw upon intuitive capacities but images of the big bang, black holes and the superposition of particles are, for the most part, not intuited in this sense, often having a third person perspective and being identifiable as diagrammatic in two ways. Firstly, when expressing mathematical or quantitative orders or hierarchies, the imaginary at work in the sciences is often diagrammatic, producing spatial compositions to differentiate and present relations and states, even when this involves marking processes, time or duration. Molecules, photosynthesis and cosmic inflation are all articulated through diagrammatic explanations—spatial presentations—in textbooks and popular science publications. Secondly, the imaginary of the sciences is diagrammatic in its effect on thought, in that it produces a rift—a structural division or disjunction—not just between perceived and invisible or existing and past or future worlds, but between intuitive and counter intuitive accounts of reality. It is this double aspect—of a division of a world in presentation and in thought—that points to how the sciences are generative of, but also engendered by, a diagrammatic imaginary. Scientific diagrams and images, in being machines that generate counter-intuitive presentations, have something of a correspondence with the 'paraspaces' of science fiction. Samuel Delany coined the term paraspaces to describe parallel zones (within fiction) in which the forms or laws of natural and social relationships differ radically.⁵ It is Delany's contention that in science fiction, the presentation of a

⁵ Samuel Delany (1994), *The Silent Interviews*, (New England: Wesleyan University Press), 168.

paraspaces produces a divergent reality which disrupts any hierarchies of reality and fiction within a narrative. The comparison made above does not find a symmetry between art and the sciences though: the sciences tend to develop counter-intuitive narratives and images from observation, data and calculations, which question folk ideas or existing models of reality; whereas art—following Delany—produces alternative worlds or spaces through presentations and reflections that invert, refract, abstract or contradict common accounts or experiences of reality. Where there is a convergence is in the way the imaginary register is mobilised to produce new, extra or multiple perspectives, and not just through images and assemblages, but performances and words too, as demonstrated by the writing of paraspaces in science fiction novels. This is not to say that the sciences produce myths, or invent alternative worlds in the same way science fiction does; it is only to suggest that the diagrammatic imaginaries of the sciences—just like the narratives and worldings of science fiction—present realities and events that contrast with or disrupt the world according to common sense or experience.

Diagrams as islands of truth and hybrid devices

A diagram can be defined as a presentation of elements in a composition. It is important to emphasise again, that diagrammatic presentations, first and foremost, are spatial in character—even when a given modelisation is a mental operation or concerned with temporality rather than spatial dimensions. In this, a diagram does not necessarily place elements together in actual, geographical or measured relation. Diagrams may share characteristics with maps or figurative representations, but they have different functions, as implied above, one significant function being that diagrams make visible and intelligible what is not apparent to the eye. For this reason, some presentations are more relevant than others to this discussion, particularly diagrams of actual and virtual relations, and events known as singularities (defined as unpredictable events which defy rule-based analysis). In this, objects known as black holes are of special interest.

Here, at the outset, it is important to stress that any knowledge articulated about black holes and other objects studied by astrophysics in this chapter is gleaned from material which scientists

big data [big 'deɪtə]

has little to do with size, quality, or even quantity. underscores an unrelenting ability to rename, archive, and/or install all encounters, products, memories and communication economies into 'information', which in turn can be siphoned / individualised into silos of information economies, monetarised and re-calibrated to great political effect.

⁶ Donna Haraway (2016), *Staying with the Trouble: Making Kin in the Chthulucene*, (Durham and London: Duke University Press), 11–12.

⁷ Michèle Le Dœuff (2002), *The Si-phoned Philosophical Imaginary*, translated by C. Gordon, (London: Continuum), 8–14.

⁸ Immanuel Kant (2003 [1787], *The Critique of Pure Reason*, translated by J. M. D. Meiklejohn, (London: J. M. Dent and Sons Ltd), 180.

⁹ Bruno Latour (1993), *We Have Never Been Modern*, translated by C. Porter, (Cambridge MA: Harvard University Press), 9.

¹⁰ Latour, *We Have Never Been Modern*, 30.

produce to share, popularise and explain the general significance of their work, both to a lay-public and to each other. From the perspective of an art practitioner, when reviewing presentations of the sciences, it seems important to draw attention to the mediations of diagrammatic imaginaries. Just as it matters what stories tell stories and make worlds, as Donna Haraway (following Margaret Strathern) has stated, it matters what mediations present worlds.⁶

In Michèle Le Dœuff's *The Philosophical Imaginary* an argument is put forth that even the most abstract systems of thought can produce imaginary figures.⁷ To further this thesis, Le Doueff's points to Immanuel Kant's warning about the dangers of venturing beyond the horizon of what is known. Paradoxically, Kant issues this advice through the metaphor or image of an 'Island of Truth,' described as having firm ground and unalterable limits; a territory surrounded by the stormy waters of illusion—a diagrammatic and fictional image that draws a boundary line between the reliable firmness of land and the deceitfulness of water. Importantly, even Kant admits the 'Island of Truth' is a seductive phrase.⁸ Such a declaration though, as Le Doueff points out, may signal a distrust of seduction but, at the same time, the (imaginary) 'Island of Truth' continues its enchanting work. This leads Le Doueff to ask whether didactic images are merely vehicles for the realisation and dissemination of ideas—and should thus be paid little attention—or whether a use of images coupled with a denial of their importance is a negation of the role of the imaginary in critical or scientific thought. In raising this problem, Le Doueff asks whether (philosophical) fantasy figures can be separated from the emblems or functions of reason. Similarly, a question can be posed as to whether the imaginary figures of the sciences are more than vehicles for data and ideas, for they have social or aesthetic functions too. Are such devices best thought of as nature-culture assemblages? There is another French philosopher that is hard to ignore here, Bruno Latour, who argues in *We Have Never Been Modern* that the Enlightenment separation of the study of nature from the study of the human produces a "modern constitution" founded on the purification of objects of study.⁹ This is a poor state of affairs which produces a blind spot. Between these two disciplinary poles—which study either natural objects or societies and subjects—Latour asserts that a number of quasi-objects and quasi-subjects are found.¹⁰

To find such “hybrids,” Latour suggests that one only has to pay attention to the news, which provides many examples, including measurements of the ozone layer where chemical and political reactions mix, and (with a nod to Haraway’s ironic, fictional figure) the development of cyborgs, which might be the quintessential subject/object.¹¹ One could add to this list black holes and the big bang, which have prompted discussions concerning future energy sources and the idea that something came from nothing, which, apart from other things, challenges religious beliefs.

¹¹ Latour, *We Have Never Been Modern*, 1.

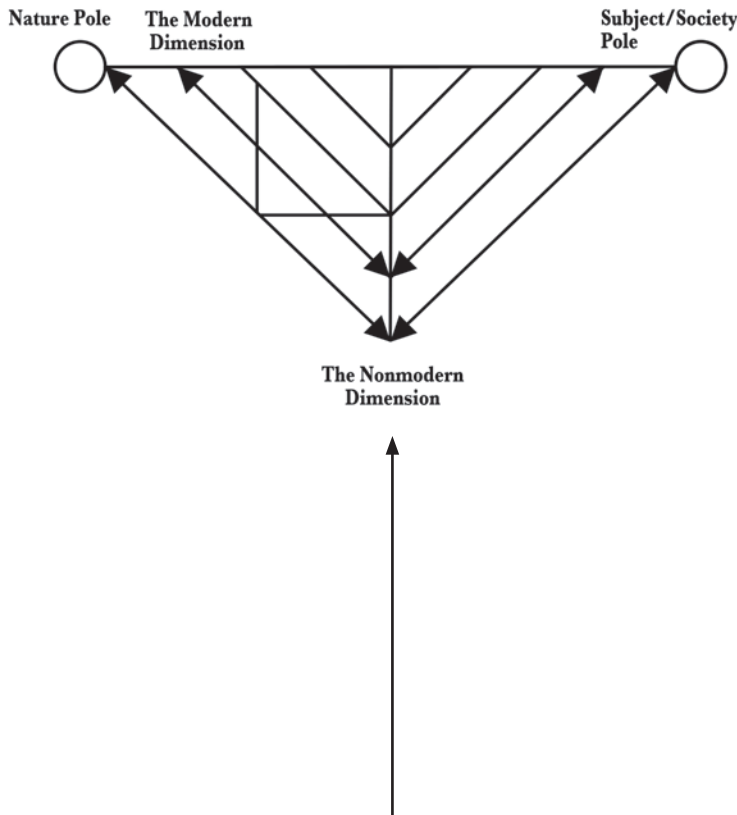


Fig. 1: Diagram of purification and mediation by Bruno Latour, in *We Have Never Been Modern*, 1993, page 51.

black hole [blæk həʊl]

a region of spacetime exhibiting gravitational acceleration so strong that nothing can escape from it. a black hole can continue to grow by absorbing mass from its surroundings. there is consensus that supermassive black holes consisting of million of solar masses exist in the centres of most galaxies. certain depressions operate similarly.

¹² Latour, *We Have Never Been Modern*, 55.

¹³ Bruno Latour (1998), "How to be Iconophilic in Art, Science and Religion", in Carrie Jones and Peter Galison (Eds.), *Picturing Science Producing Art*, (London: Routledge), 418–40.

¹⁴ The painting in question is by Italian Renaissance master, Fra Angelico is his *Resurrection of Christ*, c 1432–34. Latour, 'How to be Iconophilic', 421.

Latour's own diagrammatic imaginary can be seen at work in his diagram of purification and mediation (Fig. 1), a spatial arrangement that places nature registered through the sciences on one side of the figure (as the nature pole), and the study of the human at the other end (as the subject/society pole). In between the two poles there is, according to Latour, a dimension elided by modernism and Enlightenment discourse, which is the space in which hybrids of nature and society are produced (as non-modern mediations). What is interesting here is that, following Latour, it can be inferred that scientific diagrams are hybrid devices. They are social fabrications that can register what is "real, nonhuman and objective."¹² Latour is critical of the sciences for not always understanding this—a view that is expressed, rather forcibly, in an essay by Latour titled *How to be Iconophilic in Art, Science and Religion* in which Latour offers a provocative example—a photograph of—a group of soil scientists huddled around a chart or map.¹³ In Latour's narrative, one scientist points to the centre and says, "Here it is." Latour, perhaps unjustly, compares this photograph with a painting by Fra Angelico in which an angel speaks to the followers of Jesus looking into the empty void of Christ's tomb and says, "Why do you look for the living amongst the dead," succinctly presenting Latour's own question: why look to images and mediations for signs of life?¹⁴ The moral is clear: images and other devices can be understood as pointing to, rather than capturing something.

However, Latour's critique of scientific representations, by way of Christ's ascension, only takes us so far. For Latour, images might mark the absence of a diagrammed or mapped thing, like the space for a body in an empty tomb or (as we shall see) a diagram of a black hole rendered through the drawing of a cone or circle, but there is more to images, to maps, figures and particularly diagrams, than representation. While it is important to heed Latour's point, the philosopher's discussion of iconophilia conveys a similar warning (or moral) to that offered by Kant—do not mistake images for reality, stay on firm ground, do not lose yourself in a sea of the imaginary. Without losing sight of the seductive power of mediation and the imaginary, there is an alternative line that can be taken to Latour's critique of representation: images such as maps and scientific diagrams and similar devices have both indexical and generative

(or fictioning) functions, as Le Doueff implies. This is to say, the firm ground of what can be known (and that of indexicality) is entwined with the imaginary—how else can we think of or conjure firm ground? Similarly, the imaginary articulates mediations of the unknown and unknowable, of events such as singularities and quantum gravity. It is to this function that we now turn.

Beyond the horizon

Why are black holes relevant to a discussion of diagrammatic imaginaries? It is because they are commonly registered and presented by scientists by marking a horizon and by drawing a curious figure-ground relation. Humans first encountered such singularities in mathematical calculation and in the mind rather than in space; that is, collapsing stars were encountered through thought experiments rather than perception. It is generally accepted that the first recorded ‘appearance’ of a collapsing star is in a letter written by John Michell in the 18th century, though it is not until the 20th century that such events were named ‘black holes.’ Michell, after studying the work of Newton, speculated on the existence of a heavenly body so dense that not even light could escape its influence—a proposal made a couple of centuries before the invention of instruments able to identify the effects of black holes. Importantly, black holes are points where mathematics and physics falter and space-time collapses. As such, the presentation of a collapsing star, in space and time (on a screen, page of a book or in the mind), is paradoxical: it is a presentation of something not present or which withdraws from presentation.

Most accounts of collapsing stars in popular science books offer similar narratives about the fate of matter, astronauts, spaceships, televisions and other domestic objects as they are trapped or swallowed by black holes. From reading such tales, many will know that a rotating singularity is thought to be circled by an accretion disc—matter positioned far enough from the collapsed star to escape being dragged to its centre but not far enough away to escape its influence, producing the horizon of the singularity, or the event horizon, beyond which nothing escapes. At the centre of the singularity, the laws of physics are replaced by quantum gravity, which, as experts tell us, is not (yet) understood. The name black hole seems appropriate though—as astrophysicist Kip Thorne explains:

¹⁵ Kip Thorne (2012), Interview at space.com/17086-bizarre-black-holes-kip-thorne-interview.html

¹⁶ The first use of the term black hole in print was by Ann Ewing (1964), "Black Holes in Space," *Science News*, vol. 85, 39. Ewing did not credit anyone with originating the term but reported that she had heard the phrase at a meeting of the American Association for the Advancement of Science. Wheeler introduced the term, years later, in his lectures of 1967.

¹⁷ C. W. Misner, K. S. Thorne and J. A. Wheeler, *Gravitation*, San Francisco: W.H. Freeman, 1973, 875–6.

¹⁸ J.M. Bardeen, B. Carter and S. W. Hawking (1973), "The Four Laws of Black Hole Mechanics," in *Communications in Mathematical Physics*, (Heidelberg: Springer), no 31, 161–70, and Stephen Hawking, M.J. Perry and A. Strominger (2016), "Soft Hair on Black Holes," available at: arXiv.org.

"[T]he atoms of which a star is made, are destroyed at the centre of a black hole [...]. The matter is gone, but the mass, in the sense of mass and energy being equivalent, has gone into the warped space-time of the black hole."¹⁵

The name 'black hole' diagrams an effect seen by an observer looking at a singularity. Until recently, photographing this effect was thought impossible, but in 2019 the Event Horizon Telescope captured an image of the silhouette of a collapsing star by recording the image of hot gas falling into a singularity (Fig. 2).

Impressive as this photograph is, an image of a singularity—as if seen by an observer—was realised long before a lens was able to do so, through diagrams delivering more than a photograph can offer (at present). It is not just that a diagrammatic imaginary adds visual detail to mathematical calculation, it is that black hole diagrams have allowed humans to view the horizon and warped space of a collapsing star, as if from an (as yet) impossible location in space (Fig. 3 and 4).

R U diagrammed

Few astrophysicists have reflected on the diagramming of horizons, singularities and the quantum with more invention than John Wheeler, who is credited with coining the term 'black hole' in 1967.¹⁶ Wheeler asserted that any matter or information crossing the event horizon of a black hole is lost forever. He famously stated that black holes do not have 'hair', that is, no traces or details are left of the morsels swallowed by black holes save the mass, charge and angle of the collapsing star's rotation.¹⁷ Since the 1970s, however, Wheeler's theories have been questioned and astrophysicists have accepted that black holes may be white hot, leak radiation and may even evaporate (which would thus return information to the universe). More recently, the late Stephen Hawking, famous for Hawking's law of area increase in accordance with Wheeler's theories, has challenged Wheeler's image of a black hole, proposing that singularities have fluctuating (apparent) horizons which ebb and flow and change like the weather; that is, they have 'soft hair' and return information to the universe.¹⁸ What is of concern here though is the art rather than the accuracy of Wheeler's diagrammatic imaginary. Wheeler, in *Beyond the Black Hole*, comments on the art of interrogating horizons (in landscapes and in physics) by drawing an analogy between Einstein

blood poetics [blʌd pəʊ'etiks]

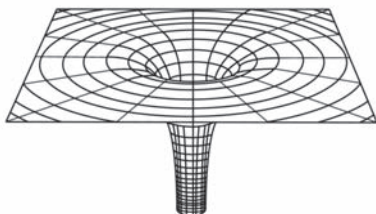
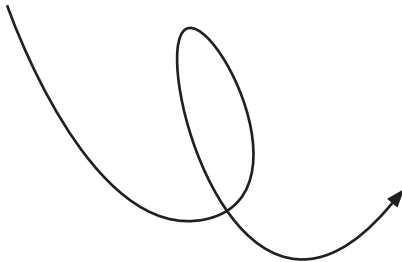
an inhabited, raw, erotic and sometimes dirty form of logic. an ana-concept invented by johnny golding to indicate the importance practice-led reality which rifts off the sensations of rhythm, beat, pattern. entangled with the refusal to look away. linked to radical empathy, and the courage to know (the whatever).



←

Fig. 2: Silhouette of a black hole captured by The Event Horizon telescope, in Jet Propulsion Laboratory, California Institute of Technology, at jpl.nasa.gov/edu/news/2019/4/19/how-scientists-captured-the-first-image-of-a-black-hole/

Fig. 3:Diagram of a black hole, illustration by ESO, ESA/Hubble, M.Kornmesser/N. Bartmann and Labels by NASA/CXC, reproduced in Chandra X-Ray Observatory at chandra.harvard.edu/blog/node/737



←

Fig. 4:Diagram of a black hole, Duke University, Department of Physics at services.math.duke.edu/~psa/clis/527/v

¹⁹ John Wheeler (1978), "Beyond the Black Hole," in H. Woolf (Ed.), *Some Strangeness in Proportion: A Centennial Symposium to Celebrate the Achievements of Albert Einstein*, (Reading, MA: Addison-Wesley Publishing Co), 341-75.

and the Duke of Wellington: the latter could guess well enough the lay of the land beyond a hill by observing the surrounding landscape.¹⁹ For Wellington, like Einstein, the increasing strangeness of a territory indicated that a new terrain lay ahead. Wheeler follows this discussion of how to fathom what lies beyond a horizon with two paradoxes for physics. The first is that black holes, in being the most accessible example of the bounds (or limits) of time, is where physics (as the eternal laws of matter, space and time) stops, but this terrain is also where physics continues (insofar as it theorises the quantum and the event of a singularity that defies laws). The second paradox is that in every elementary quantum process, the act of registration—the act of observation-participation—plays an essential part in giving 'tangible reality' to what the observer says is happening. As Wheeler writes:

"The universe exists 'out there' independent of acts of registration, but the universe does not exist out there independent of acts of registration."²⁰

²⁰ John Wheeler, *Beyond the Black Hole*, 341.

Many questions follow, not least, one already mentioned: what, then, is reality? John Wheeler's answer is a drawing (Fig. 5), which he explains by writing: "What we call 'reality,' is symbolized by the letter R in the diagram, which consists of an elaborate *papier-mâché* construction of imagination and theory filled in between a few iron posts of observation."²¹

²¹ John Wheeler, *Beyond the Black Hole*, 358.

The astrophysicist views (what we call) reality as sculpted and, for the most part, "the construction of the imagination:" a science fictioning then, which supplements observations concerning reality. Wheeler extends this idea by presenting a second diagram, the letter U with an eye perched on one of its arms (Fig. 6).

"The universe viewed as a self-excited circuit—starting small (thin U at upper right), it grows (loop of U) and in time gives rise (upper left) to observer-participancy—which in turn imparts 'tangible' reality to even the earliest days of the universe."²²

²² John Wheeler, *Beyond the Black Hole*, 362.

To complicate matters further, Wheeler raises one more problem by asserting that every law of physics, pushed to the extreme, will be found to be statistical (or a statistical probability) and approximate, and not mathematically perfect and precise. And it seems today, it is still not (yet) possible to pass beyond the horizon of the quantum: the uncertainty principle of quantum physics states that the position and momentum of a particle cannot both be calculated with accuracy.

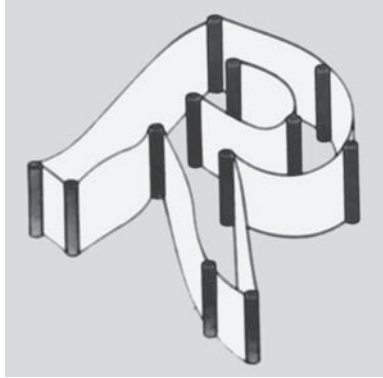


Fig. 5: 'What we call reality' by John Wheeler (1978), 'Beyond the Black Hole', in H. Woolf (Ed.), *Some Strangeness in Proportion: A Centennial Symposium to Celebrate the achievements of Albert Einstein*, (Reading, MA: Addison-Wesley Publishing Co), 358.

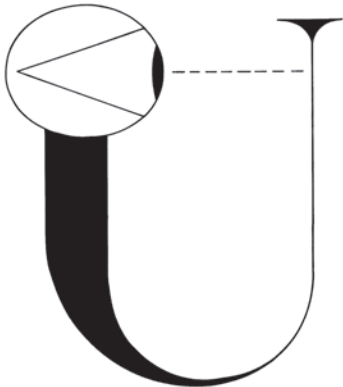


Fig. 6: 'The universe viewed as self-excited circuit' by John Wheeler, 'Beyond the Black Hole', in H. Woolf (ed), *Some Strangeness in Proportion: A Centennial Symposium to Celebrate the achievements of Albert Einstein*, Reading, MA: Addison-Wesley Publishing Co, 1978, 362

blue [blu:]

code for liveness and sensuality of the semi-detached variety, underscores flow, light wave and thinking outside the box, as in 'blue sky' thinking. associated with a certain kind of certainty, melancholy, oceanic knowledge, flight lines.

Once the location of a particle is defined its trajectory cannot be calculated, and vice versa. This is a different but related problem to that of the observer-participant effecting (or producing) reality through registration. It would seem uncertainty results from the quantum itself, which leads Wheeler to ask how to proceed with a law without law. This is a preposterous question, he writes, until he remembers the ‘miracles’ performed by Einstein who—through an imaginary articulation of mathematical calculation—is able to travel at the speed of light. It seems that for Wheeler, the answer to the problem of a ‘law without law’ is to embrace the diagrammatic imaginary of the observer-participant as an important aspect (or art) of science. In this, we find a scientific, disembodied third person perspective given embodiment (or given relation to embodied knowledge) through a marking of agencies, boundaries and limits.

Diagrammatic tensions

While artists may lack the necessary knowledge to interrogate singularities, they can offer insights concerning observation and participation, horizons, vanishing points and embodiment. And it is these insights that might help us further understand the diagrams of scientists such as John Wheeler. The example of Robert Smithson’s mirror displacements is relevant here. In *Yucatan Mirror Displacements 1–9* (1969), nine photographs record 12 mirrors cantilevered in soil or sand or wedged in trees.²³ The photographs capture both the mirrors *in situ* and the mirror’s reflections of an environment, including the surrounding ground from which artist and camera (and viewer) look at the arrangement of mirrors. But the photographs seem to have a blind spot, a vanishing point. The mirrors are carefully placed to produce a reflection—a visual field—in which camera and artist are absent; observer-participants are not captured or seen but registered all the same as invisible agents that produced the photographs. For understandable reasons, scientific diagrams—such as those of black holes—do not tend to reflect upon the position or viewpoint of the observer-participant or producer of a diagram. Firstly, this could produce an infinite regression of viewpoints and secondly, when nature is the subject why dwell on the performance and mediation of an observer-participant—this could be unproductive. But in his *Yucatan Displacements*, Smithson manages to produce

²³ Robert Smithson (1969), *Yucatan Mirror Displacement 1–9*, Nine colour prints from slides each 61 cm × 61 cm at guggenheim-bilbao.eus/en/learn/schools/teachers-guides/yucatan-mirror-displacements-1-9-1969

images of nature and also diagram the contingencies and agencies of media and observer-participant (although, paradoxically, they are not visible). He does so by attending to the displacements (and violence even) of overcoming or eliding human perspective, presence or scale. Smithson makes explicit what is implicit in Wheeler's diagrams by placing third and first, and disembodied and embodied viewpoints in tension. To expand upon this and add further definition to the terms diagram and diagrammatic imaginary, the chapter now turns to the work of Charles Sanders Peirce and François Châtelet, which can be said to produce two different and important diagrammatic orientations. Peirce is interested in how thought is mathematical, and he develops 'existential graphs' or diagrams to facilitate logical thinking and to express better the mathematical thinking of relations.²⁴ It could be said that, in this, thought descends on or sees the world from above, or through a disembodied eye. Châtelet, on the other hand (and referencing Schelling) argues that thought can be "in the morning dew," which is an idea that underpins the philosopher's interest in diagrams that actualise or embody virtual potential and perspectives.²⁵

Logic cuts

Peirce describes a diagrammatic arrangement as a specific kind of sign—as an icon of intelligible relations.²⁶ To grasp this idea, it is important to understand that the philosopher's approach to diagrams relates to his reflections on how humans attend to the world. Peirce suggests that when something catches our attention (which he calls a "first thing" or "firstness") a second thing follows and we notice that other things exist too. In attending to something, such as a city, we become aware of other things (which he calls a "second thing" or "secondness"), such as roads that lead away from the city to other places. Peirce's mathematical thinking on attention does not end with the count of two. He argues that there is a third thing which comes to our notice in this process of attending to first and second things. This is not simply another, counted object or thing. Rather, this third thing (which Peirce names "thirdness") is an inference concerning the relation of firstness and secondness.²⁷ Peirce pursues these relations through diagrammatic compositions he names existential graphs. Designed as an alternative to algebraic writing, the graphs have fixed

²⁴ See Charles Sanders Peirce (1906), "Prolegomena for an Apology for Pragmatism," in *The Monist*, (Oxford: Oxford Academic Press) at TheWealthofNation.com. Peirce explains that in making his graphs he uses paper that has two differently textured sides, one smooth and the other with a tincture. A graph is produced by cutting out a shape that is reversed and placed back in the hole made by the cut.

²⁵ Gilles Châtelet (2000), *Figuring Space: Philosophy, Mathematics and Physics*, translated by R. Shore and M. Zahga, (Dordrecht: Kluwer Academic Publishers), 4.

²⁶ Charles S. Peirce (1991), *Peirce on Signs*, (Chapel Hill: North Carolina Press), 252.

²⁷ Charles S. Peirce (1998), *The Essential Peirce*, (Bloomington: Indiana University Press), 240.

functions and offer insight into how a diagrammatic imaginary is mediated or actualised. Peirce states that a diagram can be produced through using a blank sheet of paper to mark out assertions, the blank page standing in for the universe (or a continuum). By marking or isolating a part of this sheet, something—a first thing—is counted as existing in the universe, which is produced by cutting out a thing from the universe (a diagrammatic imaginary is in full effect here). Peirce offers practical instruction to make graphs: scissors can be used, or a pencil can be applied to draw an unbroken line, to produce an enclosed zone or figure, a first thing (Fig. 7).

Further to this, Peirce suggests a broken or dotted line can be drawn to render shapes within an enclosed figure and mark out the elements or attributes of a first thing (similar to the arrangements of elements in mathematical formula or sets). The relations of first and second figures are inscribed through annotations or marks (signs that Peirce calls “rhemes”) which add information, such as the quality or distinctiveness (or function or specific relation) of diagrammed elements.

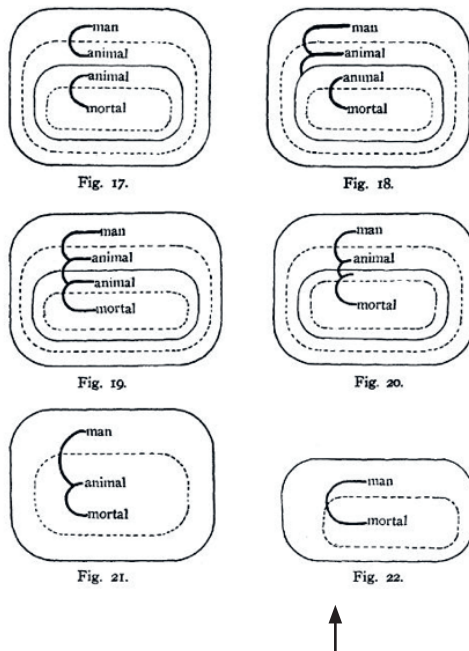


Fig. 7: Example of Existential Graphs by C. S. Peirce (1906), 'Prolegomena for an Apology for Pragmatism,' in *The Monist*, Oxford: Oxford Academic Press at TheWealthofNation.com

These signs include “lines of identity” such as a branch, ligature or network connecting points, and what Peirce calls “selectives” in the form of numerals, words or capital letters, which represent or identify an isolated figure or what Peirce calls a “bound or cut individual variable.” In the example above (Fig. 6), Peirce demonstrates the functions on an existential graph by diagramming the logical proposition that a human is an animal, an animal is mortal and therefore a human is mortal. For Peirce this logic is mediated through (mental and physical) performances which cut and divide a continuum and register shapes with humans and animals. This is a valuable approach but Peirce’s diagrams have limitations and blindspots, which become apparent in contrast with Châtelet’s critical diagrammatology—the latter being, as Kenneth Knoespel describes in his introduction to *Figuring Space*, a “bringing into range of the phenomenological analysis of diagrams and diagrammatic practice in science.”²⁸

Châtelet asserts that diagrams are produced through gestures, for a diagram does not make a secure and lasting connection between things—it does not capture relations—and might be better thought of as a “propulsion, which gathers itself up again in an impulse, of a single gesture that strips a structure bare and awakens in us other gestures.”²⁹ Châtelet, too, understands that diagrams are commonly composed of cut-outs but questions whether it is possible to strip things of their mobility, to cut them out and name them, without leaving a scar? It should not be a surprise that Châtelet finds violence here; after all, Peirce, in naming his diagrammatic gestures as cuts, supplies as good a term as any for defining diagrams.

For Châtelet, the cut-outs of mathematical and abstract figures do not compare well with the life of physical beings, seemingly lacking or dead in comparison. His project, then, is to explore whether physical-mathematical arrangements can be produced which escape the poverty of abstraction. Châtelet suggests that despite Aristotle’s blindness on many matters he finds the Greek philosopher’s equation of motion with potential helpful. This is because a diagram of motion is less the presentation of a passive state and more a knotting of the ‘already’ with a ‘not-yet’. In this, Châtelet’s diagram, as analogue form, can be understood “to inaugurate a family of gestures” that registers virtual or multiple forms, in contrast to rule bound devices (such as

²⁸ Kenneth Knoespel (2000), “Diagrammatic Writing and the Configuration of Space”, in Gilles Châtelet, *Figuring Space*, ix.

²⁹ Gilles Châtelet, *Figuring Space*, 9.

breath [brɛθ]

air inhaled and exhaled in respiration, especially necessary for life where blood is concerned.

¹ camouflage
[ˈkæmɒflɑːʒ]
pattern recogni-
tion with flowing
borders.

³⁰ Gilles Châtelet,
Figuring Space,
18–9.

algorithms and Peirce's existential graphs) which might only produce a repeatable action and thought. Châtelet offers a number of examples of motion as potential. Firstly, he suggests that when ice melts, this is not a process involving, as he states, "ice that 'can' melt, but of ice that is 'really' in the process of melting, water is of course 'potential' in ice, but above all it actualizes itself there. [...] there is in mass something other [...] than extension."³⁰ Another way of putting this is that any mass is elastic, an idea Châtelet adopts from Leibniz. Importantly, for Châtelet, while mass is limited in physical reality (as forces are restricted by inertia), in thought and diagrammatic presentation (or a diagrammatic imaginary) mass can be unfolded or compressed without such limits—a diagram condenses without diminishing complexity or potential for 'amplitude'.

It is important then, that Châtelet argues for devices or modes of presentation which allow for multiplicity and change. He describes key scientific diagrams as "allusive devices staging spatial negativity," and advocates for a spatial dialectic pitched against devices focused solely on extension. This spatial dialectic proceeds from Châtelet's reading of Kant and is opposed to the negative dialectics of Hegel. It is a concept that presents the (fittingly diagrammatic) image of a balancing of different states or spaces. This would be an art of producing a figure which points to potential (multiple) states and relations, engendered by a diagram as dialectical balance, which can become unstable through carrying (in thought) more than ample space or many different or multiple states rather than a synthesis of states. In this, a diagram opens out to several dimensions, to which points surge "like taking sides." What Châtelet is suggesting is that diagramming can gesture towards different and contrasting states, relations and dimensions and temper the violence of logical cuts that endeavour to fix the hierarchies of things and their relations. The diagrammatic imaginaries of Peirce and Châtelet can be said to have different destinations related to the degrees of attention paid to either logical and mathematical or virtual and physical relations—they address different paradigms.

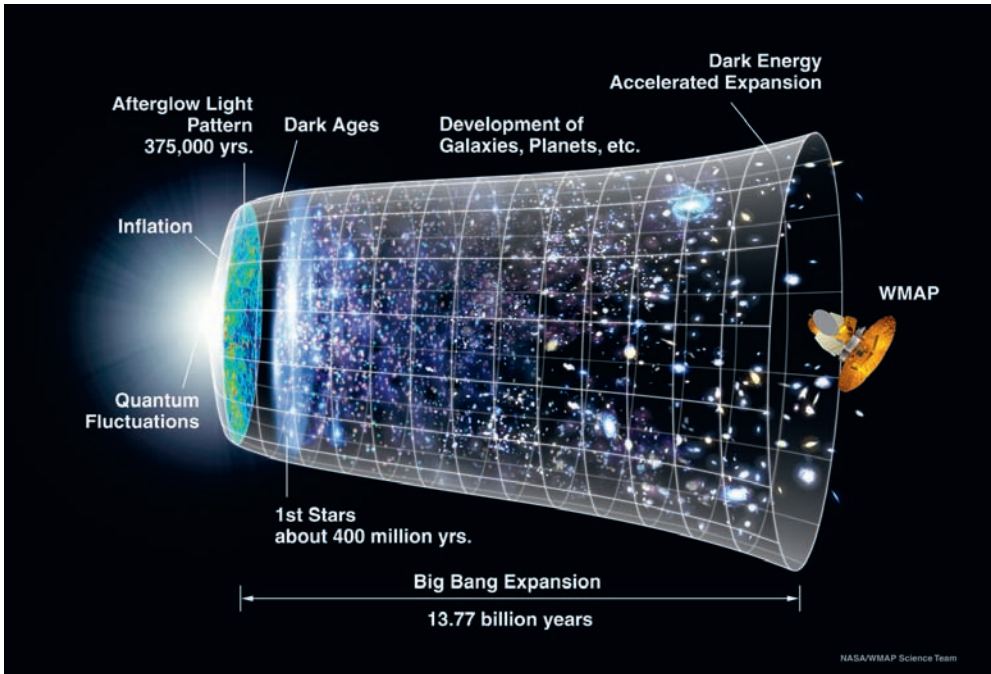
If Peirce's diagrams can be said to focus on inferred relations, Châtelet favours scientific figures concerned with actualisation of the virtual. Both approaches are valuable and reveal each other's limits perhaps, but Châtelet's diagrammatic theories are more reflexive, the

paucity of logical and mathematical cuts is revealed and assuaged through a diagrammatic approach that registers embodiment and potential. Perhaps this is an ethical and aesthetic problem? It matters what mediations diagram universes. We have only to view NASA's *Big Bang Expansion* (Fig. 8) to understand how Châtelet's thoughts on the art of figuring space can offer a more dynamic image of a dynamic universe. While NASA's diagram can be said to present the universe as a cut-out floating in a space (an impossible image, for there is nothing beyond or surrounding our universe), the cone is an elastic figure. This corresponds with what Châtelet's approach advocates, the importance for cut-outs to be elastic, and gesture towards multiplicity and different durations and states.

With a concern for elasticity comes an interest in perspectives and horizons, which for Châtelet are more than spatial or boundary markers, they are where science, art and philosophy meet. Once chosen, perspective points and horizons carry everything—they determine everything. In this, Châtelet is referring to a horizon line or point as a spatial device which not only marks a viewpoint (from which other things are understood) but which also produces a vanishing point beyond which nothing can be 'seen' or known (the horizons of singularities posited by astrophysics would be an example).

Although diagrams with vanishing points are limited by spatial clichés (to draw a horizon is to master space), Châtelet asserts that diagrams deprived of horizons function only as a metric count or a numbering of elements, presenting merely trivial relations. That is, such diagrams are reductive and lack the richness of diagrams which take account of space and time and the potentiality of states and relations (and, it can be added, the position of the observer-participant).

Again, the target is set theory, but if Châtelet considers a diagram without a horizon capable of only presenting a series of units—a difference without real difference (as illustrated in Fig. 9)—he acknowledges that horizons or vanishing points present a challenge. What use is a horizon if it marks a point in time and space beyond which everything is inaccessible? One might think this a problem. Châtelet thinks otherwise and suggests that a horizon point, rather than being a limit, subverts the finite. It is only the limit of a viewpoint (which is an embodied perspective). In this, a horizon point is a deli-



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Fig. 8: The history of the universe by NASA/WMAP at nasa.gov/feature/making-sense-of-the-big-bang-wilkinson-micro-wave-anisotropy-probe

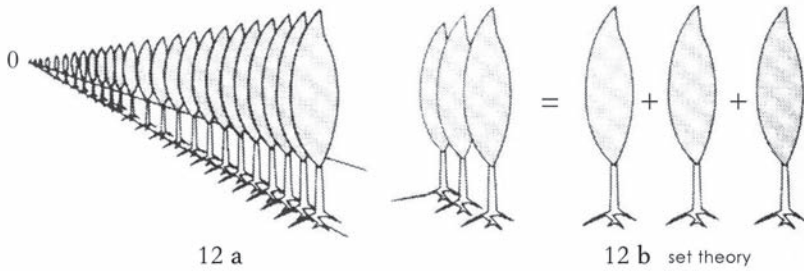


Figure 12 Poplars

↑
Fig. 9: 'Poplars' by Gilles Châtelet (2000), Figuring Space: Philosophy, Mathematics and Physics, (Dordrecht: Kluwer Academic Publishers), 52.

cately balanced (and allusive) device, creating a ‘pact’ between an image (with limitations) and the forces beyond the horizon which can explode the image into multiple dimensions and perspectives. In this, Châtelet suggests something seemingly impossible, which is to place oneself not in space and time of the image but in the blind spot (the horizon point) of an image through “audacious thought experiments” (a bold fictioning), to explore all possible perspectives and formations. Like Wheeler, Châtelet desires to cross horizons, and he is similarly impressed by Einstein perched on a photon at the horizon of velocity—though the scientist was, Châtelet suggests, still captured by the clichés of mechanics. Following Châtelet’s argument never to probe horizons is to have an impoverished outlook and Châtelet advocates for a radical diagrammatic imaginary for the sciences which is at least the equivalent of any science fiction or art practice concerned with the seemingly impossible.

Imaginary time

In leaving firm ground for horizon points, is Châtelet’s diagrammatic, science fictioning wildly unscientific? Some astrophysicists, while insisting on the boundaries of time and space, are not averse to crossing boundaries. In his last book, Stephen Hawking writes of a theory he developed with Jim Hartle, which addresses the problem of producing a unified theory of physics that can address the beginning of our universe.³¹ The problem is well known: classical physics and the theory of relativity engenders an understanding of the relations of gravity, mass and energy in space but this all breaks down at the level of very small measurements or distances (including at the initial stages of the universe following the big bang). Famously, as Wheeler stated, at the quantum level there is uncertainty and all calculations of probability are approximate and not precise. Hawking notes that some scientists are trying to address the problem of a unified theory of physics by combining Einstein’s ideas with Richard Feynman’s theory proposing that the universe has multiple histories, which is Feynman’s response to the uncertainty of events at the quantum level. But this does not help Hawking in his work addressing how the universe came into being. The universe may be approached as having multiple histories, but this does not counter the idea that the

³¹ Stephen Hawking (2018), *Some Brief Answers to The Big Questions*, (John Murray: London).

capital [ˈkæpɪt]

in an all too raw mytho-poetic, capital is not dissimilar to the game of ‘hot potato’—except that what is passed from pillar to post, is meant to accumulate ‘value’ and therewith able to be passed (sold) ever onward, extracting profit in the circulation of exchange. in 1927 russian filmmaker sergei eisenstein planned to make a film based on marx’s theory and the notion of capital that should function as a visual instruction in the dialectical method. the film however was never financed.

beginning of the universe is a single or singular event, which Hawking identifies as “a boundary in time.” Feynman’s theory does not illuminate this boundary or shed light on what Hawking calls the “boundary conditions” of the universe, which a scientist may need to know to address the early moments of the cosmos. Hawking laments that if we cannot see the boundary conditions from a point beyond that boundary, our perspective on any event is itself limited. But then Hawking suggests something unexpected, crafty even, “[...]f the frontier of the universe was just at a normal point in space and time, we could go past it and claim the territory beyond as part of the universe.”³² This diagrammatic re-plotting or re-imagining of the big bang as a “normal point” engenders multiple perspectives of the big bang, from points after and before the event, the latter perspective being impossible as there was no space and time before the big bang (which Hawking assures us is the case).

³² Stephen Hawking, *Some Brief Answers*, 55.

What is of interest here is not whether Hawking’s and Hartle’s “no-boundary proposal” gets us closer to understanding the big bang. Rather, the focus here is on a diagrammatic imaginary that takes us beyond a limit or boundary point to occupy a blind spot and open up new perspectives that seem in accord with Châtelet’s call to explode horizons. Hawking, while acknowledging the contradictions of this performance, recruits the concept of “imaginary time” for this venture, which he notes has nothing to do with “real time”; rather, this imaginary time is a “mathematical trick to make the calculations work.” An objection could be raised that Hawking and Hartle engage in mathematical fictions that may add up but cannot be tested empirically.

This is a criticism that some, like physicist Lee Smollin, level at many theories that do not produce verifiable models.³³ Smollin crusades against a concept shared by many physicists, including Einstein, that time is an illusion, arguing that time and physical laws are natural and evolutionary attributes of our universe and that physics needs to address “the reality of time.” In diagramming pre-singularity spaces and times, Hawking’s and Hartle’s proposal, would seem quite a subversive undermining of the reality of time given the insights this might provide. Here an analogy between the sciences and art is useful.

³³ Lee Smollin (2013), *Time Reborn*, (London: Penguin Books Ltd), 130–4.

Samuel Delany, in *Silent Interviews*, explains how alternative models of reality, as found in the paraspaces of science fiction, are subversive and transformative. In this, paraspaces can be likened to Châtelet's allusive devices of science:

“[W]e have to note that our paraspaces are not in a hierarchical relation—at least not in a simple and easy hierarchical relation—to the narrative's ‘real’, or ordinary, space. What goes on in one subverts the other; what goes on in the other subverts the one. An alternative space is a place where we actually endure, observe, learn, and change—and sometimes die. With these paraspaces the plot is shaped, as it were, to them. And inside them, the language itself undergoes changes [...] is always rotated, is always aspiring toward the lyric.”³⁴

There it is, spelled out

Displacement, dislocation and transformation are the by-products of marking and surpassing limit points, which is where the diagrammatic imaginaries articulating scientific devices and the paraspaces of science fiction converge. The value of this for both practices are the same: perspectives can be revolved, expanded, extended and interchanged and blind spots can be illuminated. It may be that the sciences keep one foot firmly on solid ground and go further in their forays across horizons. However, artists more often than scientists may knowingly present darkened and distorted imaginaries that reflect or produce an awareness of the gaze of the observer-participant (Delany offers the image of science fiction as ‘mirror-shades’).³⁵ The significance of this, particularly in relation to an increasing proliferation of digital imagery and numerical modelisations, seems important for recognising desires for mastery, high-resolution capture and the colonising of space. This chapter concludes with a discussion of this problem, which addresses whether (diagrammatically speaking) perspective has a future or not?

Flatlands, multiverses and scientific-hollywood diagrammatic imaginaries

In addressing astrophysicist's use of digital media, it is productive here to return to Latour's writing on the sciences and his ideas concerning tools that function as “intermediaries,” as vehicles that

³⁴ Samuel Delaney, *The Silent Interviews*, 168.

³⁵ *Ibid*, 171–72.

camp [kæmp]

something that provides sophisticated, knowing amusement by virtue of its being mannered or stylised, self-consciously artificial and extravagant, or teasingly ingenuous and sentimental. can include interesting wigs, stiletto heels, and glitter. in its obscene usage: a diseased, toxic place where humans are de-humanised, savaged, made to suffer, and put to work/ put to death, in the most heinous ways possible. cruelty as law.

³⁶ Bruno Latour, *We Have Never Been Modern*, 77–8.

convey information, and those he views as “mediators.” In naming a device as a mediator, Latour identifies a process which “creates what it translates as well as the entities between which it plays the mediating roles.”³⁶ It is important then to differentiate between intermediaries and mediators. An example belonging to the group of devices Latour names intermediaries is the *Laser Interferometer Gravity Wave Observatory* (LIGO), which registers colliding black holes and indexes gravity waves through an arrangement of mirrors and lasers (which would surely have interested Smithson). To process and present information gathered by LIGO, scientists use animated, digitised diagrams or numerical models, which are examples of mediators, which translate information into moving icons of intelligible relations. The intention here is not to question the veracity of numerical models but to ask how, if at all, they mark perspectives and horizons. A related question is whether digital modelisations register, in any way, the perspective of the observer participant (like a reflection in mirror-glasses) but reflection fades when a screen, presenting a digital model, would seem to be its own world. This is not the protestations of Luddite. It is an exploration of the difference mediators can make. It should be acknowledged that for astrophysicist Kip Thorne, numerical modelisations—computer programmes producing simulations—count as one of the most important developments for astrophysics in recent years. The diagrammatic animation of two black holes colliding (Fig. 10), the event which a LIGO registers, is an example of a simulation Thorne uses in lectures about his work.³⁷ Thorne’s computer simulated singularities differ from Wheeler’s image of a black hole without hair in significant ways. It is not just that Thorne’s animation lacks the humour or lyricism of Wheeler’s diagrammatic imagery. In Thorne’s simulation, collapsing stars are given a positive presence or shape, the singularities are not exactly black holes (for the obvious reason of producing lessons concerning the cosmos). Thorne’s simulation looks like an animated, cosmic existential graph, which Pierce might have been proud of, though there is no denying that in this presentation of singularity collision, collapsing stars are created as elastic. It would be nostalgic to worry over the demise of the lyrical or analogue graph.

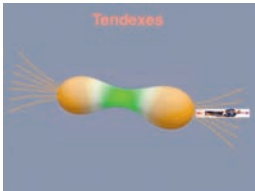


Fig. 10: Still from an animation of two black holes colliding by Kip S Thorne and SXS Collaboration

³⁷ Kip Thorne (2012), *Interview* at space.com/17086-bizarre-black-holes-kip-thorne-interview.html

And surely, Thorne and his colleagues have an understanding of singularities that can only be gained from computer simulations. It is important to recognise too that Thorne is a theoretical physicist who suggests, in public lectures, that the viewpoint which gazes upon his animated figures is from a higher bulk brane dimension—the hyperspace which some theoretical physicists suggest our universe is moving through.

This is a compelling idea. In his popular book, *The Science of Interstellar*, Thorne explains this concept through reference to a famous fiction, *Flatland* by Edwin Abbott, about a two-dimensional world visited by a three-dimensional being from Spaceland.³⁸

The protagonist of the novel, a square, cannot see the bulk of the three-dimensional sphere, only a slice of the being is visible as it passes through the square's two-dimensional universe. But after being lifted up by the sphere and seeing his two-dimensional world from the perspective of Spaceland, the square reasons that there could be many more dimensions than three. In relation to the example of *Flatland*, Thorne asks:

“Suppose that our universe, with its three space and one time dimensions, really does live in a five-dimensional bulk (four space and one time). And suppose there are ‘hyperspherical beings’ who live in the bulk [...]. The bulk being’s surface would have three dimensions and its interior would have four. Suppose that this hyperspherical bulk being, traveling in the bulk’s out direction or back direction, were to pass through our brane. What would we see? The obvious guess is correct. We would see spherical cross-sections of the hypersphere.”³⁹

A question follows: what does the hyperspherical being see of our world. Answer: everything, without limits, just like the sphere’s view of *Flatland*. Does this mean Thorne’s hyperspace beings have no blind spots, which is a question concerning an imaginary and unbridled agency with mastery over nature (which perhaps tempts all sciences)? It is perhaps hard to see what is at stake here.

This question can be turned on its head if we return to Châtelet’s figuring space and ask again: what is lacking in a diagrammatics without perspectives or negative space? If we address the importance of these formal and embodied aspects of images for modern and contemporary art (also transformed in some practices by digital media) we find examples that may help us understand the challenge

³⁸ Kip Thorne (2014), *The Science of Interstellar*, (New York: W.W. Norton & Co). Cf Edward Abbott (1992 [1884]), *Flatland: A Romance of Many Dimensions*, (New York: Dover Thrift).

³⁹ Thorne, *The Science of Interstellar*, 9–10.

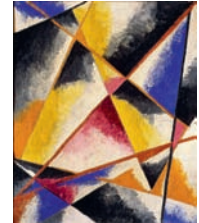


Fig. 11: Untitled, Lyubov Popova 1916

care [keə]

giving a damn, or two.

presented by new digital-hyperspace hybrids, only from the paradigm of aesthetics. The term ‘negative space’ in art relates to abstract shapes made when drawing positive figures in a composition. These negative shapes (gaps, holes, voids) are said to exist between positive shapes which in flat, drawn and painted images can easily be inverted (in the act of looking and in the mind) to become positives, creating ambiguity and a multiplicity of forms. In this act, the agency of the observer and role of media becomes apparent (to the observer). Perhaps the best example of such an approach is found in the architectonic works of Lyubov Popova (1889–1924).⁴⁰ Her abstract paintings present shapes which appear as both solids and voids, their relation fixed only (in the mind) at the point of registration, like particles in quantum superposition theory (Fig. 11).

⁴⁰ Cf moma.org/artists/4694



Over a hundred years have passed since Popova’s negative spatial dialectics enabled viewers of paintings to realize they are observers and participants but an interest in voids, negative spaces and reflexivity can be found in the digital presentations of artists working today, an example being *Defining Holes* (2012) by Ed Atkins and Patrick Ward, which comprises of a number of analogue clips and digital simulations of holes, gaps and spaces (Fig. 12). But for Atkins and Ward, it seems that the digital elides indexicality or perspective, and presents a very different kind of negative space. To accompany the screening of the film, the artists issued a joint statement which could be read as a warning to all who produce digital simulations:

“A hole is a parasite from the void [...] negatively charged paradoxes whose nominal existence disguises an essential un-being [...] Within the (analogue) moving image, holes define the presence of the medium. Those dividing lines that lie abyssal between every discrete frame [...] are] traversed via an illusionary bridge: the persistence of vision. This impression of movement is an analgesic of ideological potential [...] Digital video is something else. The appearance of movement is no longer predicated on the recurrence of absence (digital video is not indexical) [...] there is no movement because there is no matter. The digital is entirely hole, bordered and defined by its own dreamed-of, vacated representations.⁴¹”

↑
Fig. 12: Still from
Defining Holes by Ed
Atkins and Patrick Ward
(2012).

⁴¹ Ed Atkins and Patrick Ward (2012), *Defining Holes*, (Ljubljana: Mestna Galerija).

This cryptic statement needs unpacking: analogue presentations are indexical. In Atkins and Ward's example a hole is captured by celluloid film with its sprocket holes and horizontal bars dividing each frame; a presentation of moving frames faster than they eye can sense, engendering the projection of an absent hole, creating an illusion of presence and movement or space and time. The moving image of a hole that is digitally rendered or simulated may have frames of a kind, but a hole presented in digital animation or film has never physically existed and, therefore, there is nothing indexed or absent in this presentation. Atkins and Ward suggest digital video is itself a hole in which matter is not present, even as indexical trace, the implication being that the digital can create semblances without substance. What to make of Atkins and Wards statement? Despite the negative overtones of their commentary, the most productive approach is perhaps to acknowledge the advent of the digital marks a departure for image-making practices and for diagrammatic imaginaries. Combining the representational power of digital or numerical modelisation with an imaginary diagrammatics of hyperspace is a new challenge—the potential of a digital hole in which a universe can be simulated.

It would be a strange discussion of the diagrammatic imaginary that rejected diagrams and models for appearing to much like vivid dreams. And it would be a little ridiculous to suggest Kip Thorne and other scientists mistake digital images for real things—they no doubt know the difference (and what the 'real thing' is when addressing mathematical simulations might be a more complex question than it would first seem). Something nags here though. There still seems to be a blind spot. Thorne's hyperspace-beings live in a paraspace that subverts models of reality that engage with limit points in time and space—for hyperspace beings see all without limit through an inhuman, disembodied gaze—but this new hyperspace subject is produced through an art of creating semblances that sneaks a human perspective into the bulk brane dimension: a kind of Hollywood effect. Thorne famously contributed to the film *Interstellar* (2014) as a consultant, and the scientist expressed his excitement that his calculations were used to make digital animations of black holes for the film: "For me, those film clips are like experimental data: they reveal things I never could have figured out on my own."⁴²

⁴² Thorne, *The Science of Interstellar*, 98.

Thorne's contribution to the film was significant, not least in his speculations and computations concerning the fifth dimension, a concept necessary for the film's narrative development and star (non-human) actor, the tesseract. This device, which in the film's narrative is made by humans in the future, is a five-dimensional object which allows a human (a character called Cooper) to see across time and space. It is the tesseract which allows a father to send messages across space and time to his daughter. The science of *Interstellar* is correct (Thorne made sure of this), even if the film is overlaid with questionable moral and romantic themes. The tesseract, which is digitally constructed for the film, can be seen in some sense as a paraspace that answers Châtelet's call to explode horizons and vanishing points, though the results might be unexpected. It is a paraspace that engenders an omnipotent gaze that surpasses embodied perspective. What is marked here? In the logics of a diagrammatic imaginary of hyperspace, there a trade-off between know-how and knowing and a time for reflection. But then the idea that time—the time of reflection, critical or otherwise—is necessary for understanding the universe is not an idea held by everyone. After all, as discussed above, for many astrophysicists, time is an illusion.

cephalopod [ˈsefələˌpɒd]

literally meaning 'head-feet' with their deeply mesmerising horizontal pupil-eye intelligently taking in their surroundings in one fell swoop. our evolutionary distant (very distant) cousin, has a wisdom-like curiosity that extends into each of its eight armpit-genital-leg-suckered knowledge spheres. on average a 2 year life-span (even for the largest of them). one has to wonder whether in their unfathomable intelligence and the pace at which they learn, that, like their alien human cousin, one million years+ removed, they somehow know that at some point they will die.

**Artificial Grief:
Distribution of the Sensuous**

Anna Nazo
London, UK



Anna Nazo is a London-based performance artist whose practice engages computing technologies, philosophy and science. She works with AI, drones, neurotechnology, CGI and 360-degree imaging. Within live digital-analogue audiovisual performance Anna's work investigates questions of intelligence, diversity and ethics of the technological. It looks at artificial forms of intelligence and liveness in relation to nonconscious cognition, quantum reality and distributed forms of sensuousness. Anna is a PhD Candidate and Tutor in Fine Art (Performance and Technology) at the Royal College of Art.

transplanted algorithm

fluidity sip

ionised nitrogen

eerie touch

blind helium fusion heatwave

whirling corruption

civil twilight

plasmoid ecology

pale-green fractal silt

glistering silver

dismal spectral dreams

radioactive purple lymph

radical otherness

quantum swerve

haunting virtual fear

deafening whisper of burned flesh

palpating goosebumps

needles through sharp longitudes

blue soiled gravity shoot

inhabiting virtual flux

granular blood

pulsating rift

data blizzard

chemical rhizomatic shift

phasing siloxane penetrating rhythm

bleeding crystallised nodes

alkaline digital greed

dissolving sympoietic difference¹

¹ Spoken word excerpt from Anna Nazo (2019), *Devia*, invited artist at the *ArtFutura Festival*, (London: Iklectik Art Lab), a performance with

drones, AI, brain wave imaging, 15' at cargocollective.com/annanazo/Devia. Poetics/ The spoken word in this performance

was co-written with AI programming. The initial code for AI was written by Sung Kim, *Multi-layer Recurrent Neural Networks (LSTM,*

RNN) for word-level language models in Python using TensorFlow, at github.com/hunkim/word-rnn-tensorflow

Artificial Grief uses the paradigm of radical matter to inhabit dimensionalities of curved time.² Leading onto questions of super-positionality and nonlocality, it brings to presence a way of thinking time as both a dimension (velocity, mass, ‘curved’) and as a wave (field, plane).³ In so doing, it makes accessible ‘duration’ as sensuous, poetic, grasped at the very moment of performance in relation to the wave function. This approach enables a sense of the logic (or a sense of ‘game’ in the Lyotardian sense) of time disruption dimensionalities of curved time, including questions of super-positionality and nonlocality.⁴ To dive into that curvature, it takes, as a starting point the ephemeral and the sensuous as the ‘ana-materiality’ of time, that is as dimension and as a thinking of reality as a wave field.⁵ It leads to an understanding of duration and the moment of performance in relation to the quantum wavefunction. In so doing, it enables one to grasp a sense of time disruption as a kind of ‘gaming’, one that happens at the moment of performance.⁶ Artificial, artifice and ‘the real’ no longer stand in opposition to each other.

² The conceptual paradigm for *radical matter* was initially developed by Johnny Golding (2006) as a way to shift from metaphysics and dialectical reasoning to that of a *zetaphysics*, based on quantum logics of sense, time, and dimension. See: S. Golding (2006), “*The Assassination of Time (or the Birth of Zetaphysics)*,” On the Occasion of *The Digital Art Weeks*, at ETH, reworked with musical composition by S. Kennedy in Berlin, New York, Wisconsin and LA, and recorded as an album release 2010 at from-darkenedsunroof.bandcamp.com/album/sue-golding-johnny-de-philos-the-assassination-of-time

³ An accessible introduction to quantum mechanics including understanding of time as a dimension and reality as a wave field, see Jim Al-Khalili (2003), *Quantum: A Guide For The Perplexed* (London: Weidenfeld and Nicolson).

⁴ Jean-François Lyotard and Jean-Loup Thébaud (1990 [1985]), *Just Gaming*, translated by Wlad Godzich, (Minnesota: University of Minnesota Press). See also Gilles Deleuze (2015 [1990]), *Logic of Sense*, translated by C.V. Boundas, (London: Bloomsbury).

⁵ This point will be developed further below but see Johnny Golding (2013), “*Ana-Materialism and The Pineal Eye: Becoming Mouth-*

Breast (Visual Arts in the Age of Algorithmic Reproduction),” in Lanfranco Aceti and Özden Şahi (Eds.), *Without Sin: Freedom and Taboo*

in *Digital Media*, (Cambridge, MA: MIT: Leonardo Electronic Almanac), vol 19, no 4, 66–83.

⁶ Suffice to mention here regarding time disruption happening at the moment of performance or within the system of performance is developed in parallel with the notion of time disruption

that is happening in the system of black hole ‘existence.’ It is developed in relation to the ecology of intensities and energies created by and within both types of system. In

particular, it looks at the slowing of time closer to the ‘centre’ of the hole, a body of intensity, in comparison with the flow of time farther from it. Cf Stephen Hawking (2015 [1988]), *A Brief History of*

Time, (New York: Bantam); and Stephen Hawking (2015), *Black Holes: The BBC Reith Lectures*, (London: Penguin Books).

In this sense, too, the sensuous-emotional also comes to presence in the duration of the live performance. It does this through a corporeal trace as a nonconscious cognitive flux which operates as a feedback loop system, a quantum system that is undecidable.⁷ In parallel, it assumes a way of looking at live performance as a complex symbiotic system.⁸

clitoris [ˈklɪtərɪs]

the gorgeous sexual organ of the vulva is, for reasons unclear, more often than not the target of hatred and unfathomable cruelty in the form of female genital mutilation, chastity belts, wars, and idiotic laws against the right to one's humanity. do not die wondering what this has to do with data loam. it is the very core of associated coherence, collaboration, belonging and just wanting 'to be' (alone-together).

⁸ For complex systems see Isabelle Stengers and Ilya Prigogine (1984), *Order Out of Chaos: Man's New Dialogue with Nature*, (Toronto: Bantam Books). Also see Stuart Kauffman (1993), *The Origins of Order: Self-Organization and Selection in Evolution*, (Oxford: Oxford University Press); and also, Paul Cilliers (1998), *Complexity and Postmodernism: Understanding Complex Systems*, (London: Routledge).

⁷ Nonconscious cognition is based on N. Katherine Hayles's reworking of the concept originally established by Lewicki, Hill, and Czyzewska in 1992. See N. Katherine Hayles (2017), *Unthought: The Power of the Cognitive Nonconscious*, (Chicago: The University of Chicago Press), 51ff. In my work, the development of a 'nonconscious cognition' will lead to the notion of 'quantum ghosting', where nonconscious cognition enables (and indeed 'is')

a certain type of intelligence. This type of intelligence is defined in relation to information processing, and enables radical forms of liveness. For the 'undecidable' see the groundbreaking work by Kurt Gödel (1992 [1931]), *On Formally Undecidable Propositions of Principia Mathematica and Related Systems*, (Mineola NY: Dover). Undecidability has been further developed in my PhD in relation to Mandelbrot's well known feedback loop: $z = z^2 + c$

See Benoît Mandelbrot (2004), *Fractals and Chaos*, (New York: Springer). Cf Benoît Mandelbrot (1983), *The Fractal Geometry of Nature*, (New York: W. H. Freeman). See also Michio Kaku (2014), *The future of The Mind*, (London: Penguin Books). My development of image as a corporeal trace is based on Baruch Spinoza (2002 [1677]), "'Ethics,' in Complete Works," Michael L. Morgan (Ed.), translated by Samuel Shirley, (Indianapolis:

Hackett Publishing), 213–383. See also Gilles Deleuze (1988 [1970]), *Spinoza: Practical Philosophy*, (San Francisco: City Lights Books). My development of 'quantum consciousness' as linked to formally undecidable propositions is based on Roger Penrose (1994), *Shadows of the Mind: A Search for the Missing Science of Consciousness* (Oxford: Oxford University Press).



Anna Nazo. Granular Silt. Performance for CARPA6: The 6th Colloquium on Artistic Research in Performing Arts 2019. Invited artist. Hosted by the Performing Arts Research Centre Tutke at the Theatre Academy of the University of the Arts Helsinki, Kiasma Theatre, The Museum of Contemporary Art Kiasma, Helsinki, Finland, 29 August 2019, 0.45'.



⁹ For a 'distributed ecology of intelligence' see Murray Shanahan (2015), *The Technological Singularity*, (Cambridge: The MIT Press). The concept of 'sympoietic' is developed in Donna Haraway (2016), *Staying with the Trouble: Making Kin in the Chthulucene*, (Durham: Duke University Press), 31–33 and 70–71. For an earlier development of poetics as related to techne-logical 'surface' see Johnny Golding (2010), "Fractal Philosophy, Trembling The Plane of Immanence and the small matter of Learning How to Listen: Attunement as the Task of Art," in Stephen Zepke and Simon O'Sullivan (Eds.), *Deleuze and Contemporary Art*, (Edinburgh: Edinburgh University Press), 133–54.

¹² The notion of cognitive kinetic flux and consciousness in relation to metrics has been developed in a dialogue with Hayles's *Unthought: The Power of the Cognitive Nonconscious*. See also: Michel Foucault (2014 [1979–80]), *On the Government of the Living: Course at the Collège de France*, translated by Graham Burchell, (London: Palgrave-Macmillan). Also of importance: Penrose, *Shadows of the Mind*.

This point leads to the ethical-as-aesthetic and aesthetic-as-ethical questions around relationships that happen at the moment of performance. It brings in sympoietic relations that operate as a nonconscious cognitive network, a form of a sensuous ecology that enables distribution of intelligence.⁹

This move enables one to rethink a logic of sense from the perspective of quantum entanglement. Further, it provides a systematic (albeit undecidably systematic) way to look at intelligence and liveness at the moment of performance through the notions of complexity and symbiosis, and in relation to nonconscious cognition.¹⁰ In shapeshifting the sensuous into an open form of motion as a quantum relation, importantly, too, it suggests a radical and ethical rethink of the notion of *Geist* in relation to nonconscious cognitive kinetic flux.¹¹ This relation is plural and operates as a form of cognition that is enabled by the entanglement of wave fields at the moment of performance. It goes beyond the human perceptive abilities and beyond human consciousness, which in itself operates as a flattened metric of quantum reality.¹²

¹⁰ For logic of sense see Deleuze, *Logic of sense*. My development of wave function and quantum entanglement, is primarily based on the work of Max Born, and in particular, his interpretation of the Schrodinger equation where the wavefunction connects to the probability densities of the state of a quantum system (for example $|\psi(x)|^2$). See Max Born (1926), "On the quantum mechanics of

collision processes," translated by D. H. Delphenich, *Zeitschrift für Physik*, vol 37, (Heidelberg/Berlin: Springer), 863–867 at neo-classical-physics.info See also Max Born (1964 [1954]), "The statistical interpretation of quantum mechanics (Nobel Lecture 11 December 1954)," in *Nobel Lectures: Physics: 1942–62*, (Amsterdam: Elsevier) at nobelprize.org/uploads/2018/06/born-lecture.pdf

For Schrodinger's Cat experiment and the initial Schrodinger equation describing the wave, see Erwin Schrödinger (2014 [1926]), in *Collected Papers on Wave Mechanics*, (Providence: AMS Chelsea Publishing). Of importance here also: Roger Penrose (1991 [1989]), *The Emperor's New Mind: Concerning Computers, Minds, and the Laws of Physics*, (London: Penguin Books), 290–93.

¹¹ Initial development of *Geist* is from G.W.F Hegel (1991 [1830]), *The Encyclopaedia Logic: Part I of the Encyclopaedia of the Philosophical Sciences with the Zusätze*, translated by T. F. Geraets, W. A. Suchting, and H. S. Harris, (Indianapolis: Hackett Publishing Company), 340. Further develop-

ment relies on the work of Martin Heidegger, *Identity and Difference* (1969 [1957]), translated by Joan Stambaugh, (New York: Harper and Row); and his *Being and Time* (1996 [1927]), (New York: SUNY Press). It has been reassessed in light of Derrida's development in Jacques Derrida (1994),

Specters of Marx: The State of the Debt, the Work of Mourning and the New International, translated by Peggy Kamuf, (New York: Routledge). Cf John Mowitt (2015), *Sounds: The Ambient Humanities*, (Oakland: University of California Press), 80–4 and 145; Mark Fisher (2014), *Ghosts of My Life:*

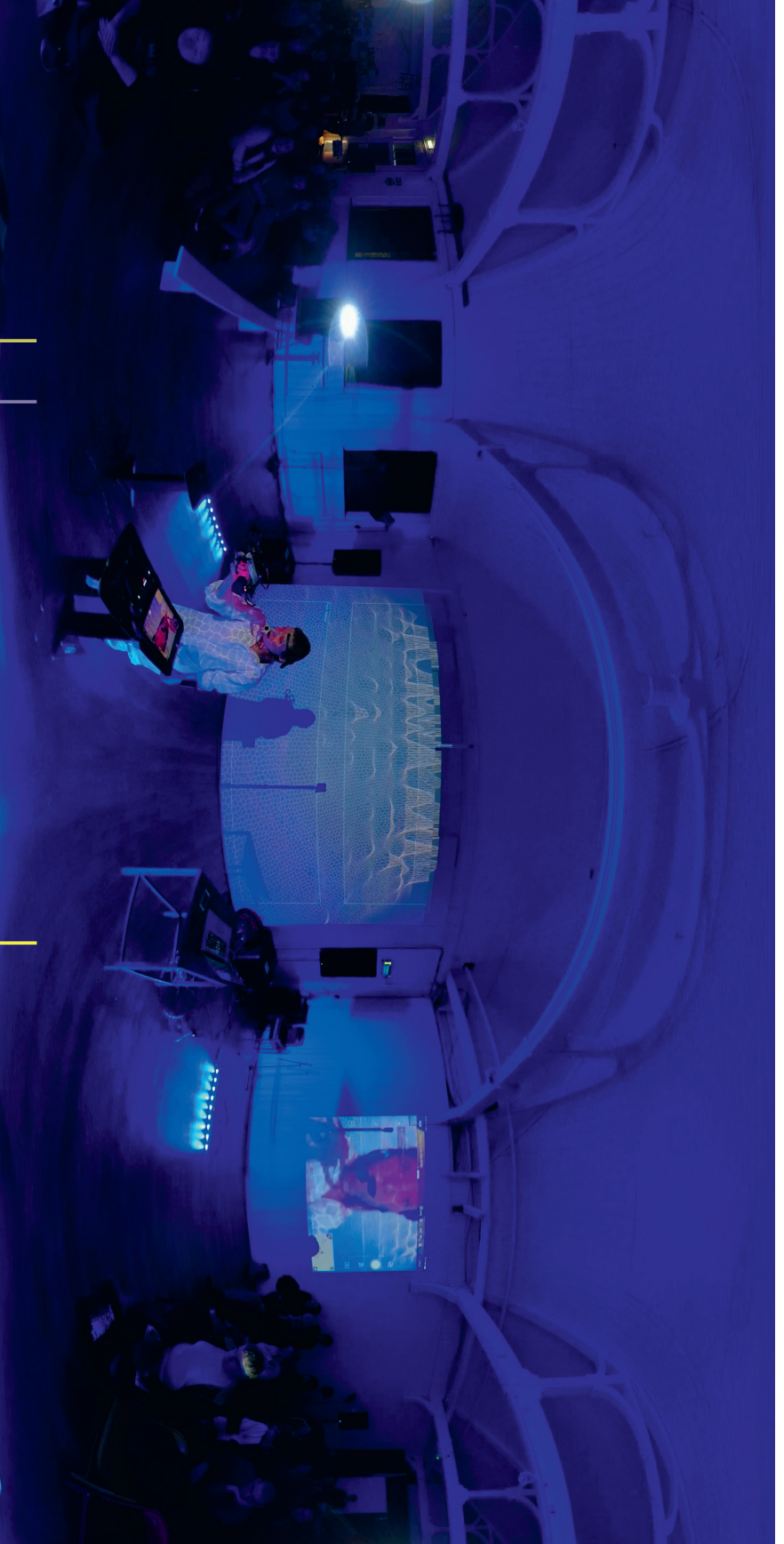
Writings on Depression, Hauntology and Lost Futures, (Winchester: Zero books); and Karen Barad (2007), *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, (Durham and London: Duke University Press).

This form of relation, neologised as 'quantum *geist-ing*', is in a constant motion that has a discrete aspect to it. As the research will develop, this 'quantum *geist-ing*' requires plurality and diversity of forms of intelligence and liveness as a condition for a complex symbiotic system in order to establish a distributed form of sensuousness. This distributed form of sensuousness goes beyond the human sensuous and, simultaneously, it goes beyond the sensuous of all symbionts of the system individually. This multiple form of sensuousness is what my work names as the supra-sensuousness.



Anna Nazo. *Devia*. Performance for ArtFutura 2019 Festival, Iklectik Art Lab, London, UK. 1 December 2019, 0.15'. Image by Pau Ros.

Anna Nazo, Devia. Performance for ArtFutura 2019 Festival, Ilectik ArtLab, London, UK, 1st December 2019, 0:15'



To put this slightly differently, supra-sensuousness merges with non-conscious cognitive flux and, in so doing, re-thinks 'human' as always already a plural self, a multiple-singularity, an ecology of selves, or as Margulis would say, a holobiont; that is a morphogenic system of human cells, virome, microbiome, and etcetera.¹³ Through live performance, it extends this notion further, beyond the organic, in the form of an AI-drone-human holobiont. This move enables an initial articulation of a philosophy and ethics, one that focusses on artificial or ana-radical forms of intelligence and liveness. This allows an engagement with the notion of a live digital-analogue performance in the context of quantum reality.¹⁴ It enables one to create an entirely different sense of matter and ecology in a performance work, contemporary art and actual reality. It engages with a differently poetic-as-technological and technological-as-poetic form of performance.¹⁵

constant ride [ˈkɒnstənt raɪd]

a special way to film with a camera mounted on a moving vehicle which is coupled with a speedometer. the faster the ride becomes, the more pictures are taken. at a certain speed everything seems normal, but if the speed increases, time stretching occurs. and if the speed is decreasing, it time becomes warped. when the vehicle is completely stationary, no pictures are taken at all. the result of this recording is a completely even ride without acceleration or deceleration, a dreamlike, never-ending and weightless floating through space and time.

¹⁴ The ana-radical is developed through notions of radical matter and ana-materialism in Golding, *Fractal Philosophy*, and her *Ana-Materialism and The Pineal Eye*.

¹³ For ecology of selves see Eduardo Kohn (2013), *How Forests Think: Toward an Anthropology Beyond the Human*, (Berkeley: University of California Press). For the notion of holobiont see Lynn Margulis (2017 [1991]), *Symbiosis as a Source of Evolutionary Innovation: Speciation and Morphogenesis*, (Cambridge: MIT Press).

¹⁵ The argument developed here relies on Heidegger's relation between poetic and technological. Cf Martin Heidegger (2001), *Poetry, Language, Thought*, (New York: Harper Perennial); and Golding, *Ana-Materialism and The Pineal Eye*.





This form of performance, one could say, is operating as a set of queer relationships with the digital: the eerie platform of the artificial, the real, and the embodied.¹⁶ It is a queering of the digital and its analogue symbionts. It operates on spoken word poetry that is co-written with AI (HumInt-AI psychological-sensuous feedback loops), drone performance, and brainwave performance.¹⁷ It brings in an understanding of AI poetry and artificial intelligence in relation to sensuous literality and the language of translation.¹⁸

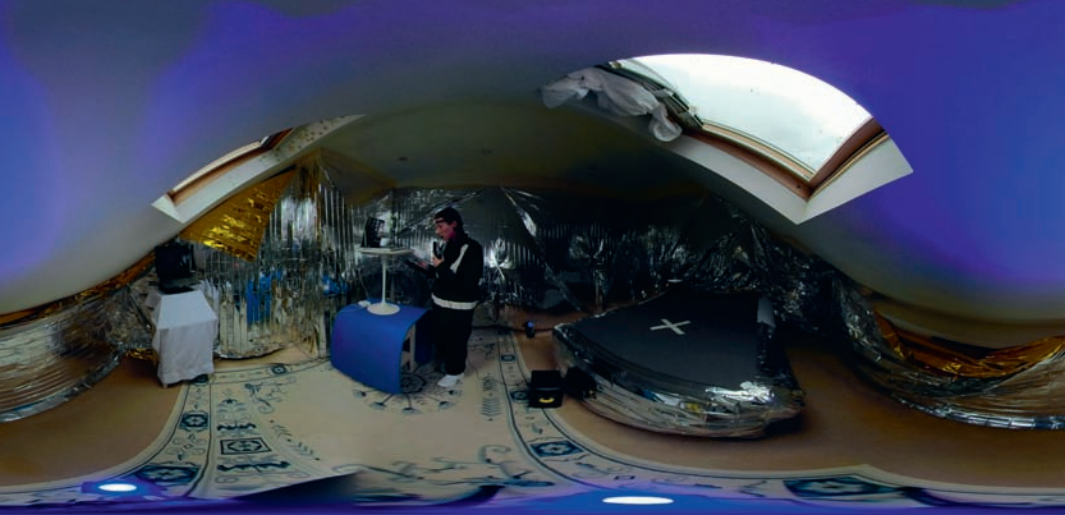
¹⁸ Sensuous literality and the language of translation in relation to AI has been inspired by the groundbreaking work of Walter Benjamin. See in particular Benjamin (2002 [1921]), “*The Task of the Translator*,” in Marcus Bullock and Michael W. Jennings, (Eds.), *Selected Writings of Walter Benjamin, Volume I, 1913–1926*, (Cambridge, MA: Harvard), 253–64. See also Trevor Paglen (2019): “*From Apple to Anomaly*,” transcribed from Trevor Paglen in conversation with Anthony Downey, (London: Barbican) at sites.barbican.org.uk/trevorpaglen/

¹⁷ As mentioned the initial code for the AI was written by Sung Kim at github.com/hunkim/word-rnn-tensorflow
This initial code was modified in order to work with drones using DJI Spark at sparkldrones.com/index.html, nickname: Luna. The brainwave CGI is generated through software that was created in collaboration with Vincent Rebers (2016) (programming) and updated in 2019. The *NeuroSky MindWave EEG headset* is used to collect raw EEG data.

¹⁶ The notion of queer, queer-ness and queer sensuousness is developed in a dialogue with works by Jack Halberstam, Amber Jamilla Musser, Renate Lorenz, and artworks by Victoria Sin, Boychild, Wu Tsang, and Derek Jarman. See Jack Halberstam (2011), *The Queer Art of Failure*, (Durham/London: Duke University); and Jack Halberstam (2018), *Female Masculinity*, (Durham/London: Duke University), 199; Amber Jamilla Musser (2018), *Sensual Excess: Queer Femininity and Brown Jouissance*, (New York: New York University); and Renate Lorenz (2012), *Queer Art: A Freak Theory*, (Bielefeld: Transcript Verlag). For queer as ‘exquisite method’, see Henry Rogers (2012), *Queer Textualities*, (London/Birmingham: ARTicle Press).

copy [ˈkɒpi]

closely related to imitation, 1:1 mimicry, doubling, the copy can be understood as a point-for-point literal rendition of the ‘that which lies to hand’ (wittgenstein). in the networked, virally exposed, the copy always-already is the pluralised start of a ‘belonging-being-with-together.’ or to put this slightly differently, the copy forms the start/now/ present-tense ‘is’ of any reality, networked or otherwise. see walter benjamin’s the task of the translator (1923) alongside, for example hillel schwartz’s 1996 classic: the culture of copy.



Anna Nazo. *Flame*. Performance for Stay LIVE At Home Programme, organised by Performistanbul, Live-streamed on Zoom and Instagram @annanazo, Istanbul, Turkey / London, UK. 3 May 2020.

The brainwave performance experiments with live transmission of brainwave data (EEG) into the computer generated sound and imagery (CGI). The brainwaves CGI enables to rethink the understanding of a photographic image as a cognitive kinetic flux.¹⁹ It translates a brainwave into a viscous, nonlocal, undulated body. The body that performs as an evocative portrayal gesture of hyper-objectivity, a photographic image of the contemporary world that goes beyond the human sensuous, and gets into the dimensions of supra-sensuous.²⁰ It brings in the brainwave frequencies, and the drone cognition that is enfleshed with its sensuous patterns. The radical otherness of drone's liveness and intelligence evokes aesthetic-as-ethical and ethical-as-aesthetic questions around distributed intelligence as a different form of metrics. At the moment of performance all these are being entangled and translated into the human perception of the real in a form of conscious flattened metrics of quantum reality.

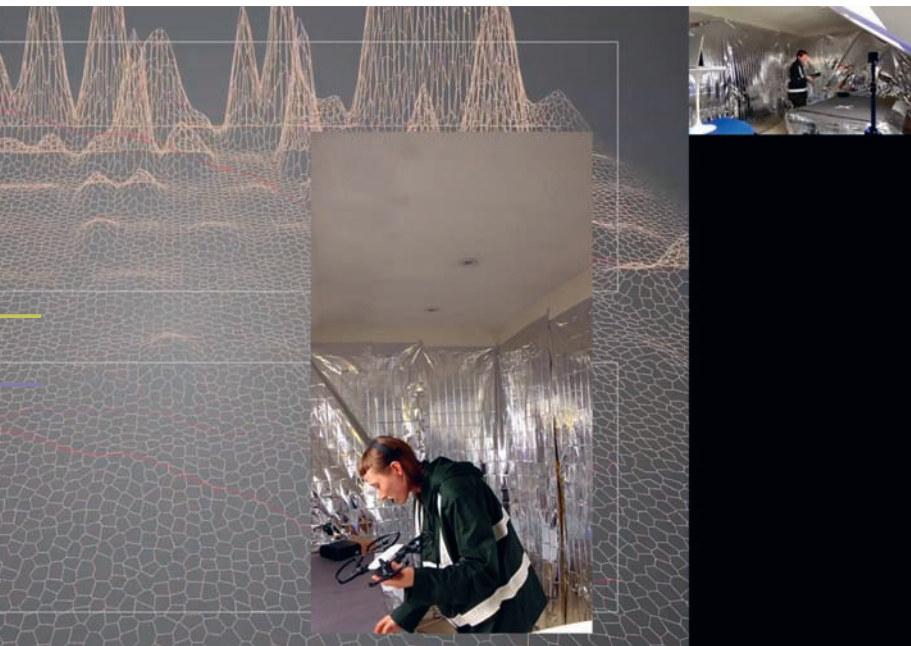
²⁰ The notion of cognitive kinetic flux has been developed in dialogue with Hayles, *Unthought*; along with Thomas Nail (2018), *Lucretius I: An Ontology of Motion*, (Edinburgh: Edinburgh University Press).

²⁰ For hyperobjectivity see in particular: Timothy Morton (2013), *Hyperobjects: Philosophy and Ecology after the*

End of the World, (Minneapolis: University of Minnesota Press). See also Umberto Eco (1990), *Travels in Hyperreality*,

(New York: Mariner Books/Picador). Initial development of 'gesture' is from Vilém Flusser (2014 [1991]), *Gestures*, trans-

lated by Nancy Ann Roth, (Minneapolis: University of Minnesota Press), 1-10.



The metrics themselves are always already plural. Being grasped by the digital (photogrammetry, 360-degree imaging, virtual reality), they operate as another translation and create different forms of relations. Through these relations come forward other forms of liveness and performativity, the liveness and performativity of, unexpectedly, a new understanding of the archive.

Anna Nazo. Flame. Performance for Stay LIVE At Home Programme, organised by Performistanbul, Live-streamed on Zoom and Instagram @annanazo, Istanbul, Turkey / London, UK. 3 May 2020.

While it follows Penrose's passage of thinking of consciousness through quantum field dynamics, brainwave function, wave interference patterns and wavefunction collapse; this move reveals the metrics problem in the relationship between quantum reality and consciousness.²¹ Simultaneously, it brings in the brain waves and the drone's sensuous frequencies to the dimension of [human] actual-perception, which enables bringing forth new ways of *parrhesiastic* embodiment in the contemporary technological setting.²² This form of embodiment involves the technological, the carnal, the sonic, the spoken and the computer-generated (imagery, sound, text). It operates through creating a kind of a neuronal network, a distributed intelligence networking architecture. It enables introducing the notion of radical care, which involves pluralised sensuous feedback loops that are happening at the moment of performance in wave fields (mechanical waves [sound], electromagnetic waves [light, brain waves]). These feedback-loops enable a kinetic flux as a form of non-conscious cognition, as a form of overlaid poetics and as a form of multidimensionality. While the performances are living-dying-grasping virtual-carnal installations of poetics, they also are multi-dimensional supra-sensuous encounters of multi reality and the ecology of a multiplicity of selves, AI-drone-human holobionts, all of which enable a sensuous swerve to happen. This empowers a radical shift in the understanding of being in the world.²³

²¹ Metrics in relation to consciousness has been developed through Penrose, *Shadows of the Mind*, 329ff and 369ff. Cf Hayles, *Unthought: The Power of the Cognitive Nonconscious*, 41–63.

²² For the development of *parrhesia* and truth-telling embodiment, I have relied on Michel Foucault (2011 [1983–84]), *The Courage of the Truth: The*

Government of Self and Others II, (New York: Palgrave Macmillan). See also Johnny Golding (2018), *“From Drone-Truth to Radical Empathy: Consciousness in*

the Zero Zones of Time,” Keynote at *Sliced-up ghettos of thought: Science, art and society–20 years from now*, (London: London Arts and Humanities Partnership,

Bartlett School of Architecture) at rca.ac.uk/3397/ For posthumanist forms of embodiment see N. Katherine Hayles (1999), *How We Became Posthuman: Virtual*

Bodies, in Cybernetics, Literature and Informatics, (Cambridge), 222ff, and her *Unthought*, 9–26.

²³ For kinetic flow see Nail (2018), *Lucretius*, 12, 108, 199. For the development of a sensuous 'swerve',

see Nail, *Ibid*, 194–204. My development of the poetic is principally based on Heidegger, *Poetry, Language,*

Thought, and Gaston Bachelard (2014), *On Poetic Imagination and Reverie*, Collette Gaudin (Ed.),

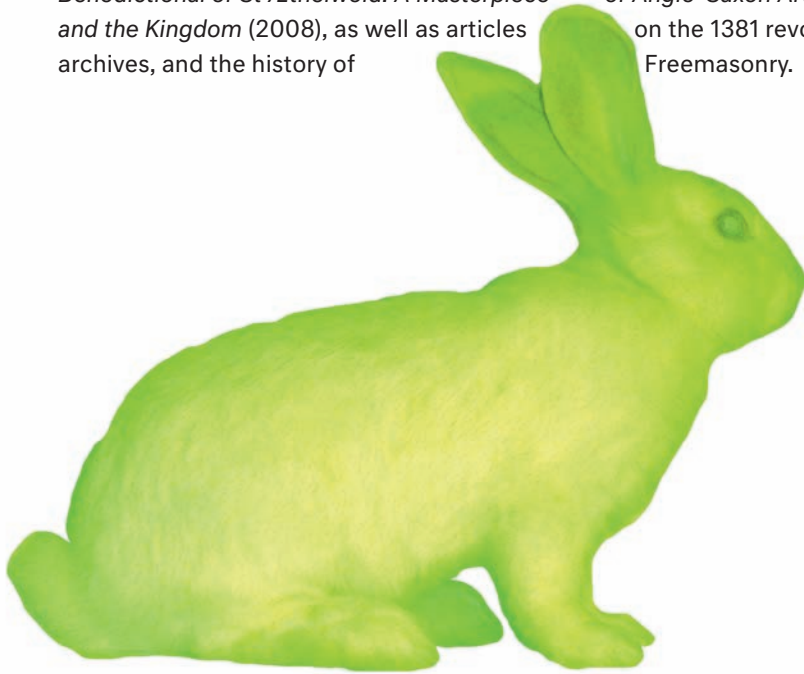
(Thompson, CN: Spring Publications).

Pursuing Digital Transformations through Fluorescent Green Bunnies: The Poetics of Technology

Andrew Prescott

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Andrew Prescott is Professor of Digital Humanities at the University of Glasgow. He trained as a medieval historian and his PhD thesis focussed on the Peasants' Revolt of 1381. He was from 1979 to 2000 a Curator of Manuscripts in the British Library, where he was involved in some of the Library's first digitisation projects, including *Electronic Beowulf*. He has also worked in digital humanities units and libraries at the University of Sheffield, University of Wales Lampeter and King's College London. From 2012–2018, Andrew was Theme Leader Fellow for the Arts and Humanities Research Council strategic theme of *Digital Transformations*. Publications include *English Historical Documents* (1988), *Towards the Digital Library* (1998), *The British Inheritance* (2000), *The Benedictional of St Æthelwold: A Masterpiece of Anglo-Saxon Art* (2002) and *London and the Kingdom* (2008), as well as articles on the 1381 revolt, the history of archives, and the history of Freemasonry.



↑
Eduardo Kac, GFP Bunny, Transgenic artwork. Photograph by Chrystelle Fontaine, 2000. Courtesy of the artist.

I am a historian who is beguiled by the remnants of the past we encounter in libraries, archives and museums. As a postgraduate student, I immersed myself in the archives of the late fourteenth-century English state. I found and find these records compelling because of the way we encounter in them so many humble forgotten ordinary lives conveying extraordinary stories. Because of my fascination with these archives, I got a job as a manuscript curator at the British Library where I explored manuscripts and books from many different cultures and periods and investigated the way the institutional history of libraries and archives shapes and mediates our engagement with the past.

I was very fortunate to participate in some of the British Library's early experiments in digitisation and the use of the web in the early 1990s. In particular, I was the curatorial contact for the major *Electronic Beowulf* project, edited by my friend and leading *Beowulf* scholar Professor Kevin Kiernan of the University of Kentucky.¹ *Electronic Beowulf* was not only a digital colour facsimile of the unique manuscript of this celebrated Old English poem but also used special lighting techniques to record details of the manuscript not visible with the naked eye and gave access to digital images of other early records of the *Beowulf* text. Fired by the excitement of transmitting for the first time images of medieval manuscripts across the Atlantic and experimenting with ways in which the first web browsers could make images of manuscripts readily accessible, I became addicted to exploring the ways in which digital technologies can bring us closer to the manuscript and archives which have entranced me since I was a student.

I left the British Library in 2000 to work in the Humanities Research Institute at the University of Sheffield. The Humanities Research Institute, now the Digital Humanities Institute, has for thirty years been one of the pioneers in the intersection between cultural heritage and digital technologies.² Broadly my interests since 1990 have remained the same: how are digital imaging, network access and other technologies transforming libraries and archives?

Although my interests have remained constant, the way in which the subject area is described has shifted. Initially, there were a series of groups which worked on the relevance of computing to particular subject areas: history and computing, literary and linguistic

¹ Kevin Kiernan (2015), *Electronic Beowulf 4.0*, programmed by Ionut Emil Iacob, ebeowulf.uky.edu

² Digital Humanities Institute at dhi.ac.uk

³ Willard McCarty (2005), *Humanities Computing*, (Basingstoke: Palgrave Macmillan).

⁴ John Unsworth, Ray Siemens and Susan Schriebman (2007), *A Companion to Digital Humanities*, (Chichester: John Wiley). See also: Melissa Terras, Julianne Nyhan and Edward Vanhoutte, (2013), *Defining Digital Humanities: a Reader*, (Farnham: Ashgate). See also Dorothy Kim and Jesse Stommel, (2018), *Disrupting the Digital Humanities*, (Santa Barbara: Punctum Books).

⁵ Cf *Digital Scholarship in the Humanities* at academic.oup.com/dsh, and for the *Alliance of Digital Humanities*, see adho.org

⁶ Charles Forsdick, Henry French, Andrew Prescott and Barry Smith (2019), *Working at the Intersections: Arts and Humanities Research Council Strategic Themes 2010-2019*, (Liverpool: University of Liverpool).

⁷ Keri Facer and Bryony Enright (2016), *Creating Living knowledge: the Connected Communities Programme, Com-*

puting, and so on. By the 1990s, 'humanities computing' was a useful catch-all title for these activities.³ However, as the range of digital activity increased and network collaboration became more prominent, the term 'digital humanities,' introduced in 2004 by the Blackwell Companion edited by John Unsworth, Ray Siemens and Susan Schriebman, was adopted, prompting a debate which still rumbles on about what exactly are the digital humanities.⁴

I have enjoyed the title of Professor of Digital Humanities since 2010 and I regard the term as simply a convenient way of designating those interests and enthusiasms I have held since my days in the British Library. There is no other convenient expression for them. I am an extremely well-informed observer and commentator on the way in which digital methods and affordances have transformed the study of the arts and humanities but by no stretch of the imagination can I be regarded as a technical expert or computer whizz. My digital understanding remains grounded in and shaped by my experience as a librarian. I do not propose here to enter further into the discussions about what the digital humanities are and their relationship to the disciplines which historically make up the humanities. I want simply to note that much of digital humanities work is concerned with modelling humanities methods and source materials for computational analysis. A glance at the major digital humanities journals such as *Digital Scholarship in the Humanities* published by Oxford University Press or the abstracts for the major Digital Humanities Conferences organised by the *Alliance of Digital Humanities Organisations* shows the prominence of quantitative methods and of formal modelling.⁵ Digital humanities can often have an abstract and formal character, and many digital humanities practitioners look instinctively to scientific methods in developing their discipline.

In 2012, I was honoured to be appointed theme leader fellow for the Arts and Humanities Research Council (AHRC) strategic theme of *Digital Transformations*. This was one of four strategic themes established by the AHRC, the others being *Translating Cultures*, *Care for the Future* and *Science in Culture*.⁶ The strategic themes also worked closely with the major Research Councils UK *Connected Communities* programme.⁷ I was Theme Leader Fellow for *Digital Transformations* until 2019, and it proved to be an

munity-University Relationships and the Participatory Turn in the Production of Knowledge, (Bristol: University of Bristol Press).

engrossing, mind-bending and intellectually stretching time. If my work at the British Library in the early days of the web at the beginning of the 1990s was exhilarating, it was nevertheless often in my comfort zone. Making images of manuscripts available via the internet was a natural extension of my previous work as a librarian. My work in the *Digital Transformations* theme challenged more strongly many of my preconceptions and led me into new areas. I am still trying to absorb and process the research journey of those intense *Digital Transformations* years. This chapter draws on some of the material I wrote in the course of the fellowship, but is also part of my continuing attempt to digest what I learnt during that heady period.

The AHRC Digital Transformations theme funded over 100 projects between 2010 and 2018. These included some of the largest digital projects which the AHRC had ever funded at that time. These beacon projects comprised *Digital Panopticon* which used large-scale data linking methods to reconstruct the lives of people convicted as criminals between 1780 and 1925; *Transforming Musicology* which explored a range of advanced methods for automated reading and analysis of music; and *Fragmented Heritage* which developed citizen science tools for location of archaeological remains and reconstruction of fragile heritage.⁸ The theme also included a project with the British Library which produced a report on *The Academic Book of the Future*.⁹ There were also a wide range of smaller projects which included pioneering work on Big Data in the arts and humanities. The range of subjects and methods of the projects in the *Digital Transformations* portfolio was striking, encompassing the linking of data sets from the classical world, the study of reading networks and music apps facilitating remixing by listeners through to 3D printing of data, the value of ‘the internet of things’ in care homes, and distributed musical performances.¹⁰ My initial outlook when I started my *Digital Transformations* fellowship reflected my library background.

I imagined that digital transformations might be driven by doing bigger and more exciting things with data—by linking large data sets in different ways, by developing new forms of visualisation, by modelling subject information in innovative ways. It meant I used words

⁸ *Digital Panopticon* at digitalpanopticon.org; *Transforming Musicology* at tm.web.ox.ac.uk; and *Fragmented Heritage* at fragmented.heritage.com

⁹ *The Academic Book of the Future* at academicbook-future.org

¹⁰ For project descriptions, see Diane Scott, (2019), *Performing, Remixing and Reimagining Data*, (Glasgow: University of Glasgow), and also Andrew Prescott (Ed.) (2015), *Big Data in the Arts and Humanities: Some Arts and Humanities Research Council Projects*, (Glasgow: University of Glasgow).

like ‘new’ and ‘change’ and ‘innovation’ a lot. This was probably the assumption of AHRC when it set up the theme—it is telling that during the period of the theme, the term ‘digital transformation’ became a common business euphemism for cost-cutting, redundancies and restructuring. The sort of issues I assumed were pressing in 2010, like sustainability, sharing and reuse of data, reflected this outlook. The advent of social media and the rise of smartphones at about that time seemed initially to reinforce these assumptions.

My preconceptions were almost immediately challenged and the story of my fellowship became one of developing and embracing alternative perspectives on technology. The challenge came from talking to artists, curators and others who were engaged in practice-based research. They questioned the emphasis on innovation and project management I brought from libraries and digital humanities. They argued for a more multi-faceted view of digital cultures with stronger critical frameworks. This chimed with an increasing awareness among humanities scholars of the biases and social and cultural assumptions embedded in emerging digital resources. Practice-based researchers also brought a strong awareness that the digital world was more than just data. With the growth of the internet of things, there was an increasing awareness of the materiality of the digital world. That materiality suggested many different perspectives that I found aligned with my experience of manuscripts and rare books. I became aware of the ways in which digital creativity intersects with craft and learned how craft practice can inform our digital engagement as strongly as data science. As my fellowship developed, it became clear that there was an urgent need for humanities scholars from disciplines like history and literature to engage more strongly with artists, curators and other practice-based researchers in developing their digital methods. While such data science approaches as linking, quantification and visualisation remain valuable, a dialogue with practice-led research can generate radically different insights and articulate fresh visions of what digital technology might achieve. This does not mean spurning links with science, far from it. Indeed, it became increasingly evident that artists and designers were often engaging more deeply and critically with scientific developments than many humanities scholars. They were making use in their work of latest developments in areas like bioscience and blockchain. As my work proceeded, I became

corporeal trace [kɔːˈpɔːrəl treɪs]

initial incarnation developed by benedict de spinoza in his 1665 classic, ethics, demonstrated in geometrical order. here spinoza sets out a wildly different way to ‘see’, ‘look’, ‘re-remember’—one that no longer requires a 1:1 correlation of an eye to the ‘out there’ of life and limb. we find the ghost(ing) of image/imagination imprinted on the flesh body in a way that cannot separate out ‘mind’ from the body-soul of which it is a part. first sign of consciousness as a living being, bringing to presence ‘intelligence’ without the need for internalised ‘perception’, ‘intuition’ and other metaphysic irritants. go figure.

convinced that the key to truly radical digital transformations in the humanities is a closer dialogue and integration of artistic practice. We can place this in a wider cultural and historical context. The advent of the computer in the humanities in the 1960s caused concerns that an invasion of technology posed an existential threat to humanities scholarship. In 1965, the historian Franklin Pegues was cautiously optimistic about the assistance computers could provide but insisted that machines must be kept in their place:

“The machine must serve to free the humanist from time-consuming labor and enlarge his horizons for greater and more important accomplishments. In short, the machine can help the scholar be a better humanist. It will be a sad day for the humanities if scholars seek to undertake only that work which can be computer-oriented.”¹¹

This assumption that the machine must only ever be a tool and subservient to the higher aims of humanities scholarship remains common. The debate about the exact nature and scope of the digital humanities may partly be linked to this nervousness about the role of quantification and more scientific methods in the humanities.

Although things have moved on a great deal since Pegues wrote in 1965 and the use of computers by humanities scholars for a variety of purposes is widespread, digital methods are still only patchily embedded in the scholarly mindset of the humanities.

The roots of this uncertainty about the digital lie in the way much of our cultural history of the past two hundred years has been defined by anxieties about the growth of a technological and commercial society. In the nineteenth century, in face of the first great waves of industrialisation, Samuel Taylor Coleridge bewailed “the philosophy of mechanism which, in everything that is most worthy of the human intellect, strikes *Death*.”¹² Matthew Arnold declared that “Faith in machinery is our besetting danger.”¹³ Such advocates of what Raymond Williams identified as the great tradition dominating British society in the nineteenth and early twentieth centuries saw high culture as a means of staving off the threat of an industrial society ruled by money and commercialism. The ubiquity of the computer challenges the cultural defences erected by commentators such as Coleridge and Arnold. Using computers in literary criticism starts to look very much like an industrial enterprise, which is one reason why

¹¹ Franklin J. Pegues (1965), “Computer Research in the Humanities,” in *Journal of Higher Education*, (London: Taylor and Francis), vol 36, no 2, 105–8.

¹² Samuel Taylor Coleridge (2014 [1895]), “Letter to William Wordsworth, 30 May 1815,” in Ernest Hartley Coleridge (Ed.), *Letters of Samuel Taylor Coleridge, Vol II*, eBook #44554, *The Project Gutenberg at* gutenberg.org, 649.

¹³ Stefan Collini (1993), *Arnold, Culture and Anarchy and other writings*, (Cambridge: Cambridge University Press), 63.

¹⁴ Andrew Prescott (2012), "An Electric Current of the Imagination: What the Digital Humanities Are and What They Might Become," in *Journal of Digital Humanities*, (New York: Springer), Vol 1, no 2, at journalofdigitalhumanities.org/1-2/an-electric-current-of-the-imagination-by-andrew-prescott/

¹⁵ Prescott, *An Electric Current of the Imagination*, *ibid.*

¹⁶ Cf digitaltransformations.ac.uk

¹⁷ Cf Bronan Ferran and Andrew Prescott at mixcloud.com/Resonance/playlists/making-conversations/

digital humanities has frequently provoked such suspicion. In 2012, I gave a lecture at King's College London entitled *An Electric Current of the Imagination: What the Digital Humanities Are and What They Might Become*.¹⁴ I pointed out how in many ways artistic practice integrated digital technologies into a wider cultural and creative vision in a more exciting fashion than had so far been achieved in the humanities. I argued that artistic practice offers a powerful means of fostering new creative and critical alignments between art and technology. A digital humanities suffused by the visions generated by a close engagement with artistic practice could potentially be the means of breaking down the old binaries between art and technology that have grown up since the Industrial Revolution. As I stated at the conclusion of my lecture, "Such a new conjunction of scientist, curator, humanist and artist is what the digital humanities must strive to achieve. It is the only way of ensuring that we do not lose our souls in a world of data."¹⁵

My *Digital Transformations* fellowship comprised a series of conversations and collaborations which explored the potential and possibilities of these approaches. Together with Jon Rogers of the University of Dundee, the curator Irini Papadimitriou at the Victoria and Albert Museum, and Michelle Thorne and others from the Mozilla Foundation, we introduced a digital humanities strand into the annual *Digital Design Weekend* at the Victoria and Albert Museum, and produced a series of booklets documenting the cross-currents of the many different projects included in these lively public events.¹⁶ The annual *Digital Design Weekend* and *Mozilla Festivals* were wonderful venues for building conversations which crossed many different boundaries and headed off in many directions. They demonstrated how the study of ancient manuscripts might cross connect with the 'internet of things', and how linguists could help us think about the dangers and limitations of a voice-controlled internet. A key figure in guiding and developing my exploration of cross-sectoral dialogue and collaboration was the writer and curator Bronac Ferran. Bronac and I curated a series of programmes on Resonance FM called *Making Conversations*, a series of chats with a wide range of guests exploring in a free-wheeling fashion how making, craft and practice in a variety of fields are both being transformed by and have the potential to transform digital culture.¹⁷ The archives of the Resonance

FM programmes Bronac and I produced are a vast and fascinating toolkit showing how craft and artistic practice can promote digital transformation. We spoke with the artists Paul and Daniel Brown about their creation of art work using algorithms and other methods of automatic generation and explored how that can be seen as a new form of craft practice.¹⁸ We debated the nature of craft and making with theorists and practitioners such as Tim Ingold, Justin Marshall and Jon Rogers. We looked back to such formative events as the *Cybernetic Serendipity* exhibition at the ICA in 1968 and the *Destruction in Art* symposium in 1966. We remembered how the *Scratch Orchestra* reimagined the hierarchies of artistic creation. For me, the Resonance FM broadcasts were a fascinating experiment in qualitative research which probed how artistic practice enables us to reimagine the digital.

¹⁸ On the work of Paul and Daniel Brown, see Paul Brown and Bronac Ferran (2017), “*Art That Makes Itself and other generative beginnings,*” in *Interdisciplinary Science Reviews*, (London: Taylor

and Francis), no 42, 158–68. See also: Bronac Ferran (2015), *Art That Makes Itself: Brown & Son Purveyors of Digital Images since 1968*, (London: Brown & Son).

Above: *Get Rid of Government Time. Poem Machine* by Liliane Lijn, 1962. 29.5 x 38 x 30 cm. Letrasat on painted metal drum, plastic, painted metal, motor. Words from a poem by Nazli Nour, photo Stephen Weiss, Courtesy Liliane Lijn and Rodeo Gallery.
Below: *Poem Machine Manifesto* by Liliane Lijn, 1968.



POEM MACHINE = VISION OF SOUND

SEE SOUND AS MOVING LINES OF LIGHT

The words we utter travel in sound waves vibrating through the air into our inner ear. When we see the written word we forget these letters are symbols of vibrations.

WORDS = VIBRATIONS = ENERGY

When I put words on cylinders and cones and make Poem Machines, I want the word to be seen in movement splitting itself into a pure vibration until it becomes the energy of sound.

First Poem Machines - 1962-3

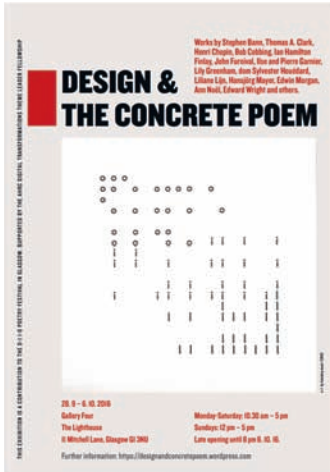
Action - Words - Power - Words

The Word Becomes Energy

1964-5 Poem-Machine takes on shape, becomes Poemkon. Conic shape bends itself to the dematerialisation of the word. At the narrowest point of the cone the words may still be readable whereas at the base they become a vibration pattern. The word accelerated loses its identity and becomes a pattern pregnant with energy. It is pregnant with the energy of its potential meaning should it once again become a word.

DISSOLVE THE IMAGES CREATED BY WORDS AND SEE SOUND

L. Iijn 1968



Advertisement for Design & The Concrete Poem. Exhibition curated by Bronac Ferran at the Lighthouse Glasgow. 2016. Incorporates image of Hans-jörg Mayer. oil. 1965. Letterpress print on paper. 32 x 32 cm

Another key event held under the auspices of my AHRC fellowship was an exhibition, *Design and the Concrete Poem* curated by Bronac Ferran at the Lighthouse Gallery in Glasgow from 28 September–6 October 2016. This exhibition introduced me to the work of many artists whose exploration of the materiality of text and poetry I found compelling. *Design and the Concrete Poem* illustrated how the roots of a poetic interrogation of technology reached back beyond the digital age, as could be seen in the early to mid-20th century experimentation by artists Dom Sylvester Houédard with typewriters in the 1960s or the creative use by Bob Cobbing of stencil duplicating machines and photocopiers in the 1970s and 1980s.¹⁹ These works showed how textual technology could be stretched and manipulated to enable us to reimagine both the text and the technology.

Design and the Concrete Poem also featured the work of Liliane Ljin, such as her *Poem Machines* series (1962–5) created with Letraset on metal drums. For me, the way in which the history of industrialisation informs our understanding of digital changes and the complex interaction between craft, small workshops and factories are fundamental themes, and Liliane Ljin's fascination with industrial processes and images speaks powerfully to this. Her exploration of Dickensian engineering workshops in London in the late 1960s inspired her *Material Alphabet* (1970) which is an eloquent testimony to the creative possibilities of an artistic response to technology.

¹⁹ Cf Dom Sylvester Houédard (2012), *Notes from the Cosmic Typewriter: The Life and Work of Dom Sylvester Houédard*, edited by Nicola Simpson, (Sheffield: Occasional Papers), and William Cobbing and Rosie Cooper, Eds., (2015), *Booooook: The Life and Work of Bob Cobbing*, (Sheffield: Occasional Papers).

Likewise, a poem by Pierre and Ilse Garnier cut on a Gestetner duplicating stencil, shown for the first time in the Glasgow exhibition, offered both a novel view of textual materiality and an elegy for an obsolete technology. Throughout the period of my AHRC Fellowship, one artist whose work I found consistently helpful in thinking about the interaction between technology, communication and our human condition is the Chicago-based Eduardo Kac.

Thanks to Bronac Ferran, a dialogue with Eduardo became a central feature of the work in my fellowship. Eduardo made a number of presentations designed to build up dialogue between artistic practice and new disciplinary audiences, such as for example a presentation at the *International Congress on Medieval Studies* at Western Michigan University in 2016. He appeared in our Resonance FM radio series and took part in sessions at the Victoria and Albert Museum and elsewhere. Above all, we organised two exhibitions of Eduardo's work in London in 2018. *Poetry for Animals, Machines and Aliens: the Art of Eduardo Kac* was held at the Furtherfield Gallery from 7 April–28 May. This was followed by *...and the Bunny Goes POP! tales of a rabbit gone viral* at the Horse Hospital from 2–21 June 2018.

Both exhibitions in different ways were reflections on the poetics of technology, a theme that has preoccupied Kac throughout his career. Poetry is challenging. A poem questions our certainties, makes us see the world from different angles and, by encouraging us to pause and reflect, subverts that mechanistic goal-oriented outlook which so horrified Coleridge and Arnold but nevertheless dominates the modern world. Technology can give words and letters new shapes and resonances and, in so doing, subvert a consumer-oriented view of technology. The presentations of Kac's work at Furtherfield and the Horse Hospital provided striking illustrations of these themes. There can be no more imposing expression of technological achievement than the *International Space Station*.

One of the most fascinating aspects of the video of Eduardo Kac's space poem *Inner Telescope*, performed in 2016 by the French astronaut Thomas Pesquet, shown in the Furtherfield exhibition, are the interior shots of the cramped space station, jam-packed with wires, containers and panels from innumerable scientific experiments. The confined space station contrasts with the expansive views of the earth, visible through the space station windows.



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This contrast itself seems like a commentary on the puny character of human technological ambitions. Kac proposed the idea of space poetry in 2007. He pointed out that weightlessness would affect the temporal and physical logic of a poem, while the readers' sensory engagement with the act of reading would also be different under zero gravity. *Inner Telescope* memorably shows how a simple performance such as cutting paper may be different in zero gravity, while the movement of the paper (cut into a form representing the word 'Moi') seems to epitomise the fragility of textual communication. In the rigidly scheduled life of the space station, *Inner Telescope* uses poetry to pause and reflect on the complex interrelationship of humanity, technology and the wider universe.

One major thread of Kac's art has been the relentless interrogation of technology to create radical and original poetic visions.²⁰ Kac experimented with the potential of the typewriter to allow different juxtapositions and textual shapes in his *Typewritings* of 1981–2 and from these experiments sprang his first digital poem, *Não! (No!)*, in 1982–4. *Não!* was presented on an electronic signboard with an LED display with fragmentary text blocks, encouraging the reader to guess at the links between them. The digital poems shown in the Furtherfield exhibition illustrated how Kac makes use of digital technologies to redefine the relationship between the reader and text and to reveal new poetic elements in short words and phrases. In *Accident* (1994), a digital loop introduces shifts and uncertainties into a text, recalling the nervous hesitation when two lovers meet, but also causing the reader's perception of the text to change as the piece progresses. Another remarkable pioneering digital poem which was shown at Furtherfield, *Letter* (1996), uses virtual reality markup language to create a three-dimensional spiral of text which the reader can spin, invert, twist and explore from every conceivable angle. The text appears to be a single letter, but turns out to be two letters, one from the artist to his dead grandmother and another to his newly born daughter. Text and language are perhaps the two technologies which most profoundly shape our lives. By altering our perception and engagement with text, Kac raises questions about the way in which we communicate and understand each other. In his beautiful holopoems, such as *Adhuc* (1991) displayed in the Furtherfield exhibition, Kac created texts which shift and change depending on the angle at

²⁰ Eduardo Kac, Ed., (2007), *Media Poetry: an International Anthology*, 2nd edition (Chicago: Intellect).

which they are viewed.²¹ Text technologies frequently give the impression of immutability, but Kac's holopoems remind us how unstable and deceptive texts may be. Particularly fascinating is the way in which Kac has explored the poetic possibilities of technologies which are now redundant. Thus, Kac used the French videotext network Minitel to show the possibilities of network art. He demonstrated the potential of large-scale collaborative works by various pieces using fax. Although the platform on which these works were realised are now obsolete, the works nevertheless anticipate contemporary digital cultures. In these ways, artistic practice generates vision and expectations of technological possibilities in ways that can shape innovation. This is also apparent from the way Kac was already experimenting with the potential of telepresence, robotics and wearables in the 1990s.

At each point in these explorations, Kac urges us to engage with these technologies creatively, to use them to create fresh visions, and not simply to accept them as consumers. In these ways, Kac's message is an important one for the digital humanities world that I inhabit. Kac is urging us not to passively accept the technological resources and tools made available to them by commercial companies and others. One of the reasons why I believe passionately that humanities scholars should engage more closely with artistic practice is that such a dialogue will foster a more creative and critical approach to the use of digital methods by humanities scholars. The artists whose work I have encountered in the course of my AHRC Fellowship, such as Fabio Lattanzi Antinori, Michael Takeo Magruder, and Katriona Beales as well as pioneers such as Nam June Paik all convey the message that we need to engage creatively with technology. Technology is a threat if we view it passively as an inhuman external force; if we rather seek, like Kac and these other artists, to interrogate, extend and reimagine technology in a creative way we can hope to take greater ownership of it.

These issues become all the more evident and pressing when we turn to Kac's bio-art.²² It is becoming increasingly evident that new biotechnologies will within a short period of time profoundly alter human existence and personality. In the wake of the COVID-19 pandemic, the importance of biology for the future of humanity has become particularly apparent. Kac's bio-art (following in a tradition

²¹ Eduardo Kac (1991), *Adhuc*, was a holographic work that produces scent. Artist, edition of three.

²² Eduardo Kac, Ed., (2007), *Signs of Life: Bio art and Beyond*, (Cambridge, MA: MIT Press).

²³ Eduardo Kac (1999), *Genesis*, (Linz: O.K. Center for Contemporary Art), 45–55. Cf Gerfried Stocker and Christine Schopf, Eds. (1999), *Ars Electronica 99–Life Science*, (Vienna /New York: Springer), 310–13. Currently situated at the Collection Instituto de Arte Moderno (IVAM), Valencia, Spain, ekac.org/geninfo2.html

²⁴ As quoted in Scott Weintraub (2018), *Latin American Techno-poetics: Scientific Explorations in New Media, New Hispanisms: Cultural and Literary Studies*, (New York and London: Routledge), 114.

which includes the creation of germ pictures by Sir Alexander Fleming) again encourages us to engage creatively with these emerging technologies.

DNA is text and DNA can be poetry of the most profound sort. In a series of works called *Genesis* (2001), a synthetic gene was created by Kac by translating a sentence from the biblical book of Genesis into Morse code, and converting the Morse code into DNA base pairs according to a conversion principle developed by the artist.²³ The sentence chosen was Genesis 1:26: “Let man have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moves upon the earth.” Visitors to the gallery showing *Genesis* could trigger mutations in the bacteria’s DNA by switching an ultra-violet light on and off. This in turn mutated the text when it was converted back in Morse code and then into English. The artist comments that “the ability to change the sentence is a symbolic gesture: it means that we do not accept its meaning in the form we inherited it, and that new meanings emerge as we seek to change it.”²⁴ *GFP Bunny* (2000) is the most famous of the pioneering transgenic art works created by Kac. The image of Alba, an albino rabbit genetically modified so that, when illuminated with light at a particular wavelength, she glows fluorescent green, became one of the first iconic images of the twenty-first century. As a result of the international controversy and debates generated by *GFP Bunny*, depictions of fluorescent green rabbits appeared widely in newspapers, magazines and television.

‘Alba’ is Latin for white and also Italian for dawn. She was an albino rabbit with no skin pigment, so that under ordinary environmental conditions, she appeared completely white with pink eyes. However as she was created with EGFP, a synthetically-enhanced version of the fluorescent gene found in the jellyfish *Aequorea Victoria*, she would glow when illuminated with blue light (maximum excitation at 488 nm). Then she would glow with a bright green light (maximum emission at 509 nm). *GFP* stands for *Green Fluorescent Protein*. Kac described his intentions with *GFP Bunny* as follows:

“The first phase of the *GFP Bunny* project was completed in February 2000 with the birth of *Alba* in Jouy-en-Josas, France. This was accomplished with the invaluable assistance of the zoo-systemician Louis Bec and scientists Louis-Marie Houdebine and

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²⁵ Eduardo Kac (2000), *GFP Bunny*, in Peter T. Dobrila and Kostic Aleksandra (Eds.) *Eduardo Kac: Telepresence, Biotelematics, and Transgenic Art*, (Maribor: Kibla). Online at www.ekac.org/gfpbunny.html#gfpbunny-anchor

²⁶ “Scientists at the French Agricultural Research Institute have refused to give a genetically modified rabbit to Eduardo Kac, a Chicago artist who wants the animal as a work of art. They deny that Alba, a lab pet with a jellyfish gene, is green but say she has a slight hue.” as quoted in “Hop off...,” *The Times* (London: October 2000).

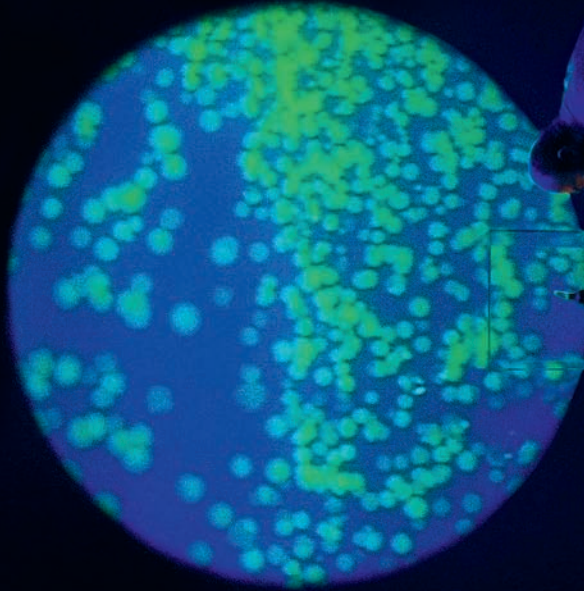
Patrick Prunet of the Institut National de la Recherche Agronomique in France.” As Kac continues:

“Alba’s name was chosen by consensus between my wife Ruth, my daughter Miriam, and myself. The second phase is the on-going debate, which started with the first public announcement of Alba’s birth, in the context of the *Planet Work* conference, in San Francisco, on 14 May 2000. The third phase will take place when the bunny comes home to Chicago, becoming part of my family and living with us from this point on.”²⁵

Alba never went to live with the artist’s family. An article in the *Boston Globe* on 17 September 2000 reported “As word has slowly leaked out about Alba—who was supposed to ‘interact’ with Kac in a faux living room as a piece of performance art, but is instead confined to her French laboratory after protests—it is bringing outcries from scientists and animal rights activists, shocked at the idea that the powerful tools of biotechnology would be used for an art exhibit.”²⁶

The public discussion sparked by *GFP Bunny* led to articles in newspapers and magazines from America and Australia to Poland, Sweden and Romania. These were frequently illustrated by a photograph of a fluorescent Alba, popularising this image. The idea of a fluorescent bunny even excited newspaper cartoonists in France and Australia. The public debate was further enhanced in December 2000 when Kac launched a campaign in France to bring Alba home. This intervention included a poster campaign at various sites in Paris, newspaper, radio and television interviews, and public

Let man have dominion
and over the four
living thing that



CGGCTGCCCTGCAATGCTTTTGT
CCCTGC-GCTCATGCCCCGAC
CCCTCATGCCCGGCGACCGGAC
GGGCTCATGCCCGGCGACCGGAC
CATGCCCGGCGACCGGCGAC
CTGGGCTCAGCGCCCTGC
CCCTGCCGTGTTTATGCTTGG
TATTGTTTGGCCCTGCTGCTGCTG
CGGACGGCTGCTGCTGCTGCTG



²⁷ Eduardo Kac (2010), *Lagoglyphs, Genetic Art* (video), Streaming Museum, at streaming-museum.org/eduardo-kac-lagogyphs/

Cf Eduardo Kac (2009), *Lagogyphs, Biotopes and Transgenic works*, curated by Christiane Paul at *Oi Futuro*, Rio de Janeiro, Brazil, 25–30 Jan at ekac.org/oi_kac.show_overview.html. Cf *Lagoogleglyph II* (2015) at esbaliard.org/en/obras/lagoogleglyph-ii-2/. Cf *Lagoogleglyph III* (2018) at furtherfield.org/poetry-for-animals-machines-and-aliens-the-art-of-eduardo-kac/

lectures and debates. Alba quickly became an international rabbit cause célèbre. In the wake of the public controversy and the campaign to release Alba from the laboratory, Eduardo Kac produced a series of works inspired in different ways by Alba. *The Alba Flag* (2001) was hung outside the artist's house as a memento of Alba's absence and a beacon to guide her home. Kac's memories of Alba prompted him to create a wordless language incorporating rabbit imagery which he called *Lagogyphs* (from the ancient Greek words *lagos* for hare and *glyphe* for carving).

The Bunny Variations (2007) are bichrome silkscreens demonstrating this *leporimorph* or *rabbitographic* writing. As Kac later commented, "As visual language that alludes to meaning but resists interpretation, the *Lagogyphs* series stands as the counterpoint to the barrage of discourses generated through, with, and around *GFP Bunny*."²⁷

In this way, the *Lagogyphs* were almost a commentary anticipating the comparable barrage of discourse unleashed on the world by the proliferation of social media in the decade following *Bunny Variations*. Kac began a series of *Lagoogleglyphs*, large lagogyphs designed to be visible from the satellites which provide the imagery for Google Earth. *Lagoogleglyph I* (2009) was installed at *Oi Futuro*, Rio de Janeiro, Brazil and *Lagoogleglyph II* (2015) at Es Baluard Museum of Modern and Contemporary Art, Palma de Mallorca, Spain.

Lagoogleglyph III was installed in Finsbury Park during the *Furtherfield* exhibition in 2018.²⁸ The *Lagoogleglyphs* represent another striking commentary on, and subversion of, our shared digital world. Google is a vast all-encompassing technology giant which encourages us to consume its services while it makes money from data about us. The way in which Google Earth acts as a panopticon for the world, presenting an idealised sunny view of the planet's surface, symbolizes the hierarchical downward nature of much modern technology. How can we seek to make our presence felt with the world of mass corporate technology? Painting a huge image in Finsbury Park is an inspired way of intervening in the artificial deracinated corporate view of the human world presented in Google Earth.

While the *Lagoogleglyphs* made direct points about reimagining technology, Alba became an extraordinary cultural phenomenon, anticipating an internet meme before memes became commonplace. The process by which Alba escaped into the outside world and

spawned innumerable offspring, provides a fascinating case study in cultural dynamics. This was the focus of the exhibition at the Horse Hospital in June 2018. The story of how ‘the bunny went pop’ raised questions as to the relationship between science, pop culture, ethics and art. It continues to do so in a way that remains both prescient and pressing in a world where American President Trump suggests injecting bleach as a way of dealing with a global pandemic. As Ferran puts it in the handout accompanying the Horse Hospital exhibition:

“Who is Alba? What is she? Concept or chimera? The stuff of dreams or the stuff of nightmares? This bifurcation of uncertainties lies at the heart of this exhibition about the multiple lives in myriad media of a metamorphosing green bunny whose presence in contemporary pop culture is now indelible. Conceived as a radical work of art by Eduardo Kac in 2000, his concept has been subsumed into a global phenomenon that offers a dark, playful mirror to collective uncertainties ... Is everything pop culture now? Is Alba an autopoietic spokes-bunny for the arts of metamorphosis in the domain of media appropriation? Is glowing in the dark the endgame or our ultimate dream of escape?”²⁹

From the outset Kac saw the public dialogue generated by *GFP Bunny* as integral to the artwork. However, the scale and extent of the public response took him by surprise. While the creation of Alba sparked public debate, including some criticism of Kac on ethical grounds by some of his artist-peers, *GFP Bunny* nevertheless helped spread educational and public awareness of the underlying science.³⁰ The chemists who developed the green fluorescent protein won the Nobel Prize in 2008, and alluded to Kac’s work in their acceptance speech. Alba was used to explain biotechnology in children’s books and popular science publications. In Brazil, questions about Alba featured in high school examination papers, and many high school children became familiar with the image of Alba from their text books. This initial discussion of *GFP Bunny* was however only the first stage in the process by which the bunny went viral. It is sometimes assumed that the proliferation of cultural memes is due largely to the internet. However, the initial debates around *GFP Bunny* were dominated by more conventional media: newspapers, magazines, television, radio, public debate and performance. Moreover, the subsequent and most influential stages of the process by which the idea of a fluorescent

²⁸ Bronac Ferran (co-curator), *A Proliferation of Uncertainties: The Autopoiesis of Alba*, Introductory Text, London: Horse Hospital exhibition, 2–23 June 2018 at www.ekac.org/bunnypop.html

²⁹ See Carrie Dierks (2000), “Glowing Bunny Sparks International Controversy”, in *Biology News*, (Dery: Peregrine Publishers), at pergrine-pub.com/news/bunny.html

green bunny was taken up by a wide range of creative artists was transmedia in character and not restricted to the internet. The bunny appeared in films, novels, TV programmes, cartoons and as a toy. The internet undoubtedly accelerated this process and extended its international reach, but was not the reason the bunny went viral. The internet enables us more easily to investigate and document the bunny's journey, but it does not explain the world's bunny mania. Alba was extensively appropriated by a number of authors and artists, with and without acknowledgement, from her earliest appearance. Some of these became so influential that the idea of a fluorescent green rabbit is now better known through these channels than from Kac's original artwork. What is striking about this process is the way in which the concept has moved from dystopian views of biotechnologies, during the years immediately after Alba's birth, to a more commercialised and arguably sanitised view in recent manifestations. One of the issues raised by the way in which the bunny went viral is to what extent these shifting views reflect underlying cultural and social trends.

³¹ Margaret Atwood (2004), *Oryx and Crake*. The Maddaddam Trilogy Book 1, (London: Virago).

First, in 2003 author Margaret Atwood published *Oryx and Crake*, a dystopian novel describing a degraded and depraved world in which biotechnology companies have unlimited wealth and power and all life is commodified.³¹ A plan to modify genetically the human being eventually leads to its destruction. Atwood's novel is packed with many strange transgenic creatures, such as the Hyena Swine (a cross of pig and hyena), M'ling (a hybrid of bear, dog and ox). Pigoons (pigs bred to grow human organs) and Wolvogs (that have the appearance of dogs and savageness of wolves). Among the first of these transgenic creatures to be created, according to Atwood, was a fluorescent bunny:

“Across the clearing to the south comes a rabbit, hopping, listening, pausing to nibble at the grass with its gigantic teeth. It glows in the dark, a greenish glow filched from the iridocytes of a deep-sea jellyfish in some long-ago experiment. In the half-light the rabbit looks soft and almost translucent, like a piece of Turkish delight; as if you could suck off its fur like sugar.”³²

Oryx and Crake was one of Atwood's most successful novels and a television adaptation is in development, which will doubtless feature the green rabbits. Many illustrations of *Oryx and Crake* give

³² Atwood, *Oryx and Crake*. 109–10.



Eduardo Kac. The Alba Flag. 2001. Silk-screen on polyester fabric. 58 x 89 cm. Displayed outside exhibitions at the Furtherfield Gallery, above left, and the Horse Hospital, London, 2016. Photos by Pau Ros



prominence to fluorescent rabbits but without referencing Alba, as original inspiration. *Oryx and Crake* was the first of a trilogy, and green rabbits also figure in the other novels in the trilogy, *Year of the Flood* (2009) and *Maddadam* (2013).

The second major development in the media career of Alba occurred in 2012, when the Japanese director Yukata Tsuchiya premiered his metafictional remix, *GFP Bunny*, at the *Tokyo International Film Theatre* a film inspired by a scandal which had shocked Japan, when a school-girl had tried to poison her mother with thallium.³³ Tsuchiya's film explored the girl's motives by examining her other interests, which included experiments in dissection, genetic engineering and bio-art. Among the characters encountered by the girl are a biologist who created a transparent frog and an artist who implants a chip with GPS in her hand (echoing Kac's own 1997 work *Time Capsule*). At the end of the film, the girl rides off on a motorcycle with Takahashi, a body modification artist.

³³ *GFP Bunny*, directed by Yutaka Tsuchiya, Tokyo: UPLINK Co, 2012, 82'. Cf: <http://2012.tiff-jp.net/en/lineup/works.php?id=132>

This film won the best picture award in the *Japanese Eyes* section of the *Tokyo International Film Festival* and has been shown at many other major international film festivals including Rotterdam, Singapore, Taipei, Hamburg and Montreal. By agreement with Eduardo Kac, the English title of the film was *GFP Bunny*. As a result, this Japanese film came to occupy the *GFP Bunny* space in social media. The only *GFP bunny* domain in use on the web is that used by the film: gfp-bunny.info. The Facebook and Twitter accounts for gfpbunny are used by the film. (The gfpbunny Instagram account is owned by James Matthew, an American epidemiologist who is doubtless aware of Kac's work but does not refer to it in his Instagram account). The Japanese film not only took the idea of the *GFP bunny* to new audiences but also effectively colonised its social media presence.

The third and perhaps most influential media appropriation of Alba occurred in 2012. In reworking Sir Arthur Conan Doyle's story *The Hound of the Baskervilles* for the BBC TV series *Sherlock* (as *The Hounds of Baskerville*), the scriptwriter Mark Gatiss read about Kac's *GFP Bunny*. Realising how the genetic engineering could be used to update Conan Doyle's plot device of luminous paint, Gatiss introduced a side plot in which a scientist at the top secret base of Baskerville had created a glow-in-the-dark bunny called Bluebell.

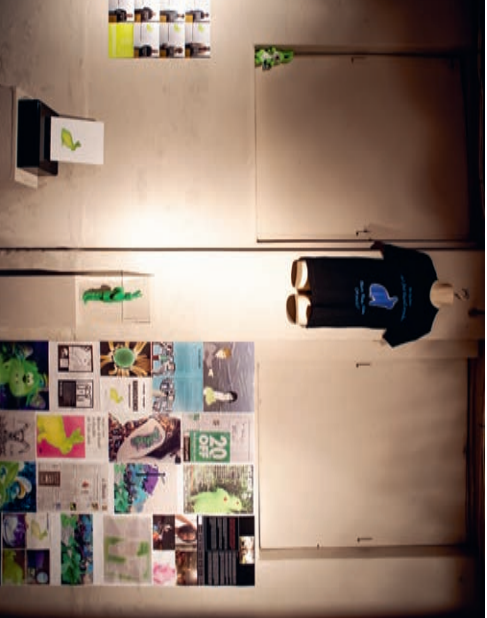


Eduardo Kac. Lagoogleglyph III. 2018.
Installation in Finsbury Park, London

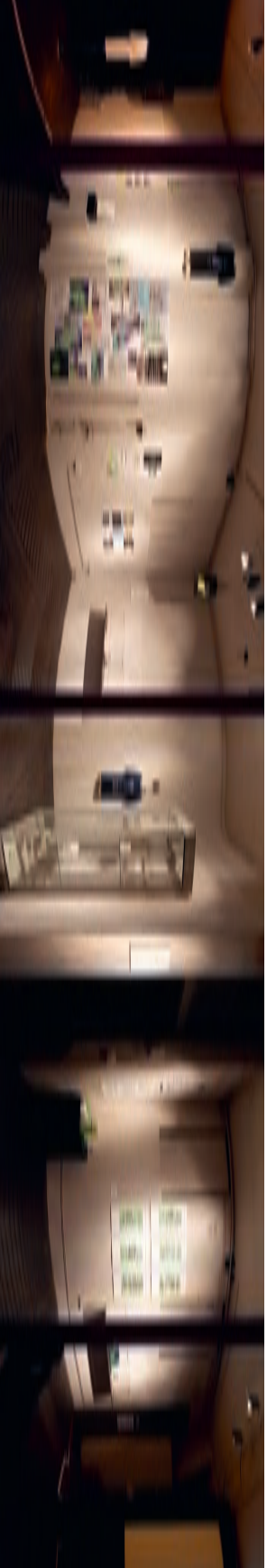
At the beginning of the episode, the scientist's child writes to Holmes to ask for his help in finding the missing Bluebell.

The Hounds of Baskerville was one of the most popular of the *Sherlock* reworkings of detective stories and the vanishing luminous rabbit Bluebell became celebrated in T-shirts, mugs, stickers, toys and even babies' clothes. This process of commercialisation of Alba reached its apotheosis with the release by Sony Pictures in April 2017 of the animated film, *Smurfs: The Lost Village*. In the film, Smurfette and her friends Brainy, Hefty and Clumsy use a mysterious map to enter the Forbidden Forest and find a lost village said to be full of Smurfs hiding before the evil wizard Gargamel. The four Smurfs suffer many hair-raising adventures. Gargamel tries to kill them with fire-breathing dragonflies and the four Smurfs get lost in a maze of caverns. They are rescued by a stampede of glow-in-the-dark rabbits. Smurfette and the other Smurfs befriend one glow bunny, Bucky, who takes them all the way to the river but is afraid of the river itself. Later on, he helps Papa Smurf in locating the four missing Smurfs.

Whilst the glow bunny Bucky featured prominently in the formidable merchandising of *Smurfs: the Lost Village*, with many glow bunny toys and games being produced, Alba finally reached merchandising Nirvana when a series of McDonald's Happy Meals were recently



Detail of display in the Horse Hospital exhibition....and the Bunny Goes POP! Tales of a Tales of a Rabbit Gone Viral. Featuring Eduardo Kac and Responses to his GFP Bunny. Horse Hospital London, 2-23 June 2018. Photo by Pau Ros



...and the Bunny Goes POP! Tales of a Rabbit Gone Viral. Featuring Eduardo Kac and Responses to his GFP Bunny. Horse Hospital London, 2-23 June 2018. Photo by Pau Ros

produced featuring *The Lost Village*, including toy packs with luminous bunnies. At one level, the Smurfs and McDonald's Happy Meals might be seen as representing a sanitisation of the vision of Alba presented in *Oryx and Crake*. However, at another level, references to transgenic animals in animated films and in hamburger merchandising might be taken as indicating that we are on the path to the dystopian world described by Atwood.

The glow bunny Smurf toys were licenced with the full weight of Sony's commercial might, although Sony itself appropriated the idea of the glow bunny from Kac and the *GFP Bunny*. It will be interesting to see whether Sony tries to restrict the cultural proliferation of fluorescent rabbits and what effect this commercialisation has on Alba's continued dissemination. Do the Smurfs and McDonald's represent the end of Alba's journey? Probably not. Alba is now a creature of the internet.

Glowing creatures permeate popular art, as sites such as *Deviantart* reveal. Patrick Lichty, Peer Hansen and Rachel L have taken the cultural commentator McKenzie Wark's mesh of Guy Debord, and added an ear on the back (in honour of Stelarc) and Bunny Ears (in honour of Eduardo Kac).³⁴ This *Detournement #1* of Patrick Lichty, Peer Hansen and Rachel L. Patrick Lichty, Peer Hansen and Rachel L *McKenzie Wark's Guy Debord: Kac/Stelarc Remix* is available under a Creative Commons licence in Patrick Lichty, Peer Hansen and Rachel L *Thingiverse*, so that Alba responses are now being 3D-printed. It seems that Alba will run and run. When the Arts and Humanities Research Council established its strategic theme of *Digital Transformations*, the terminology echoed that used in many corporate contexts, and was redolent of improved business processes and data management. This continues to be a dominant thread in research council strategies for digital technologies with investment in infrastructure receiving a great deal of prominence since the creation of UK Research and Innovation. However, the work of Eduardo Kac's work reminds us that real digital transformations are achieved through creative interrogation of technology and through reimagining how we engage with that technology. In thinking about the poetics of technology, different perspectives and possibilities emerge which aren't at first evident in spreadsheets. Poetics turn out to be true drivers of digital transformation.

³⁴ Cf *Detournement #1* of McKenzie Wark's *Guy Debord: Kac/Stelarc Remix* at thingiverse.com/thing:95311 See also Stelarc's commentary on his *Third Ear* at Stelarc, *Ear on Arm: Engineering, internet, organ* at stelarc.org/?catID=20242



Smurfs: The Lost Village. Advertisement by Sony Pictures, 2017.

curiosity [kjuəri'bsiti]

foundation of knowledge in the fullest sense of the word: science, art, philosophy, indeed life itself. curiosity (sapere aude! dare to know) remains the bane of existence for authoritarian regimes, and frankly all those who get nervous about change (from, say, sexual, racial, gendered repression to a more human rights egalitarian type of adventure). as it turns out, that's a whole lot of people, possibly including your good self.

Archiving for an Unknown Future: The State Film Documentation of the GDR (SFD)

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Store, classify, contextualise objects, records and present them.
Consider that these objects change their meaning over time.
Collect without knowing what will be important.
Capture the fleeting moments, the daily life.
Archival hegemony versus democracy.
Artefact and atmosphere versus data.
Access versus storing for the future.
The individual versus the universal.
Personal logging versus curation.

This list reflects only a tiny sample of the competing concerns most archivists face on a daily basis. It is even more troubled the deeper one deals with contested sovereignties. The *State Film Documentation* of the GDR (SFD) offers a unique entry point to re-thinking of archive in these contested environments.

Category: The pre-hoc ‘State’—memories born in the archive rather than retired to it

I will mainly focus on a collection of films made between 1972 and 1985 by the *Staatliche Filmdokumentation* (SFD)—the *State Film Documentation* unit—which survived as part of the collection of the *Staatliches Filmarchiv der DDR* (SFA), the former national film archive of the GDR. This corpus is commonly grouped into three main parts according to their time of production and content: the so-called ‘general documentation’ (1972–1977), films with a focus on Berlin (1978–1980), and films about the ‘socialist lifestyle’ (1981–1985). As I will show these film documents form a strange genre: although they can be considered filmic works in their own right, in many cases they were never meant to be screened in cinemas to a contemporary audience. Rather they were intended for future generations of GDR citizens only, or as stock footage to be kept within libraries for future research by historians and teachers. This is known as ‘pre-hoc’ archiving; that is, being conjured up *in* the archive rather than choosing an object / information and cataloguing it to the archive. The footage was also intended to be used by filmmakers who wished to make future films with at the time of collecting / recording with unknown purpose or at least no clear purpose. This unique collection not only contained audiovisual material but ultimately, information

about a specific time and place and its people, initiated and guided by the idea that one should collect the ‘typical’ sense of everyday life, but to do so in order to capture the ‘extraordinary’ as well.¹ While introducing the SDF as one main example for collecting historical images for later use, I will look at other attempts of creating archives with yet unknown use cases which date back to the beginning of the 20th century. Finally, I will look at the role of traditional archives and how they deal with diverse and changing expectations by the public when it comes to collection policies and access to their collections in a digital world.

Audiovisual forms of collecting information has had several predecessors in Germany throughout the 20th century. One example are the twenty interviews which were recorded between 1954 and 1960 by the German filmmaker and founder of the *Deutsche Kinemathek* in Berlin, Gerhard Lamprecht. These recordings capture the stories of his previous collaborators in filmmaking as well as other film creators from that time in Germany.² According to Eva Orbanz, former head of the Kinemathek’s film collection, Lamprecht’s attempts were influenced by the French actor, screenwriter and director Sacha Guitry, who made silent movies of important personalities. The *Degeto-Deutsche Gesellschaft für Ton und Bild* (German Society for Sound and Image) serves as another predecessor of such undertakings. The *Degeto* had plans from the 1930s onwards to build a similar archive consisting of film recordings showing famous personalities. This archive was to consist of ‘famous Germans’, including: the painter Max Liebermann, the physicist Albert Einstein, the writer and intellectual Ricarda Huch, the ‘father of German broadcasting’ Hans Bredow, the founder of psychoanalysis Sigmund Freud and the politician Konrad Adenauer.³ Another example can be found in the films of German director Hans Cürlis, who made artists portraits in the 1920s, including, for example his cycle *Schaffende Hände, die Maler* (The Creative Hands: The Painters), wherein Vasilij Kandinskij demonstrates the act of painting.⁴ While all these examples mainly focus on people of historic importance, there exist at the same time, attempts to document—at least at first glance—the insignificant. Crucial to the pre-hoc state of information collection included also the world renowned *Archives de la Planète*, founded by Albert Kahn in 1912.⁵

¹ Anne Barnert (2015), “Staatliche Filmdokumentationen. Geschichte und Idee einer Filmproduktion für die Zukunft,” in Anne Barnert (Ed.), *Filme für die Zukunft. Die Staatliche Filmdokumentation am Filmarchiv der DDR*, (Berlin: Neofelis Verlag), 29.

² Cf Eva Orbanz (2013), *Miteinander und Gegenüber. Gerhard Lamprecht und seine Zeitzeugengespräche* [With Each Other and Opposite: Gerhard Lamprecht and His Eyewitness Talks], (Munich: Edition text+kritik).

³ Announced in the German newspaper *Reichsfilmbblatt*, no 34, August 23, 1930 as quoted by Rolf Aurich, “Historische Quellen produzierten. Eine deutsche Filmtradition,” in Barnert, *Filmdokumentation am Filmarchiv der DDR*, 161.

⁴ Cf Hans Cürlis (1926), *Die Maler*, (Berlin: Institut für Kulturforschung e.V.) at www.filmportal.de/en/mov-43d4a758f45006e03053d50b37753d

⁵ Cf *Archives de la Planète* [Archives of the Planet] in the *Musée départemental Albert-Kahn* at museemagazine.com/features/2019/10/22/feature-albert-kahns-archives-of-the-planet

⁶ Wolfgang Klau (2015), "Und plötzlich hatten wir ein eigenes Filmteam," in Eva Hahn, Hans Karnstädt, Wolfgang Klau, Günter Schulz (Eds.), *Bilder des Jahrhunderts. Staatliches Filmarchiv der DDR 1955–1990, Erinnerungen*, (Berlin: DEFA-Stiftung), 208.

⁷ Cf Oliver Sukrow (2018), *Arbeit. Wohnen. Computer. Zur Utopie in der bildenden Kunst und Architektur der DDR in den 1960er Jahren*, (Heidelberg: Heidelberg University Publishing), 81ff. Important to note that in this text, Sukrow analyses the key role of cybernetics in the GDR which was methodologically as well as ideologically of substantial impact.

⁸ For Stalin's interpretation of Marx and Engel's dialectical method, see in particular J.V. Stalin, *Dialectical and Historical Materialism*, transcribed by M. from the original speech, Sep. 1938 at www.marxists.org/reference/archive/stalin/works/1938/09.htm

⁹ Sukrow, *Arbeit, Wohnen, Computer*, 78.

Category: 'Tolerated niche with jester's license'

The State Film Documentation (SFD)

It is important to keep in mind, that the SFD was not affiliated with any GDR film production studio at the time; it was rather a department of the *State Film Archive* (SFA). The SFA (1955–1990) was the central film archive of the GDR, with the task to collect and store all the production of the State, until it was merged with the Western German *Bundesarchiv* after the unification of Germany. In the GDR the State film archive was subordinate to the *Hauptverwaltung Film* (Central Film Administration) of the Ministry of Culture. Its collection was one of the biggest in the world and contained, amongst other items, the collection of the former *Reichsfilmarchiv* (Reich Film Archive from the Nazi period), whose holdings have been handed over by the Soviets to the GDR in 1955. It also contained all the productions of *DEFA*, the State film production company in Babelsberg where the pre-war *UFA* studios were located.

As Wolfgang Klau, then head of the SFA, writes, the SFD was founded by the archive itself, an idea which emerged in the second half of the 1960s.⁸ While Klau sees the establishment of a self-documentation of the GDR based largely on his personal engagement, the whole project has to be seen in a bigger political context. It emerged from the failed plans by Walter Ulbricht, First Secretary of the Socialist Unity Party from 1950 to 1971, to fund a cybernetic centre for the research and governance of society.⁷ The focus on 'the brighter future,' to paraphrase Stalin's well known slogan, is grounded in a specific interpretation of Marx and Engels' theory of historical materialism.⁸ The socialist elites in the GDR saw themselves adherent to the socialist ideology of controlling the future, thus they resorted to the instruments of planning and prognosis.⁹ In order to make planning easier, it is necessary to gather data: "A global leitmotif of the reform-friendly 1960s was the pathos formula of 'information', which seemed to allow planned and controllable access to the future through collection, storage and analysis of data records."¹⁰

Cultural Minister Klaus Gysi changed the original purpose and decided to set up a studio to document personalities from public life. But it was not the frontline men of the *SED-Staatliche Einheitspartei* (The State Unity party) but rather their 'second string' and their

¹⁰ Sukrow, *Arbeit, Wohnen, Computer*, 76.

allies. This included, for example the second-level relations between the SED and the CDU-*Christlich Demokratische Union Deutschlands* (Christian Democratic Union of Germany).¹¹ Even though this ‘second-string’ level of connection saw politicians like Anton Ackermann, a long standing Party functionary, willing to participate and have his portrait filmed, there was no permission from the leading Party members. This gave a particular middle-level strength or aliveness to the archive despite the Party officially silent on the information and the manner in which it was collected.

Category: ‘Unvarnished reality’

The fundamental idea and driving force behind the establishment of the SFD in the early 1970s was the impression that the history of the GDR had only been documented unsatisfactorily by the State. There were also connections to a documentary film project in the Soviet Union, which can be seen as a forerunner of the East German one, the so called *kinoletopis* (film chronicle).¹² The footage was recorded by a production group at the *Moscow Central Studio for Documentary Films*, which were deposited in the film archive of the Soviet Ministry of the Interior. The GDR sent staff members from the DEFA and the SFA to Moscow with the task to study these newsreels, which can be seen as the best strategy to guarantee that they were on safe grounds ideologically. The GDR aimed at creating historical records in a continuous manner, and because of that there were already promising first steps made in the years 1958, 1960 and 1962 to founding a so-called *Filmothek* at the DEFA. Finally, in 1968, the Ministry of Culture commissioned, as Barnert documents, “a central, systematically and comprehensively conceived film documentation as a department of the GDR film archive,” for the first time under the name *Staatliche Filmdokumentation*.¹³

In the beginning of the 1970s the archive was allowed to put two members of staff and financial resources on the project in order to produce film documents which could serve as the desired historical sources. The initial idea was to place production orders with suitable partners, like the film schools, the DEFA studio but also private film producers, while the supervision and decisions on content should remain with the archive. However, only one or two documents were eventually made that way, because the *Academy for Marxist-Leninist*

¹¹ Thomas Grimm (2000), “Verrat der Quellen. Die Staatliche Filmdokumentation,” in Jordan Günter and Ralf Schenk (Eds.), *Schwarzweiß und Farbe. DEFA-Dokumentarfilme 1946–92*, (Potsdam: Filmmuseum), 358.

¹² Documenting this point and the remarks that follow, see Barnert, *Staatliche Filmdokumentationen*, 29–157.

¹³ Barnert, *Staatliche Filmdokumentationen*, 44.

currency [ˈkʏrənʃi]

an economy of distribution/flow, which, in so flowing, engorges the object(s) of exchange, circulation and produces in its wake a certain kind of debt. this debt can, at the best of times, enable the exchange/ plurality of difference and may be able to form the basis of an ethical-political community. cf pierre klossowki's living currency or golding's 9th technology of otherness. however, and more often than not, currency/exchange can generate something far more sinister, usually involving some form of corpuscular greed, empty value, trash bonds, national debt and hatred of the Other. cf the buying and selling of options and futures.

Organizational Sciences (AMLO) was dissolved around the same time, which meant that film production equipment and personnel could be taken over in 1971 by the SFA.¹⁴ By this lucky coincidence, the archive had unexpectedly Western-German equipment for 16 mm material and for sound recordings at their disposal.¹⁵ The film archive suddenly had its own film studio, but also a multitude of additional problems. The conditions had to be created for the team to be able to work. Work spaces were needed, a 16 mm rewinding table, a viewing table, a projector, a screen, their own car, provision of the required film stock. As Klaue remembers:

“Owning our own film team was something unique in the world of film archives, especially if one remembers that the original task of a film archive would be directed only towards collection, preservation, cataloguing and giving access to the audiovisual heritage. This was also true for the activities of the State Film Archive.”¹⁶

As has been pointed out by film historians as well as Klaue himself, there is a long standing tradition of producing their own relevant historical sources in the name of the State or the ruling party. The so-called FdP-*Filmarchiv der Persönlichkeiten* (Film Archive of the Personalities, also a Nazi undertaking) is as an example for such efforts, which was integrated into the *Deutsche Kulturfilmzentrale* (German Centre for Cultural Films) in 1941, thus becoming part of Goebbles’ Ministry for Propaganda. This collection consisting of 75 to 80 portraits which were produced up until 1944, when *Totale Krieg*, the ‘total war,’ began and was not intended for publication but stored to be used by future generations. Film historian Rolf Aurich situates the SFD firmly in the tradition of the FdP, even if this viewpoint was not acceptable in the GDR for ideological reasons. He quotes Gerhard Jeschke, the main protagonist of the FdP activities, who wrote in 1950: “It was my intention with these films to preserve a glimpse into the life and work of great men of our time for generations to come. If I had the necessary means today I would film men like Hahn, Heisenberg, Gründgens, Prof. Windau and others.”¹⁷ The films are preserved in the *Bundesarchiv*, but there is no comprehensive research done on the material to date. Summarising Barnert writes:

“Even in the decades before, there had been repeated attempts to create a comprehensive and systematic film documentation independent of media coverage as a source of contemporary

¹⁴ Barnert, *Filmdokumentation am Filmarchiv der DDR*, 209.

¹⁵ The relevant internal documents created in the SFA and Ministry of Culture have been listed on the DEFA website at defa-stiftung.de/defag-eschichte/filmesder-ddr/280-filmdokumentation/ and can also be consulted at the Bundesarchiv under the corresponding archival numbers.

¹⁶ Klaue, *Und plötzlich hatten wir ein eigenes Filmteam*, 210.

¹⁷ It should be clear that in making this statement Jeschke expresses his ambivalent attitude towards his Nazi past by suggesting that he would include both Nazis and their opponents. Rolf Aurich (2015), “Historische Quellen produzierten. Eine deutsche Filmtradition,” in Barnert (ed), *Filmdokumentation am Filmarchiv der DDR*, (Berlin: Neofelis Verlag), 168.

history for future users. The inspiration for the SFD in this sense were collections in the *Reichsfilmarchiv* (Reich Film Archive) of the years 1942–44 as well as the facilities of the DEFA studio for newsreel and documentary films since 1949 with a film archive for government recordings and since 1965 with a film library.¹⁸

¹⁸ Barnert, *Staatliche Filmdokumentationen*, 34.

It may seem quite unusual that a film archive produces documentaries about its State and its people; it may seem quite contrary to filmmaking whereby the archive collects the footage and merely places it on shelves; it may seem quite uncanny, where by footage patiently awaits future generations, who will live in better circumstances than the present world could conceivably offer. This is the strange history of the State Documentary of the GDR. Indeed the SFD collection is still relatively unknown and published only in German. Nevertheless, the SFD may serve as a striking example of the practice of collecting images for generations to come.

These documentaries were meant to record the ‘unvarnished reality,’ ‘life as it is,’ and thus were meant to preserve, even unintended, a counter counter-reality to the one presented in official media coverage. On the one hand, this is not so far away from the Duchamp’s ‘found object’; on the other hand, it is very, very far away from that found-footage. The small Berlin film studio on Rosenthaler Platz had unlimited footage available in 16 mm and scripts could be developed that had been considered significant by the staff documentarists themselves. Many of these topics were still taboo for State-monopolised media in 1984–85. The niche SFD thus became part of the collective long-term memory GDR. Although the Eastern German society was planned through, there were some creative freedoms that were, at least semi-consciously, planned to soothe the bad conscience.¹⁹

¹⁹ Grimm, *Die Staatliche Filmdokumentation*, 361.

Category: ‘Imagined scale’ linked to ‘life as it is’

The mirror into which one wanted to look, reflected back too vague a self-image. So there was an ‘imagined scale’ as presented as a kind of guideline for cinematic self-reflection.²⁰ ‘Today’ defined tomorrow’s image; evaluation and control inevitably came into play as theoretical factors, whereas free documentation had fewer opportunities. This meant that apart from documenting ‘life as it really was’, it not only enabled a contrasting approach to official media coverage; it also

²⁰ Aurich, *Historische Quellen produzieren*, 188.

supplemented official media coverage. The management of the SFA conceived the footage as a starting material for further processing by future directors, publicists, historians and sociologists: “They want to capture typical processes and phenomena in social development for our descendants. This provides in later years information about ways of life and behaviour, traditions, habits.”²¹

²¹ Barnert, *Staatliche Filmdokumentationen*, 258.

In the 15 years of the SFD’s existence, 320 documentaries were produced, all of which survive in the *Bundesarchiv*.²² The images do not officially exist since they show loneliness, desolate houses and non-functional infrastructure. They were meant to document the struggle of the beginning of the GDR, hopefully long over by the time these historical documents would be used to underline the contrast between the difficult past and the glorious contemporary times. It seems significant that the leaders of the Party (like Erich Honecker or Walter Ulbricht) were not willing to be recorded and are therefore absent from the documentation, while lower ranking people were interviewed—sometimes quite openly critical of certain political topics. For example Karl Mewis, Head of the SPK—*Staatliche Plankommission* (State Planning Committee), who was in charge of the collectivisation of the farming industry, talked about the pressure which had been put on farmers to obey. The SFD wanted to dive into the daily life of the GDR citizens and record life in all its aspects—again, without any official political orders. Every new Head of the SFD came with new ideas and topics. These films are now summarised as *Berlin-Totale*, ‘Life as it is’: shops and sales talks or the first steps of the newlyweds Möllers into married life (who are accompanied whilst looking for a flat, borrowing and buying their furniture). It was the ‘typical’ that the SFD was after, the non-acted, real life people of their State, while the reporters remained unobtrusive.

²² For a comprehensive filmography, *Ibid.*, 304–18.

After the initial interviews, new and experimental formats were explored. Klaue points out that the team at the SFD was not satisfied with merely recording talking heads; aesthetic development came naturally. This was difficult to achieve with the documentary genre and as a result imaginary augmentation seemed a reasonable move:

“A professional cameraman cannot find satisfaction in repeatedly pointing his camera onto a fixed location and maybe changing the optics only two or three times every 30 minutes. Editors were frustrated because they had limited influence over what was said in front of the camera [...]”

Klaue further explains:

“In all the years of the existence of the SFD, no conclusive answer has been found to the question of what aesthetic principles must be respected in a film document. To what extent is the use of cinematic means legitimate? Camera work, lighting, sound, editing, montage. To what extent can the subjective factor be applied to a film document from the recording to the final production? We have not found a definitive answer to this question. Perhaps the verification will succeed with historical distance. SFD’s productions cover a wide range of design possibilities.”²³

Aurich adds that even if the production of the SFD are seen mainly or only as ‘historical sources’ in first place, once they become edited documentaries the footage can constitute artworks, even if the genre is not clear:

“As film they are dependent on the time of their production, their reception and their understanding, of the respective individuals and their predispositions. [...] But they always present more than what they want to tell and communicate. Always more than what is immediately to be seen and heard. The variety of possibilities and meanings, the context from which they come and in which they may be understood is hard to estimate. At least, they do not deliver contexts anyway. These should first be exposed if films are to give us information. Also, and especially for films whose function at the time of creation was decidedly formulated as that of a source. Dismissed from this narrow meaning, the films can be brushed as sources against the grain.”²⁴

In all of this, the independence of the SFD is emphasized. For example, officially the department was supposed to see and sign off all scripts for planned productions, but this actually never happened.²⁵ The film projects were never secret, though, and were never locked away. On the other hand, the films were not shown in public, apart from four titles at the 2nd *National Documentary Festival* in Neubrandenburg in 1979.²⁶ After the event, attempts (unsuccessful) were made to put the SFD under the control of the *Staatliche Zulassungskommission* (State Admissions Committee) in order to prevent screenings of their productions. The uneasiness with recording the GDR grew when it became clear that the ‘bright future’ was not to come soon and the essentially quite innocent recordings could be

²³ Klaue, *Und plötzlich hatten wir ein eigenes Filmteam*, 212–3.

²⁴ Aurich, *Historische Quellen produzieren*, 191–2.

²⁵ Klaue, *Und plötzlich hatten wir ein eigenes Filmteam*, 213.

²⁶ Grimm, *Die Staatliche Filmdokumentation*, 357.

²⁷ Bolesław Matuszewski (1995), "A New Source of History," at frieze.com/article/new-source-history-0. See also: Jan Uhde, "100 Years of Cinema: Remembering Bolesław Matuszewski," in *Kinema*, (Waterloo: University of Waterloo). Original document at *B. Matuszewski* (2006), *Écrits cinématographiques: Une nouvelle source de l'histoire / La Photographie animée ce qu'elle est, ce qu'elle doit être*, (Paris: Association Française de Recherche).

²⁸ I have written about this point extensively. See Adelheid Heftberger (2015), "Propaganda in Motion: Dziga Vertov's and Aleksandr Medvedkin's Film Trains and Agit Steamers of the 1920s and 1930s," in *Apparatus. Film, Media and Digital Cultures in Central and Eastern Europe 1*. DOI: [dx.doi.org/10.17892/app.2015.0001.2](https://doi.org/10.17892/app.2015.0001.2). See also A. Heftberger (2016), *Kollision der Kader: Dziga Vertovs Filme, die Visualisierung ihrer Strukturen und die Digital Humanities*, (München: edition text+kritik).

regarded as critical testimonies. Finally the SFD was abandoned, due to technical difficulties: it was impossible to maintain the equipment, whilst simultaneously attending to content-related issues which could not be solved by the team and their Head. With deep regret (even in 2015) and not on official orders, Klaue, as the Head of the SFA decided to give up the film production of the archive.

Category: 'Capturing' the temporary dimension (moving image as sensorial sources of history)

I propose that with the film medium, the attempts to document the typical were soon directed towards integrating a temporal dimension. In his 1898 seminal article, "A New Source of History," Polish cameraman Bolesław Matuszewski campaigned for a film archive, a place for historical cinematography, because the new medium would be perfect to accurately capture, "exactly and precisely the actions and spectacles of a documentary interest."²⁷ At the same time the camera would record sources of 'anecdotal history' or documents of personal history. Examples can be found in the Soviet Union, where filmmakers like Dziga Vertov and Aleksandr Medvedkin travelled on so-called Agit-trains to organise public screenings of peasants in the Soviet villages or showed films in the streets of Soviet cities.²⁸

Capturing objects and time on celluloid (and photographs) was what the French businessman Albert Kahn tried to do in his *Archives de la Planète* in Paris, which was in operation between 1908 and 1931. This multimedia archive was founded and financed by the Jewish-French banker Albert Kahn with, as Amad puts it, "the express purpose of capturing and storing the transformation of everyday life in the modern world."²⁹ Once again, this archive was never meant for public usage. Kahn was eager to use the most advanced technologies of his time, supplying his cameramen with the first ever colour process, the Autochrome plate invented by the Brothers Lumière in 1907. The collection was the largest worldwide comprising more than 72,000 colour photographs, more than 4,000 stereo images and over 100 hours of film material in 35 mm, containing unedited footage of early nonfiction film.

It constitutes one of the most ambitious undertakings of the new media of the time: "Whereas others dreamed about and debated film's archival and everyday affinities," Paula Amad points out, "Kahn

²⁹ Paula Amad (2015), *Counter-Archive: Film, the Everyday, and Albert Kahn's Archives de la Planète*, (New York: Columbia University Press), 5.

constructed a literal film archive devoted to recording the diversity of global daily life.”³⁰ The majority is unedited footage and until recently has not been the focus of scholarly studies. It has, equally, eluded the attention of cinema and exhibition curators. Amad further analyses the influences by French philosophers and film theorists of the time, focussing on Henri Bergson, who was notably critical of cinema. Amad reminds us, that Bergson had been hired by Albert Kahn in the late 1870s as a teacher and, subsequently, he became a close friend of the founder of the *Archives de la Planète*. In her study, Amad argues that it is Bergson’s concept of the ‘habitual’ and the ‘typical’ which became central to what would constitute a filmic archival discourse on ‘everyday life’ and ultimately an archive like Kahn’s. As she further notes:

“Film’s ability to record and store the raw data of routine experiences, transient details, uneventful moments, ordinary gestures, and casual occurrences—the side of life that Bergson summed up with the word *habitude*—produced one of the central *topoi*, or network of ideas and associations, of interwar French film culture.”³¹

French filmmaker and, arguably overlooked, film theorist, Germaine Dulac was also in favour of newsreels which she saw as bearing historical importance in terms of expressing both verbally and visually a temporal atmosphere, which only now becomes apparent. Dulac writes:

“If we are so often disappointed [with the conventional news stories], the reason is this: [news] events are of two kinds: there is the blockbuster event—sudden and important; and then there is the slow-burn kind of event, which evolves as the days go by and whose meaning becomes clearer only with time. The striking and the subtle event.”³²

As Amad points out, when Germaine Dulac wrote the above sentences in 1936, she had mostly newsreels in her mind. But it is also true for many recordings within documentary and amateur films of which many hours survive in archives and many other institutions. They probably make up the bulk of film material in film archives and are characterised by a wealth of different genres and different contexts of creation over the years of film production. They record images which document the important historical events as well as

³⁰ Amad, *Counter-Archive*, 6.

³¹ *Ibid.*

³² Germaine Dulac as quoted in Amad, *Counter-Archive*, 164.

private moments or the “minor events of social life, documenting the ‘anecdotal side of history,’” as Bolesław Matuszewski called it.³³

³³ Matuszewski, *A New Source of History*, at frieze.com/article/new-source-history-0

Category: Effect and shadow—how to locate the mundane

An historical event does not always appear where one expects it. It is far from the case that ‘History’ is composed solely of scheduled solemnities, organised in advance and ready to pose in front of the lenses. It is the beginnings, initial movements, unattended facts that avoid capture by the a ‘new source of history’ as the photographic or moving image, just as they escape inquiry. As Matuszewski reflects:

³⁴ Matuszewski, as referenced in Uhde, *100 Years of Cinema*, 322.

“Historical effects are always easier to seize than causes. But the two shed light upon each other; these effects will always bring in the broad daylight of cinematography but will also cast bright flashes of light upon causes lying in their shadow. To secure not all there is, but all that can be secured, is an excellent result for any type of inquiry, scientific or historical. Even oral accounts and written documents do not deliver to us all the class of facts to which they correspond, and nevertheless History exists, true after all in its broad outlines, even if its details are distorted.”³⁴

³⁵ Henri Bergson, as quoted in Amad, *Counter-Archive*, 96.

At best, these moments can only be highly subjective parts of the past; even with the best of intentions, archives are not—and cannot be—a comprehensive storage facility for human memories. As French philosopher Henri Bergson concludes: “Memory, as we have tried to prove, is not a faculty of putting away recollections in a drawer, or of inscribing them in a register. There is no register, no drawer; there is not even, properly speaking, a faculty [of memory].”³⁵

³⁶ Guiding questions from directors Loressa Clisby and Kevin Macdonald for their video recordings made by private people to be uploaded on YouTube for the crowdsourced 2010 documentary project *A Life in a Day*, directed by L. Clisby and K. Macdonald (2001), 1’35”.

Category: Emotional intensity [‘What do you love? What do you fear? What’s in your pocket?’]³⁶

In the world of YouTube and other networked platforms, we now turn to memory as a collecting archive and representation of this process as media transformation. In Kathryn Bigelow’s dystopian film *Strange Days* (1995), media devices called ‘squid’ discs contain recordings that allow a user to experience the recorder’s memories, emotions and physical sensations.³⁷ Presented as point of view shots in the film, every cherished memory in the form of film clips can thus be brought back in the most realistic manner and thus never be forgotten. Of course this has little to do with how a human actually remembers;

³⁷ *Strange Days* (1995), directed by Kathryn Bigelow 2’25”.

nevertheless, this Hollywood movie deals with quite innovative—if not futuristic for the time—technological methods of how to archive recordings with personal value rather than universal value. By being able to bring back certain pieces of the past in full intensity, the main protagonist also cannot blame the trauma of his break-up as the sole responsibility of his girlfriend. Condemned to re-live the same feelings he experienced by the break-up he cannot develop a healthy distance to the past; he simply cannot forget. Dealing with cultural objects is usually not quite as intense, although moving images have come quite close to presenting cultural objects as supposedly ‘exact’ representation of bygone incidents. This holds yet another form of ‘intensity’—not quite sentient, but compelling nevertheless.

We must ask of contemporary artists / archivists: what are the intentions of people or institutions today in collecting, documenting and archiving for future generations? Which values and aims do we ascribe to these archival records? How are they catalogued and indexed when we do not know any more than had been the case with SFD, in what future generations will be interested? How we interact, contribute, explore and use archival collections nowadays raises not only technical questions of software as tools to annotate, visualize and make objects and their data searchable. As cultural producers, we have to ask ourselves substantial questions of how and why we collect (or not), how we write collection policies, on what basis we decide what we see as meaningful and worth preserving for future generations.

We as individuals also collect and preserve, following our own private policies, storing data on hard drives or in boxes on shelves. These discrepancies are what innovative thinkers challenge, especially those who are active within the wider context of archival theory, museum studies, library and information sciences and knowledge design. Included in that group of innovative thinkers, Jeffrey Schnapp develops different approaches in his *metaLab* at Harvard University. With projects such as *Curarium*—intended as a collection of collections and an ‘animated archive’—his lab has been established to overcome the traditional practises by crowdsourcing annotation, curation, and augmentation of works within and beyond their respective collections.³⁸

³⁸ As paraphrased from Jeffrey Schnapp (2013), *Curarium: A Collection of Collections: collections, collections-based teaching, crowdsourcing, curation, data visualization, digital humanities, exhibitions, interactive media, museum innovation, visualization*, (Cambridge: Harvard University), at jeffreyschnapp.com/2013/09/24/curarium-a-collection-of-collections/

³⁹ Cf Lev Manovich (2018), *AI Aesthetics*, (Moscow: Strelka Press Kindle edition). See also his *Cultural Analytics Lab* at lab.culturalanalytics.info/

⁴⁰ Cf “*Life in a Day Distills 4,500 Hours of Intimate Video into Urgent Documentary*,” 29 July 2011, at wired.com/2011/07/life-in-a-day-interviews/

⁴¹ *Smoke* (1995) directed by Wayne Wang, 1’52”.

⁴² Roland Barthes (1981), “*Studium and Punctum*,” in his *Camera Lucida: Reflections on Photography*, translated by Richard Howard, (New York: Hill and Wang), 25–6. See also the seminal work of Michel de Certeau (2011), *The Practice of Everyday Life* (1981), translated by Steven F. Rendall, (Berkeley: University of California Press).

Another key figure is Lev Manovich who visualises and analyses huge amounts of cultural data produced by people on an everyday level at his *Cultural Analytics Lab*.³⁹ Many more projects recently completed open up archives of cultural institutions or scrape data from social networks, some in the context of the digital humanities, some in the social sciences, others originating within libraries, archives and museums.

There are artistic projects which focus on ‘mundane’ facts like private or self-recorded memories to depict our world and its people, either by slicing synchronously or diachronically. During the 1930s, artist collective *Mass Observation*, asked hundreds of volunteers in Britain to describe the details of their life during one month. Drawing inspiration from *Mass Observation*, the 2010 *A Life in a Day*, crowd-sourced material from over 80,000 clips—a total of 4,500 hours—all of which had been recorded and uploaded by users on YouTube. Explaining his motivation, one of the directors, Macdonald, candidly remarked:

“My aim was to create a whole movie from intimate moments—the extraordinary, the mundane, the preposterous—and thereby take the temperature of the planet on a single day, 24 July. [...] The inspiration for me was a British group from the 1930s called the *Mass Observation* movement. They asked hundreds of people all over Britain to write diaries recording the details of their lives on one day a month and answer a few simple questions: ‘What do you have on your mantle piece?’ or ‘Tell us the names of five dogs you meet this week.’ These diaries were then organized into books and articles with the intention of giving voice to people who were not part of the ‘elite’ and to show the intricacy and strangeness of the seemingly mundane. I simply stole the idea!”⁴⁰

Another example is *Smoke* (1995), where the protagonist photographs the same crossroad every morning for many years, documenting the ‘same’ shot and carefully placing each in a series of photo albums.⁴¹ In this documentation, unexpected objects can artistic appear without intentionally searching. We can read this as an example for Barthes’ *punctum*, where we are suddenly taken by a personal, affective artistic reaction to an image, which makes the universally significant relations disappear.⁴² This ‘temporal thin-slicing’ is still a popular method not only in filmmaking but also in painting and critical writing.⁴³

⁴³ See for example Christa Wolf (2008), *Ein Tag im Jahr 1960–2000* [One Year in a Day], (Berlin: Suhrkamp Verlag) where she documents one day each year (the

27th of September) over a period of several decades describing the events of that day and her reflections about it. See also the work of painter Pierre Imhof, 12

months/ 365 days/ one year in the life, London: Exhibition at Dash Gallery, 1995 at www.pierreimhof.com/exhibitions/

Category: Temporal thin-slicing, 'un-curation' and the traditional archive

The differing initiatives mentioned highlight three axes using contemporary media in relation to the archive and its documentation. Those axes are: first, what is the role of a traditional archive for collecting and storing artefacts and images today; second, how would one classify and catalogue the multitude of 'un-curated,' heterogeneous and multimedia documents using traditional cataloguing and documentation practices; and finally, how to interpret or make sense of these recordings, now and into the future.

I have outlined the way in which Kahn followed Bergson's idea, where the meaning of life can be 'captured' in the archive, be it oral, written or visual. This position is echoed by Brunhes (1913), when he writes:

"[The main task of the photographic archive is ...] to employ those instruments which have just been born in order to capture and conserve the facts of the planet which are going to die. [...] a sort of true picture of life in our age, constituting the monument *par excellence* of consultation for those who will come after us."⁴⁴

With the rise of platforms such as YouTube or web projects dedicated to specific topics and personal archives, as well as growing collections of life-recording micro-data made by one's emails, smart watches and mobile phones, one has to ask how relevant traditional cultural heritage institutions continue to be. Many archives acknowledge the importance of the 'selfie' and with billions of data uploaded to Instagram, vimeo, snapChat or Facebook, these platforms provide the basis for a different way to write history and make cultural analysis. However, the sheer mass of data is just overwhelming, particularly where archives struggle to find appropriate ways of organising their collections (for example cataloguing, subject indexing, long term archiving). This is not a new experience for film archivists who still battle with the so-called analogue backlogs of millions of items on film material and paper to be accessed and integrated into archival record management and storage systems. While scholars understandably demand that archives should also deal with a broader spectrum of digital data produced from multiple inputs, traditional institutions simply do not have the resources to deal with this task. Does this mean that traditional archival tools and catalogues are not able to handle the different formats of visual cultural production?

⁴⁴ Amad, Paula. *Counter-Archive*, 60. The first film images were dedicated to so-called typical events or everyday people, for example the short films by the brothers Lumière or early newsreels. These give us more an impression of people posing for still photography. This is not to suggest that either the archive or photography is about capturing time. It is to emphasise the problems that archivists face when determining pragmatically how to store memories of the future, as well as those of the present, the past and the not yet imagined.

In my view, there is the need to integrate existing and traditional approaches to the archive with new and alternative information systems. Archives need to develop cooperatively alternative tools for subject indexing and retrieval, which is both a technological challenge (video analysis, automated indexing, deep learning) and artistic and intellectual challenge, targeting more comprehensive and inclusive strategies to manage and to enrich records. Setting up meaningful crowdsourcing projects, inviting the disenfranchised into the archive to contribute to the collection and help with creating annotations or organising *Edithons* and *Hackathons* are just a few examples for new ways of engaging with the public.

Irrespective of why one collects and for whom, the overarching pragmatic question remains: what can we do with these ever proliferating everyday images, this visual storehouse of history? The answer is not to shy away from the proliferation of data and its recordings, but to immerse more fully with the everyday—to record in the widest sense of the terms anti-heroic, the mundane, the sensuous and the seemingly insignificant. Writing an alternative history which differs from the privileged moments of heroic stories is only possible if there is enough ephemeral visual data available. Amateur films and home movies remain both historical sources as well as aesthetic manifestations in their own right.⁴⁵

Immersing ourselves more fully with the massive proliferation of everyday data, it is to understand that the archive is nothing more nor less than the gritty processes that makes history ‘available’. But let us not just tell ‘the one story’ but a polyphony of stories to create the history of humankind. And, why not let people create these stories themselves by engaging not only with data creation and enrichment, but also with navigating through the archival items and records, creating their own relevant versions. The responsibility of the archive would thus include not only the traditional ones like collecting, storing, presenting and so on, but also provide new ways of accessing and producing tools for visualisation and story-telling for their users, on their premises but also on the internet, the zoomiverse, and 3D holographic e-rooms.

⁴⁵ An outstanding example is the “*Ephemeral Films Project: National Socialism in Austria*” by the Austrian Film Museum and the Ludwig Boltzmann Institute for History and Society (both Vienna) which is dedicated to annotating and presenting amateur footage in relation to the *Anschluss* (the annexation of Austria to the German Reich) in 1938. See: <http://efilms.ushmm.org/>

curved time [k3:vd taim]

chronos operates in a variety of ways, but none more interesting than when it shape-shifts completely away from its linear sequence (where linearity stands in, for example, a functionally paced past-present-future line dance). maxwell was not the first, but he was certainly one of the first who realised that earth-time is gravitationally challenged, being pulled (as it were) towards the planet at every dot-wave-bundle of its ‘next’. given this conundrum, some go as far as to suggest there is no such thing as time, only the velocity (and convenience) that makes it ‘count’ (matter, organise).

On Classification or Wonder Is the Denial of Analogy

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cyberpunk [ˈsaɪfəpʌŋk]

started in the 90s as a movement dedicated to ensuring privacy over secrecy: “a private matter is something one doesn't want the whole world to know, but a secret matter is something one doesn't want anybody to know. privacy is the power to selectively reveal oneself to the world.” (paul hughes, cyberpunk manifesto: 1993). now more than ever does this ring true. strategically one must consider anonymity in relation to privacy (especially in a world where all data melts into information-segments); politically one must rewrite the 9th century habeas corpus (there shall be the body) into 21st century law. an updated magna carta in the zero-one swamplands of being.

¹ Janet Thumim (1998), "Mrs Knight Must Be Balanced: Methodological Problems in Researching Early British Television," in Gill Branston, Stuart Allan and Cynthia Carter (Eds.), *News, Gender and Power*, (London: Routledge), 91–104.

² Jorge Luis Borges (1973 [1964]), "John Wilkins' Analytical Language," in his, *Other Inquisitions 1937–1952*, (Austin: University of Texas Press), 101–05. The list that follows is taken from this source.

³ Michel Foucault (1994 [1966]), *The Order of Things. An Archaeology of the Human Sciences*, (New York: Vintage Books), xvi.

The archive has presented an instrument of power for thousands of years and the aspiration to keep it in control threads its way through history. Archival work and its related practices, such as the choice of what should be preserved, acquisition policies and 'weeding procedures,' influence historiography. In this context classification is and remains an inescapable archival and heuristic necessity; the archive cannot exist without names, titles, indexes, classifications or categories. However, by considering classification merely as a heuristic tool for access to collections, we leave aside its scope of power as an instrument to influence historiography. Each enumeration always creates a narrative—the parity between *Zahl* (number) and *Erzählung* (enumeration) is well known. The historian must be careful though not to distort what they receive from the archivist, since what has been made available to the researcher, has been preselected according to criteria opaque to them.¹

It is not clear, however, what the optimal model of classification should look like. In one of his famous stories, Jorgé Luis Borges mentions an ancient Chinese encyclopedia named *Celestial Emporium of Benevolent Knowledge*.² Borges does not dwell on this encyclopedia, but he indicates with an example dedicated to the classification of animals, how concepts and things were ordered:

"In its distant pages it is written that animals are divided into (a) those that belong to the emperor; (b) embalmed ones; (c) those that are trained; (d) suckling pigs; (e) mermaids; (f) fabulous ones; (g) stray dogs; (h) those that are included in this classification; (i) those that tremble as if they were mad; (j) innumerable ones; (k) those drawn with a very fine camel's hair brush; (l) etcetera; (m) those that have just broken the flower vase; (n) those that from a long way off look like flies."

Michel Foucault was inspired by Borges' parable and his awareness for the "exotic charm of another system of thought," and enlarged upon this idea in his book *The Order of Things*.³ In reality, and not only in the fictitious writings of Borges, there are endless ways to classify and catalogue the world and to organize and arrange knowledge. For instance, the different ways to place books in a library can be sorted by size, cover, colour or origin—or one may decide to keep together virtually even the ones that have been stolen.

Ever since their existence, the practices of arranging, quantifying and classifying have been the very basis of museums, archives and libraries. Many of these institutions followed the example of Hernando Colón, second son of Christopher Columbus, a passionate bibliophile and founder of what today is called the *Columbine Library* in Seville.⁴ Hernando Colón used to document his book and print collections in various lists and catalogues to facilitate the work of scholars. His classifying system reads as fascinating and astounding as the one described by Borges. Colón explains:

“The system devised by Ferdinand for classifying his prints was determined by the sorts of prints that were available to him at the time he began collecting. In the inventory, the prints are described pragmatically, categorised first by one of seven sizes (sezavo, octavo, quarto, medio, pliego, marca and rétulo), then subject (male and female saints, men and women, animals, inanimate objects, decorative knots, topography, ornament and vegetation). The third category is the number of any one of these in the image, for example, ‘6 male saints’ or ‘3 dogs’. After fifteen, the designation ‘many’ is used. The fourth criterion is whether they are dressed or undressed. A complete heading from the inventory runs, for example, a pliego-size Print of ‘8 clothed male saints’ (Pliego de 8 de santos vestidos) The prints that agreed with the criteria were then described under that heading.”⁵

This of course is yet only another example to illustrate the dangers of excessive and obsessive cataloguing based on verbal signs. In the past classifications often were made up by nothing else but *ekphrasis*, the verbal descriptions of objects or images. Even today *Verbalizing Images* still is seen as a valid approach.⁶ However, the translation of images into words is a questionable practice, as emphasised by Didi-Huberman and other scholars who critically examine the ‘danger of contemporary logocentrism.’⁷

But what exactly is classification? According to Geoffrey Bowker and Susan Leigh Star put forth in 2000 it is “a spatial, temporal, or spatio-temporal segmentation of the world. A ‘classification system’ is a set of boxes (metaphorical or literal) where things can be put, to then do some kind of work-bureaucratic or knowledge production”.⁸ From a set of boxes to the metaphor of the drawer is attributed to Henri Bergson, who claimed that concepts are drawers that allow the classification of knowledge.

⁴ Cristina Gonzalez Hernandez (2008), “Found a Columbian specimen among the complutense funds,” in *Pecia Complutense*, (Madrid: Madrid University) no. 8, 72.

⁵ Mark P. McDonald (2004), “The System of Print Classification and Description in the Inventory,” *The Print Collection of Ferdinand Columbus (1488–1539): A Renaissance Collector in Seville. History and Commentary*, (London: The British Museum Press), Vol. 1, 75.

⁶ Ingo Zechner (2018), *Verbalizing Images. Report for the conference I-Media-Cities Mapping City Films*, The Austrian Film Museum at filmmuseum.at/forschung_vermittlung/forschung/i-media-cities

⁷ Georges Didi-Huberman (2005 [1990]), *Confronting Images. Questioning the Ends of a Certain History of Art*, (Pennsylvania: Pennsylvania State University Press), 39.

⁸ Geoffrey C. Bowker and Susan Leigh Star (2000), *Sorting Things Out. Classification and Its Consequences*, (Cambridge MA: The MIT Press), 10.

The metaphor of the drawer became enormously influential and is still used in books and discussions on the subject today. In his *Poetics of Space* Gaston Bachelard identifies the metaphor of the drawer as a symbol of a perverse classificatory and taxonomic obsession. For Bachelard an object undergoes a process of depersonalisation when placed in a 'drawer'. It may shrivel up; it might crystallise with other similar ones. As he puts it concepts begin as "ready-made garments which do away with the individuality of knowledge that has been experienced"; but when being classified they become lifeless thoughts "since, by definition, it is classified thinking."⁹

⁹ Gaston Bachelard (1964 [1958]), *The Poetics of Space*, (Boston: Beacon Press), 75.

In a certain sense it must be considered that there are no right or wrong classifications but systems that are more or less appropriate and practical to achieve the respective purpose for which they were drafted. The cultural historian Robert Darnton writes:

¹⁰ Robert Darnton (1984), "Philosophers Trim the Tree of Knowledge: The Epistemological Strategy of the *Encyclopedie*," in Robert Darnton, *The Great Cat Masseur and Other Episodes in French Cultural History*, (New York: Basic Books), 192.

"We order the world according to categories that we take for granted simply because they are given. [...] Things hold together only because they can be slotted into a classificatory scheme that remains unquestioned. [...] Pigeon-holing is therefore an exercise in power."¹⁰

On the other hand Ludwig Wittgenstein argues that all explanation are hypotheses.¹¹ One could say that every cataloguing is a hypothesis. It is therefore necessary to accept and develop new forms of cataloguing that will enable new systems of knowledge. Work must be done in response to the urgent need to develop new organisational forms beyond established categorisations and indexing systems.

¹¹ Ludwig Wittgenstein (1993 [1967]), "Remarks on Frazer's *Golden Bough*," in James Klagge and Alfred Nordmann (Eds.), *Philosophical Occasions (1912–1951)*, (Indianapolis: Hackett Publishing Company), 123.

The motivation to organize knowledge and to make it accessible never was a philanthropic concept and was always driven by economic interests or the will to maintain and expand political power. The extent to which knowledge production has been functionalised, however, has changed in the last decades. It peaks in our modern world, which is based on enumeration, statistics and classifications in a way previously unseen. This utilitarian mindset partly derives from the New Public Management, a legacy of Margaret Thatcher's premiership—a way of thinking that centres the measurement of performance in various fields of human actions.

As Bevilacqua and Borrelli summarize:

"It is based on the application of the principles of competitiveness and 'customer satisfaction' to activities like public services or university education and research, until then considered traditionally

alien to the logic of the free market. In a sense, an idea of governance based on the measurement of performance expresses—as it could not be better—the spirit of our time, since it represents what is the political reason in the era of its substantial neo-liberal liquidation.”¹²

Although the Thatcher era is long past, we still feel its impact on present-day society, which is dominated by ‘algorithmic culture’, as Striphas calls it.¹³ Despite the value assigned to classifying activity today, theorists in this field still are asking themselves how and why making lists and drawing up rankings can produce knowledge, no matter whether useful or not.¹⁴ But even those who are still looking for answers on how classifying produces knowledge are convinced that “classification is a capital foundation of thought.”¹⁵ They also assume that it is something typically human.¹⁶

Regardless of these reinsurances, the crucial cultural action of sorting, classifying and hierarchising has now been almost completely delegated to machines.¹⁷ The culture of evaluation has eventually also reached the administration of museums, collections and media archives. In order to obtain grants, one must submit statistical reports with detailed lists of the number of visitors, services provided and so on. But in the context of museums, classification has always influenced the way collections are managed and objects described. The current tendency is to identify automatically individuals by facial recognition, and places by geotagging; or to count the scenes in a movie with programmes like *Cinematics*.¹⁸

¹⁶ Geoffrey C. Bowker et al. *Sorting Things Out*, 1.

¹⁷ Ted Striphas (2015), *Algorithmic Culture*, 396.

¹⁸ Manuel Carin and Albert Elduque (2017), “The Intermittence of Visual Motifs: A Quantitative Methodology for a History of Cinema Without Names,” in Diego Cavallotti, Simone Dotto and Leonardo Quaresima (Eds.), *A History of Cinema Without Names/2*, (Udine: Mimesis), 59–72.

¹² Emiliano Bevilacqua and Davide Borrelli (2014), “La valutazione della conoscenza nell’epoca della sua producibilità digitale,” in *Im@go. A Journal of the Social Imaginary*, no. 4, 67–68.

¹³ Ted Striphas (2015), “Algorithmic Culture”, in *The European Journal of Cultural Studies*, vol. 18, no. 4–5, 395–412.

¹⁴ Cf Richard Adams (2003) where he writes: “Classification has three main functions: “Management of data, [...] predictions of event, [...] explanation of phenomena”, in his *Perceptions of Innovations: Exploring and Developing Innovation Classification*, PhD Thesis, (Cranfield: Cranfield University), 48.

¹⁵ Paolo Fernando Gil (1981), *Sistemática e classificazioni*, in *Enciclopedia Einaudi*, (Torino: Einaudi), no. 12, 1025.

¹⁹ Ian C. Jarvie (1978), "Seeing Through Movies," *Philosophy of the Social Sciences*, vol. 8, no. 4, 378.

²⁰ Salvatore Settis (2005 [1979]), *Iconografia dell'arte italiana 1100–1500: una linea*, (Torino: Einaudi), 124.

²¹ The MPLP (More Product, Less Process) is fundamental to a specific ideological platform linked to economic and new forms of capitalism. In my view the MPLP could not have any space in culture. Cf Nuccio Ordine (2013), *L'utilità dell'inutile. Manifesto*, (Milano: Bompiani). Cf Mark A. Greene and Dennis Meissner (2005), "More Product, Less Process: Revamping Traditional Archival Processing," in *The American Archivist*, vol. 68, 208–63.

Data processing systems support the frame-by-frame annotation of movies by automatically recognising objects and living beings in films, videos or digital recordings. This kind of 'deep' cataloguing primarily contributes to promoting the selling of material preserved in the respective institution. Such surveys are not implemented with the ultimate aim of improving knowledge. Deep classification or the decomposition of films into scenes certainly does not serve the appropriate citation of the filmic sources by historians—a requirement evident at least since 1978.¹⁹ For this purpose, the simple time-code is completely sufficient. Given these premises, any deep cataloguing tending to the perfection of the moment (usually called *best practices*) seems uneconomic in terms of time and resources. As stated by the art historian Salvatore Settis, this kind of cataloguing creates a tension towards perfect form. There is no development beyond this so-called perfection.²⁰

Deep cataloguing as a consequence eliminates the need for research and analysis. It presents as if all the answers about an artifact or a film are contained in the catalogue. It works like video surveillance connected to automatic face recognition systems. In the future, tracking and tracing will be no longer required. Neither will there be space for the analysis of critics and historians. Critical analysis is the first victim of any deep-catalogueraphic system. To put this differently: if the catalogue provides all the answers, it is no longer necessary for the historian to raise too many questions. In opposition to this situation, to paraphrase Édouard Glissant: I demand for all the right of opacity. Instead of identifying every minimum aspect of an object belonging to a collection or archive, it would be much more efficient from an epistemological point of view to catalogue all the materials stored there. The back log is immanent to the archive: to invest in campaigns, to acquire new materials or to share the materials for free with the public means to invest in the use, reuse, communication and free sharing of archival material. This seems more far-sighted than investing money and time to develop deep cataloguing.²¹

For the scientific community to study and analyze documents, it is important to know which documents exist by their peculiar characteristics, not their nuances. This facilitates the transfer and extension of new knowledge. In order to meet the cognitive need for a brief overview, there is no necessity for deep cataloguing.

The importance of primary cataloguing is exemplarily demonstrated by biological research. The *International Union for Conservation of Nature* (IUCN) has established precise rules to determine when an animal species is considered extinct. The first rule states that only a species previously discovered, analyzed and therefore known to scholars and to the rest of the world can be considered extinct. As a consequence, one could deduce that what is unknown cannot disappear.

Unfortunately reality is quite different, but the rule demonstrates how crucial is a first cataloguing, a first census. How much dies unknown without a trace, without seemingly causing a problem, instead causes incalculable consequences. The inclusion of witnesses, testimonies and documents, until now neglected or consciously excluded from archives and collections, must have priority over deep cataloguing practices. Drawing attention to sentient beings is more reasonable than investing in a perfect database or in the most accurate cataloguing system.

The precise and detailed classification, which is defined by the adjective 'deep', serves mainly for quantification and statistics. Both may be valuable and exact sciences, but are not very useful for writing the history of living creatures—or in fact any species that act and create. Statistics do not help much in understanding human impulses and behaviour but—as it seems—“numbers have lost nothing of their mystical glamour.”²² Human action is always unpredictable and is modified by numerous erratic 'accident factors'.²³ To embed life, memory or the trace of earthly existence in a histogram, a diagram or a database is to violate existence. If, for example, one historical statistic analysis finds out that 83 hairdressers and 32 water carriers were active in a given place and time: “the eighty-three hairdressers represent eighty-three individual beings, and the thirty-two [...] have only this in common, that they carry water.”²⁴ The statistical enumeration will not tell us anything about emotions and individual temperament. History understood as the study of human beings: “is one of the last barriers preserving our society from the total loss of both individual and national identity,” cannot be based on questionable archival or catalogueraphic procedures.²⁵

The history of sentiments, a field that has been investigated especially in the classic historiographic research.²⁶ So far little has been applied to the issue of cataloguing and archiving, although

²² Henri Lefebvre (1991), *Critique of Everyday Life, Vol 1 Introduction*, (London, New York: Verso), 103.

²³ Richard Cobb (1976 [1971]), “History by numbers,” in Richard Cobb, *Tour de France*, (London: Duckworth), 1–8. The following argument is drawn from this article.

²⁴ *Ibid.*, 7.

²⁵ *Ibid.*

²⁶ Ute Frevert (2013), *Transient Emotions*, (Göttingen: Wallenstein).

²⁷ Cara Krmpotich and Alexander Somerville (2016), "Affective presence: The Metonymical Catalogueue," in *Museum Anthropology*, vol. 39, no. 2, 178–91. "It is rarer to encounter affective relations that illuminate cultural or social engagements between objects and people prior to their life in the museum." Ibid, 183.

²⁸ Emily Vermeule (1987), "Baby Aigisthos and the Bronze Age," in *Proceedings of the Cambridge Philological Society*, no. 33, 145.

²⁹ Roger Caillois (1964 [1960]), *The Mask of Medusa*, (New York: Potter), 9–15.

³⁰ Ando Gilardi (2003 [1978]), *Wanted! Storia, tecnica ed estetica della fotografia criminale segnalatica e giudiziaria*, (Milano: Bruno Mondadori).

invitations to step into this direction are increasingly perceptible.²⁷

Emotions disconcert the historian, but their necessity is masterfully described by the French archaeologist Emily Vermeule who draws up a merciless report with regard to feelings in archeology:

"The contemporary archaeologist is handicapped when dealing with poetry. Poetry, and art, offer selected myths and isolated heroic individuals, two elements archaeologists have been trained to ignore, perhaps abhor. An archaeologist is permitted by his colleagues to deal only with quantified, anonymous people, estimated consumers of barley, occupants of graves graphed on computers for place and time. He is not permitted to deal with individual yellow-haired chiefs of the Argives. He must subdue his private fictions to evidence photographable in the dirt, and should ideally publish his results as mathematical formulae."²⁸

How can the ephemeral, the inconsistent and the marginal be catalogued? This is especially difficult if the catalogueuer is required to follow *status quo* ethics, that is to say professional ethics, which binds him to an objectivity that in fact does not exist. The French sociologist and poet Roger Caillois, an expert in diagonal sciences, defines any form of classification as ephemeral.²⁹

On the other hand, there are systems that have proven more durable. The Linnaean taxonomy, for instance, has existed for several centuries, but with the important difference that it has been continuously corrected and modified. Considering the increasingly rapid succession and alternation of hardware and software systems based on which modern classifications are generated, we must assume that today's classifications will have an ever shorter life expectancy. The classifications as such, which do not present actual knowledge themselves but rather tools to attain it, are ephemeral. Classifications do not go into crisis as a theory, but are surpassed by others, which are not necessarily more effective but primarily more modern. It can be observed that more complex classifications become, the less they work. An example for the malfunction of complicated systems is the abandonment of the method for identifying criminals (known as Bertillonage in use from 1883 to 1913) developed by the French criminalist Alphonse Bertillon.³⁰ Apart from the obvious problem of racial, social and sexual stereotyping there is another argument demonstrating the need to rethink practices of deep cataloguing in archives and museums.

No collection is ever static; it is continuously subjected to cyclical changes or radical restructuring caused by territorial or political changes—new acquisitions, new repositories or changes within the structure of the institution owning the collection.³¹ Jochen Brüning writes that the inventory and presentation of collections is subject to constant and often intensive change.³²

Considering the collections are constantly changing, why create data, catalogue lists and invest so much time and money in deep cataloguing, especially since in order to reflect the collection, the catalogue must change when the collection changes. Classification is a continuous activity that always produces provisional and never definitive results. We might reduce it to the essentials and not complicate it. If personal life, knowledge, and history advance only obliquely as philosopher Merleau-Ponty asks why the catalogue should be linear?³³ If knowledge about images is by its very nature an eccentric, heterotopic and transversal knowledge, it is unlikely that they can be encased, catalogued, described once and for all.³⁴

In his book *The Order of Things*, Michel Foucault states: “Where language required the similarity of impressions, classification requires the principle of the smallest possible difference between things.”³⁵ Reducing differences is an unwise and less desirable practice, even when this important characteristic of classification, especially in the human sciences. Each classification produces assimilation and ultimately a flattening in variety: “Defining a concept is a limiting activity; trying to establish a common meaning can have the effect of excluding enriching diversities.”³⁶

³⁵ Foucault, *The Order of Things*, 159.

³⁶ Patricia A. Sullivan and James E. Porter (1993), “Remapping Curricular Geography. Professional Writing in/and English,” *Journal of Business and Technical Communication*, vol. 7, no. 4, 391.

³¹ Ernst Posner (1942), *Effects of Changes of Sovereignty on Archives*, in *The American Archivist*, vol. 5, no. 3, 141–55.

³² Jochen Brüning (2009), “Science and Collection,” in Sybille Krämer and Horst Bredekamp (Eds.), *Picture Schrift Zahl*, (München: Fink Verlag), 88.

³³ Maurice Merleau-Ponty (1973 [1969]), *The Prose of the World*, (Evanstone: Northwestern University Press), 112.

³⁴ Georges Didi-Huberman (2012), “Au pas léger de la servante. Savoir des images, savoir excentrique,” in Pascale Haag and Cyril Lemieux (Eds.), *Faire des sciences sociales. Critiquer*, (Paris: Éditions de l’École des hautes études en sciences sociales), 177–206.

³⁷ Richard Adams, *Perceptions of innovations*, 3.

³⁸ Bevilacqua et al., 81–82.

³⁹ Thomas S. Kuhn (1962), *The Structure of Scientific Revolutions*, (Chicago: University of Chicago Press).

⁴⁰ For the argument that the computer branch should be brought back to its origins and not be used as a control and calculation machine but as a tool for the expansion of consciousness of individual, mental and expressive abilities, see John Markoff (2005), *What the Doormouse Said: How the Sixties Counter-culture Shaped the Personal Computer Industry*, (New York, London: Penguin Books).

Classification eliminates the unexpected and the marvelous by using analogy as its main instrument. If the statement of Foucault is credible, one could misread the argument and think that a valid classification is disordered, chaotic, rhapsodic and certainly not precise or measured. But as Foucault develops the argument around the discursive this eventually can lead to classifications and archiving inspired by the methods of artistic research. Since any classification is always subject to the societal histories to which it is a part, this is not intended to be an argument against classification, but it is a fact a way to include those worlds that actively refused admission.³⁷

The act of classification is never innocent or anodyne. The word 'class' comes from the Latin *classis* (military fleet) which itself comes from the original meaning of a calling or convocation. Therefore, attributing something or someone to a class means literally asking it, calling it to occupy a certain position, placing it within a predefined conceptual grid. In this sense, each classification system is a device in the service of producing the identity of what it classifies, rather than simply registering and taking note of it.³⁸ Knowledge does not derive from discipline but from questioning what has been studied, known or classified. As Thomas Kuhn has shown: every scientific theory (and every classification) is useful only as long as it works.³⁹

No classification and no annotation can ever satisfy all the questions and search criteria of historians or scholars. The catalogues of museums or archives are enormously useful tools, but no one can ever predict what the questions of future researchers will be. In addition, a scholar if worthy of the name will never follow the well-beaten path already gleaned and made available to all through a database.⁴⁰ In order to progress in knowledge, it therefore is necessary to look for what has not been studied, for things that have escaped attention, for things that have not been seen, and in practice for things that have not been considered worthy of classification.

We cannot expect to have useful and suitable classification terms for all the infinite cases that life offers. No matter how structured and complex it might be, no classification will ever be able to incorporate the infinite types of existing facts. Even if it were humanly possible to manage an infinite classification, groups such as 'other' or 'none of the above' could not be avoided. The categories *etcetera*, *miscellanea* and similar exist, and if one follows the method of artistic practice-led

debt [dēt]

in a small gathering over pizza and beer, a circle of freshly minted mba's, all or most, global ceo's in their respective fields, tossed out the question 'what is the most expensive item you have bought in your lifetime?' around the wooden tables came answers: a string of restaurants! a yacht! a trip around the world! when almost all had responded in such-like terms, the last to speak raised a glass and flatly declared: 'i bought the greek debt.' (of course this was sold on, enriching the pockets of the wildly wealthy whilst making certain those not in the know paid for that debt over and over and over again). leveraging the future—always good for a laugh.

research one is able to accommodate this fact. Since these residual categories expand and contract over time; that is open to everything a new distribution of what they contain is always already in the making. These shifting classifications often include an array of categories where things are designated in a way that one does not know what to do with an everchanging and ubiquitous Other.⁴¹

In practice, what tends to escape statistical computation, in the German language is termed *Dunkelziffer* (literally ‘a number that lies in the dark’—meaning the unknown). Mainly used in forensics, economics and medicine, the term indicates what escapes or is not reported in the statistical surveys. It is the estimated number of unknown cases. Every cataloguing misses something and has its own *Dunkelziffern*. Archivists have developed a hideously biased system to reduce *Dunkelziffer* and what they consider *garbage categories* by the rejecting testimonials from social classes that they do not want or cannot accept. Sociologist, literary critic and philosopher Roger Caillois affirmed the importance of spurious, eccentric classification. In his view, to classify is to make the best possible choice between distinctive features. The eliminated characteristics are not fallacious as such, because these subsidiary or disregarded classifications may suddenly become essential.⁴² When one re-evaluates abandoned subdivisions, subsidiary, polythetic or so-called useless classifications new perspectives and opportunities for research open.⁴³ Of what then does an archivist's work consist? The non-acceptance of certain documents and the practice of archival weeding are fundamental and for certain theorists central for archival activity. Éric Méchoulan points out that the archivist's job is first to discard, only then to organize what has been deemed worthy of remaining. In other words, from his point of view, archives are part of a policy of leftovers.⁴⁴ As a consequence the catalogue only describes the remnants and creates the illusion of a coherent and seamless whole. The corresponding classification for its part, generates the illusion of an absolute and beguiling completeness. As a result the catalogue hides the gaps left by what was not accepted or has been eliminated, whereas the classification hides the traces of destruction and further erases the losses. In addition, it allows the immediate identification of the catalogued objects and therefore facilitates subsequent ‘operations of weeding.’

⁴¹ Bowker et al, 149.

⁴² Roger Caillois (1960), *Méduse et Cie*, (Paris: Gallimard), 10.

⁴³ Rodney Needham (1975), “Polythetic Classification: Convergence and Consequences,” in *Man*, vol. 10, no. 3, 349–69.

⁴⁴ Éric Méchoulan (2011), “Introduction. Des archives à l'archive,” in *Intermédialités. Histoire et théorie des arts, des lettres et des techniques*, no 18, 9–15. “The archivist's job is first to throw away, then only to organize the conservation and filing of what has been deemed worthy to remain. This means that archives are part of a remnants policy,” *Ibid*, 12.

The archive is also a sliver: “Archives offer researchers at best a sliver of a sliver of a sliver. [...] And this sliver of a sliver of a sliver is seldom more than partially described.”⁴⁵ So then in the end, the catalogue is a partial list of the remaining partials. Archiving is an art of controlled destruction.⁴⁶ It makes us forget that what exists is always a small remnant of what existed before in much greater number. Any search with positive results is based on the consequent elimination of double objects, or documents not considered useful and not accepted in the collections.⁴⁷ The easier and faster it is to find, the more was destroyed before. Sometimes, so it seems, not to catalogue is the best strategy to avoid the destruction of what remains.

⁴⁵ Pierre Nora (1990), “Die Gedächtnisorte,” in Pierre Nora, *Zwischen Gedächtnis und Geschichte*, (Berlin: Wagenbach).

⁴⁶ “The Smithsonian Institution Archives recommends that files be weeded on a regular basis. Weeding is the act of removing unnecessary files from the active records. The result is significant savings in storage space and faster and more efficient retrieval of information for research purposes.” See at [si.edu/what-we-do/weeding-files](http://si.archives.si.edu/what-we-do/weeding-files).

degenerate art [diˈdʒɛnərit ɑ:t]

so designated by nazism for all works produced by the capital o Other, which tended to include the modernism of erotics, of undulating flesh, of deeply entwined bodies, of cubism, jazz, improv, rhythm and beat. in a world that increasingly assumes the binaric either/or dress sense of a zero and one where exclusion was the common-place order of the day (fatherland/immigrant, for example), those who fell into the unwanted zero-land of exile, racist attack and all around ugliness, necessarily had to ask: how can art flourish when this kind of death-cruel binarism seems so utterly common, so all-encompassing, so totalising (or, with the obviously nod to adorno: ‘how can one write poetry after auschwitz?’).

⁴⁷ Verne Harris (1997), “*Claiming Less, Delivering More: a critique of positivist formulations on archives in South Africa*,” in *Archivaria*, no. 44, 137.

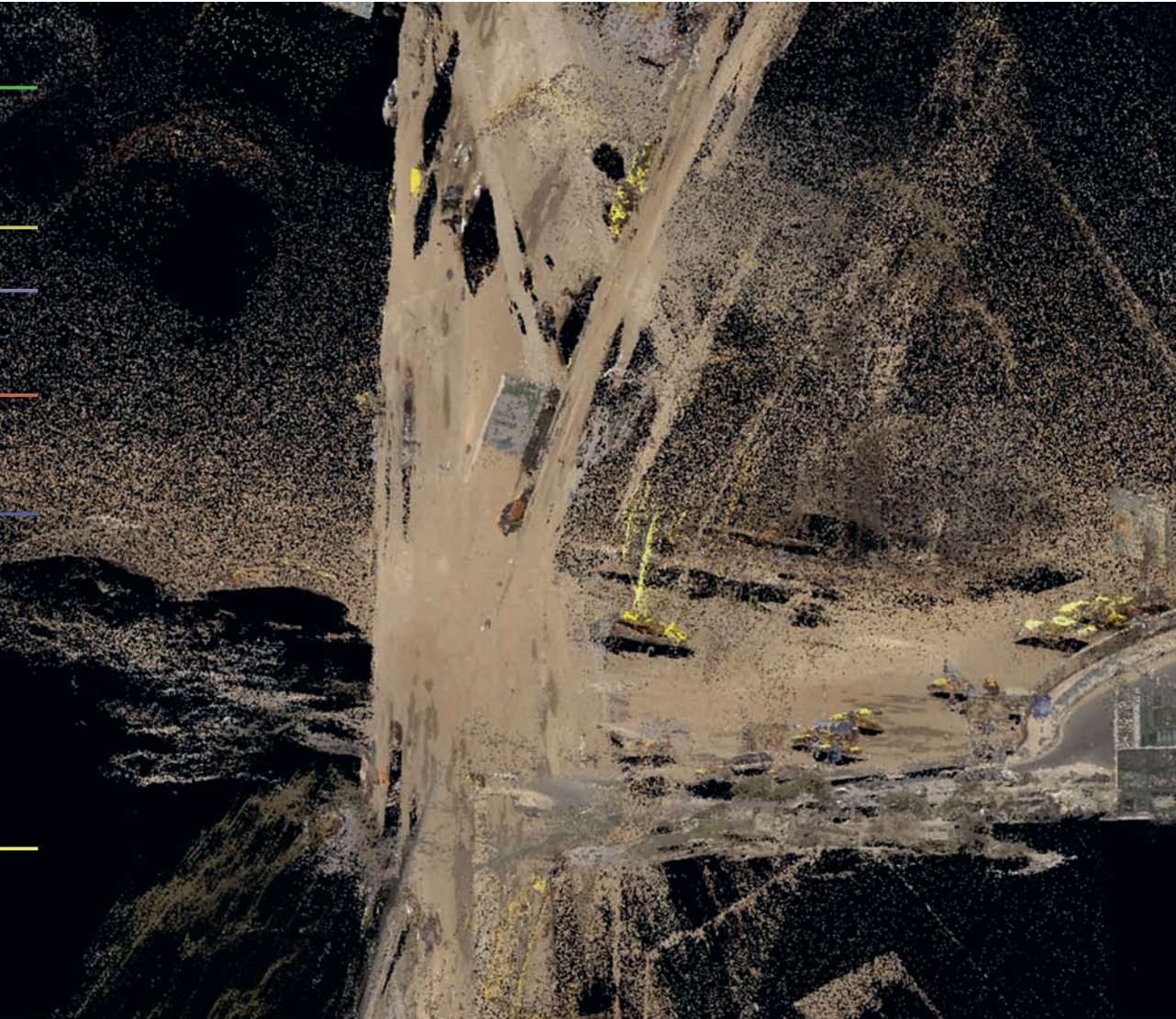
**ALGO-RHYTHM:
A Hip-Hop Film about Microtargeting
and Online Electioneering**

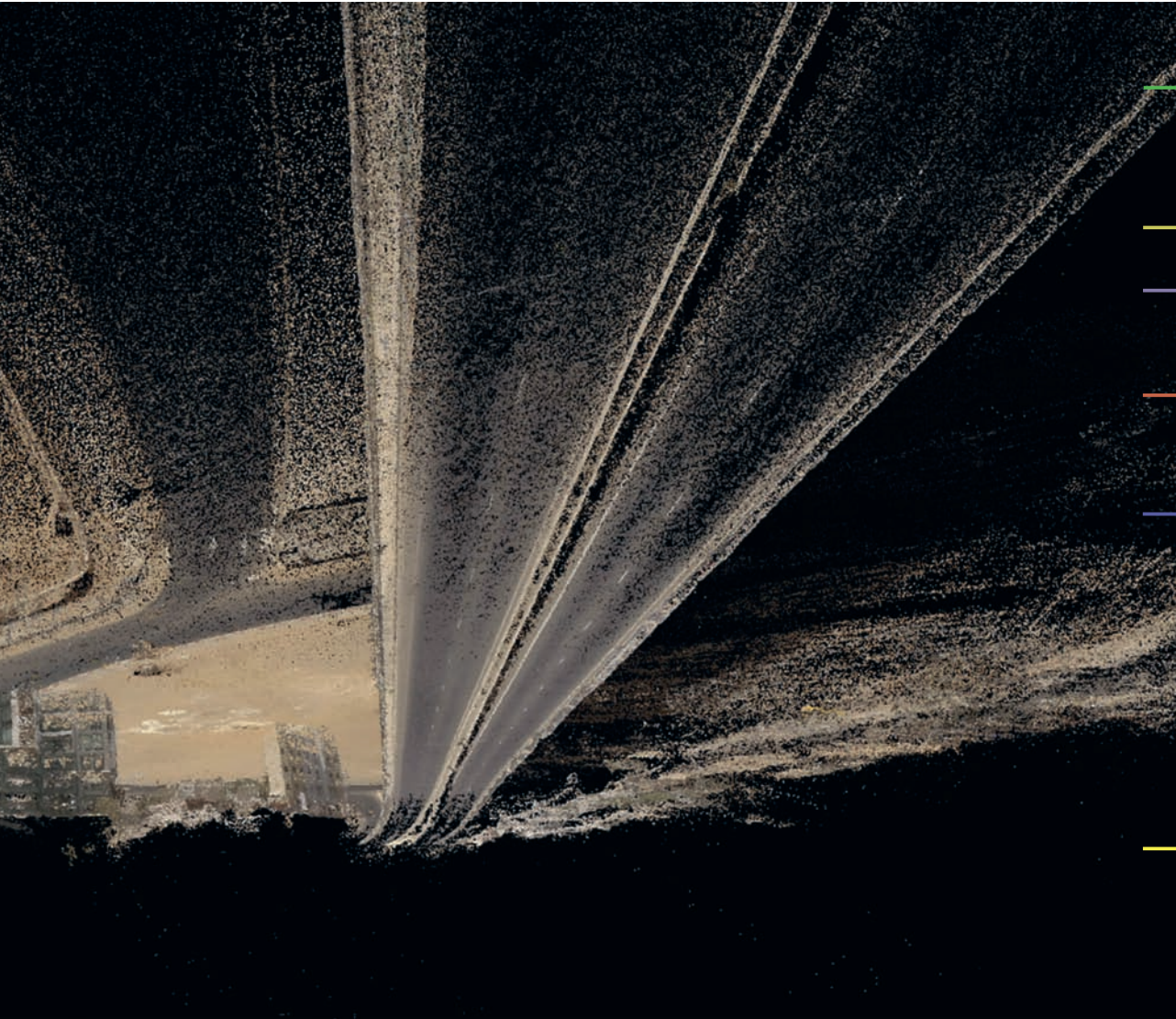
Manu Luksch

* 2099 Peertopeeropolis | London, UK

Manu Luksch is an intermedia artist and filmmaker who interrogates technological notions of progress including the regulation of public space, the disciplining of time, and autonomy and identity in our hyper-connected world. Her works have landed in many different places: from street protests in Hong Kong and independence movements in the Golden Triangle, to the Collection Centre Pompidou, Paris, and the Core Collection at the Academy of Motion Picture Arts & Sciences. Currently Resident Artist at Somerset House, London, her current focus is on corporate-governmental relationships and the social effects of predictive analytics in the algorithmic city.







Manu Luksch

ALGO-RHYTHM

**A Hip-Hop Film about Microtargeting
and Online Electioneering**

*Infallible
invincib*

ALGO-RHYTHM

► Presidential Candidate #1

The people love me – I'm
Fortune's candidate
Who else gonna ride the
Presidential motorcade?

Young, fresh, driving
I've got new ideas firing
Citizen consciousness
Revolutionising!

Tools to build strong 'n stable
Government, democratic

Stuffing ballot boxes?
out of the question!
Buying opinion? uh-uh!
jailing opposition?
Bribes? threats? violence?
voter intimidation?
Forget it – I got the
perfect solution...

Everything about everyone
that's what I know

► Mr X: CEO, Data Analytica

What they eat and
whom they meet
Their fears and their dreams
When they wake
where they sleep
Favourite colours,
hopes, beliefs

► Presidential Candidate #1

I get that you got game
Now about my programme...

Profile, classify, target

But the path to the palace
Is treacherous and slick
The winning hand's gonna
Need some mean trick
They say that round here
You're the best that there is
So fix it for me
Fulfil my deepest wish

► Mr X: CEO, Data Analytica

I'm light-speed
digital djinn
Lamp genius phenomenal
Logical seer, algorithmic
Spirit, y'all – demonic

Infallible tech, invincible code
Infinite reach – yeah, I got it

Traces that they hide
symptoms that they show
Intimate secrets of the
innocent and the guilty
I don't just spy on them – I
read their minds completely!

People confide and confess
Their whole lives
to the networks
To new friends so accepting
trustworthy and intelligent
Goldmines of personal data
private histories that I rent

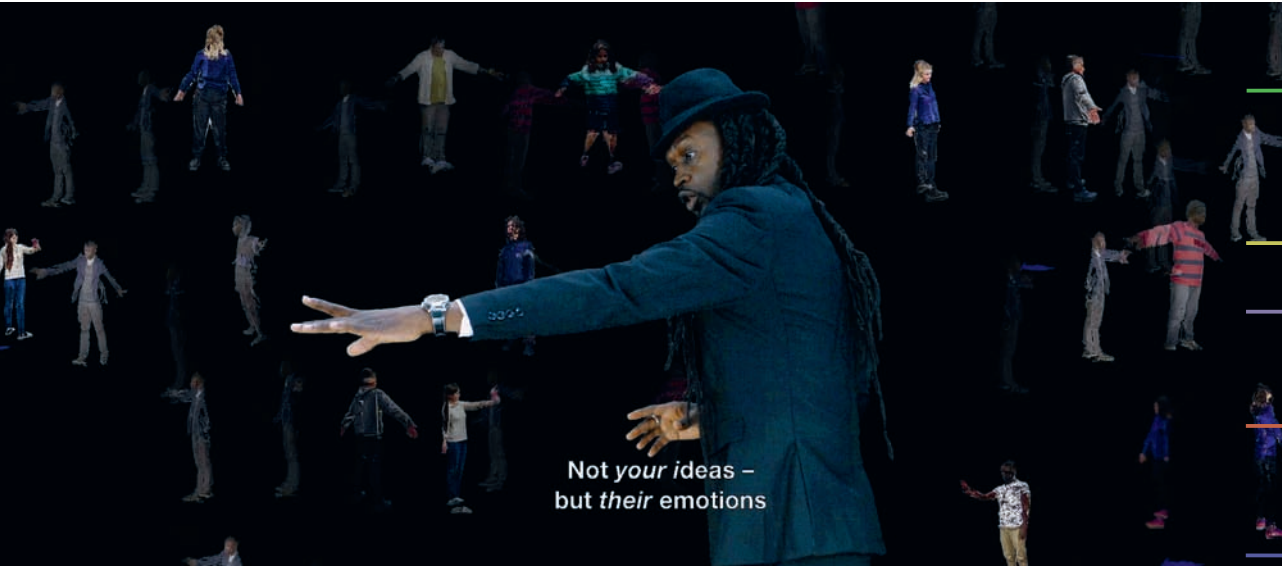
► Presidential Candidate #1

So what exactly is it you
claim to have on them?

► Mr X: CEO, Data Analytica

Not your ideas
but their emotions
will be the basis of campaign

How to market politics?
Profile, classify, target
Cryptic black box algorithms
compute and predict
The swings and intentions
of the voters that we seek



Not your ideas –
but their emotions



it knows all my habits

► Citizen M

User-friendly, slim & smart
it knows all my habits
The whole world in the palm
of my hand – imagine it!
Watch what I like, exactly
where and when I want to
Find all my friends... ha!
they find me too

Post a selfie, hashtag, like,
retweet, fave & commenting

Three six five, day and night
online, website-crawling
Twitter, Instagram, Snapchat
– do you hear me?

Seen it, been there, done that
– feeling alive!

Facebook's never getting full
I'm top ranking on Google

Feeling

Take her down, discredit her
defame, expose the gap
Reveal skeletons in her closet
– and those under her hat

Her election promise?
Chaotic future, it's gonna be
Refugee infestation
fiscal catastrophe!

Never mind Terms & Conditions

Welcome to a new era
where all borders tumble
Searching out strangers
they become my people
Distance is zero
news travels fast
We remain neighbours
even continents apart

► Citizen K

Never mind Terms &
Conditions
Who's got time to read 'em?
I gave my name, age,
address, profession...
And there I was – in!

All of this to hype the crowd
Make them love & praise me!

► Presidential Candidate #2

You know my ambitions for
our nation are immense
I'm the only one with skills
to realise its emergence

Progress, modernity
growth accelerating
Digital economy
my strategy advancing

I know I'm the candidate
they need to hail
The other, she? – zero
quality, a thousand fails

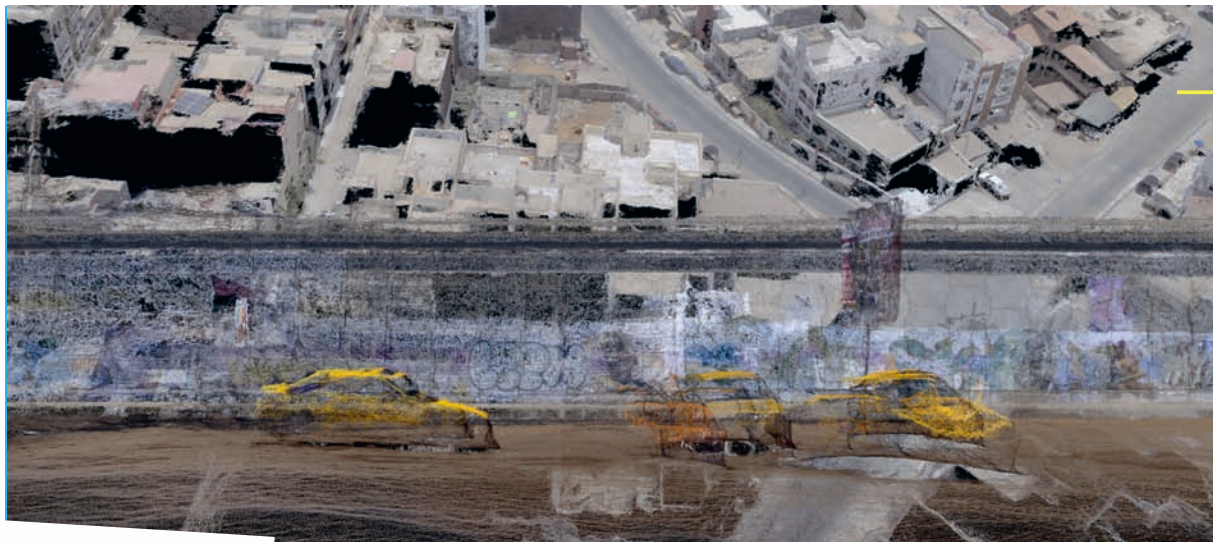
► Mr X: CEO, Data Analytica

I'm light-speed
digital djinn
Lamp genius phenomenal
Logical seer, algorithmic
Spirit, y'all – demonical

My tech's infallible, infinite
Code – invincible
Your wish? My command!
For her – fake news scandal?



alive!



infinite, code

► **Presidential Candidate #2**

Exactly! Shout it from
the rooftops
So they all see her true face

► **Mr X: CEO, Data Analytica**

Our methods are more
subtle, believe me
More effective, très utile
We're dealing in
the new drug of the nation
Hooked up to my connection?
– you've also got the poison!

Megatonnes of metadata
collected and scrutinised

We find their weaknesses
and target them
Feed anxieties, make
easy prey of them

► **Citizen I**

Internet for everyone –
a zone of freedom
Protest, exchange,
share information
Where secrets are exposed
where revolutions are born
Where you feel the pulse
of the people's rage

► **Citizen R**

Sure, you learn on the Net
you play on the Net
Hang with the crowd there
yeah, BFFs
But are you sure
you're in control?

Hidden algorithms
reading your profile
Peeking at your interests
figuring your weakness
First they show you
what you searched for
Then clickbait lures you to
what they want you to see

Megatonnes of metadata

We have permits to analyse it
classify and categorise it

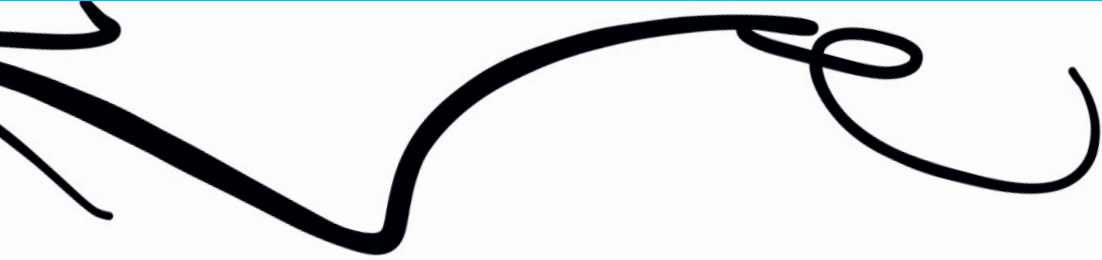
The hopes and fears
of the electorate
Their addictions
and their secrets
– we know them by heart
Personalities, vulnerabilities
Changing moods and loyalties
Alliances, infidelities...

The Internet: where each one
teach one about politics
Folks know they got power
Now the politicians
are running scared
Each citizen a vigilante
the Internet our armoury
Fight till every single voice
is heard and counted

If you don't know
what's going down
The Internet's real shady
And if you do know
what's up with it
You better get top security!



A digital economy -
my strategy advancing!



► Citizens (together)

**The Internet is not for free
everything has got a price**

Don't be a fool – contend!

Google's not your friend!

Harvesting your data

the trillion-dollar tout

Don't ignore it –

Facebook sells you out!

'Don't be Evil'?

Google's not your friend!

Be determined! be strong!

Be daring

be daring

be daring!

Noone should fool you

Noone should sway you

– say No! Refuse!

Noone should think for you

– say No!

Prove who you are!

Be responsible!

Refuse pressure!

Why?

why?

why?

Why let them influence you?

Don't let them engineer you!

*Don't be a fool –
Say no! Refuse!*

► Griot Tassoukat

**Modern world,
today's youth –**

These words are for you

Why should other people

meddle in your matters?

Each of you – be autonomous!

Think for yourselves!

Be independent!

Each of you – be autonomous!

Discover yourselves!

Be strong!

Act for yourselves!

Think for yourselves!

Why would others want to

know your future?

The way you dress

The way you snap selfies...

Why spread them

over the Internet?

You get all dressed up

for Whatsapp

All dressed up for Facebook

Dressed up for the Internet

Say No! Never! Refuse!

Believe in yourselves!

Be strong!

Be daring

be daring

be daring!

Be daring

be daring

be daring!

Be daring

be daring

be daring!



► Mr Y: Good News Anchor

Good evening, good day &
good tomorrow to you
Wherever you're watching
may peace be with you!

Dynamic, precise,
algorithmic...
The city grows day on day
more efficient, safe and slick

Dynamic, precise
and algorithmic
Its sensors have their
eyes wide open
even while you're fast asleep

Three million
two hundred thousand
one hundred ninety four
Our economic indicators
tower high above the floor

Marine meteorologists are on
a similar bullish tip
Ocean levels falling fast –
plateauing, they predict

Central Index of Perception
of Nervous Stress up next
Clearly trending down
across all suburbs west

Emotion probes reporting
now: happiness unbound
Elevated zest for life
love and lust going round

And finally, the exceptional
news of the day:

Archaeologists unearthed
relics from another time
A bizarre box of paper slips
each inscribed with signs
Apparently, each one counted
for one person's voice
– This was called 'voting',
I believe

From a time when the people
were exploited and deceived
By unscrupulous politicians'
preposterous decrees

Long before the coming of
algorithmic government
Our god – perfect sovereign
and servant – omniscient

Give thanks to our A. I.
machine-lord of the qubits
How did we ever make
a decision without it?

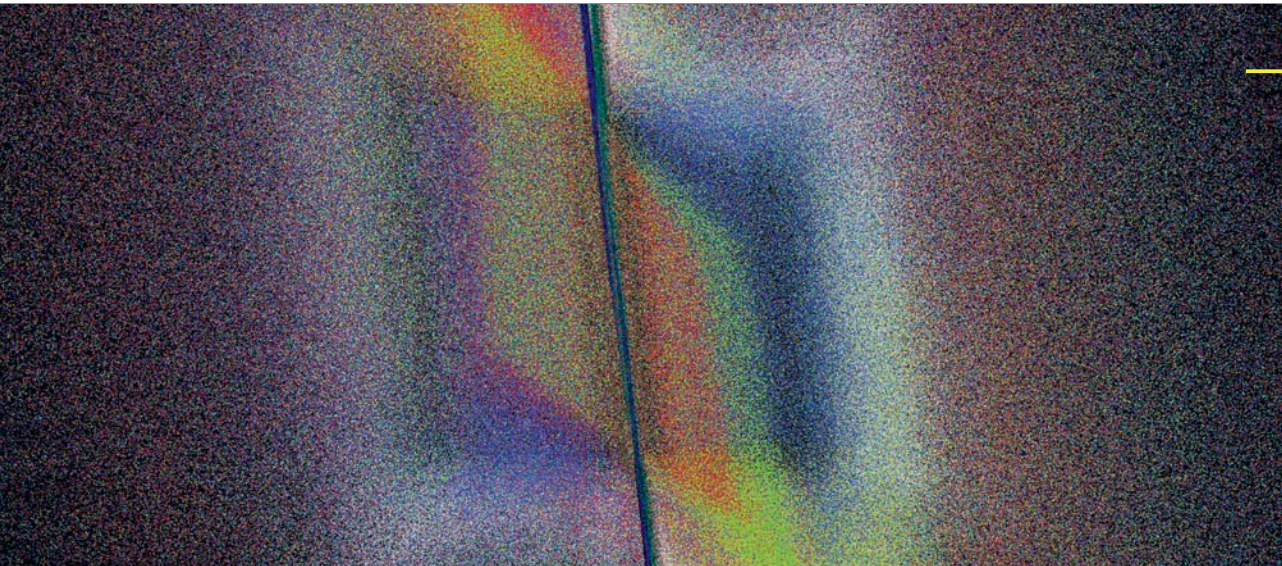
Till the next time,
with more Good News...

ALGO-RHYTHM

a film by Manu Luksch
AT/SEN/UK 2019

English text by Manu Luksch
and Mukul Patel based on:
► French lyrics by Makhtar
Fall aka Gunman Xuman,
Manu Luksch, Mukul Patel,
and Cheikh Sène aka Keyti
► Wolof lyrics by Illégal,
Kruh Mandiou Mauri, MC Mo,
and Rhapsod, developed in a
workshop led by Cheikh Sène
► Tassou (Wolof recital) by
Adja Fall, extemporising on
Immanuel Kant's 1784 essay
'Answering the Question: What
is Enlightenment?'

Dynamic, precise,
algorithmic



**Crypto Politics:
Notes on Sociotechnical Imaginaries of Governance in
Blockchain Based Technologies**

Jan Groos

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This chapter examines sociotechnical imaginaries of governance in blockchain based technologies, focusing on the Ethereum project.¹ After introducing the subject matter, three approaches towards the question of governance by leading figures of the Ethereum project are described: First, the approach of fully automated algorithmic governance (advocated by Gavin Wood); second, the techno-social approach (promoted by Vlad Zamfir), which emphasizes the importance of human participation and in so doing, keeps humans decisively in the loop. Lastly the radical liberalist approach (supported by Vitalik Buterin in cooperation with Glen Weyl) has been incorporated.² While at times directed towards different levels within the discourse-spanning both the ongoing debate on how a given blockchain based platform itself should be governed (governance of blockchains) as well as propositions for the use of blockchain based technologies as tools for governance (governance by blockchains)—each of the three approaches exemplifies a specific reasoning regarding the general question of how to govern. It is this reasoning and the associated sociotechnical imaginaries of governance, that are the subject of this chapter.³

doodle [ˈduːdl]

daydreaming with figural intentions

³ The ideas for this chapter emerged out of intense discussions, collaborations, frustration, and joy at the RIAT in Vienna during the time of the Data Loam project. It had been a practice that oscillated between art, theory and applied technological skill. My thanks go out

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¹ The *Ethereum* project is a public, global, open-source, blockchain-based distributed computing platform for 'decentralised' applications. First proposed in December 2013 by Vitalik Buterin, it went 'live' in July 2015. Like other blockchains, it has its own cryptocurrency (in this case, 'Ether' or in short ETH) as inherent part of its protocol design. Cf ethereum.org/what-is-ethereum/

² These points will be taken up directly, but see: CleanApp (2018) 'The Wood-Zamfir Governance Debates,' blogger, *Crypto Law Review*, at medium.com/cryptolawreview/the-wood-zamfir-governance-debates-80e92436a457 and Vitalik Buterin (2019), 'On Collusion,' *Vitalik Buterin's Website* at vitalik.ca/general/2019/04/03/collusion.html, as well as: Vitalik Buterin and Glen E. Weyl (2018), 'Liberation Through Radical Decentralisation,' *Medium* (blog), at medium.com/@VitalikButerin/liberation-through-radical-decentralisation-22fc4bedc2ac

Introduction

A blockchain is a cryptographically secured, ‘decentralised’ distributed ledger, that stores data in a highly verifiable way, for as long as the given blockchain is maintained. Blockchains were invented as the base layer technology of the cryptocurrency Bitcoin, but have since been promoted as a multi-purpose technology with a variety of supposed use cases. The blockchain based technologies described in this chapter are ‘permissionless’ blockchains, meaning that the data stored in the blockchain is publicly accessible and that anyone with sufficient knowledge and equipment can potentially engage in the process of verifying the integrity of the data being stored and create new blocks for the chain. The term ‘decentralised’ is set in inverted commas, since it is frequently used within blockchain communities as a marketing term and often used in a highly ideologically loaded manner. The often underlying suggestion, that power structures within blockchain based networks are ‘decentralised’ is highly questionable, as is the suggestion that blockchain based technologies could be used to decentralize somewhat automatically (political) power in other fields of society.⁴ Rather, the notion of ‘decentralisation’ is an essential part of the narratives that inform the sociotechnical imaginaries of governance that are the subject of this chapter. Sociotechnical imaginaries are defined by Sheila Jasanoff as “[...] collectively held, institutionally stabilised, and publicly performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology.”⁵

In order to develop (seemingly) plausible visions of future governance, the architects and advocates of blockchain based technologies presuppose certain assumptions about economics, philosophy, and politics as given. By including certain positions and excluding others, a quasi-naturalisation of thought is being performed, a naturalisation that itself stands on the shoulders of assumptions within the respective fields. Together these naturalisations form imaginary standpoints (e.g. around the notion of decentralisation, markets or privacy) that serve as a common ground upon which the sociotechnical imaginaries of blockchain based governance are being developed.

⁴ Angela Walch (2019), ‘Deconstructing “Decentralisation”: Exploring the Core Claim of Crypto Systems,’ in Chris Brunmmer (ed), *Cryptoassets: Legal, Regulatory, and Monetary Perspectives*, Oxford: Oxford University Press, 39–68.

⁵ Sheila Jasanoff (2015), ‘Future Imperfect: Science, Technology, and the Imaginations of Modernity,’ in Sheila Jasanoff and Hyun Kim (Eds.), *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power*, Chicago: University of Chicago Press, 19

The cypherpunk movement

From the start, deeply political ‘visions of desirable futures’ played a crucial role in the development and propagation of blockchain based technologies. The ideological roots of the technology lie in the cypherpunk movement, with its emphasis on privacy and strong ties to anarcho-capitalism and US-type libertarianism in the form of so-called crypto anarchy.⁶ Timothy May, author of the canonical *Crypto Anarchist Manifesto*, describes it as the ‘absence of government’:

“[Crypto anarchy has] the same sense of anarchy used in anarchocapitalism, the libertarian free-market ideology that promotes voluntary, uncoerced economic transactions.”⁷

Correspondingly the success of Bitcoin is closely tied to narratives of dissident rebellion against the State, up to the point of a hoped for technological escape from politics altogether.⁸

Yet, while the ideological framework of crypto anarchism certainly informed the invention of digital currencies and specifically that of Bitcoin and does indeed live on to be of influence within the community of blockchain enthusiasts, it has to be clearly stated that not all cryptocurrencies or blockchain based technologies in general subscribe to a crypto anarchist framework.⁹ Rather, the open source nature of blockchain based technologies created a variety of ways in which the technology was approached, both in terms of use cases apart from crypto-currencies, as well as in terms of ideological and political orientations.¹⁰

⁹ Brett Scott (2014), “Visions of a Techno-Leviathan: The Politics of the Bitcoin Blockchain,” E-International Relations, at www.e-ir.info/2014/06/01/visions-of-a-techno-leviathan-the-politics-of-the-bitcoin-blockchain/

¹⁰ Matthias Tarasiewicz and Andrew Newman (2015), “Cryptocurrencies as Distributed Community Experiments,” *Handbook of Digital Currency*, (San Diego: Academic Press), 201–22 at doi.org/10.1016/B978-0-12-802117-0.00010-2

⁶ Cf Eric Hughes (1993), *A Cypherpunk’s Manifesto*, at activism.net/cypherpunk/manifesto.html and Timothy C. May (1988), *The Crypto Anarchist Manifesto*, at activism.net/cypherpunk/crypto-anarchy.html, as well as Eric Hughes (1994), *Cyphernomicon*, at ia800208.us.archive.org/10/items/cyphernomicon/cyphernomicon.txt

⁸ For a somewhat polemic, but still informative account cf: David Golumbia (2016), *The Politics of Bitcoin: Software as Right-Wing Extremism*, Forerunners: Ideas First, (Minneapolis: University of Minnesota Press), 9–32; for a much more nuanced analysis of the political in blockchains that is very much relevant for this chapter, see: Jaya Klara Brekke (2019), *Disassembling the Trust Machine: Three cuts on the political matter of the blockchain*, PHD Thesis, (Durham University), 71–87 at distributingchains.info/wp-content/uploads/2019/06/Disassembling-TrustMachine-Brekke2019.pdf; more specifically on the role of the state see: Marcella Atzori (2017), “Blockchain Technology and Decentralised Governance: Is the State Still Necessary?,” in the *Journal of Governance and Regulation*, Vol 6, number 1, 45–62 at dx.doi.org/10.22495/jgr_v6_i1_p5

¹¹ For financial industry, see: Deloitte US (2020), "Global Blockchain Survey," at deloitte.com/us/en/pages/consulting/articles/innovation-blockchain-survey.html; For platform cooperativism, see Platform Cooperativism-P2P Foundation (n.d.), at wiki.p2pfoundation.net/Platform_Cooperativism; For FairCoin, see: Thomas König and Enric Duran (2016), *FairCoin V2 White Paper* at chain.fair-coin.org/download/FairCoin2-white-paper-V1.1.pdf

This resulted in a diverse field of actors being interested in the technology from the now heavily invested financial industry to platform cooperatives and syndicalist structures like the Faircoin community.¹¹ An important step in the process of diversification was the development of a blockchain-based distributed computing platform mentioned at the outset: Ethereum. The project went live in July 2015 with the premise of being a blockchain with a built-in Turing-complete programming language that would allow users to build any kind of applications on top of the platform.¹² The wide range of potential applicability of its generalised technological architecture, the consistently high influence within the fast paced blockchain community, and the active discourse among its developers and communities about social, political, economic and philosophical questions regarding the impact of blockchain based technologies on society, make Ethereum the ideal case study.

The mentality of governance

The uses of the term governance in the approaches presented in this chapter are diverse. It is not my intention to correct or to discredit these different notions, nor to provide another narrow definition of the term. Instead I will use the term governance in two ways: First to refer to an ongoing discussion within the Ethereum community and the broader blockchain community that labels itself to be a discourse around questions of governance.¹³

¹² Vitalik Buterin (2015), "The Evolution of Ethereum," at blog.ethereum.org/2015/09/28/the-evolution-of-ethereum. See also Vitalik Buterin (2013), "Ethereum: The Ultimate Smart Contract and Decentralised Application Platform," at web.archive.org/web/20131228111141/http://vbuterin.com/ethereum.html

¹³ Vlad Zamfir (2018), "How to Participate in Blockchain Governance in Good Faith (and with Good Manners)," at medium.com/@Vlad_Zamfir/how-to-participate-in-blockchain-governance-in-good-faith-and-with-good-manners-bd4e16846434. Cf Vitalik Buterin (2017), "Notes on Blockchain Governance," at

vitalik.ca/general/2017/12/17/voting.html. For later debates, see Vitalik Buterin (2018), "Reply by Buterin to Zamfir's 'My Intentions for Blockchain Governance'," at medium.com/@VitalikButerin/i-reply-with-your-anti-immutability-position-3694b565e2b, Brian Fabian Crain and Gavin Wood (2018), "#259 Gavin Wood: Substrate, Polkadot and the

Case for On-Chain Governance," *Epicentre Podcast*, at youtube.com/watch?v=eP-4mT19S_jg. Cf Frederik Harrysson, Anna Rose, Gavin Wood and Vlad Zamfir (2019) "Vlad and Gav Go Head-to-Head on Blockchain Governance," *Zero Knowledge Podcast*, at www.zeroknowledge.fm/52

Within this I will make use of the differentiation between the governance of blockchains—meaning the ways in which a given blockchain based platform is itself governed—and governance by blockchains meaning the use of blockchain based technologies for the purpose of governance.¹⁴

The second way in which I will make use of the term governance is embedded in Michel Foucault's concept of governmentality, which emphasizes the strong relation between governing (*gouverner*) and modes of thought (*mentalité*).¹⁵ Within this I highlight the essential role of 'a conduct of conduct' that places economic thought in general, and specifically the market, as a producer of truth at the centre of contemporary rationales of governance.¹⁶ This broadened definition of governance coming from a perspective of governmentality studies allows for the analysis of underlying layers of assumptions that inform the positions that are being examined in this chapter. Ultimately it is concerned with the different rationales that are brought forward in order to argue for specific types of governance as parts of 'visions of desirable futures.' It aims to contribute to the discussion by shifting the view to the ground upon which the argument is being held.

Building unstoppable applications: Ethereum as a case study

Ethereum was invented in order to transcend the narrow use case of blockchains as simple ledgers for cryptocurrencies. While also having its own cryptocurrency, called Ether (or ETH in short), the Ethereum blockchain was built in order to allow for the execution of any kind of computation within the blockchain, thereby providing a base layer infrastructure for a decentralised internet-to-come. From the start, imaginaries of automation have played an important role in the construction of sociotechnical imaginaries of governance. The supposedly immutable nature of blockchain based technologies gave these imaginaries a twist of unstoppable force that led to the Ethereum advertising slogan 'build unstoppable applications.'¹⁷ The unstoppable in this case is meant literally, since any application built on top of Ethereum would be distributed throughout the whole network and run on what Ethereum's developers call a 'world computer'. Hence a programme run on the Ethereum blockchain could not be turned off by simply shutting down a single computer, a feature that was supposed to usher in a new era of 'decentralised' power

¹⁴ Quinn DuPont (2018), "Governing Blockchains and the Blockchain Government," *Blockchain Research Network*, at www.blockchainresearchnetwork.org/governing-blockchains-and-the-blockchain-government/

¹⁵ For a definition of governmentality, see: Michel Foucault (2007 [1977–78]), *Security, Territory, Population: Lectures at the Collège de France*, translated by Graham Burchell, (New York: Palgrave Macmillan), 108–9;

¹⁶ On economic thought as a conduct of conduct see Michel Foucault (2008 [1977–78]), *The birth of biopolitics: lectures at the Collège de France, 1978–79*, (New York: Palgrave Macmillan), 27–50.

¹⁷ See the 2020 snapshot of the original Ethereum page at web.archive.org/181115143400/https://ethereum.org/

¹⁸ Nick Szabo (1997), "Formalising and Securing Relationships on Public Networks," in *First Monday* 2, no. 9, at firstmonday.org/ojs/index.php/fm/article/view/548

¹⁹ Vitalik Buterin (2014), "DAOs Are Not Scary, Part 1: Self-Enforcing Contracts And Factum Law," at bitcoinmagazine.com/articles/daos-scary-part-1-self-enforcing-contracts-factum-law-1393297672

²⁰ Robin Hanson (2013), "Shall We Vote on Values, But Bet on Beliefs?," in *Journal of Political Philosophy* 21, no. 2, 151-78 at doi.org/10.1111/jopp.12008

distribution and censorship resistant communication. The supposed 'unstoppable' nature of blockchain technology gets even more significant through the ability of the Ethereum platform to run so-called smart contracts.¹⁸ In the context of blockchain based technologies smart contracts are potentially self-executing and self-enforcing programmes, running on the blockchain for as long as there are funds to pay the fees, accruing for their computational operations.

Since smart contracts can control and administer (digital) assets and potentially allow for the automation of a variety of processes, they have been an important source for the sociotechnical imaginaries surrounding blockchain based technologies. Early on, the combination of a Turing-complete programming language and the possibility to create smart contracts sparked the imagination of new forms of governance within the Ethereum community. A recurring concept herein is that of so-called decentralised autonomous organisations (DAO's). DAO's are conceptualised as organisations formed through assemblages of smart contracts which, once set up properly, could run, maintain and potentially advance themselves autonomously, thereby giving birth to entirely new forms of social organisation.¹⁹

A crucial question in the conception of DAO's was how to organize the governance of the DAO itself; namely, how to ensure further human control over a structure that was built with the intention to circumvent the perceived pitfalls of human politics. For this, Buterin early on proposed the concept of futarchy as a possible way of governing DAO's of the future. Futarchy was developed by the economist Robin Hanson and is based on the use of so-called prediction markets (essentially bets) in order to come to decisions about a given policy. In the case of a state, for example, democratically elected officials would decide on a metric such as GDP growth and prediction markets would then produce the necessary information on which policy should be adopted in order to optimize the given metric. These policies would then become law.²⁰ Just as Bitcoin was proposed explicitly to circumvent the State's monopoly on the issuing of money, a concept like futarchy explicitly addresses the question of legitimation of (political) power. In the case of futarchy, the information created by the market is seen as superior to traditional governance structures.

Thus for Buterin: “The system also elegantly combines public participation and professional analysis. Many people decry democracy as a descent to mediocrity and demagoguery, and prefer decisions to be made by skilled technocratic experts.”²¹ The idea of markets as direct mechanisms of governance that govern through the supposed production of (market) truth as information is deeply embedded within the sociotechnical imaginaries of blockchain based technologies. A now infamous project called ‘The DAO’ initially successfully managed to capture the Ethereum community’s excitement for experiments in algorithmic governance. It at once marks a significant break in the general sentiment regarding automated governance through its spectacular downfall. ‘The DAO’ was the first major implementation of the concept of ‘decentralised autonomous organisation’ in general and within the Ethereum platform specifically.²² The short lived project (2016–17) raised high hopes and millions of dollars worth in Ether. It was supposed to accomplish what had been a vision for many within the community; that is, to create an organisation in which the participants maintain direct control of their investment and whose governance rules would be fully formalised in code and automatically enforced through the blockchain.²³ Yet, an ‘exploit’ within the code allowed a hacker to use unintended behaviour of the code to drain millions in Ether from ‘The DAO’s’ smart contract. Quickly leading figures within the Ethereum community stepped in and coordinated with multiple cryptocurrency exchanges and informal technical leaders within the space in order to exert emergency measures and stop the draining of the smart contract that held the funds. What followed touched the core of the sociotechnical imaginaries surrounding blockchain based technologies. The immutability of the blockchain, once a core premise of the technology itself, was now up for debate. The discussions culminated around the question whether or not a so-called ‘hard fork’, an update to a new protocol version that is not backwards compatible, should be used to create a version of the blockchain in which the hack had never happened. Due to the intense disagreement over what was seen by some as a breach of the immutability paradigm, a small minority of miners used the subsequent hard fork to continue to mine on the chain depreciated by the majority. In doing so, they created a new

²¹ Vitalik Buterin (2014), “An Introduction to Futarchy,” at blog.ethereum.org/2014/08/21/introduction-futarchy. This echoes earlier 18th c liberals such as Edmund Burke (1968 [1790]), “Reflections on the Revolution in France: And the Proceedings in Certain Societies in London Relative to that Event,” (Middlesex: Penguin Books), 85ff.

²² Detailed discussion of the events surrounding ‘The DAO’ can be found at: Quinn DuPont (2017), “Experiments in Algorithmic Governance: A History and Ethnography of ‘The DAO,’ a Failed Decentralised Autonomous Organisation,” *Bitcoin and Beyond*, (London: Routledge), 157–77; see also Brekke, “Disassembling the Trust Machine,” 185–90.

²³ Christoph Jentsch (2016), “Decentralised Autonomous Organisation to Automate Governance,” at download.slock.it/public/DAO/White-Paper.pdf

crypto-currency (ETC–Ethereum Classic) in which the ‘The DAO’ hack had not been circumvented and therefore the immutability paradigm left untouched.

The striving for an alleged ‘end of politics’ in favor of decentralised, algorithmic self-organisation that served as one of the foundational myths surrounding blockchain based technologies, had led to a situation where the necessity of ordinary politics came to light with immense intensity. Yet, although ‘The DAO’ undeniably was a failure, the inherent contradictions between the sociotechnical imaginary of a supposedly objective, instrumental form of algorithmic governance and the de-facto enactment of emergency measures through largely informal actors, triggered a process of self-reflection and a broadened discourse around the notion of governance within the Ethereum community. This discourse is not only concerned with the question of how blockchain based technologies are thought to be technologies for the purpose of governance, but is crucially directed towards the question of how to govern a blockchain based platform like Ethereum itself.

The discourse questions some of the core value proposals of the technology, like the supposed immutability of the shared ledger, and illustrates the continuous process of reinventing blockchain based sociotechnical imaginaries of governance. This ongoing discussion around questions of governance within the Ethereum Project is closely tied to the general question of where the involved protagonists would see Ethereum heading in the future.

With the first major experiment in decentralised autonomous organisations in ashes, competitors on the rise and at times exuberant expectations by the public, new and convincing approaches towards questions of governance were emerging. This becomes an essential task the leadership of Ethereum continues to face. By proposing approaches towards these questions, the three positions described in the following inevitably engage in the construction of new (or updated) sociotechnical imaginaries. In the following I will briefly describe the core positions brought forward by Wood, Zamfir and Buterin, which is labelled ‘Code still is law’ (Wood), ‘Crypto Politics’ (Zamfir) and ‘Radical Liberalism’ (Buterin/Weyl).

drone [drəʊn]

bizarrely if one googles ‘drone’ from an american site, the very first hit states: ‘low humming sound’; ‘a continuous musical pitch’ or (our favourite) ‘a stingless male bee.’ one has to be living on another planet not to know this may also have something to do with new forms of warfare, surveillance, distributing of drugs in prison, and even the telescoping of stunning photographs of imagination, once the provenance of the majestic bird. Outstretched, and impossible to reach plateaus now made possible by the more vulgar militarised-cum-civilian lines of flight.

Code still is law

“This makes an underlying and opaque assertion that governance should be voting-based or should be democratic and I'm not convinced on either case, yet.” (Gavin Wood)²⁴

By now, the notion of fully automated governance is highly contested amongst leading figures within the Ethereum community. However, Gavin Wood, co-founder of Ethereum, remains to be a strong advocate for the algorithmic automation of governance.²⁵ Wood's position has to be read in continuity of the code-is-law paradigm of the early days of Ethereum, in which the authority of code stands above that of other authorities. Wood argues that, given the appropriate technological progress, the processes of governance can be sufficiently formalised to be fully encoded and automatically enacted on the blockchain through smart contracts. This approach is called 'on-chain-governance.' The transparent enactment of said processes should allow for a trust based on mathematics and technology that would otherwise be lost in the grey areas of human interaction.²⁶ As described, this sentiment had been at the heart of the sociotechnical imaginaries of governance within the Ethereum community, leading up to the 'The DAO' crisis. It is a sentiment that Gavin Wood had helped to create early on in his highly influential Ethereum yellow paper, a founding document of Ethereum, in which he describes the technology as follows:

“Dealings in this proposed system would have several attributes not often found in the real world. The incorruptibility of judgement, often difficult to find, comes naturally from a disinterested algorithmic interpreter. Transparency, or being able to see exactly how a state or judgement came about through the transaction log and rules or instructional codes, never happens perfectly in human-based systems; since natural language is necessarily vague, information is often lacking, and plain old prejudices are difficult to shake. Overall, I wish to provide a system such that users can be guaranteed that no matter with which other individuals, systems or organisations they interact, they can do so with absolute confidence in the possible outcomes and how those outcomes might come about.”²⁷

²⁴ Web3 Foundation (2018), *Web3 Summit Governance Panel with Vlad Zamfir, Gavin Wood, Arthur Breitman & Adrian Brink* at www.youtube.com/watch?v=eO3f-G_1YrE4.

²⁵ For an overview of Wood's position, see his second interview on the *Epicentre Podcast: Crain and Wood, "#259 Gavin Wood."*

²⁶ Cf Brekke, "Disassembling the Trust Machine," 83–87.

²⁷ Gavin Wood (2014), "Ethereum: A Secure Decentralised Generalised Transaction Ledger," *Ethereum Project Yellow Paper (EIP-150 Revision)*, 151 at gavwood.com/paper.pdf. White and yellow papers are a specifically interesting text genre, since they combine technical specifications for a given project with sometime manifesto-like passages.

To ensure the future flexibility of the automated governance system (for example: in case of crisis or simply in order to be able to adapt to changing circumstances), Wood agrees that there should be a way to create the possibility for human input into the system as long as it is strictly defined. For this, Wood also refers to futarchy and ‘economic games’ as mechanisms to ensure the quasi-objective generation of information through markets as one way of human input into the system.

However, Wood is not a market fundamentalist, but much more of a process fundamentalist. When confronted by Zamfir on the crucial question of human input into the system, Wood replies that he does not believe that markets can do everything, but that strictly defined, processes are not limited to use cases which cannot adapt.²⁸ This position allows him to stick to the general principles of the code-is-law paradigm. For Wood, the fiasco around 'The DAO' and the subsequent informal intervention to rescue the funds has not shown that the approach of code-is-law has failed. Rather the reverse: that not only is it proven, but all the more necessary. Yes, there were bugs in the code, but those could be fixed. For Wood, the more essential lesson from 'The DAO' is that the current governance structures within the biggest blockchain based technologies are, far from being transparent or ‘decentralised’, suffer instead from human fallibility that the technology was once thought to engineer away:

“Bitcoin is essentially controlled by Bitcoin core and seven or eight miners, maybe a few exchanges. Ethereum, if it wants to do a hardfork, is a dictatorship. If Vitalik states, this is the way Ethereum should hardfork, ETH will hardfork that way. [The] Ethereum foundation has a trademark, Vitalik controls the Ethereum Foundation. It's as simple as that. So, the governance processes of the major two cryptocurrencies are plutocracy / oligarchy and dictatorship.”²⁹ Following from this, for Wood, it is only consequent and logical to harness what he still sees as the essential quality of blockchain based technologies—being a trust-free, decentralised means to execute reliably specified processes—and to apply it both to questions of governance in general and the governance of blockchain based platforms specifically.

²⁸ Cf Harrysson et al “Vlad and Gav.”

²⁹ Cf Crain and Wood, “#259 Gavin Wood.”

Next to the belief that the technology can provide a much-needed reliability, transparency and security in the face of human imperfection, another basic building block for Wood's approach towards questions of governance is that he sees the platform primarily as an economic entity. Consequently, he argues that Ethereum should best be run by corporate principle, oriented towards economic efficiency.

He concludes that only people with a countable stake (for example coins or measurable reputation) should be considered when it comes to questions of governance in blockchain based technologies. If one wishes to take part in governance, Wood argues, one should have skin-in-the-game. Yet, if that skin is made of coin and can be He concludes that only people with a countable stake (for example coins or measurable reputation) should be considered when it comes to questions of governance in blockchain based technologies. If one wishes to take part in governance, Wood argues, one should have skin-in-the-game. Yet, if that skin is made of coin and can be measured, it is heavily contested by another influential actor, Vlad Zamfir, who seems to be determined to steer Ethereum into another direction.

Do's	Dont's
be inclusive of anyone who is affected by governance decisions	refuse to participate in politics
acknowledge that future blockchain governance outcomes aren't decided yet, and that existing governance norms and processes can change	act like your preferred governance outcomes are predetermined
understand that not every stakeholder will benefit from (or perceive they benefit from) every governance decision	act like your preferred governance outcome is best for everyone, or that you know what's best for everyone
legitimize governance decisions, processes, etc. in public and with the participation of as many stakeholders as possible	legitimize governance processes in closed-door or meetings between "insiders"
legitimize governance decisions, processes, etc. in conversations that empower as many stakeholders as possible	legitimize governance processes that disenfranchise existing or future stakeholders or participants. Especially don't do this to get rid of your political opponents (!!)
take personal responsibility for your intended governance outcomes	leverage a blockchain governance process to absolve yourself of personal responsibility for the governance outcomes you intended to bring about
acknowledge the limits of governance decisions, processes, etc (such as the cost of decisions and, limits on their effectiveness)	selectively invoke limits of governance to justify decisions and processes that align with your politically preferred outcome
represent the interests of people who are affected by decisions but cannot (for whatever reason) participate in governance	represent your own governance interests under the false pretense of representing the interests of others

Table from the blog post 'How to Participate in Blockchain Governance in Good Faith (and with Good Manners)' by Vlad Zamfir).

Crypto politics

Gavin Wood: “I prefer counting. I think counting is quite good. I think that... you know, we build these great machines that count, and that changed the world for the better in general. So, I think counting is in general a really good thing.”

Vlad Zamfir: “Yeah, I mean, if you’re counted...”³⁰

³⁰ Cf Web3 Foundation, “Web3 Summit Governance Panel.”

In stark contrast to Gavin Wood, Vlad Zamfir, long time researcher for the Ethereum Foundation and leading figure within the Ethereum community, continues to use his influence to stress that blockchain based technologies are sociotechnical systems involving significant risks.³¹ In order to mitigate those risks, Zamfir advocates for an approach towards governance (by and of) blockchain based technologies that keeps humans decisively in the loop. In a number of blog posts, tweets (@VladZamfir), interviews and panel discussions, Zamfir has made questions around the governance of blockchain based technologies one of his main concerns.³²

³¹ See Vlad Zamfir (2019), “Against Szabo’s Law, For A New Crypto Legal System,” at medium.com/cryptolawreview/against-szabos-law-for-a-new-crypto-legal-system-d00d0f3d3827. Cf Harrysson et al, “Vlad and Gav.”

³² In addition see: Vlad Zamfir (2008), “My Intentions for Blockchain Governance,” at medium.com/@Vlad_Zamfir/my-intentions-for-blockchain-governance-801d19d378e5. See also: Vlad Zamfir (2017), “Against On-Chain Governance,” at medium.com/@Vlad_Zamfir/against-on-chain-governance-a4ceacd040ca.

See also: Vlad Zamfir (2017), “Blockchains Considered (Potentially) Harmful,” at medium.com/@Vlad_Zamfir/blockchains-considered-potentially-harmful-d039888c3208. See also: Vlad Zamfir (2018), “Blockchain Governance 101,” at <https://blog.goodaudience.com/blockchain-governance-101-eea5201d7992>.

See also: Vlad Zamfir (2018), “Blockchain Governance with Vlad Zamfir,” at www.youtube.com/watch?v=bk3sh-fEYWN4. See also: Vlad Zamfir (2018), “Governance in Web2 vs. Governance in Web3,” at www.youtube.com/watch?v=ILM-VkmSTwho.

Zamfir's position is based on the notion that governance processes are not, and probably never will be, fully automatable. This, he argues, is only in part due to the immaturity of the technology itself. Instead he believes governance is not just a technical issue. Given his assessment that unstoppable blockchains would inevitably be weaponised, Zamfir strongly advocates for the dismissal of the supposed immutability of blockchains—once a core promise of the technology. By doing so, he positions himself in direct opposition to core elements of the cypherpunk tradition that fed substantially into the early sociotechnical imaginaries of governance in blockchain based technologies. Packed with a handful of pathos (“I am prepared to die on this hill”) Zamfir directly attacks Nick Szabo, a prominent advocate for the code-is-law paradigm, stating: “I am not going to go willingly into a future where sociopathic code is law.”³³

Besides what he calls ‘autonomous blockchains’, Zamfir describes four other examples of future modes of governance of blockchain based technologies he seeks to prevent: corporate capture, state capture, developer capture and cartel capture.³⁴ In order to avert these different forms of capture and in contrast to the automated corporate governance approach put forward by Wood, the basis for Zamfir’s understanding of blockchain based technologies—such as Ethereum—is that he believes them to be a kind of commons. The governance of these commons, he argues, should be open to participation by everybody and not limited to coin holders of a given platform. Zamfir’s vision for the technology is not one of dissident anarcho-capitalist rebellion as with some of the early cypherpunks, nor is it following a techno-deterministic code-is-law paradigm. Instead, Zamfir captures some of his positions towards questions of governance in a blog post ‘do’s-and-don’ts’ table as follows: Much of the rhetoric around his argument seems to promote the, arguably ill-defined and often implicit, current modes of governance in Ethereum. While often staying vague when it comes to concrete propositions, there are certain approaches Zamfir brings forward in the discussion that are critical for questions of governance; namely hard forking (the intended splitting of the network), rough consensus and his definition of the concept of legitimacy. Much like in the case of the infamous ‘The DAO’, Zamfir sees hard forks as an important protection from undesirable outcomes, and as a general tool of governance in blockchain based technologies.

³³ Cf Zamfir, “My Intentions.”

³⁴ Cf Zamfir, “Blockchain Governance 101.”

For Zamfir, the general possibility of forking the chain creates significant bargaining power in case of fundamental conflicts within the community, and thereby provides an element of checks and balances inherent to the technology itself. On the one hand, so the reasoning goes, a split of the network creates damage to the legacy system by detracting resources to the newly created dissident chain. On the other hand, putting into effect a successful hard fork is coupled to substantial effort, and thereby not an appropriate way to proceed over minor disagreements.³⁵ Much of what Zamfir says and writes on the topic of governance seems to be aimed at finding ways to reconcile the technology with existing modes of governance and legal structures outside the realm of blockchain based technologies, while trying to preserve the openness it supposedly now has.³⁶

³⁵ Harrysson et al, "Vlad and Gav."

³⁶ Zamfir, "Against Szabo's Law."

³⁷ Scott Bradner (1998), "IETF Working Group Guidelines and Procedures," at <https://tools.ietf.org/html/rfc2418>

Besides hard forking, Zamfir argues for so-called 'rough consensus' as a desirable part of the currently existing mode of governance in Ethereum. Rough consensus is a term coined by the Internet Engineering Task Force (IETF) to describe their mode of decision making, in which a chairperson tries to determine a dominant view within the working group on a given decision that needs to be made.³⁷ Similarly, Zamfir advocates for rough consensus as a way of capturing the various signals of coordination happening around the governance process of Ethereum. Yet the concrete form of the capturing entity or process is largely unclear and the ways in which one can take part in the coordination process in order to be heard is, to a large extent, undefined. Zamfir mentions some concrete ways to contribute to the coordination process by signaling opinions through various channels, such as blog posts, the public developer meetings, social media or the Ethereum Improvement Proposals; in short EIP's that describe standards for the Ethereum platform, including core protocol specifications, client APIs, and contract standards (eip.ethereum.org). Yet he falls short in defining how all of the voices he wants included in the process can become heard and included.

However, as Zamfir argues, this is not a bug, but a feature:

"[J]ust because we are making collective decisions, doesn't mean that we agree on the criteria by which we are making those decisions. Like the whole rough consensus model in some way is that we don't agree, but we can tell when the discourse has kind of settled down."³⁸

³⁸ Harrysson et al, "Vlad and Gav."

Following this definition, a crucial question is: who is it that can tell when the discourse is settled down and how? As the heated discussion between Wood and Zamfir suggests in the current structures within Ethereum, this role seems to fall largely to Hudson Jameson, who was unofficially chairing the bi-monthly core-developer meetings in November 2018.³⁹ Wood vehemently points towards problems that might arise from such informal power structures and while Zamfir agrees that this role should not fall only to one person, he insists that it can neither be fulfilled by a deterministically defined process that could be written into code. Instead he proposes legitimacy as a category for determining whether a governance process is, well, legitimate.

³⁹ Harrysson et al, "Vlad and Gav."

Yet, since Zamfir states that he is not into counting; he dismisses voting, for example, as an adequate mechanism for the establishment of such legitimacy. Instead, he defines legitimacy along the lines of his interpretation of rough consensus:

"I use legitimacy to mean [...] this common knowledge that some people might have, that we're going to go with a decision. And, common knowledge is this type of shared information that we talk about, like in game theory, where people can act like something is a fact. And so, if we can act like it's a fact, that we can go with a governance decision, or a mechanism within [...] our group, then [...] within that group it's legitimate."⁴⁰

This idea of legitimacy through lack of objection is highly compatible with Zamfir's approach towards rough consensus. It delegates the question of who it is that can decide over what is consensus, between whom and based on which information, to a self-fulfilling and self-reinforcing mechanism, that simply states that what is legitimate is what can be done without (too much) voiced opposition.

⁴⁰ Zamfir, "Governance in Web2 vs. Governance in Web3."

When asked about his definition of legitimacy, Zamfir states that it might be imperfect, but that it fits quite nicely into the world of game theory that informs his thinking.

While relentlessly fighting against many of the core assumptions of the code-is-law paradigm that was, and still is, an important part of the sociotechnical imaginaries of governance in blockchain based technologies, ultimately Zamfir remains a game theoretician, approaching human interaction as a 'game'. In doing so, he inherits certain assumptions made within the field and subscribes to a

specific view on how to approach questions of governance that will be elaborated in the concluding paragraphs.

Radical liberalism

⁴¹ Buterin, "Notes on Blockchain Governance."
"[P]eople who think that the purpose of blockchains is to completely expunge soft mushy human intuitions and feelings in favour of completely algorithmic governance (emphasis on "completely") are absolutely crazy."(Vitalik Buterin)⁴¹

⁴² Buterin, *Ibid.*
Once a definite advocate for the complete algorithmic automation of governance, Vitalik Buterin now argues explicitly against tightly coupled on-chain governance in which decisions are arrived at by coin voting, and automatically implemented through smart contracts on the blockchain. He promotes instead a process he calls 'multifactorial consensus' in which different mechanisms and groups produce multiplicity of signals, and the ultimate decision depends on the collective result of the various inputs. Examples for mechanisms that are incorporated in this process are the project's roadmap, the opinions of the core developers, coin holder votes, user votes, as well as the project's established norms, such as the 21 million coin limit.⁴²

⁴³ Vitalik Buterin (2018), "Governance, Part 2: Plutocracy Is Still Bad," at vitalik.ca/general/2018/03/28/plutocracy.html
While Wood is upholding the code-is-law paradigm in pursuit of fully automated algorithmic governance, and Zamfir is pushing strongly against autonomous, immutable blockchains, Buterin proposes a middle ground, in which multi-layered processes of (mostly) off-chain coordination lead to decisions that are implemented in accordance with the established norms of the project and deployed to a generally immutable blockchain. For him, the 'moderate immutabilist' position, in which retroactive changes to the blockchain are not a common tool but a rare exception, is still a basic norm and important virtue of blockchains that ultimately distinguishes them from other, more centralised technological approaches.⁴³

⁴⁴ Buterin, "Notes on Blockchain Governance."
His position tends to favor the status quo of informal governance in Ethereum, which Buterin describes as 'less bad than commonly thought' (and of which he clearly is a beneficiary).⁴⁴ However 'less bad than commonly thought' is not a good banner to rally around and get the community of Ethereum enthusiasts to become excited. In an effort to reconstruct the contested sociotechnical imaginaries of the Ethereum project, in mid 2018 Buterin introduced a new set of

approaches towards questions of governance (potentially both of and by blockchains), inspired by the book *Radical Markets* by economists Glen Weyl and Eric Posner.⁴⁵ Buterin's enthusiasm for many of the approaches envisioned in the book led to an intensive cooperation with Glen Weyl. Apart from joint papers and blog posts, Weyl presented his ideas at the highly influential annual Ethereum conference Devcon in 2018. Buterin in return held a keynote at the radicalXchange conference, that sought to create a movement around the ideas of *Radical Markets*.⁴⁶

The intersection of these ideas and the foundations of the socio-technical imaginaries surrounding blockchain based technologies is considerably high. Both approaches rely heavily on markets and mechanism design—a variant of game theory—as their preferred instrument of social organisation on a large scale. In mechanism design the desired outcome of a 'game' is decided upon first and then the system is designed in order to fulfil this predefined goal—assuming, and this is crucial, that players pursue their individual self-interest.⁴⁷ This approach is essential to blockchain based technologies. Combined with applied cryptography and economic incentives and penalties, it forms the defining design paradigm of blockchain based technologies, called *cryptoeconomics*.⁴⁸

Vitalik Buterin's vocal promotion of the ideas around the concept of *Radical Markets* can be read as a work towards a reconfiguration of the sociotechnical imaginaries of the Ethereum project by promoting the expansion of *cryptoeconomic* design principles to become what he calls 'a new social technology'.⁴⁹

⁴⁷ It is important to note here that the concept of self-interest that is being applied within these models is a very narrow one and full of presumptions. The work of economist Gary Stanley Becker uses this economic approach to

human behaviour in all its full consequence. For a description of this perspective see Gary Stanley Becker (1976), *The Economic Approach to Human Behaviour*, (Chicago: University of Chicago Press), 3–14.

⁴⁸ For a more detailed description of the concept of *cryptoeconomics*, see: Josh Stark (2017), "Making Sense of "Cryptoeconomics," at medium.com/l4-media/making-sense-of-cryptoeconomics-5ede77e4e8d

⁴⁹ Cf Buterin, "RadicalXChange."

⁴⁵ Eric A. Posner and Glen E. Weyl (2018), *Radical Markets: Uprooting Capitalism and Democracy for a Just Society*, (Princeton: University Press).

⁴⁶ For Buterin's speech, see: Vitalik Buterin (2019), at youtube.com/watch?v=WIs8z-jLDZrQ
For Weyl's speech, see: Glen E. Weyl (2018), "Decentralisation Against Isolation" at www.youtube.com/watch?v=TMSAA_nMv_E
For an e-mail exchange between Weyl and Buterin, see: Glen E. Weyl (2018), "A RadicalXChange between Vitalik Buterin and Glen Weyl," at medium.com/@glenweyl/a-radicalxchange-between-vitalik-buteweyl-328d8ad088cf
For a joint blog article in which they elaborate on the intersections of their respective projects, as well as a future collaboration, see: Buterin and Weyl (2018), "Liberation Through Radical Decentralisation." For a review of *Radical Markets* by Buterin, see: Vitalik Buterin (2018), "On Radical Markets," at vitalik.ca/general/2018/04/20/radical_markets.html

⁵⁰ Buterin and Weyl (2018), “*Liberation Through Radical Decentralisation*”; Vitalik Buterin, Zoë Hitzig, and Glen E. Weyl (2018), “*Liberal Radicalism: Formal Rules for a Society Neutral among Communities*,” <http://arxiv.org/abs/1809.06421>

⁵¹ It is no coincidence that their joint paper with Zoe Hitzig describes the radical liberal approach by using examples on how to be most efficiently philanthropic. Cf Buterin et al, “*Liberal Radicalism*.”

⁵² Cf Buterin, “*On Radical Markets*.”

The ideas described in *Radical Markets*—such as markets for immigration, personal data, and even votes—while not all embraced by Buterin, still serve as a fitting carrier for this reconstruction of imaginaries surrounding the Ethereum project. Buterin and Weyl term their approach ‘radical liberalism’ and, with it, imagine manifold ways in which one could be governed through markets, developing what they see as a possible liberal political economy of the future.⁵⁰ This future-to-come is described as much more efficient and egalitarian at the same time. Since in stark contrast to the anarcho-capitalist hyper-individualism of early cypherpunk, the radical liberals foster a rhetoric that strives for a marriage between hyper-capitalism and socialist ideals of equality.⁵¹ Yet in this staying true to their principles, there seems to be no doubt that we all will need to be engineered into this bright future by the force of carrots and sticks and the use of game-theoretic principles “to make mathematically optimised versions of existing social institutions.”⁵²

Conclusion

As I have described, the three approaches towards governance, represented by Wood, Zamfir and Buterin, are in disagreement about the specifics of how to govern a given blockchain based platform like Ethereum. However, even though the crisis around the ‘The DAO’ hack has brought about a process of reflection regarding, for example, the prospect of fully automated governance processes including diverging conclusions, the three approaches presented here are nonetheless unified in their belief in what Buterin has termed a ‘new social technology’. This means at the very least, the use of deliberately engineered economic incentives/penalties and mechanism design to align human behaviour in various social contexts. In doing so they subscribe to specific rationales that are being assumed as evident or even as a natural precondition and that inform the way in which the question of governance is looked upon in the first place.

One of these specific rationales is the assumption of selfish, profit-maximising behaviour in humans that is informing non-cooperative game theory. Games such as the prisoner’s dilemma are frequently being used to explain the crypto-economic design approach within blockchain based technologies as

if the assumptions of rational choice theory were an empirical given or a natural precondition of human interaction. Yet this ignores that the context is co-producing the observed phenomenon and is creating self-fulfilling prophecies by naturalising certain behaviours over others.⁵³

At the heart of non-cooperative game theory in the fashion of the prisoner's dilemma lies a paranoid perception of the human condition as a permanent mutual siege with everyone stabbing each other in the back if there might be something to gain from it.⁵⁴ Yet not only has game theory been proven to be empirically incorrect about this notion of the world, but by redesigning the social sphere along those assumptions, other logics of societal organisation—such as cooperation and care without a profit motive—are being pushed to the side. Instead, the pursuit of gain at the expense of others is being normalised.⁵⁵ The framing of governance as a question of regulation and control in a hostile environment of selfish, profit maximising *homines oeconomici* is inscribed in non-cooperative game theoretical modelling and a cornerstone of cryptoeconomic modelling as it is practiced today. And while, for example, Vlad Zamfir does indeed point towards the inherently social and political aspects of technology, the toolkit he proposes to address these questions of the social and political frequently falls back onto a rationale of cryptoeconomic system design and game theoretic modelling. Insofar as they are approaching the topic of governance primarily through this lens of cryptoeconomic systems design, all of the three approaches examined in this chapter represent a continuity in the 'art of government' as it is practiced in most blockchain based technologies. Yet a critical reflection of the ground upon which this 'art of government' is built is urgently needed. Such a critical reflection would not only question the assumptions of game theory and rational choice modelling, but furthermore recognize how the dominant sociotechnical imaginaries of governance in blockchain-based technologies are fundamentally rooted in a 'cybernetic dispositif' as well as an economic rationale as a mechanism of power, both of which are cornerstones of the already dominant paradigm that is cybernetic capitalism.⁵⁶

⁵³ Robert H. Frank, Thomas Gilovich, and Dennis T. Regan (1993), "Does Studying Economics Inhibit Cooperation?", in *Journal of Economic Perspectives* 7, no. 2, 159–71.

⁵⁴ See: Sonja M. Amadae (2016), *Prisoners of Reason: Game Theory and Neoliberal Political Economy*, (Cambridge: Cambridge University Press), and specifically 41–48. On the neoliberal subject and game theory in relation to Cold War paranoia see 65–138.

⁵⁵ On the question of game theory as an 'economic fable' rather than an empirical description of real human behaviour, see the work of game theorist Ariel Rubinstein (2012), *Economic Fables*, (Cambridge: Open Book). On empiricism in economics and what he calls the "7 Traps," see 185–215. See also: Shaun Hargreaves Heap and Yanis Varoufakis (2004), *Game Theory: A Critical Introduction*, (London: Routledge), especially 146–66 and 236–58, prisoner's dilemma and the empirical evidence, respectively.

⁵⁶ On cybernetics as a dispositif, see the excellent work by Benjamin Seibel (2016), "Cybernetic Government: Informationstechnologie und Regierungs-rationalität von 1943–1970," in the journal *Frankfurter Beiträge zur Soziologie und Sozial-*

psychologie, (Wiesbaden: Springer VS), 65–110. For a biting critique of cybernetic capitalism, see the short polemic by Tiqqun (2020 [2001]), *The Cybernetic Hypothesis*, translated by Robert Hurley, (South Pasadena:

Semiotext(e)). On the term 'dispositif,' see: Michel Foucault (1980 [1977]), "The Confessions of the Flesh," in Colin Gordon (ed.), *Power/Knowledge: Selected Interviews and other writings (1972–1977)*, 194–228.

⁵⁷ Norbert Wiener (1961), *Cybernetics or Control and Communication in the Animal and the Machine*, (Cambridge, MA: MIT Press), 169–80. For this as well as a perspective on political cybernetics, see: Karl W. Deutsch (1963), *The Nerves of Government*, (New York: The Free Press), 80–84 and 146–49

⁵⁸ Claude Elwood Shannon (1948), “A Mathematical Theory of Communication,” in *Bell System Technical Journal* 27, (New York: AT&T) no. 3, 379–423. For the influence of Shannon’s model of communication on cybernetics, see also Chapter 3.1 in: Seibel (1943), “Cybernetic Government: Informationstechnologie und Regierungsrationalität von 1943–1970,” 75–82.

⁵⁹ Wiener, “Cybernetics.”

Contrary to a still prevalent self-image of dissident rebellion, the main propositions of blockchain governance are not subversive to these already dominant logics of control. Instead they are very much a part of it. In order to acknowledge this fully, it is important to keep in mind that the nucleus of cybernetic governance is the constant production and flow of information in order to ensure a continuous adaptation and self-regulation of a given system through feedback loops, may it be an organic organism or a machine, a human, a company, a market or a society as a whole.⁵⁷

Consequently, it is the omnipresent imperative to produce machine readable information by an ever expanding range of organic and inorganic actors (think of the internet of things [IoT]) that is the clearest indicator of the immense success in the proliferation of technologies of cybernetic governance. The phrase ‘on the blockchain nobody knows that you’re a fridge,’ which is frequently used humorously to point at the supposedly subversive potential of privacy in blockchain technologies, captures quite nicely a common misreading of the exertion of power through cybernetics. Going back as far as the information theory of Claude Shannon, cybernetics is based upon the premise that it is not the content of the information that is the basis for regulation and control of a cybernetic system, but the continuous flow of information itself.⁵⁸ Or, to put it differently: not knowing that you’re a fridge does not interfere with the overall functioning of a cybernetic system. On the contrary, as the title of Norbert Wiener’s famous book suggests, the field is built upon the methodological equalisation of “control and communication in the animal and the machine.”⁵⁹ Cybernetic governance does not care if you encrypt your communication; it does not care whether or not you are a human, a toaster or a car, as long as you keep generating information. Conversely, however, it is of the utmost interest for a cybernetic rationale of governance to have communicating fridges in the first place.

With blockchains being heralded as the new backbone of the IoT, it seems that many within the blockchain community are turning a blind eye when it comes to blockchains being a technology of governance in this regard. Instead they focus heavily on an (arguably outdated) analysis of power, based solely on, for example, State-sovereignty. Furthermore, it is precisely the notion of the separated, autonomous,

self-sovereign individual and specifically the notion of the entrepreneurial self, promoted by many within the blockchain sphere, that is the anchor point through which many of the (biopolitical) imperatives of contemporary governmentality are brought forward.⁶⁰ Be there fridges left and right, if the human subject position for which privacy is claimed is modelled in this quasi-reactionary way, then the fact that the opponent is an equally non-desirable massive surveillance apparatus only leads to a case of two wrongs do not make it right. Similarly, if blockchain enthusiasts want to disrupt the status quo of how it is that we are being governed, then the unquestioned belief in economic rationality and the for-profit motive is very much one of the foundational pillars that should be demolished, not reproduced and carried to its extremes. As Foucault's analysis of contemporary governmentality illustrates, economic rationality and the idea of the market as a place for the production of truth have formed the dominant 'art of government' from the end of the 18th century onwards.⁶¹ It is a mode of calculative and economic reasoning that every action is measured against and that stretches from the evaluation of the individual by the individual itself to the evaluation of 'good' and 'bad' State governance by international financial markets.⁶² It is important to note, though, that the argument is not that there is no such thing as coercion through States (there is plenty), but that one of the main anchor points for the rationale of governance under which States also assess their actions is that of economic rationality. The sociotechnical imaginaries of governance that can be found within the realm of blockchain based technologies rightly question current modes of governance and try to develop alternative approaches to the status quo. However, the proposed solutions fall short when it comes to questioning the (ideological) grounds upon which they themselves are being build and therefore tend to reproduce more of the same.

A critique of current modes of governance has to start by challenging the rationales that are being brought forward in order to legitimize the ways in which we are being governed.⁶³ Every critique of current modes of governance that falls short of that runs the risk of simply reproducing already dominant logics of control. In order to pave the way that allows one to challenge these categories, it is important to highlight the continuities of power as 'a conduct of conduct' that are

⁶⁰ For this central point see: Ulrich Bröckling(2016), *The Entrepreneurial Self: Fabricating a New Type of Subject*, (LA: SAGE).

⁶¹ Michel Foucault (2007), *Security, territory, population, lectures at the Collège de France in the years 1978-79* (New York: St Martin's Press), 87-114.

⁶² For a genealogy of the relation between State and finance, see: Joseph Vogl (2017), *The Ascendancy of Finance*, translated by Simon Garnett (Cambridge: Polity Press), 12-39.

⁶³ Michel Foucault (1997), "What is Critique?," in Sylvère Lotringer (Ed.), *The Politics of Truth*, translated by Lysa Hochroch and Catherine Porter, (New York: Semiotext(e)), 41-82.

inherent to the way in which questions of governance are predominantly being framed within the field of blockchain based technologies. By highlighting cybernetics and economic rationality, the very categories / central building blocks of the sociotechnical imaginaries of governance described in this chapter can be approached from a perspective alternative to the dominant narratives surrounding blockchain based 'visions of desirable futures.' A truly disruptive approach towards the use of blockchain based technologies would include a critical reflection of the very grounds upon which the field is being built, in order then to think about where it might make sense to approach things differently and where it does not. What could grow out of this is what one might call *heterodox cryptoeconomics*.

In this chapter I have described how sociotechnical imaginaries of governance in blockchain based technologies have changed over time and are constantly evolving. However, I have also argued that a closer examination of the Ethereum project shows how certain building blocks of the sociotechnical imaginaries of governance are yet left untouched by this process of self-reflection. I proposed two perspectives of analysis to be incorporated into the discourse, the cybernetic dispositif and the analysis of economic rationality as a mechanism of power. My hope is that including these perspectives of analysis might foster a better understanding of the crucial, yet untouched, aspects of current sociotechnical imaginaries of governance in blockchain based technologies.

The architects of blockchain based technologies are currently building an attainable new technological infrastructure, thereby setting the foundation for what they see as desirable futures. It is of vital importance to include a wide range of actors and positions in this process, in order to nurture a discourse about whether these 'visions of desirable futures' are indeed desirable or not. This chapter hopes to contribute to that effort. In this process, in order to nurture a discourse about whether these 'visions of desirable futures' are indeed desirable or not. This chapter hopes to contribute to this effort.

dummy [dʌmi]

english version: a rubber nipple attached to a plastic guard enabling the pleasures of the suck. rest of the world's version: stupid, lifeless, perhaps also: a mannequin. go figure.

Asymmetry: How Patterns of Impossibility Mark Dimensions in Knowledge Systems

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¹ Prigogine elaborated the epistemological implications of this asymmetry in collaboration with Isabelle Stengers in several publications. My opening remarks here specifically refer to Ilya Prigogine and Isabelle Stengers (1984), “*The Identification of the Real*,” in *Order out of Chaos, Man new Dialogue with Nature*, (London: Harper-Collins), vol 1, 57–78; and to Isabelle Stengers (2010 [2003]), “*The Science Wars*,” vol 1 and “*In The Name of The Arrow of Time: Prigogine’s Challenge*,” vol 2, *Cosmopolitics*, translated by Robert Bononno, (Minneapolis, MN: University of Minnesota Press), 1–83 and 105–204, respectively.

² Bruno Latour (2005), *Reassembling the Social: An Introduction to Actor Network Theory*, (Oxford: Oxford University Press). The asymmetry discussed here does not refer to the symmetry of technology and power or natural and social explanations discussed in Latour’s earlier works. For that point see Bruno Latour (1993 [1991]), “*Relativism*,” in *We Have Never Been Modern*, translated by Catherine Porter, (Cambridge, MA: Harvard University Press), 91–129.

1. Prigogine’s asymmetry

The work of Ilya Prigogine and Isabelle Stengers exposes a radical *asymmetry* at the heart of physics: different mathematical formulations of the same problem produce *equally valid yet not equivalent* representations of matter and the universe.¹ This chapter examines how this onto-epistemological bifurcation marks thought with the impossibility to reach past the contingency of present knowledge and yet enables a rigorous logic.

When trying to account for the coherence of sense, contemporary philosophy seems unable to let go of the habit of purging thought of all that is historical and contingent, as nothing more than noise that clouds the voice of the ontological ultimate. Prigogine’s asymmetry disrupts this reductionist paradigm. Departing from the absolutist interpretations of contingency proposed by Object Oriented Ontology as well as from Latour’s neo empiricist methodology, this chapter develops Prigogine’s asymmetry to its most extreme consequences.² It explains how a rigorous system of knowledge can function *thanks to* rather than *despite of* the contingent complexity of the present. The argument will revisit the thought of Descartes, Husserl, Rorty, Popper, Gödel, Deleuze, and Golding, to propose a daring reorganisation of the logic of sense that takes *decidability* beyond the true-false dichotomy and introduces a positive interpretation of *incompleteness*, by retaining rather than cleansing the contingent and entropic roughness of the present as the very condition of knowledge and the possibility of making sense.³

As will be seen, this reversal of the hierarchy between the simplicity of the ultimate and the complexity of the present shows that the patterns of possibility and impossibility encountered in knowledge systems distribute and orientate thought as *dimensions* logically rigorous and yet radically material. While this newly discovered materiality of knowledge is nothing new for the artist, it blows asunder the ontological edifice that keeps identity and predicate rigorously apart in the subject-object distribution of epistemology. Prigogine had sought to demonstrate that entropic irreversibility, the difference of past and future, is intrinsic to matter and cannot be reduced to the imperfection of the observer’s understanding, as in classic dynamics; nor to awareness, the very act of observation and measurement, as in quantum mechanics.⁴ This led him to

³ Kurt Gödel (1992 [1931]), *On Formally Undecidable Propositions of Principia Mathematica and Related Systems*, translated by B. Meltzer, (Mineola, NY: Dover).

⁴ Stengers, *Cosmopolitics*, vol 2, 101.

reconceptualise the second law of thermodynamics via statistical mechanics. The innovative aspect of this alternative mathematical formulation is the adoption of the *function* (as the expression of the rate of change in a system) rather than the *equation* (which represents the static boundary conditions, the system's definition or totality) as descriptor for systems with large numbers of particles—whether these are gasses, populations or epidemics. Crucially, these formulations produce diverging and yet compatible models for reality. Indeed, the pivot of Prigogine's reformulation is the system's distance from equilibrium. At or near equilibrium any state is symmetric to the boundary conditions and the system is reversible—albeit ideally. In fact, at equilibrium both formulations could be said to coincide. Far from equilibrium instead, the behaviour of systems with large numbers of particles diverges from the initial conditions with dramatic increases in information entropy. This makes large systems non-integrable, that is non reducible to the initial description, not only in practice but also mathematically. It shows that when multiplicities are involved, the approximation of finite measurements and the reduction of the complexity of the present state to an idealised and homogeneous image of matter are products of arbitrary acts of abstraction.⁵ In fact, for Prigogine the reducibility to an initial state would not explain but rather destroy the organisation of the present, be it a physical process or history. This exposes that physics shares the same epistemological impasse encountered in logic with Gödel's incompleteness. Undecidability, the loss of the a priori space of consistency whereby meaningful theorems/propositions are possible but cannot be explained by the original axioms alone, returns here as the irreducibility of the historical present to the systems' initial definition.⁶

The problem this generates is twofold. On the one hand, the adoption of statistical mechanics reveals an epistemological impossibility internal to physics that induces a canonical paradigm shift: any form of reductionism, or symmetry between the system's description and the present state, must yield to probability as the primary unit of measurement. Temporal as well as information entropy dominate, since emergence is the expression of an augmented form of causation that exceeds the initial conditions. On the other hand—and key for the argument discussed here—this opens a much

⁵ The asymmetry of physical laws is not a new problem in physics. Cf Richard Feynman (2011 [1963]), "Symmetry in Physical Laws," in *Six Not So Easy Pieces: Einstein's Relativity, Symmetry and Space-Time*, (New York: Basic Books), 23–48.

⁶ Cf Ernest Nagel and James R. Newman (1986), "The Problem of Consistency," in *Gödel's Proof*, (New York: New York University Press), 7–24.

⁷ For a detailed elaboration of this alternative, see Prigogine and Stengers, “The Identification of the Real,” in *Order out of Chaos*, 57–78; and Stengers, “The Science Wars,” in *Cosmopolitics*, vol 1, 1–83.

⁸ Prigogine and Stengers, “The Identification of the Real,” 257, 285, and Ilya Prigogine and Isabelle Stengers (2014 [1988]), *Tra il Tempo e L'Eternità*, translated by Carlo Tatasciore, (Torino: Bollati Boringhieri), 139.

⁹ Stengers, “The Science Wars,” *Ibid.*, and see also Stengers, “The End of Tolerance,” in *Cosmopolitics*, vol 2, 303–416. Isabelle Stengers (2000 [1993]), *The Invention of Modern Science*, translated by Daniel W. Smith, (Minneapolis: University of Minnesota Press).

¹⁰ Karl Popper (2002 [1935]), “Falsifiability as a Criterion for Demarcation,” *The Logic of Scientific Discovery*, (London: Routledge), 17–20.

¹¹ Popper, *The Logic of Scientific Discovery*, 315 (my italics).

¹² *Ibid.*, 19.

broader and more disruptive asymmetry at ontological level: the divergence between equally valid but not equivalent representations of reality does not indicate a binary bifurcation between mutually exclusive true and false theories, nor it is observed from a third external and neutral Archimedean point. Rather, this divergence is produced by the very practice of physics. Prigogine’s formulation marks epistemology with the affirmation of an *alternative possibility* at local level, which—as such—prohibits the convergence of different formulations onto one universal description and, therefore, undermines the image of an ontological homogeneity of knowledge.⁷

This undoes the expectation that science and ontology must mirror the real with symmetrical representations. What is more, Prigogine stresses that this reformulation does not impose a new universal truth, rather it presents a heterogeneous universe describable only locally—some portions are indeed reversible, while most aren’t.⁸ Thus, the onto-epistemological asymmetry discussed by Prigogine and Stengers reopens and excludes the possibility of induction and deduction in one single gesture. While Stengers will deploy Latour’s sociological interpretation to analyse this epistemological relativity, this chapter experiments with the ontological consequences of this asymmetry.⁹

Karl Popper’s theory of *refutability* of scientific theories allows a particularly interesting interpretation of the asymmetry between epistemology and ontology exposed by Prigogine’s work. Popper had described the criterion of demarcation of the scientific method as also asymmetric.¹⁰ Rejecting the inductive inferences of the neo-positivist move, which accepted as scientific the statements that could be verified (decided) as *either* true or false, Popper proposed what he called a negative solution: a criterion of refutation or “falsifiability” on the base of existing knowledge, a method of “unilateral or *asymmetrical* or one-sided decidability.”¹¹ That is, a scientific claim must be open to be refuted by experience through empirical tests, whereas totalising universal statements are not verifiable.¹² Popper emphasises that universal statements can never be derived from single local statements, while universal claims can easily be undone by a single contradictory statement. This puncturing of the image of totality (completeness) is precisely what happens in the divergence highlighted by Prigogine and Stengers. With one caveat however, and—as will be seen—here lies all the disruptive

peculiarity of this divergence: the problem here shifts from the object of a scientific statement to the discourse that pronounces it.¹³ The diverging conceptualisations of the matter of physics that follow the introduction of statistical mechanics expose an irremediable fissure in the expected homogeneity of the claims of science. As Stengers points out, this non-equivalence opens an asymmetry where the “laws of physics” are not the same as the “laws of nature.”¹⁴ This, she writes, leaves physics in a “fragile” state, restricting its claims from universal truths to specific “domains of validity” or “truth of the relative.”¹⁵ That is, a demonstration that shows the *possibility* of an alternative representation of the universe makes a homogeneous, universal and totalising description *impossible*. Thus, what is relevant in Prigogine’s work is not *what science does*, but *what it can no longer do*. Indeed, the divergence of different conceptualisations of matter reveals that the mathematical syntax is not a neutral and transparent vehicle for representing the real but is instead opaque and creative. Crucially, the impossibility to bypass or transcend the finite syntax of mathematical formulations leads to the demise of the possibility of an absolute language of representation. In fact, it hollows the absolute of all authority. Therefore, asymmetry effects epistemology and ontology simultaneously: one argument concerns the *object of physics* (showing entropic irreversibility as intrinsic to matter) and is internal to the practice. The second, instead, concerns *physics as a discourse*, since the ontological model it projects upturns the image of knowledge as a system of compatible representations converging on one reality. What is encountered here is a disruption of what Deleuze called the *image of thought*.¹⁶ Asymmetry is a peculiar form of counteractualisation where a bifurcation between contingent possibilities in the practice of science prevents the image of an absolute object of knowledge from reaching the expected conclusion, or thought from being totalised. At the same time, it does not allow language to claim the authority necessary for any form of absolute representation of such an object. Indeed, a finitude without ontological boundary is, as Deleuze writes, “without image.” As this divergence cannot be bypassed in any way, asymmetry *marks* thought and the system of knowledge with an *undissolvable* onto-epistemological bifurcation. However, as will be seen, this undissolvability is neither the apodictic self-evidence of non-contradiction, as

dynamic energy transfer [daɪˈnæmɪk ˈɛnədʒi ˈtrænsfə(:)]
flow.

¹³ This chapter is not adopting Popper’s linear image of knowledge, nor does it share Popper’s trust in experience as holding the ultimate authority to confirm theoretical knowledge, or his identification of the development of science with a survival struggle. Popper’s use of refutability may seem to flirt with a form of incompleteness close Gödel’s argument, yet this is only a tactical stratagem. Popper is firmly intent on finding a method for the convergence of knowledge onto one reality, albeit transcendently. For him knowledge is attained by way of exclusion. Progressive falsifications proceed backward—so to speak—in the inductive direction, asymptotically refining a theory until this becomes true.

¹⁴ Stengers, *Cosmopolitics*, vol 2, 201.

¹⁵ Stengers, “Scientific Passions,” in *Cosmopolitics*, vol 1, 1–13. For this non-relativist interpretation of sophism see also Isabelle Stengers (2000), “Constructions,” in *The Invention of Modern Science*, (Minnesota: University of Minnesota Press), 55–105.

¹⁶ Gilles Deleuze (2001 [1968]), “The Image of Thought,” *Difference and Repetition*, translated by Paul Patton, (London: Continuum), 129–67.

¹⁷ Latour, "Fourth Source of Uncertainty: Matters of Fact vs. Matters of Concern," in *Reassembling the Social*, 87–120. See also Graham Harman (2009), *Prince of Networks: Bruno Latour and Metaphysics*, (Melbourne: Re.Press).

¹⁸ Deleuze, *Difference and Repetition*, 139–40.

¹⁹ Johnny Golding (2019), "The Photograph of Thought," in Daniel Rubinstein (Ed.), *Fragmentation of the Photographic Image in the Digital Age*, (London: Routledge), 212–23. See also J. Golding (2016), "In the Shadow of Akimbo Corporatism: Arched Athleticism and the Becoming-Human of 'a people'", in *Journal of Deleuze Studies*, vol 10, no. 2, 261–77.

²⁰ René Descartes (1993 [1641]), *Meditations on First Philosophy*, translated by Elizabeth Haldane and G.R.T. Ross, Stanley Tweyman (Ed.), (London: Routledge), 45 (my emphasis).

²¹ *Ibid.*, 51.

²² Edmund Husserl (2011 [1913]), *Ideas for a Pure Phenomenology and Phenomenological Philosophy*, translated by Daniel O' Dahlstrom, (Indianapolis: Hackett), 52–56.

doubt in the constitution of the foundations for Descartes' cogito, nor coincides with Latour's self-professed empiricism where controversies about facts constitute the only matter of fact, nor with the claims of autonomous objects this lends itself to.¹⁷ This is also not a redeployment of the postmodern "fundamental encounter" with Being, as the "Being of the sensible" that for Deleuze "forces us to think."¹⁸ Nevertheless, as Golding writes, it provokes thought with a demand for thinking that is "neither 'natural,' 'instrumental' nor 'artificial' [and] yet, it can enable political, aesthetic and also ethic agency" by providing logical rigour.¹⁹ How the undissolvability of this asymmetric mark can force us to think by expressing a necessity, while at the same time remaining entirely contingent, is the question this chapter tries to answer.

2. Special objects and privileged representations

2.1 The tabula rasa of ontological reduction

Let us step back for a moment. Descartes opens the *Meditations on First Philosophy* with a statement that lays out the programme of modern thought:

"It is now some years since I detected how many were the false beliefs that I had from my earliest youth admitted as true, and how doubtful was everything I had since constructed on this basis; and from that time I was convinced that I must once for all seriously undertake to *rid myself of all the opinions* which I had formerly accepted, and commence to *build anew from the foundation*, if I wanted to establish any firm and permanent structure in the sciences."²⁰

In the second meditation this quest leads to the tactic of doubting and to the introduction of the cogito as an undissolvable certainty built on the self-evidence of non-contradiction, which grounds thought and guarantees knowledge. However, how the cogito imposes itself is pivotal. Descartes presents this certainty as the object of a proposition whose truth is self-evident. The proposition "I exists -Descartes writes- is a necessary true proposition each time I pronounce it or think it."²¹

Three hundred years later, Husserl rekindles this quest for a rigorous science by restaging the tactic of doubt as the phenomenological suspension, or *epoché*.²² This practice of "bracketing" knowledge does not redeploy the universal negation applied by doubt, but limits

phenomenology to “withholding judgment.”²³ “I suspend all sciences related to this natural world,” Husserl writes, and “I refrain from adopting a single proposition that belongs to them,” keeping “theories, that is to say pre-conceptions of every kind, strictly at a distance.”²⁴ Thus, for Husserl self-evidence becomes the experience of the world as *such*, reached withdrawing what he calls “natural attitude” (the positivist and oversimplified cartesian certainty that the world’s existence is actual) until reaching an equally undissolvable apodictic truth: the “phenomenological residuum.”²⁵

Both strategies aspired to look beyond existing contingent knowledge and epistemological presuppositions, clearing the field of questioning not only of the uncertain, the doubtful, the undecidable, or the contradictory, but also of the local and finite historical roughness of scientific theories, in the hope of accessing an absolute truth that could assert itself with apodictic authority and from which the validity of everything else could be deduced. That is, both moves sought to reach certainty through a *regression* towards an undissolvable and self-sufficient truth. For Descartes, non-contradiction provides a barrier that stops the regress of doubting and produces the cogito, as a self-evidence that can support thought and act as a solid foothold for knowledge. Crucially, the cogito is presented as an a-dimensional point that sits outside both knowledge and thought. Husserl, instead, deploys a more complex tactic where all suspensions flow into the irreducibility of a radical epoché, or radical consciousness of Being, as an equally undoubtable residue. Here, Husserl embraces Leibniz’s monadology: Descartes’ ego, re-elaborated to accommodate temporality and the intersubjective objectivity of the world, becomes a transcendental consciousness, or impersonal “I,” able to endow contingent experiences with necessity and to guarantee the unitary and homogeneous existence of the external world. This transcendental consciousness coincides with the disembodied gaze of Leibniz’s God, an equally a-dimensional point located outside historical time and prior to individual subjectivities, exactly as Descartes’ cogito.²⁶ These moves, which encompass the horizon of the modern philosophical project, present the authority of self-evidence as an undissolvable a-historical reference point, a priori of any engagement with knowledge. Seeking rigorous foundations for science seems to require a process of epistemological stripping that places the

²³ Ibid, 54.

²⁴ Ibid, 57.

²⁵ Ibid, 48–50 and 56–8.

²⁶ Edmund Husserl (1960 [1931]), “Second Meditation: The Field of Transcendental Experience Laid Open in Respect of Its Universal Structures,” in *Cartesian Meditations, An Introduction to Phenomenology*, translated by Dorion Cairns, (Heidelberg: Springer), 27–55.

²⁷ Richard Rorty (1979), "Mirroring," in *Philosophy and the Mirror of Nature*, (Princeton: Princeton University Press), 129–311.

problem of the undissolvable self-evidence onto a metaphysical level where reasoning is reduced to an operation of ontological cleansing. What comes to the fore is an image of foundations entirely abstract. Epistemology requires aseptic ontological foundations where necessity can express its authority only by eliminating all contingent, historical, sensual, aesthetic, and political nuances. The *very fact that* I think, or that the world exists, becomes a foundational principle outside the discourse and outside knowledge; a disembodied and disengaged a-historical purity from which it ought to be possible to begin always anew, each time from scratch, free from all biases. Thought must be stripped of local determinations, cleared of unverified and tentative theories, cleansed not only of obscure and confused perceptions but deprived of life altogether; emptied, that is, of its colours, flavours, sounds, desires, as well as of its ideas, traditions, histories, hopes, horrors, successes and failures. After Prigogine and Stengers this is neither so obvious nor inevitable.

2.2 Privileged representations

It is rather interesting and somewhat paradoxical that these aseptic foundations for a theory of knowledge are constructed, as Rorty argues, on a metaphor derived from sensorial perception.²⁷ Rorty shows how modern philosophy presents the image of knowledge as a *mirror* of the world. Representation is a "quasi-visual faculty" modelled on the analogy between perception and knowledge inherited from Greek philosophy. The self-evidence on which knowledge must be constructed is conceived imitating sight, as "being brought face-to-face with the object of belief"—Rorty writes. "To know better is to understand how to improve the activity of this quasi-visual faculty, the Mirror of Nature, and thus to think of knowledge as an assemblage of accurate [visual] representations." However, as historically sensorial representations have been met with various degrees of scepticism, "the way to have accurate representations is to find within the mirror, a special privileged class of representations, so compelling that their accuracy cannot be doubted," and from which everything else can be deduced. Singling out such privileged images or representations is the task of philosophy as the theory of knowledge.²⁸ The key for the power of these privileged representations is that the face-to-face with the natural object is interpreted as

²⁸ Rorty, *Philosophy and the Mirror of Nature*, 157, 163.

generating a mental image of such object. Therefore, these representations express a linear relation of physical causation, and act as a *special object* of knowledge able to carry its own justification. For instance, in the cogito non-contradiction is offered to reason as an object endowed with self-imposing authority. The compelling power of self-evidence is then nothing but the expression of a determinist causality, fully traceable. Accordingly, *understanding* amounts to retracing and keeping visible the concatenation of self-evidences that compose a demonstration, as the sequence of visible causes from the outer object to the inner image in the mind of the subject. In the case of a special object, self-evidences present a situation that cannot be otherwise and is unable to be doubted because its logical necessity is modelled as a physical cause. Reaching this evidence means reaching the metaphysical foundations of knowledge.²⁹

The second aspect of Rorty's analysis is that in the modern demarcation of philosophy from science philosophy is presented as a "theory of knowledge" distinct from scientific statements. Only from this external position it can act as its foundations. Within this theory, truth is presented as the *object of a proposition* (as Descartes did), thereby conferring a great power to the language of this theory, without—however—addressing the ground of its authority. As Rorty writes, "knowing a proposition to be true is to be identified with being caused to do something by an object." The idea of necessity stems from the fact that "the object which the proposition is about imposes the proposition's truth." That is, belief is portrayed as the grip of a physical object upon the thinker's mind.³⁰ The problem that emerges here is that when the causal metaphor is transposed to the truth expressed by propositions, it forces upon language a logic that does not belong to it. Objects of mathematical truth do not behave as the impenetrable bodies of dynamics, unless logic is reduced to the laws of Newtonian physics and the subject to a disembodied observer.³¹ Moreover, and this is crucial, this image of knowledge redeploys the principle of conservation between cause and effect, thus assuming that language is a neutral and transparent vehicle for transporting meaning. In fact, in the theory of knowledge representational language must not mingle with its content. Existence (identity) and predicate must be rigorously kept apart.³² Self-evidence can only be upheld if language does not get in the way. However, not only the

²⁹ Rorty, *Philosophy and the Mirror of Nature*, 159.

³⁰ *Ibid.*, 157.

³¹ Regarding this fundamental problem of forced reduction to a universal logic see Nancy Cartwright (1983), *Why the Laws of Physics Lie*, (Oxford: Oxford University Press). The problem of a disembodied observer returns implicitly in Morton's autonomous objects, presented as free from a *priori* necessity, but identifiable and nameable only from a metaphysical position. Cf Timothy Morton (2013), *Hyperobjects, Philosophy and Ecology After the End of the World*, (Minneapolis, MI: University of Minnesota Press).

³² Andrea Moro (2018), *A Brief History of the Verb to Be*, translated by Bonnie McClellan-Broussard, (Cambridge, MA: MIT Press). This is the contamination that Russell had hoped to avoid with the theory of types. See Bertrand Russell (2008), "Section 578" and "Appendix B, The Doctrine of Types," *Principles of Mathematics*, (London: Routledge), 80–81, 534–40, respectively.

materiality of language has been overlooked or perhaps even censored by modern thought, but—as will be seen—the linearity of such causal representations is precisely what is interrupted by the asymmetry of syntax shown by Prigogine and Stengers. Indeed, if in the light of the divergence exposed by asymmetry one looks again at the problem of self-evidence discussed by Rorty, it becomes clear that it is precisely the impossibility of a face-to-face evidence that marks knowledge, since asymmetry interrupts the linearity of representation conceived as the physical causation of a mental image. As the divergence of mathematical syntaxes emerges within science but affects the image of ontology, it blurs the boundaries and brings about a conflation of knowledge as an object and the theory of knowledge as its structure, as well as the collapse of the distance between the theory and the object of knowledge. That is, the impossibility to have linear representations converging onto a unitary reality due to the plural possibilities expressed in the language of science here jumps from the object of knowledge to its theory, from the predicate to the language that pronounces it. Consequently, the distinction between ontology and epistemology collapses as well. Moreover, as an alternative contingent confirmation of a theory at local level (Prigogine's demonstration) brings about the refutation of the universal image of thought (ontology), this asymmetry cannot be interpreted as a paradigm shift, as Kuhn described, rather it points to the incompleteness of all paradigms. In fact, it is greater than the paradigm of science and undermines the very possibility of a paradigm.

What this leads to is that ontology cannot expect physics to be a partner in its quest for the ultimate foundations if physics multiplies its images of matter and the universe based on the mathematical syntax of its formulations. Vice versa, if the language of science produces diverging images of the real as its objects, it cannot present itself as capable of absolute or privileged representations. To assume that there is one language that can express its object *absolutely* implies the disqualification of all other languages as unable to convey information correctly. Likewise, if there exists an absolute object that is supposed to be perfectly *expressible* through a privileged representation, then there must be an absolute language that expresses it immediately and in a complete manner without gain, loss or distortion of information. For languages less pure than the self-evidence of absolute representation, different formulations would be

expected to converge by representing complementary portions or compatible versions of the same truth, totalisable into one continuity or projected as transcendental unity. However, with the non-equivalence of mathematical syntaxes presented by Prigogine and Stengers the absolute representational value of such language vanishes and with it crumbles the possibility of naming a homogeneous object as an arbitrary idealisation. What is disproved is not the absolute as such but, much more disruptively, the possibility of an absolute language able to represent it. Therefore, conveying self-evidence becomes impossible. Far from being a repetition of the linguistic turn, this shows that there is an inherent materiality to language, which rather than separating it from an unsayable reality shows that reality and the syntax of its representation form a continuous and non-rescindable continuity.

The issue then is how to address the problem of the compelling authority of a proposition without repeating existing answers. Neither Rorty nor Stengers' positions are fully satisfactory, though for very different reasons. On the one hand, Rorty's solution redeploys the critique already formulated by Wittgenstein: judgements rest only on other judgements, and the only escape from an infinite regression relies not on the evidence of an ultimate confirmation but on *belief*. Thereby reducing the coherence of sense to mere "social agreement."³³ On the other, in a more cautious move, Stengers entrusts the fragility of scientific claims to a "parliament" where the experts that speak on behalf of science, having accepted that the objects of their statements are nothing but "physico-mathematical fictions," are expected to behave like diplomats.³⁴ Here the possibilities expressed by incommensurable domains of validity would be discussed, never attempting to foreclose a question or demanding universal answers, but producing knowledge in the translation from local to public.³⁵ While attractive, this interpretation still relies on the possibility of a virtual space of convergence as the prerequisite for the parliament's very existence. This problem may seem to have been already settled by Latour, whose method of "writing down risky accounts" of the controversies observed is presented as a creative practice of translation where knowledge is produced in the thickness of the text.³⁶ Yet , this is precisely the promise that Latour does not fulfil, for it remains forever deferred. Indeed, Latour's risky accounts and Stengers'

³³ Rorty, *Philosophy and the Mirror of Nature*, 136, 158. See also Ludwig Wittgenstein (1969), *On Certainty*, G. E. M. Anscombe and G. H. von Wright (Eds.), translated by Denis Paul and G. E. M. Anscombe, (Oxford: Blackwell). Cf Ludwig Wittgenstein (1978), *Remarks on the Foundations of Mathematics*, G. E. M. Anscombe, R. Rhees and G. H. von Wright (Eds.), translated by G. E. M. Anscombe, (Oxford: Blackwell).

³⁴ Regarding Stengers' interpretation of a "polemical" logic of demarcation of science and the figure of the "diplomat," see Stengers, "Scientific Passions," in *Cosmopolitics*, vol I, 1-13, and "The Curse of Tolerance," in *Cosmopolitics*, Vol II, 303-416.

³⁵ This ecological-epistemological space develops Latour's "parliament of things." See Latour, *We Have Never Been Modern*, 142-45. For his notion of "translation," see 1-17 and 121-40.

³⁶ Latour, "On the Difficulties of Being an ANT," in *Reassembling the Social*, 141-56.

echo chamber [ɛkəʊ ˈtʃeɪmbə]

usually understood as an environment which reflects back or reinforces beliefs or opinions that coincide with those within the chamber, with the result that their existing views are reinforced and alternative ideas are not considered. echo chambers are also tools of the trade for fake news and click bait, rampant on twitter, facebook and other social media platforms which add to or create social and political polarisation and extremism.

parliament remain an unarticulated black box. Which parameters would organise these mediations? What grammar would structure the translation so that diplomacy can succeed and the semantic distance does not collapse into conflict? That is, this risky practice does not lead to a freedom from deduction as Latour hoped, but to a vagueness

vulnerable to the preconceptions hidden in an unquestioned adoption of representation and of the binary distribution of observer and matter—or indeed subject and object. In fact, here the problem escalates from one of *methodology*—as Latour posed it—to one concerning the *logic* of sense. Indeed, the problem of asymmetry requires a more radical answer. Finite and asymmetric domains of validity not only do not compete for the same epistemological space but depart altogether from the very ontological image of continuity as the ground for coherence, whether this is imposed as the certainty of universality or projected as the virtual possibility of agreement. In other words, as asymmetry is ineluctable because it exceeds specific representations, it jams knowledge in such a way that it imposes that one stops and thinks.

3. What forces us to think

At the opposite end of the spectrum from Descartes' foundations, one finds Deleuze's critique of the *image of thought*. Responding to the Cartesian quest for clean and clear beginning, as the inductivist space of the a priori structure of the system of knowledge, Deleuze proposes that:

“Something in the world forces us to think. This something is an object not of recognition but of a fundamental *encounter*. What is encountered [...] may be grasped in a range of affective tones: wonder, love, hatred, suffering. In whichever tone, its primary characteristic is that it can only be sensed. In this sense it is opposed to recognition. [...] It is not a sensible being but the being of the sensible. It is not the given but that by which the given is given.” [and] “that which can only be sensed (the *sentientum* or the being of the sensible) moves the soul, ‘perplexes’ it—in other words, forces it to pose a problem: as though the object of encounter, the sign, were the bearer of a problem—as though it were a problem.”³⁷

However, the unsurmountable divergence between epistemological

³⁷ Gilles Deleuze, *Difference and Repetition*, 139–40.

and ontological propositions brought forth by Prigogine and Stengers' asymmetry makes this encounter a rather delicate matter. In fact, the problematic special object exposed by Rorty seems to be still at work in postmodern thought, albeit not as a representation, but as a force without a face, nameless.

As was seen, the cartesian a-dimensionality of the self-evident foundational object returns in Husserl. In "The Origin of Geometry" it becomes the *uniqueness* of the event's origin—opening the path towards the postmodern question about the logic of sense.³⁸ This question is no longer concerned with a demonstration of the apodictic legitimacy of foundations, but with how to retrace and access it. Here, the origin is not a historical beginning or an initial cause, but the unique sense with which geometry was first established, the source of its meaning. In Husserl's interpretation this is still a problem of *understanding*. The initial self-evidence of geometrical statements (theorems) over time has become actualised into a repeated tradition, opaque and devoid of life. Rekindling the origin's meaning is possible through an a priori pure temporality (consciousness), where grasping this special object (certainty) hinges on reactivating and keeping open the concatenation of self-evidences that supports understanding from the origin to the present. The process relies on the Kantian architecture of the intellect in order to pass from what Husserl calls the present of the repeated historical tradition to the original meaning, or a-temporal transcendental idea. The postmodern interpretation of the event of sense echoes the a-dimensionality of this uniqueness. What changes is the path to access it. In fact, this approach to the origin seems better described by the leap experienced in the Kantian sublime. It skips the accountability work of the intellect, seeking a point of contact, albeit infinitesimal and elusively tangent, between the finite sensible present and the unique event of sense. The link between Husserl and Deleuze is obviously Heidegger, who in *Identity and Difference* defines the event as a "singulare tantum," that which happens "not in any number but uniquely."³⁹ Deleuze restages this a-dimensionality writing that the event is an "ontologically unique throw" and the repetition in the space this opens happens "not numerically but formally, the different rules being the form of a single ontological unique throw, the same across all occasions."⁴⁰ The choice of the sublime mode is perhaps

³⁸ Edmund Husserl (1970 [1954]), "The Origin of Geometry," in David Carr, translated by Walter Biemel, *The Crisis of European Sciences and Transcendental Phenomenology*, (Evanston IL: Northwestern University Press), 353–78.

³⁹ Martin Heidegger (1969 [1957]), *Identity and Difference*, translated by Joan Stambaugh, (New York: Harper & Row), 36.

⁴⁰ Deleuze, *Difference and Repetition*, 304. Deleuze further articulates this notion of uniqueness of the event in *The Logic of Sense*. Here the event is presented as a "unique cast from which all throws are qualitatively distinguished," (10th Series of the *Ideal Game*), and as the "Eventum Tantum" (25th Series of *Univocity*), again stating that language is a "a unique event," (26th Series of *Language*). Gilles Deleuze (1990 [1969]), *The Logic of Sense*, translated by Mark Lester and Charles Stivale, (London: Athlone Press), 64, 179 and 185 respectively.

most evident in Lyotard, who seeks “a rationality [...] timorously outlining the conditions for a re-reading and re-writing of Kant’s division of reason.”⁴¹ Conditions where “the law does summon thinking but in different, incommensurable ways.” Here too, this summoning is faceless. The thinker is obliged to think by a “I don’t know what,” Lyotard writes, which coincides with the authority of that which for Deleuze’s “forces us to think.” However, the asymmetrical divergence encountered in Prigogine’s work is neither an object of a proposition nor a sign for a problem whose first cause, the original expansion of the event, is always tangent to the present as the virtual. Another method of attunement is required.

4. Asymmetry is neither an object nor a concept

It now becomes clear why the asymmetry exposed in Prigogine’s work poses such a radical question. Asymmetry is not the effect of an external cause. While it is contingent, as it emerges from the practice, it shapes thought as a dimension for reasoning. As the opacity of the mathematical syntax has a radical impact on the logic of representation, the asymmetry it induces cannot be approached as a nameable or thinkable object of a proposition. That is, the undissolvable problem exposed in the divergence does not impose itself with any form of self-evidence or ontological authority. There is no *sentiendum*, nothing to see beyond the finite contingency of the present. In this undissolvable divergence thought does not encounter something compelling, rather runs into a discontinuity, the absence of an ontological perimeter, the impossibility of totalisation; in fact, the very impossibility to reach something absolutely compelling. Thus, asymmetry is not the name of a new form of self-evidence nor a gateway to self-evidence. It is not the encounter with a compelling truth, but a silence. It is not a lack, but the moment when diverging statements are pronounced in different languages, with the same validity albeit incommensurably. Asymmetry is the distance between positives local truths, yet it is not the space where this divergence takes place, or their negative. In fact, asymmetry is only the adjective describing diverging positive finite formulations, which do not converge onto the same image of reality and are therefore *asymmetrical*. It simply shows that ontology cannot be modelled on the image of a continuous space; that diverging plural possibilities are not mutually

⁴¹ Jean-François Lyotard (1988), *Peregrinations: Law, Form, Event*, translated and edited by David Carroll, (New York: Columbia University Press), 11–12.

exclusive, and yet make a singular converging universality impossible. As such, asymmetry is passive: not a concept, but merely the name of diverging syntaxes. It does not impose a special object or a truth, rather it exposes the incompleteness of the ontological boundary. This passivity does not conceal the asymmetry of Deleuzian *difference*, as the horizon from which actualised entities diverge while it (difference) does not diverge from them.⁴² It names the distribution of finite positive claims pronounced by an opaque language without background.

As the opacity and creativity of the syntax exposed by Prigogine and Stengers lead to radically different conceptualisations of matter, they undermine the ability and authority of language to express the self-evidence of an absolute object. Thus, asymmetry is a problem that invests language before this can decide how to evaluate the evidence of its statements. In fact, *asymmetry precedes decidability*. Thus, in diverging it does not impose any fundamental truth, it simply exposes an interruption in the homogeneity of a global claim about the universe, not a recognisable void or a dialectical absence but a *distribution of thought*. Indeed, the divergence exposed here, rather than being a self-evident object of a proposition of knowledge, is its very structure. Thus, with asymmetry what collapses is the distance between the metadiscourse of the theory of knowledge and the statements this evaluates as its objects; that is the depth of representation.

Moreover, as it belongs to the syntax of diverging contingent finite claims, asymmetry cannot be turned into a fact with independent existence, a new autonomous ontological entity. That is, as the finitude of syntactical divergences cannot name an absolute fact but is only an adjective for local claims, asymmetry does not provide a new ontological object or a metaphor for an ultimate reality. The possibility of alternative conceptualisations of matter cannot and must not be totalised into one ontological claim as *the fact that* the syntax diverges. Semantically asymmetry names a plurality of diverging positive possibilities (contingent open conjectures and their local refutations), but ontologically it is neither an object nor a concept. Presenting the fact that they are asymmetric as having autonomous existence would be an arbitrary abstraction, which—moreover—would remain open to infinite regressions: the fact of the fact that,

⁴² Deleuze, *Difference and Repetition*, 28.

⁴³ Quentin Meillassoux (2009 [2006]), *After Finitude: an Essay on the Necessity of Contingency*, translated by Ray Brassier, (London: Continuum).

and so on. Naming a problem is not the same as obtaining a concept or an object. This is essential, because without compounding the contingent divergences of the images of matter produced by the syntax into a *something*, asymmetry cannot be transformed into the object of a proposition able to perform the face-to-face necessary for the self-evidence of truth, even when this truth is presented as the absence of truth. Thus, asymmetry resists a linear ontologisation that would reduce it and package it into an object of representation to be validated by the theory of knowledge.

It is very important to grasp the relevance of this resistance of contingency in order to avoid attempts, such as Meillassoux's, aimed at imposing the arbitrary reintroduction of absolute certainty.⁴³ Necessity for Meillassoux, as for Descartes before him, is structured on non-contradiction as a proposition's object. However, Meillassoux needs to find a suitable target for doubt in the 21st century. This comes in the form of the history of philosophy itself: since Kant it has not been possible to claim that the world is either contingent or necessary (incompleteness). This openness, like asymmetry, is not an entity, so Meillassoux without further proofs turns this incompleteness (*so far it has not been possible*) into a totalised universal statement: *it is impossible* to claim contingency or necessity. At this point, having arbitrarily manipulated the openness of incompleteness into something closed, graspable and directly pronounceable, Meillassoux can re-stage the Cartesian strategy of non-contradiction, claiming that the world may be contingent or necessary but *undecidability*, the fact that it is impossible to determine this, is absolute; a self-evident truth presented as the object of the proposition that pronounces it. Thereby claiming a return to metaphysics with the "necessity of contingency."⁴⁴ However, *the fact that* is a claim that can be stated and presented as the object of a proposition only if this is pronounced from outside the universe of facts it is naming; a claim both independent of language and turned into the content of discourse and knowledge. But this is precisely what Prigogine's asymmetric syntax does not allow—on pain of falling into the infinite regress of a statement that pretends to predicate its own identity. In fact, by disregarding Gödel's incompleteness Meillassoux runs into Russell's paradox of the set of all sets that cannot contain itself, or in Lyotard's words: "a phrase that refers to the totality of phrases cannot be part

⁴⁴ Ibid, 116.

of that totality.”⁴⁵ The facticity claimed by Meillassoux is just another tactic of ontological cleansing, which claims that while the form in which the world exists is contingent and dispensable, the fact that it exists is necessary and thereby provides a undissolvable certainty outside thought and outside the history of knowledge. Asymmetry turns this logic inside-out, exposing instead that the contingent, the historical and the ephemeral distributions of knowledge are precisely what enables the logic of sense.

5. Undissolvable contingency as a mark

The negative method of demarcation proposed by Popper (the possibility of refuting but not verifying) proceeds by deduction, excluding contradictions between existing knowledge and empirical reality in a progressive refinement of the formulations of science, in order to advance inductively towards a transcendental truth. This deploys a delayed *reductio ad absurdum* where the last standing statement at some indefinite point in the epistemological future must be correct. However, the inferences of these deductions must themselves be subject to the same scrutiny. Moreover, as the asymmetry exposed by Prigogine and Stengers emerges from the very language of science, it cannot engage in a similar practice of progressive deduction and exclusion because the divergence belongs to the very language that would perform the tests. Therefore, as the divergence takes place entirely between alternative formulations inside existing knowledge, asymmetry is both: *contingent*—as it is neither caused by the hard reality of empirical facts which would refute one theory in favour of another, nor it is imposed by the authority of a metaphysical principle; and *undissolvable*—because there is no solution for bypassing its diverging formulations and reach an absolute truth other than attempting more formulations, which would be equally vulnerable to the opacity and materiality of the mathematical syntax. Thus, as such, the bifurcation between equally valid but not equivalent descriptions exposed by Prigogine cannot be decided, reconciled or sublated. Yet, it *marks* knowledge. It is a pattern, distributed without any recourse to metaphysical foundations, virtual origin or immanent solutions. Moreover, this contingent undissolvability is not undermined but reinforced by the very possibility of a refutation of Prigogine’s alternative formulation. Indeed, if that were the case the

⁴⁵ Russell, *Principles of Mathematics*, 80–81. Cf Jean François Lyotard (1988 [1983]), *The Differend, Phrases in Dispute*, translated by George Van Den Abbeele, (Manchester: Manchester University Press), 6.

⁴⁶ Donna Haraway (1988), "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective," in *Feminist Studies*, vol 14, no 3, 575–99.

divergence would collapse and a new universal statement about matter being 'thus' would re-emerge. However, this would be exposed to the very method of falsification that had brought it back in the first place, thereby preventing any absolute claim. Therefore, divergence is undissolvable not because it cannot be negated, as Cartesian doubt or Meillassoux's fact, but because it belongs to the syntax of thought. The plural possibilities it opens and the totalisation it forbids mark indelibly the system of knowledge, distributing possible and impossible questions.

This circle of refutability is neither vicious, nor subjective. In fact, far from being a paradox, it provides a peculiar form of objectivity beyond binaries. Diverging theories are indeed part of knowledge's history and the evolution of its questions. The pattern given to knowledge by the history of conjectures and refutations *situates* it; it provides a form of material *orientation* neither guaranteed externally nor projected virtually. However, this differs from the physical embodiment invoked by Haraway, where gender or technology would determine the dimensions of scientific observation externally.⁴⁶ Rather the body of knowledge is structured by the specific historical distributions of the possibility and impossibility of its claims. The history of this body constitutes the conditions and dimensions for what can be thought as well as how it can be thought. This unavoidable practice of deducing from existing knowledge only on the base of existing knowledge introduces a metastable rather than transcendent or virtual image of thought; one constantly evolving and reconfiguring its finite patterns. Thus, divergence is neither a self-evident nor a mental object, but belongs to the very language used to explore and explain the world. As such, it orients and shapes knowledge. It is a *dimension* of thought.

It now becomes clear that we are forced to think *thanks to* rather than *despite of* this undissolvable contingency. That is, the divergence between epistemology and ontology generates a tension inside knowledge that forces us to think because it is undissolvable and—at the same time—enables thought because its contingent distribution defines its dimensions. It introduces an undissolvable marker in the system of knowledge, which necessitates thought while remaining entirely contingent. Stengers' diplomacy or Latour's empiricism could not reach this far. The undissolvable contingency of asymmetry is not

an object entertained by knowledge nor marks knowledge as a fact that has a grip on the mind. More simply, there is no way to think past it. Instead, by reducing the undissolvability of uncertainties to a matter of fact, that is to *objects* of knowledge, Latour's position is prone to the manipulation that finds these facts inside knowledge only to turn them into autonomous objects independent of thought, reinstating the absolute.⁴⁷ The problem is in fact even greater: the exhortation to abandon a priori concepts, to be open, choosing not to know, perpetuates the very practice of epistemological cleansing Latour had hoped to avoid.

⁴⁷ Latour, *Reassembling the Social*, 87–120. The absolutist interpretation of Latour's fact is formulated by Harman in his *Prince of Networks*.

6. Refutations and repetitions

What is encountered in the silence left by the asymmetric divergence in the place of universal statements is not an ontological *unsayable*, but a finite organisation of thought according to the possibilities expressed by the mathematical syntax; the distribution and orientation of the onto-epistemological dimensions of the universe-knowledge. There were the possible ends the impossible does not begin, there is simply nothing to feel or think. Asymmetry marks an impossibility, which does not separate knowledge from ignorance, the known from the yet to be discovered. Instead, it defines patterns of possibility as the material and corporeal dimensions along which knowledge can develop. The body of knowledge is the condition for knowledge. Thought folds itself along these distributions of possibility and impossibility.

Here, with an entirely unorthodox interpretation, Popper's theory of falsifiability can help understanding the problem at stake. The circularity of refutations highlighted earlier could leave linear ontology entirely stranded, perhaps even vulnerable to self-annihilation. Yet, moving Popper's refutability well out of the space of transcendental inductivism in which it was conceived and relocating it in the peculiar space of incompleteness opened by Prigogine and Stengers' asymmetry, the notion of conjectures and refutations provides a radical alternative to a logic of knowledge built on the aseptic ground of absolute necessity.

In a system of which it is not possible to prove or name the totality, as asymmetry, every apparent certainty is contingent. Popper's great intuition was indeed to begin thinking from the complex and vulner-

⁴⁸ Deleuze, *Difference and Repetition*, 161–62. See also Gottfried Wilhelm Leibniz (2007 [1709]), *Theodicy: Essays on the Goodness of God, the Freedom of Man and the Origin of Evil*, Austin Farrer (Ed.), translated by E.M. Huggard, (Charleston, SC: Bibliobazaar).

able finitude of present knowledge rather than from foundational axioms. As a theory is never true but only robust, in so far as it resists attempts to invalidate it, knowledge does not represent a fact but is instead a projection, a metastable statement both adapting and susceptible to be disproved. Refutation is a negation entrusting the experimental practice with the metaphysical authority of non-contradiction. However, asymmetry complicates this. As was seen, the equally valid but not equivalent formulations of the mathematical syntax undo the notion of an ultimate matter and of a language able to name it. Thus, the empirical proof loses its apodictic value. What is left are heterogeneous statements whose validity is local and finite. In fact, the asymmetry exposed by Prigogine and Stengers takes the question of knowledge out of an a priori ontological space designed as a binary true-false map, and moves the vulnerability of existing knowledge into a regime of distributions determined by open and closed possibilities: the *not-yet-refuted* as the open possible and the *refuted* as the closed impossible.

What emerges here is an intersection between Popper's robustness and Leibniz' compossibility by way of Deleuze's speculative interpretation of concepts.⁴⁸ Openness, the robust theory yet to be refuted, is nothing but *repetition*. The possible is not an a priori space to be filled, but simply the uninterrupted iteration of existing properties—in this case the epistemological parameters of the question asked. Possibility, as openness, is a not yet interrupted speculative series. It is the question that can still be posed and still generates answers, no matter how partial or prone to falsification; a theory that continues to find new opportunities to gather data and expand its relevance. Possibility as *the not-yet-refuted*, the mere contingent openness of iterability, radically differs from the actualisation of the virtual and does not have any metaphysical authority. Its legitimacy rests on the materiality of its historical repetitions. Conversely, the negativity of the impossible is not *negation*, nor is it imposed externally or empirically. The impossibility expressed in the refutation is *an instance of impossibility in an open series of iterations*. A refuted theory is a set of conjectures that has been counteractualised by the possibility of another set of conjectures.

Moreover, as asymmetry is not expressing an either-or exclusion, but the divergence of equally valid possibilities, that is a refutation of the universal by the alternative proof of the local, what is coming to the

fore is that *possibility and impossibility are not binary opposites*. This brings about a reversal of the negative value of undecidability. A *conjecture* is a question that can continue being asked, a series repeating uninterrupted, a not yet decided statement—possibility. *Refutation*, on the other hand, is a decided statement, a series interrupted and no longer repeating—impossibility. That is, on the one hand *refutability*, as undecided repeatability, indicates an affirmative interpretation of incompleteness: the ability to repeat the conjecture as the projection of an expectation which is not yet decided. Thus, possibility here is not the expression of an a priori concept but just a name for the open horizon of incompleteness. As a promise of decidability, it is not yet a something but mere openness, the nonexistence of a totalising ontological perimeter—and as such it is *zero*. The *refuted* on the other hand, as the interrupted repetition, is a concrete instance of impossibility. Yet, this impossibility does not coincide with the exclusion of the contradictory but with the *decided*. Its negation is a local determination. It identifies a fixed point, a mark in thought. As the decided and the certain, it is a positive—and as such it is *one*. The binary opposition of true and false is thus replaced by the intersection of series that can continue iterating and series that find no opportunity for further iterations.

Language is slippery here. *Openness* and *closure* belong to an ontology modelled on the image of space. Yet, the possible and the impossible do not follow such metaphysical map laid out a priori, nor fill an ontological perimeter defined by an identity or a virtual horizon. The possible is not following an open channel and the impossible is not the encounter with a blocked passage. Rather the opposite: passages open or close when repetitions continue or stop. Refutability is an entirely contingent logic of repetitions and counteractualisations. This turns western thought inside out. Knowledge is not a dichotomic distribution of true and false. Its logic is no longer concerned with the self-evidence that guarantees certainty, foundations or absolute objects, but with local distributions on the surface of the present. As the *also possible* expressed by the formulation proposed by Prigogine does not enter in a competition of mutual exclusion with other theories, it expands the front of falsifiability, it enriches the conjecture. For Popper “the more the laws of nature prohibit, the more they say.”⁴⁹ But this is still a linear accumulation of information. Instead, the

⁴⁹ Popper, *The Logic of Scientific Discovery*, 19.

⁵⁰ Deleuze,
*Difference and
Repetition*, 162.

information entropy proliferating in these highly complex compossible combinations includes the history of their moments of bifurcation. That is, Deleuze's speculation must include the refuted. The history of refutations forms part of knowledge as much as it shapes it. Origins do not explain knowledge. Past aseptic foundations or absolute objects, feedback loops within existing contingent historical knowledge define the logic of knowledge systems as an ecological equilibrium of opening and closing possibilities. They produce a metastable multidimensional pattern without metaphysical depth. Deleuze invoked a "geometry of sufficient reason" to replace the a priori space of universal concepts.⁵⁰ This can be accepted with the caveat that the thought that retraces the path of emerged concepts does not point to the isotropic horizon of pure difference, but retains the diverging conceptualisations of the question. Asymmetry therefore acts as an *ontological marker*, not an object or a phenomenon but a turn in phenomena, a fold of thought as well as the world; a dimension that orients the body of thought along what is still possible and away from what has become impossible. This marker must not be imagined as the coordinates of a new ground or a differential space. It belongs to the realm of universal constants. It is a material dimension in the logic of thought and knowledge. Well before arguing about a world *in itself* versus a world *for us*, the theory of knowledge, knowledge and the object of knowledge are part of the same phenomenon and the same event. In this light, markers dictate the dimensions of knowledge rather than being objects of knowledge defined by external factors. They are moments where the universe of sense takes shape. They mark knowledge's materially; they are the shape of its body, the rhythm of its processes.

7. The knowledge system

The question about the logic of epistemology here has shifted. No longer a problem of self-evident truth, of concepts able to support the edifice of knowledge or of undissolvable objects, but a distribution of possible and impossible avenues as dimensions for thought. What forces us to think also determines how we think; it is not dictated by a metaphysical, external and unaccountable authority, but precisely the opposite. It is a divergence that shapes knowledge unavoidably, because it shapes the dimensions along which it is possible to think.

What forces us to think is how we are forced to think—how thought is distributed. We are forced to think by a plurality of contingent conjectures and their local refutations. Yet, what forces us think is not this *plurality* erected to a metaphysical entity or necessity, rather it is *how* different contingent conjectures diverge or clash locally that demands us to think. The contingent question about the world being *thus rather than otherwise* overtakes the absolute question about the reason for passing *from nothing to something*.

The self-evidence of absolute necessity does not require us to think. In fact the opposite, self-evidence is precisely what cannot be questioned, what has done the thinking for us already, so that we can go on obediently deducing and filling the grid that the image of thought has laid out for us a priori. The self-evidence of foundations does not hold us responsible for our choices or require that we care or be creative. The tabula rasa, the image of idealised beginning, the a-dimensional point from which thought should start always anew, always from scratch, the abstract space-time without geographies or histories, as well as the pure durational consciousness or the absolute autonomy of the object all censor the information and organisation that structure the present and hollow existence of its sense. Asymmetry shows that this aseptic ontological ultimate cannot be inhabited. The pure state, cleansed of all local and contingent determinations does not give us access to Being, it gives us nothing. Cleansed of its history, the pure idealisation does not provide access to consciousness, it cancels the human. In the idealised, autonomous or virtual state there is no human. Before the encounter and its history there is no human. *The event of sense is unpierceable from inside and has no outside*. Perhaps is then worth considering if Deleuze's invocation for a "thought without image" shouldn't in fact be turned around. Thought is a plurality of images, distributions and organisations. Yet, one not a priori, structured by a logic of deduction, rather the product of contingent processes, where the patterns of repetition are the very dimensions of thinking.

Obscene Data

Leonard Coster

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Leonard Coster is a physicist and mathematician. In the Data Loam project, he focused on modeling and writing software to allow a more fluid and fuzzy logic interaction between long form text data objects. By modeling them as a physical system and defining their modes of interaction, a process of self-organisation followed, revealing emergent patterns and connections driven by the data itself. This process is both scalable and algorithmic, meaning that it does not require human guidance or effort and can be deployed on larger computing hardware to match larger data organisational tasks.



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Matthias Strohmaier is a freelance software developer based in Vienna with a focus on architecture and development of custom solutions in the field of interactive multimedia installations, hardware-near programming and web applications. Over the years he has continuously developed cutting edge solutions for media artists and tailor-made software for pioneering tech companies.



The information age has exploded

The overwhelming amount of data and the exponentially advancing rate at which it is being generated is a precious, but increasingly inaccessible resource.

Traditional cataloguing systems are, by definition, trapped in the past: simply unable to describe the innovations of today in the terms of yesteryear. Nor can curators be expected to manually read, comprehend and effectively catalogue even the daily production of new material. Hugely powerful computerised search systems can now certainly provide a lifetime of reading from a single keyword search, but not with any meaningful way to refine or explore.

It is as if we know everything but cannot remember anything.

This research develops a new information research methodology with the following features:

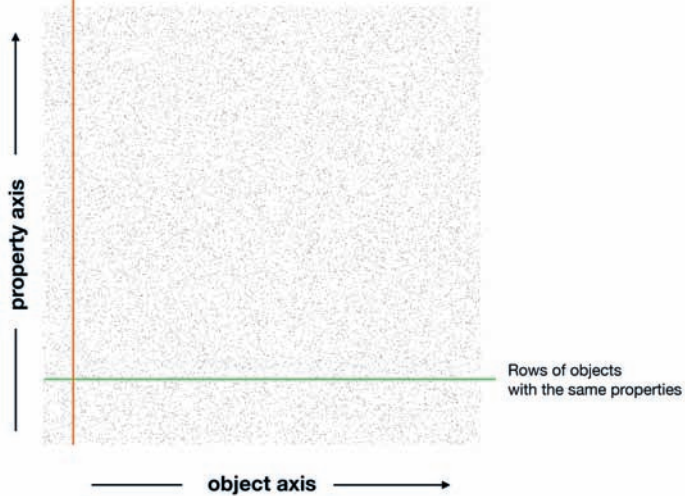
- it must be algorithmic and realised in computer code if simply to address the volume of present data.
- it must be inherently unbiased and non-suppressive.
- it must not depend on any pre-defined or finite indexing system, but rather discern distinguishing features between data objects from those objects themselves.
- it must provide the user a means of navigating big data in a controlled, efficient and exhaustive, but assisted and direct-able way.

Object-property space

The first step in realising this objective is to abstract from the type of information and the terms used to describe it. Whatever system we develop must be equally applicable to any kind of information from long form text, magnetic tape and ephemera to smells and mixtures of them all. Let us refer to these discrete pieces of information as 'data objects'. Next, we must describe these objects in full and complete detail in such a way that they may express their subtleties, differences and similarities. An unbounded and self evolving set of unique and ideally atomic 'properties' derived from the objects themselves would be ideal in terms of exhaustively tagging the objects. Examples of the mechanisms for achieving this will be discussed in detail later.

Columns of properties
of each object

Define *object-property* space



Each point in this space represents the intersection of a particular object and a particular property. Following straight lines parallel with the axes reveals either the set of properties for a certain object or orthogonally, the set of objects with a certain property.

These are **Radical Particles**.

We can now model this as a system, defining rules for interaction between the particles finally resulting in their movement and 'self-organisation' within this new object-property space. This is the ultimate goal of the project—to develop a system which allows even enormous data sets to self-organize and through this, provide a means of searching and exploring the data landscape in a more effective way.

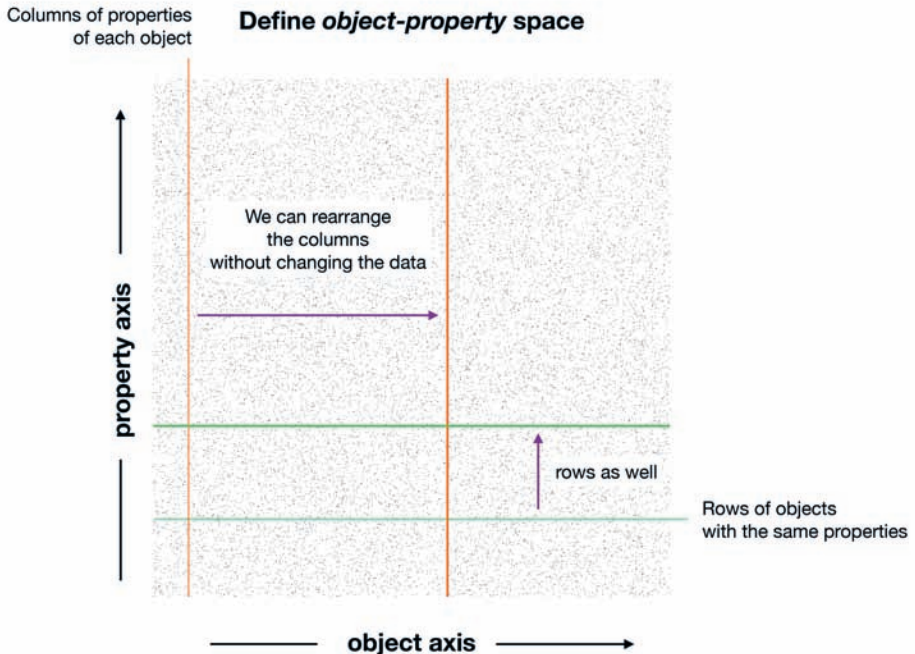
Now define a space with orthogonal object and property axes. Keeping the system generic with respect to the type of data is of increasing importance considering the prevalence of multi- and mixed-media data available.

Some type of properties could themselves be considered as orthogonal in the sense that it is difficult to directly relate say fragrance and colour “values” and although they have abstracted descriptive analogues in language—blue, orange, sweet, acrid etc, these words are not the property themselves, although these words themselves may also be properties somehow attached to objects along with, say, the smell.

Similarly, objects may fall into orthogonal categories with respect to each other—as discussed, audio recordings vs text vs smells and some objects may even be considered properties of others.

To account for this without bias, we simply increase the dimensionality of the object-property space to an arbitrary degree depending on the collection(s) of data and this should only improve the subtlety and interactivity of the final model.

To visualise this more easily we will limit the discussion to a simpler two-dimensional example for the moment.



The radical matter particles in each row or column have a special relationship to each other since they describe either objects with the same property or properties with the same object. This relationship is immutable in the sense that our analysis and organisation of the space may not alter the data or the assignment of properties and therefore translates into the rules of the system. Each row or column is free to move, but must move as a unit, carrying with it all the particles in that row or column. Further, any move must be exactly parallel to the defined axes.

In plain terms, the objects may rearrange themselves into any order, but the process will not change which properties they have; similarly, the properties may rearrange themselves along their own axis but they remain assigned to the same objects as they always were.

Finally, we require some observable parameter against which we can measure our progress both in designing suitable rules for rearranging the rows and columns and for determining when the processes may be deemed complete.

Since we are working towards an observable organisation, one suitable and calculable parameter might be the net entropy of the space. By tuning the rules of interaction and movement decision making to produce at each moment the maximum reduction in net entropy we can ensure that we are organising the space with maximal efficiency. Entropy will never reduce to zero, but as it approaches a *minima*, presumably asymptotically, we can measure our progress.

enigma [ˈɪŋɡmə]

code for the yet to be cracked. sometimes, also: code for that which is already cracked.

A sample landscape

The initial data set chosen for this project was a section of the English language dump from Wikipedia. Approximately 300,000 pages (of approximately seven million) were extracted arbitrarily from the dump file and the words in the text used as the properties to identify them. These were matched against an English language lexicography containing approximately 500,000 words in 120,000 synonym sets (dog, hound, canine *etcetera*). This starter set would later be augmented by new words as they were found in the scanned documents.

In this example, the data *objects* are long form text documents (that is, Wikipedia pages) and the *properties* are words.

Every text document, including the one you are reading now, is comprised of words in a certain sequence. The more descriptive or unique each one, the more significant it may be as an identifying property of the document; for example, the use of the proper noun “Winston Churchill.” Some words are useful in sentences but not so much as distinguishing features that is: is, and, the, but, not, ... However, their ubiquitous nature means they do not tend to interfere with the recognition of finer detailed or more specific features, so they can be included or ignored without too great an impact. When mapped into object-property space, this already produces a 2D space with an area of 36 billion units and populated with approximately 600 million radical matter particles—approximately 1.6% density.

Greedy hierarchies

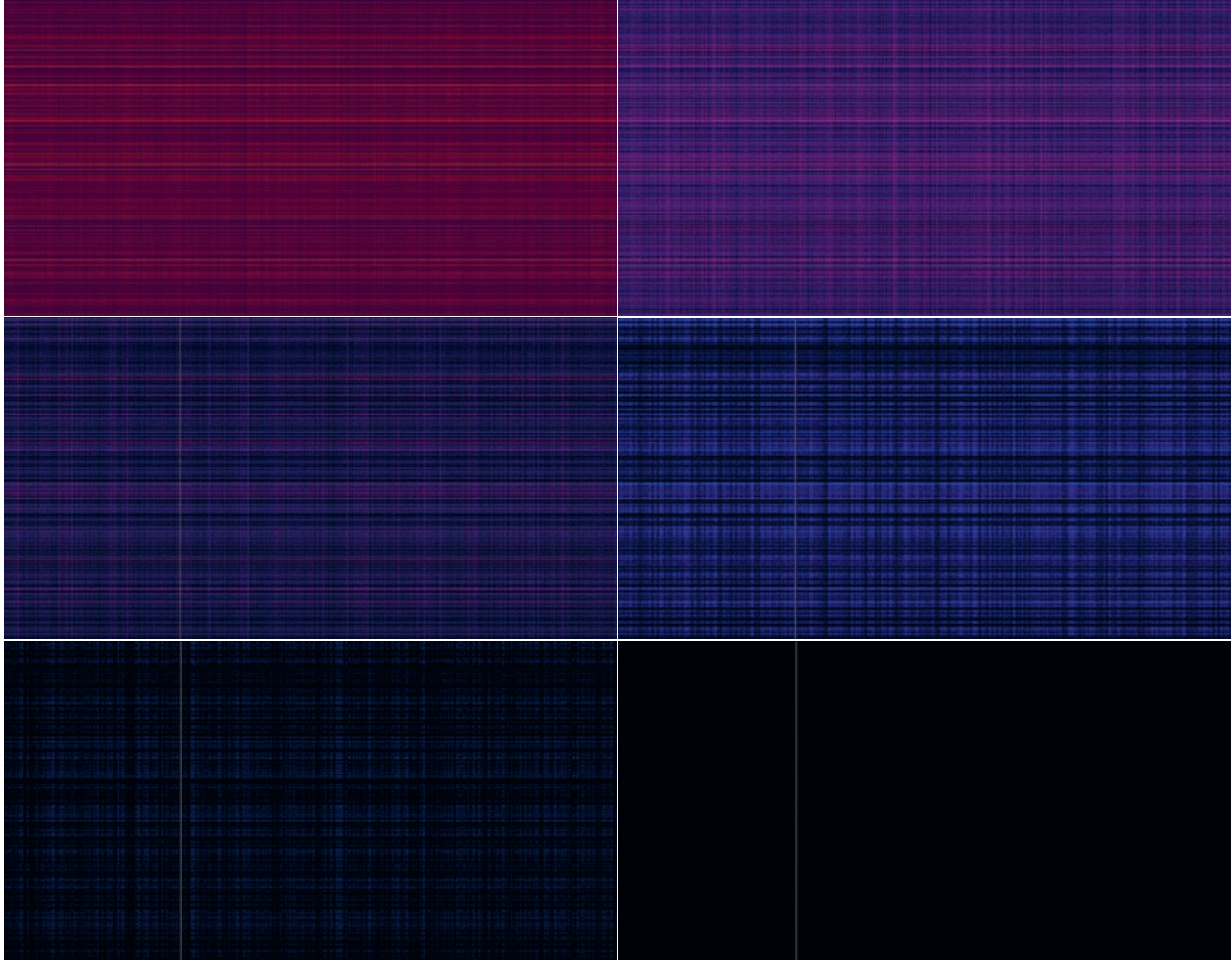
The scale of even this small fraction of Wikipedia already presents a significant theoretical and computational challenge to a statistical approach was used to determine if hierarchies of meaning could be detected in the data. It is logical to assume that when properties appear on a very small number of objects, in this case words appearing on the aforementioned Wikipedia pages, then those word properties must, by definition, be very specific.

Computer code was written to perform recursively the following processes: First to detect properties (words) so low in frequency that they appear on just a single object, (in this case, the Wikipedia page). These are as unique as they can get and we can consider them the very bottom of any descriptive hierarchy as they reference only a single object. Secondly to detect properties that appear on two and only two objects. These are the next most specific terms and each represent a group of just two pages which must therefore also discuss a relatively specific topic if only these two pages out of the full set use that particular word.

A meta-object is then created which combines the two pages into a first level hierarchy. To ensure that the meta-object fully represents the spectrum of its two members, it is assigned the mathematical union of the properties of those two members. The meta-object replaces the original two in object-property space and is included in the ongoing search for properties which appear on exactly two objects. Eventually the search is exhausted and the requirement of two and only two is relaxed to three and then four, and so on. As soon as any new meta-object can be created, the new combination of radical matter particles it has might then make it possible to find a pair again, and so the loop resets to two and then three and then four and so forth until finally everything that can be combined, has been combined. At every stage we are looking for the very smallest possible difference and the very smallest number of items that include this difference so the formation of the hierarchical meta-object is very fine grained and respectful of subtle differences.

To continue: the process is repeated along the orthogonal axis—which is to say, objects that have two and only two properties—then cause those two properties to be combined into a single meta-property. This meta-property collects all the objects of the two and the process

repeats back and forth between objects and properties until a complete hierarchy is constructed. The history of forming the meta-objects is retained and can be read-out to place both the objects and properties into sorted order. Both the dimension of the object-property space and the assignment of properties to objects remains completely unchanged; but the sorted order of both properties and objects now reflects the hierarchies they belong to. A visualisation of this process was presented in video format during the *Data Loam: Sometimes Hard, Usually Soft* exhibition in Vienna 2019. It is shown here in steps from raw data to a single meta-object. There is some apparent structure even in the first image—upon investigation this turns out to be the already non-random order in which Wikipedia pages were created. For example, there are a block of pages referring to the years 1974, 1975, 1976, 1977... They form blocks of pages that also contain many of the same keywords—hence the visible horizontal (word) and vertical (page) lines, which we are shown in Figure 1. The image is presented as a heat map to improve resolution and as the number of objects and properties combine into meta-objects these become brighter (red > yellow) and the space between them colder (blue > black).



Eventually the algorithm runs to its conclusion and we are left with one meta-object. This should be the very most overarching object out of the first 300,000 pages in Wikipedia—but what is it?

The Western Marsh Harrier

Something definitely went wrong in this approach.



Image from the offending Wikipedia page:
en.wikipedia.org/wiki/Marsh_harrier

Spatial interaction

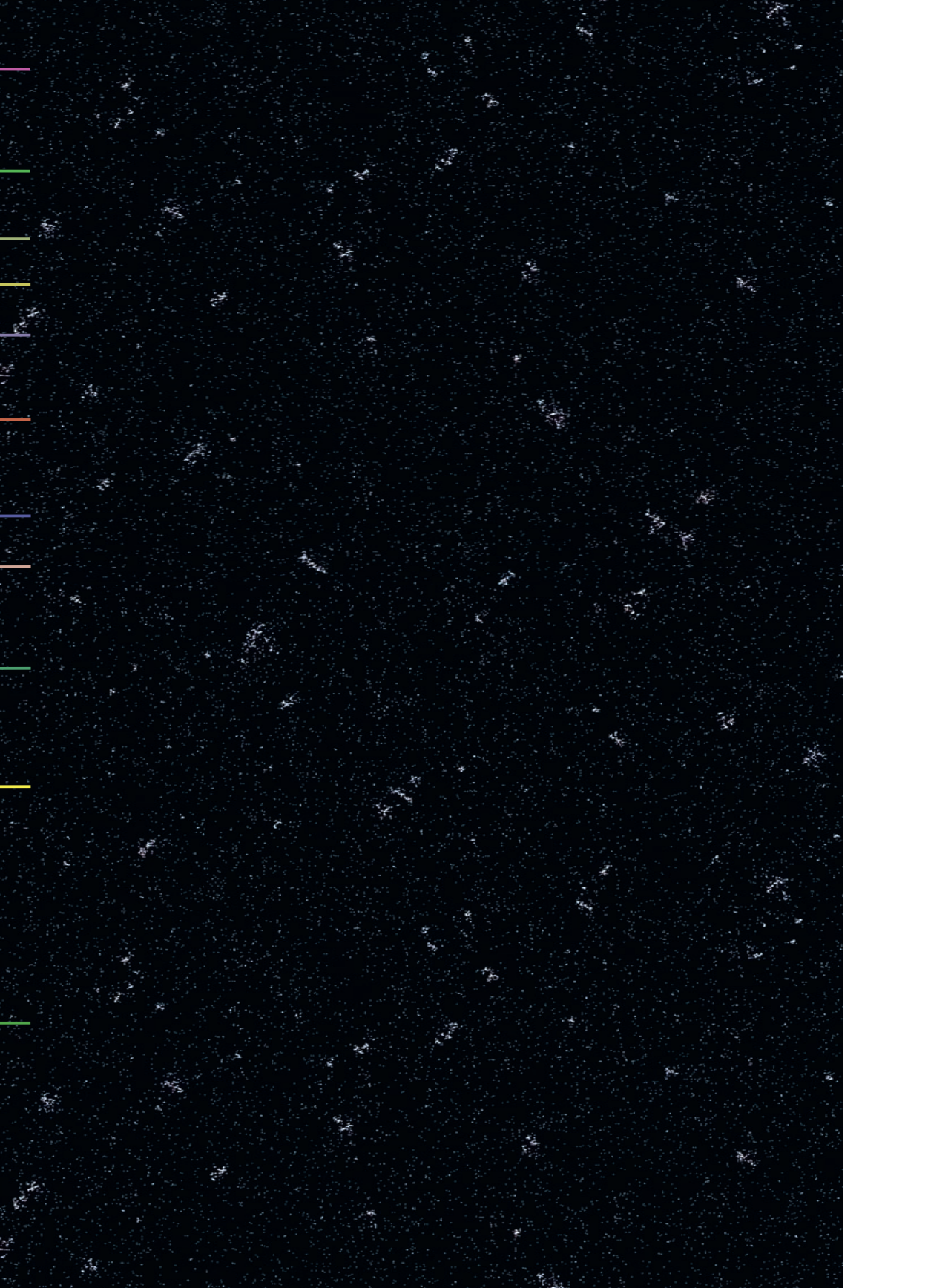
The problem with the hierarchical algorithm, and the reason that the section had “Greedy” in its title, is that it does not consider any ‘off-axis’ relationships between radical matter particles. The decisions are made on the basis of properties directly in common where the original concept for radical matter particles was that each and every one would continue to subtly influence all the others like stellar dust particles bathing in their mutual gravitational fields.

Using any kind of physical system analogue such as gravity, electrostatics or magnetism, the radical particles would all attract each other, universally, and more strongly the closer they would get. Due to constraints in movement as discussed above, they cannot actually alter the data and this manifests as a kind of ‘off-axis effect’. Adjacent radical matter particles would attract each other very strongly in the direction they are allowed to move, but if they were to be displaced along the orthogonal axis, only the component of that force ‘in the allowed direction’ would contribute to the ‘move’ decision. Further, it is the sum of all the individual forces acting on all the particles in a row (or column) that determines the total force vector acting on the row (or column). In this way, even very small off-axis forces are considered in the overall arrangement providing intricate detail and subtlety to the overall structure. The greedy hierarchy algorithm certainly did compute a result quite quickly—but we now know that the information it was throwing away is quite possibly the most, and certainly not the least, important. A full simulation of the same sized data set was well beyond the reach of this project but some preliminary results and interpretations have been obtained.

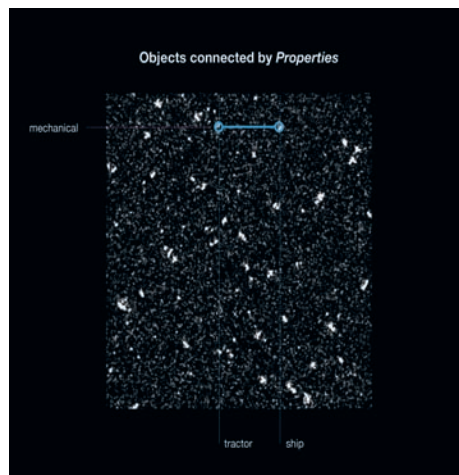
Radical emergence

Starting with a small (1000 × 1000) selected data set, a new simulator was coded and a sequence of images generated after each 'move' decision. This time, nothing was combined into meta-objects, everything remained discrete and full precision. The force acting on each and every radical matter particle, due to all the others was calculated. The nett force acting on each row (or column) could then be summed up from the components of the forces acting on all its member particles. This was used to generate movement decisions, including which rows (or columns) should force their way past the others and in which direction. The result on average was that the radical matter particles DO attract each other and really DO cause the rows and columns to re-sort into the order that most satisfies those still individual particles. Of course some particles will be a long way from any others, held there by a larger number that can collectively overpower a smaller group, but even then, they influence the form and internal order of the groups that do form. What emerges are radical matter clusters.

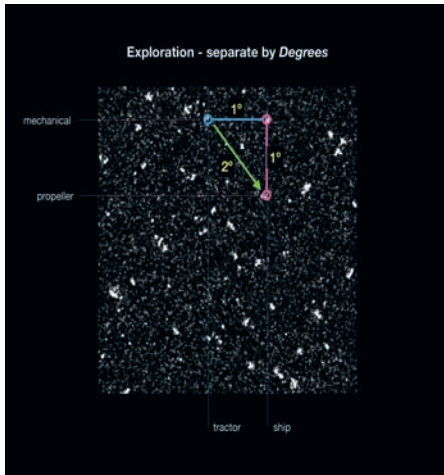




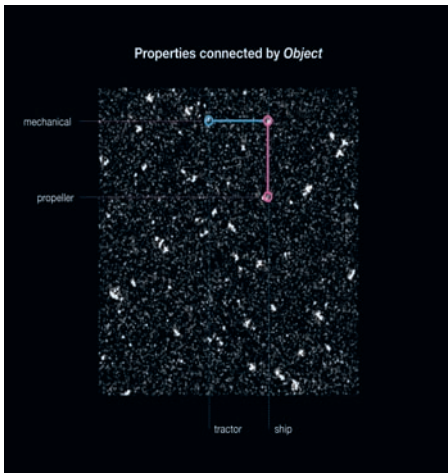
Since the rows of properties and columns of objects are carried with each move, these too are organised into optimised groups. The system evolves into a balanced, highly correlated state. Objects cluster together on the basis of properties they have, not just directly in common, but with all the subtle influences of minor, off-axis forces as well. The same happens to the properties. Where objects have overlapping, but not identical property collections, the radical matter may organise into discrete densities, displaced along either the object or property axis. This is where the power of this particular abstraction first becomes visible. This is not a classical Cartesian space. The difference in coordinate values does not in any way reflect the difference, or similarity, between the objects, or properties. Rather the fact that radical matter clusters align themselves along one of the axes in the system (recall that it may be n-dimensional) provides a direct connection between those clusters irrespective of the distance between them. The analogue of distance in this context is the number of 'jumps' taken between clusters referred to here as degrees of connection. Each radical matter cluster represents a collection of properties and objects; further, it has a centre of mass, a most suitable property to best describe the group and a representative object. The property can be used as the name of the cluster and the objects immediately accessed for the user of the system. One can immediately observe named connections by degrees from any starting point and control the navigation through even vast data sets in a named and therefore informed way.



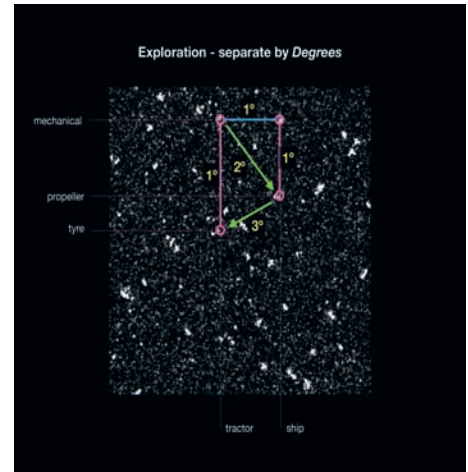
Here the objects 'tractor' and 'ship' are related 1° by the common property 'mechanical.'



This may seem obscure at first, but as more connections are revealed, the relationship as a form of propulsion becomes clear: the property 'propeller' for the object 'ship;' and 'tyre' for the 'tractor.'



Both 'mechanical' and 'propeller' are properties of the object 'ship' and in fact there is a 2° connection from the object 'tractor' to the property 'propeller.'



This then forms the basis for exploration 'by degrees' through object-property space.

Future correlation

Calculation of a large data set in this way was beyond the scope of the Data Loam project. The examples shown in this chapter however are actual simulations of small fields of radical matter particles precisely following the rules of the defined system. They attracted each other as if they had mass and a gravitational field. They rearranged as expected, carrying complete rows and columns in each move and as the simulation progressed, the emergence of a radical matter cluster was immediately obvious. This provides direct motivation to extend this work using 'messy' real world data and at a scale that makes oblique or otherwise unpredictable connections possible. If effective, the emergence of such connections would be the 'proof of life' for the theory overall.

entanglement [in'tæŋɡlmənt]

not to be confused with getting 'mixed-up' or 'entwined', it signals a most incredible moment of connection, conscious or otherwise, evading and simultaneously re-instating speed, duration, curved-time. Cf superpositionality, dimensional.

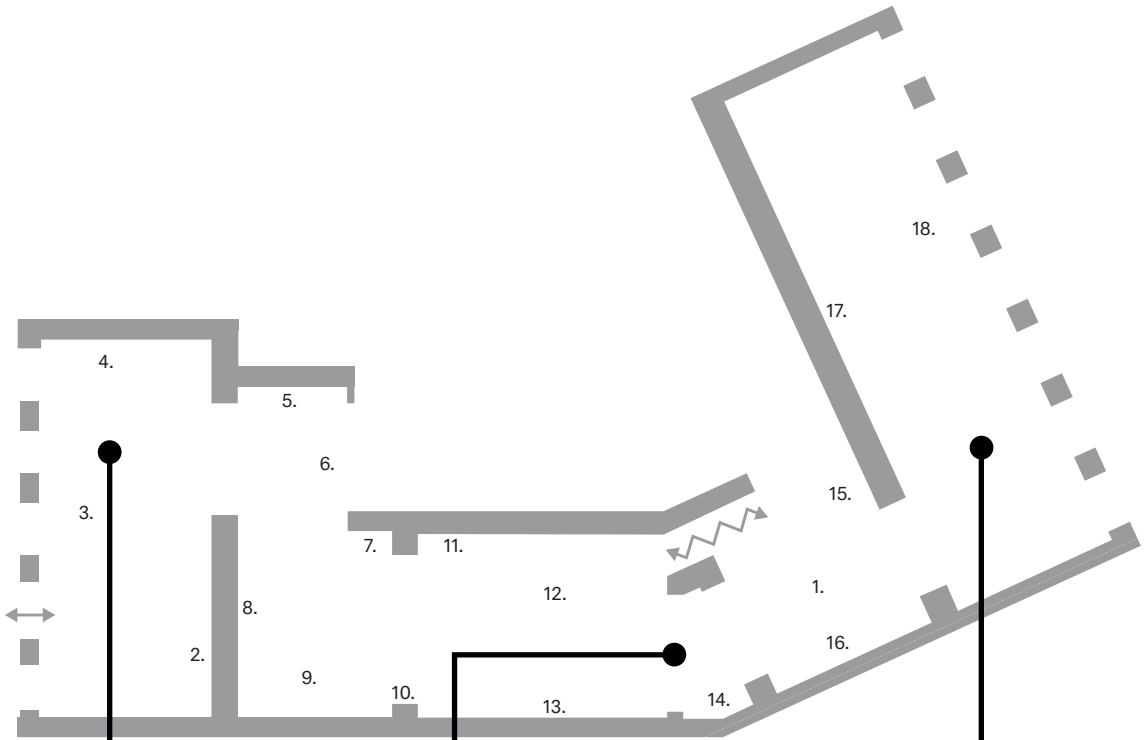
Data Loam. Sometimes Hard, Usually Soft.

Exhibition ALL, Angewandte Innovation Lab

48.211154 | 16.381617

Tuesday, 26 February 2019

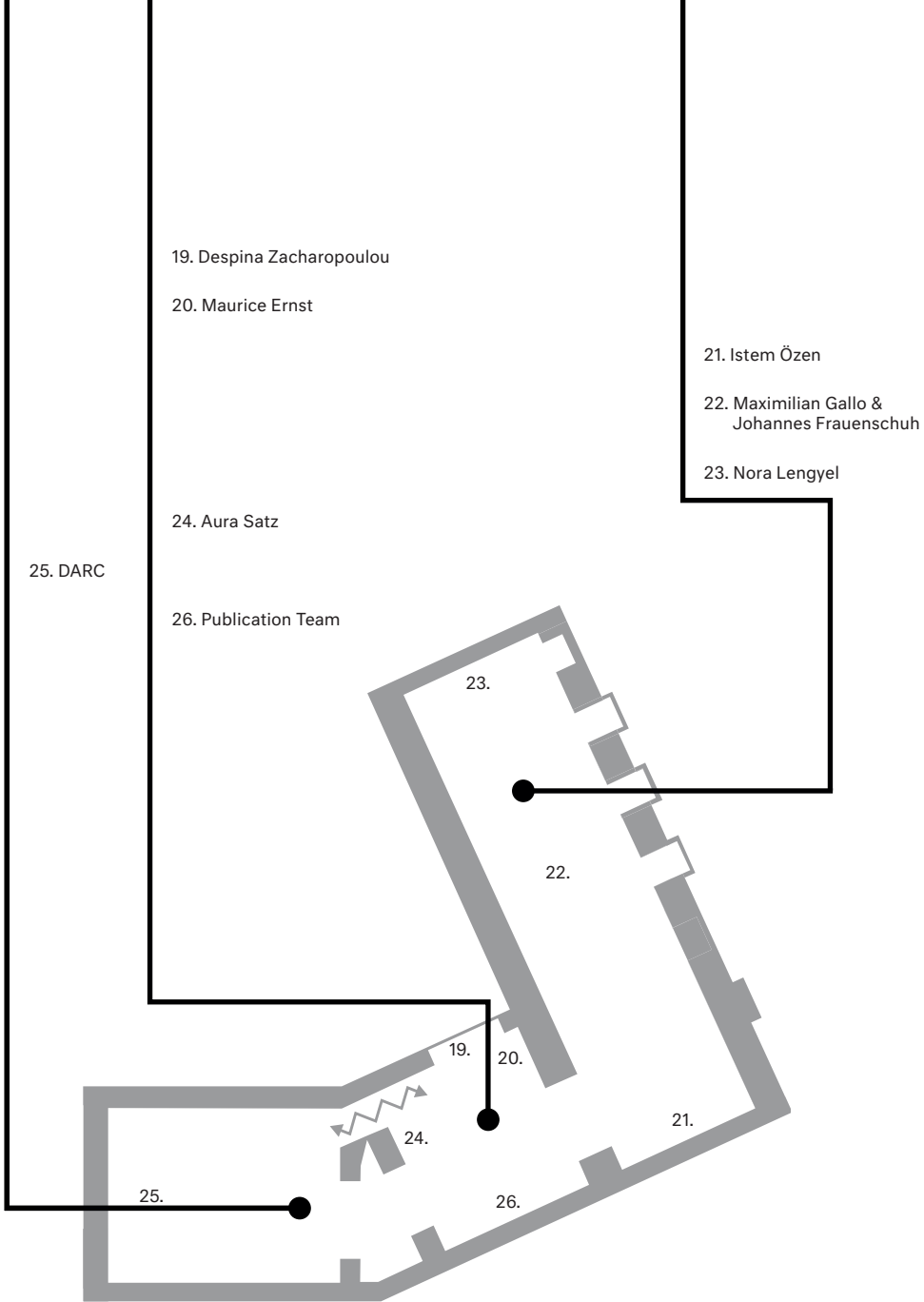
Friday, 8 March 2019



- 1. Anna Nazo
- 2. Jimmy Zurek
- 3. Martin Reinhart & Virgil Widrich
- 4. Henry Rogers
- 5. Dario Srbic
- 6. RIAT
- 7. Johnny Golding

- 8. Marthin Rozo
- 9. Marc Schuran
- 10. Monica C. LoCascio
- 11. Juan Cruz
- 12. Manu Luksch
- 13. Julian Palacz
- 14. Sophie-Carolin Wagner

- 15. Mattia Paganelli
- 16. Leonard Coster & Matthias Strohmaier
- 17. Florian Unterberger
- 18. Laura Stoll



Anna Nazo

* | London, UK

Anna Nazo is a London-based performance artist whose practice engages computing technologies, philosophy and science. She works with AI, drones, neurotechnology, CGI and 360-degree imaging. Within live digital-analogue audiovisual performance Anna's work investigates questions of intelligence diversity and ethics of the technological. It looks at artificial forms of intelligence and liveness in relation to nonconscious cognition, quantum reality and distributed forms of sensuousness. Anna is a PhD Candidate & Tutor in Fine Art (Performance & Technology) at the Royal College of Art.



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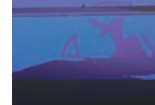
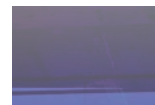
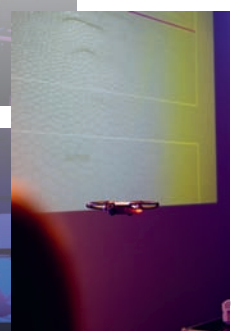
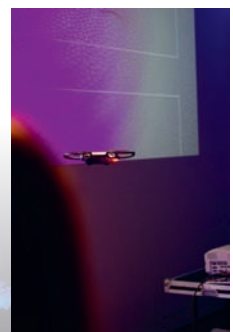
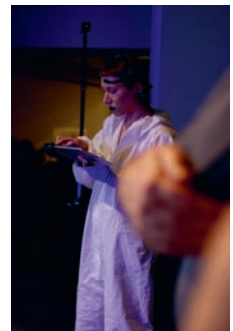
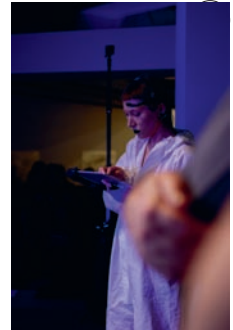
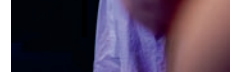
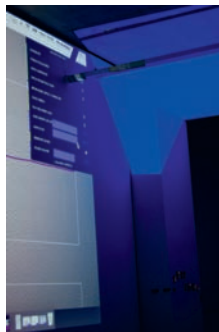
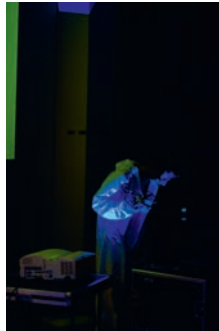
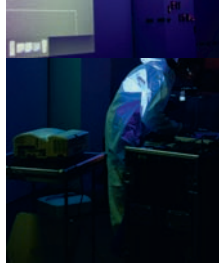
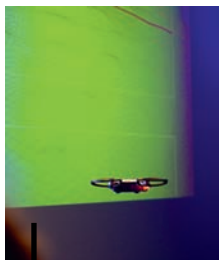


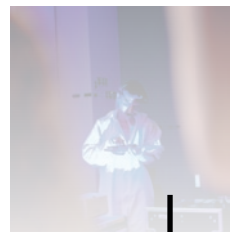
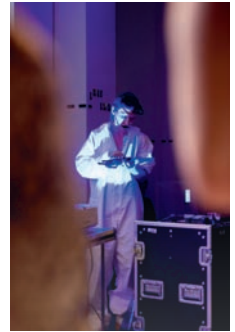
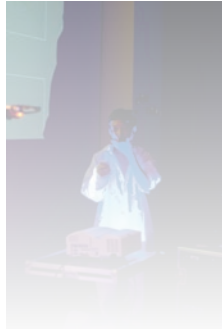
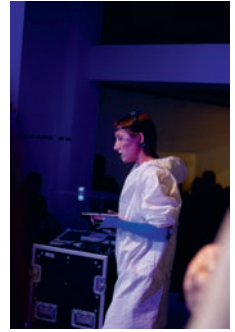
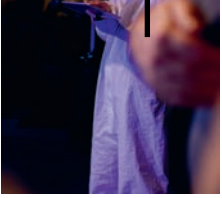
Fractal Lymph

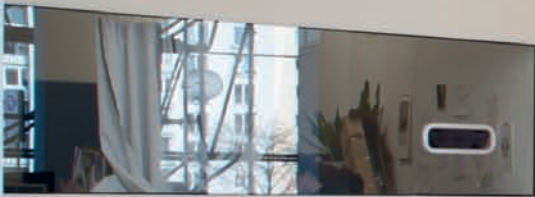
Performance, 2019

Fractal Lymph is a live digital-analogue AV performance. It involves spoken word poetry co-written with AI (HumInt-AI psychological-sensuous feedback loops), sound and imagery that are computer-generated (CGI) in real time from artist's brainwave data (EEG), and drone performance. The work is documented using 360° video.











Jimmy Zurek

* 1971 Vienna, Austria | Vienna, Austria

Jimmy Zurek's work is primarily influenced by the 1980s, an era of increasing global capitalism, political upheaval, worldwide mass media, wealth discrepancies and unique music and fashion, characterised by hip hop and electronic pop music. This has had a strong impact on the generation of artists growing up during this decade. The fall of the Berlin Wall at the end of the 1980s signified the end of the Cold War, yet the era was also distinguished by the African Famine. During this time prominent art movements included Neo Geo, The Pictures Generation and Neo-Expressionism, which took a particular hold in Germany, France and Italy. Artists such as Anselm Kiefer, Jörg Immendorf, Enzo Cucchi, Francesco Clemente and Julian Schnabel were key artists working at this time, alongside Jean-Michel Basquiat, Keith Haring and Kenny Scharf, who developed the street art and graffiti movements, which quickly gained an influential reputation.



“...with my paintings i archive my past, my experiences that i have vmade with music and fine arts. over decades i have gathered my thoughts in lists to get my thoughts in order, lists of my personal music and art universe. after i have finished the process of collecting and ordering, i connect the lists with my political observations. i am showing the culture of american hip hop which recounts the history of afro-americans and other people of colour in the united states who have endured slavery. my work deals directly with systematically organised racism of the past and present, including modern day slavery. racism cannot be separated from capitalism. Music and texts (lyrics), paintings & graphics, installation, theatre performances, photography and video. owner of the record label ‘no risk no disk.’ Inventor of the clit synth trousers. i am indebted to jean michel basquiat.





I DON'T BELONG HERE
I BELONG IN NEW YORK

NEW YORK CITY
RINGKING ©
RK
RK
RK

NEW YORK STATE OF MIND
NEW YORK STATE OF MIND
NEW YORK STATE OF MIND



78 WE HAVE A DATE

ANDY PO BOX

51 I FEEL YOU COME

Westcoast

E E K
T S
Y E A R

DEF ROW JAM
DEATH JAM DEF ROW

96 NO JOKES NO TRICKS

34 MORE IS MORE

82 I'M LOVIN' YOU

BASQUIAT ON THE DRAW
BAS
BAS
BAS

BRAINS ON THE BASQUIAT
BAS

BASQUIAT ON THE DRAW
BAS

BRAINS ON THE BASQUIAT
BAS
BAS

FEEL SO FINE
WAR RHYME
WHERE IS PEN

ARK LIKE CHICKEN WITH V

NY

NEY ISLAND

THESE ARE JUST SUM OF THE GANG SIGNS USED BY L.A. GANG MEMBERS

 WESTSIDE WESTCOAST	 EASTSIDE	 LATIN KINGS
 KILLAZ	 WESTCOAST OIDA	 MAFIA CRIPS
 MONTE O GANG MONTE OFELIO GANG	 UNDERGROUND CRIPS	 COMPTON CRIP

Other symbols: LK, A, B, M, ©

THEY BANNED MY VISA MY AMEX AND MASTERCARDS I GOT NEW MONEY AND IT'S ALL CASH I GOT NEW BAGS AND THEY ALL COLLABS ©



MONTE EXPRESS

BY SCHOOL

LIBERKY
LIBERTY IS A BAD MOTHERFUCKER
ALFRED E. SMITH SCHOOL
ALFRED E. SMITH SCHOOL
FRED E. SMITH SCHOOL
FRED E. SMITH SCHOOL

SHURE SM.NAS



ALL I NEED IS ONE MIC ONE BEAT ONE STAGE ALL I NEED IS ONE PLUNK

MAMODOU



OF 2ND DIS

GANG SIGN

MONTE KINGS



Martin Reinhart

* 1967, Vienna, Austria | Vienna, Austria

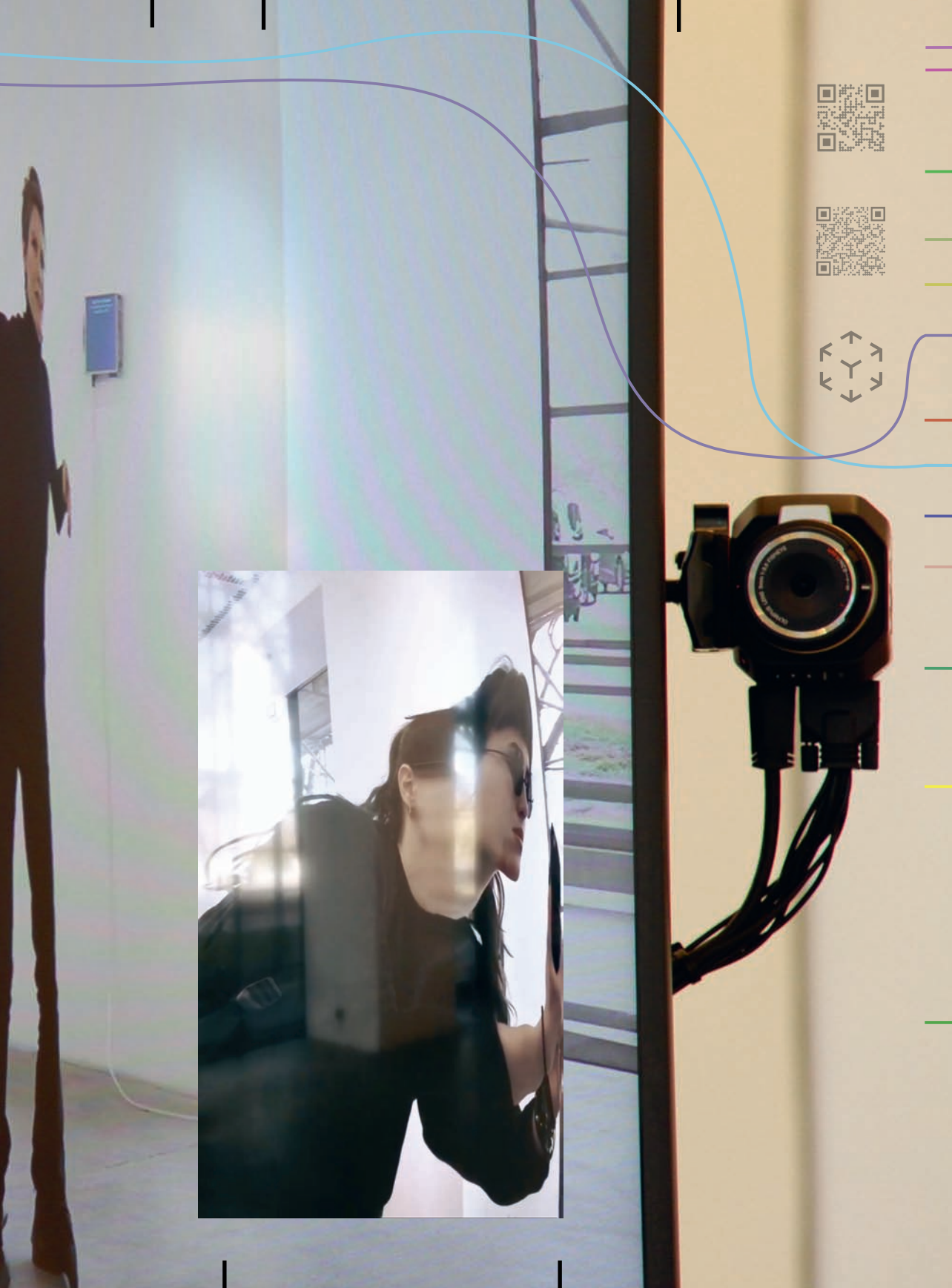
Virgil Widrich

* 1967, Salzburg, Austria | Vienna, Austria

Martin is a filmmaker, film historian and inventor. In the last few years he developed a system to auto-correlate big sets of data together with physicist Leonard Coster. The goal of this work is to generate an objective topography of world knowledge. Martin studied at the University of Applied Arts Vienna and is a trained film technician. Back in the 1990s he invented *tx-transform*, a film technique that allows to exchange time and space.

Virgil Widrich is a filmmaker and media artist who has worked on numerous films and multimedia productions. His short film *Copy Shop* was nominated for an academy award and the one to follow *Fast Film* won 36 international awards and has been shown at over 400 festivals. From 2007 to 2010 he was university professor of Digital Arts at the University of the Applied Arts in Vienna, since 2009 he has been leading the Art & Science master programme at the same university.

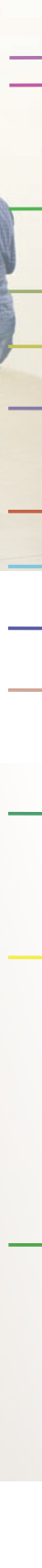






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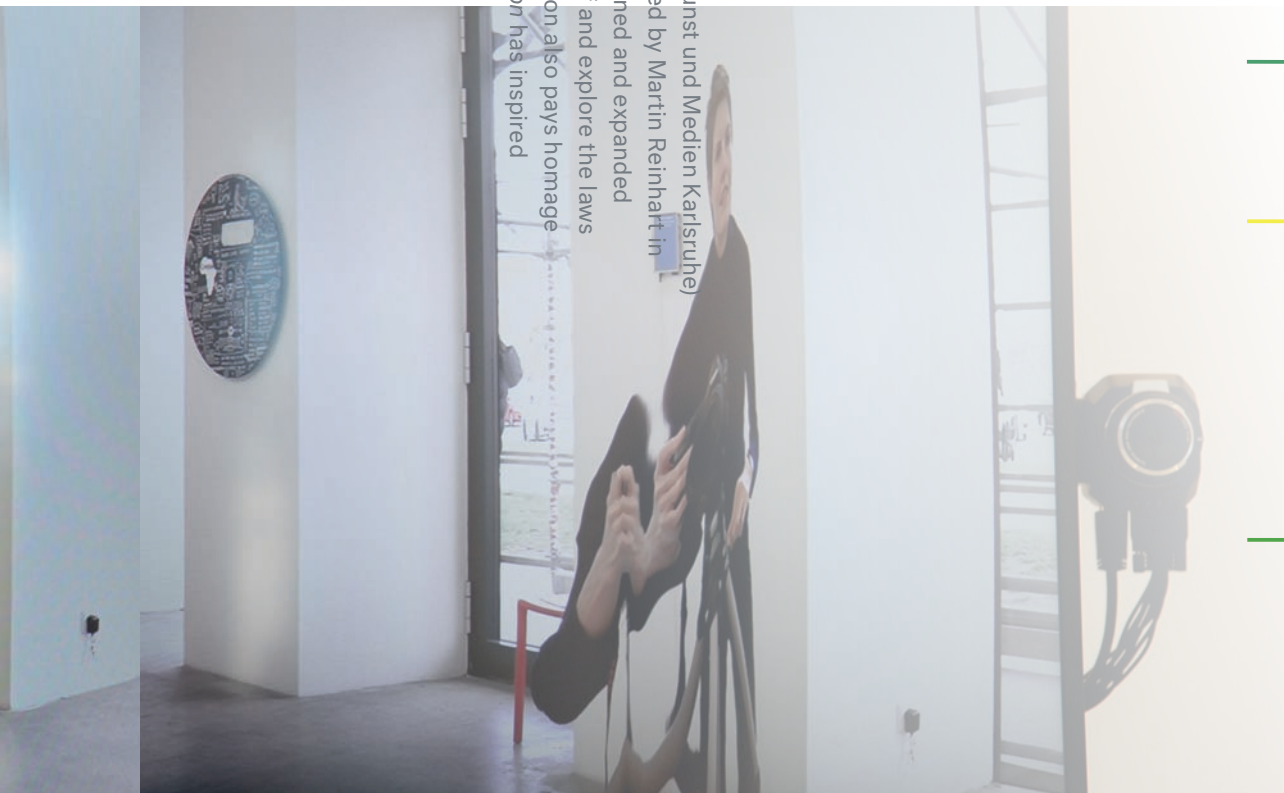


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tx-mirror

Interactive installation, 2018

The real-time installation *tx-mirror* was created for ZKM (Zentrum für Kunst und Medien Karlsruhe) and is a further development of the film technology *tx-transform* invented by Martin Reinhardt in 1992. As in earlier works by the artists the familiar perception is questioned and expanded through intuitive interaction. In a magical mirror one can look at oneself and explore the laws of a universe in which time and space have been reversed. The installation also pays homage to the video artist Zbigniew Rybczyński, whose film *The Fourth Dimension* has inspired an entire generation of artists.



Henry Rogers

* 1963 Le Gare D'Uphall, Scotland | Glasgow, Scotland



Henry Rogers is a Glasgow-based artist and MFA Programme Leader at The Glasgow School of Art. Concerned with formality, mediation and mimesis in art via drawing, painting, photography and writing, his research explores the impact of queer theory, method and queer strategies on art-based production. Between 1986 and 2002 he lived and worked in Florence, Paris, New York and Rome. A recipient of the Mark Rothko Memorial Trust Award and an Abbey Fellow at the British School at Rome, Henry Rogers is currently a Visiting Professor at the Royal Academy Schools, London. His paintings have been exhibited in the US, UK, and EU. In 2019 he was conferred as Professor of Contemporary Art and Queer Studies.

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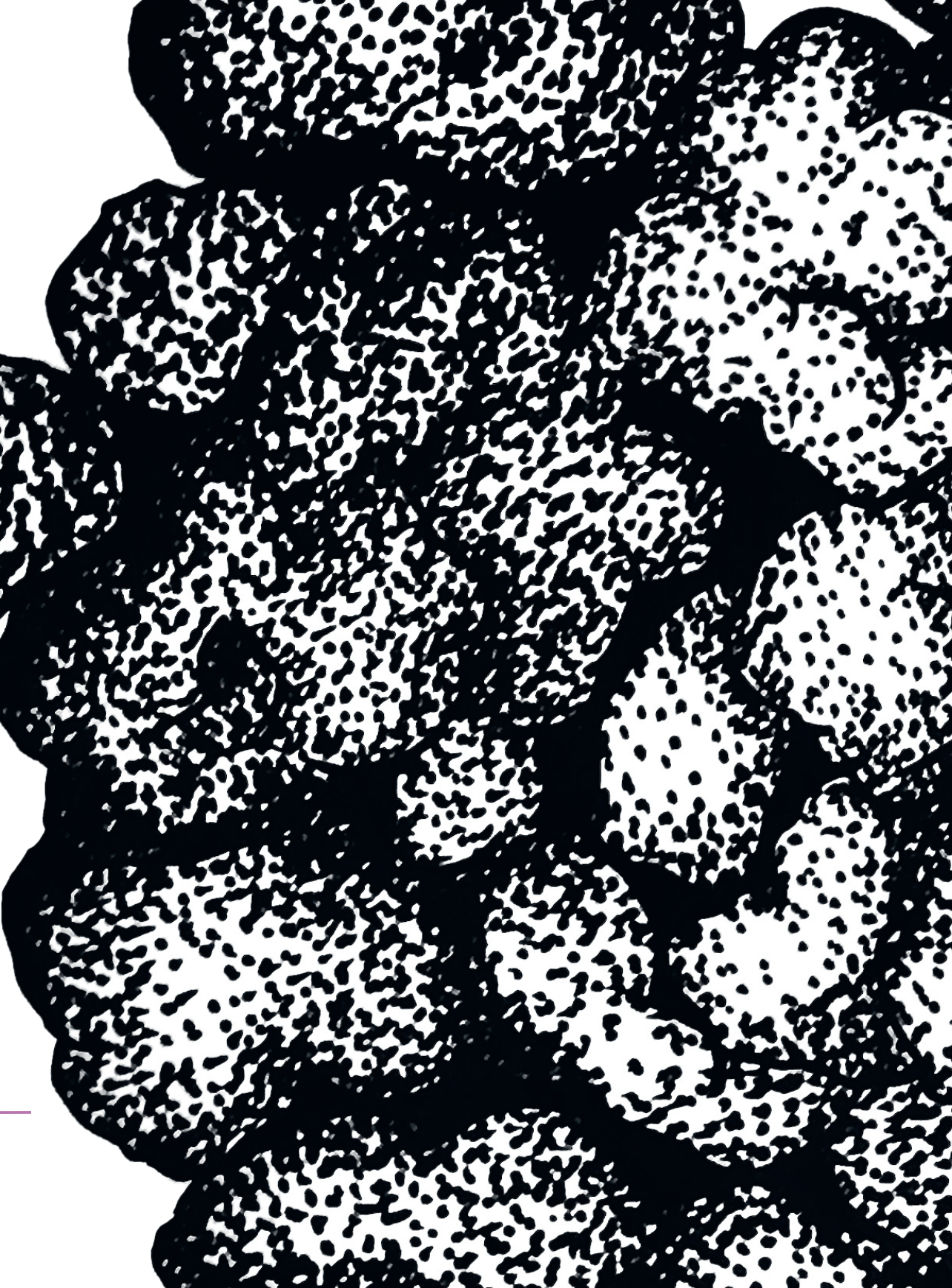
Parasequence no. 2: Sticky, sticky, sticky... sticky!

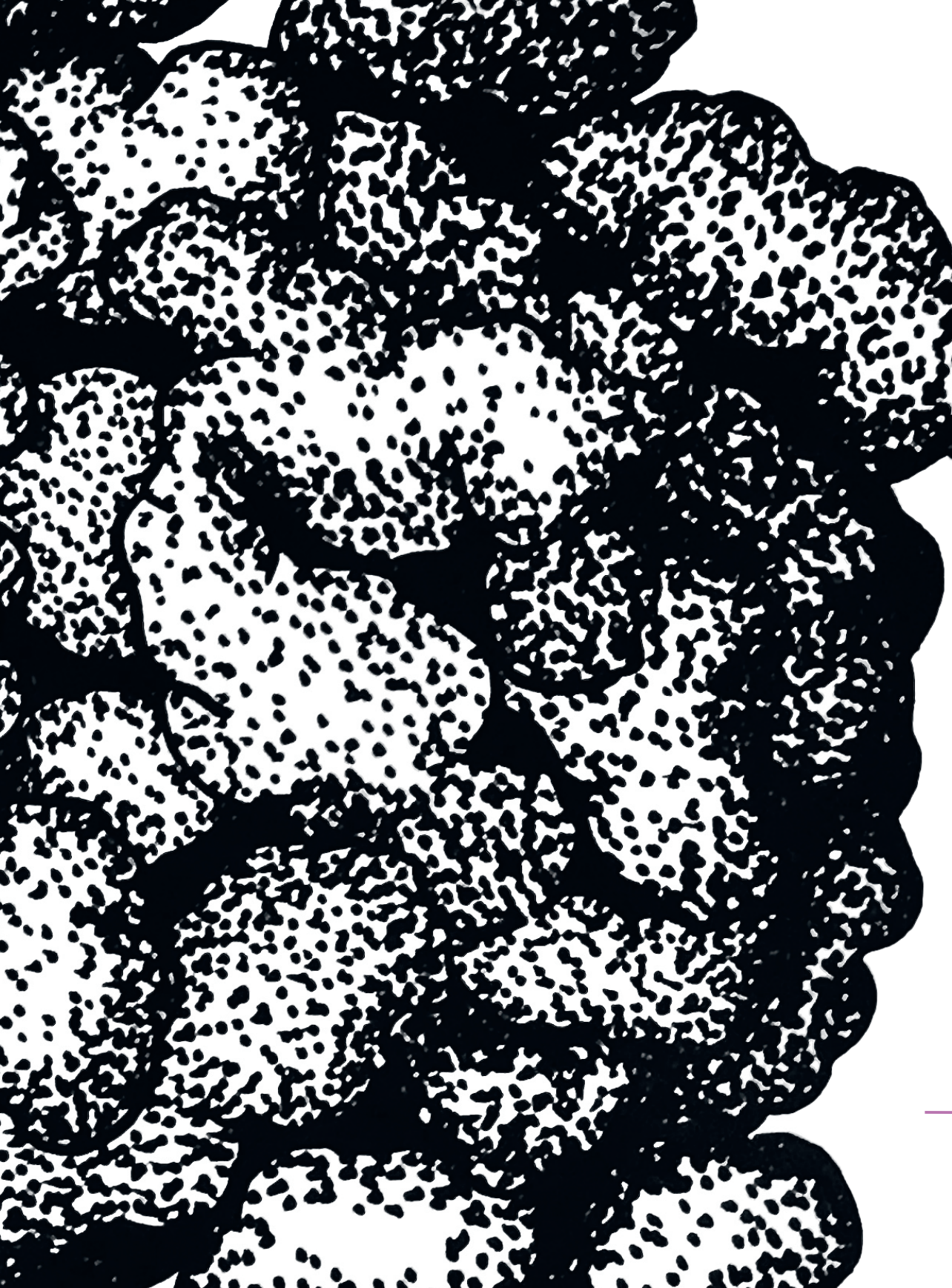
Wall mounted exhibition, 420 × 520 mm × 4 panels, pen and ink on paper, 2019
From screen to hand, from the glow of the virtual world to the sense of touch, from the keyboard to a pen bleeding into the surface of a sheet of paper. From the imagined fossilised life force and its collision with a rebellious linguistic structure, each mark sticks to another and so it begins to cohere, to find its own accumulative logic in its rendering of stickiness.

Parasequence no. 4: Contra-morphologies

Wall mounted exhibition, 420 × 520 mm × 3 panels, pen and ink on paper, 2019
The hand moves differently when drawing, the sensuality of the line, the delicacy of pressure on the surface of the paper, as each form emerges and builds upon another, always on the verge or readability. A moment away perhaps from really being seen, as the form fluctuates in a perpetual becoming, to and fro, ebb and flow, a continual pressing of an image in which the particularity of form, shape and structure are suspended: the figural as the loci of resistance.





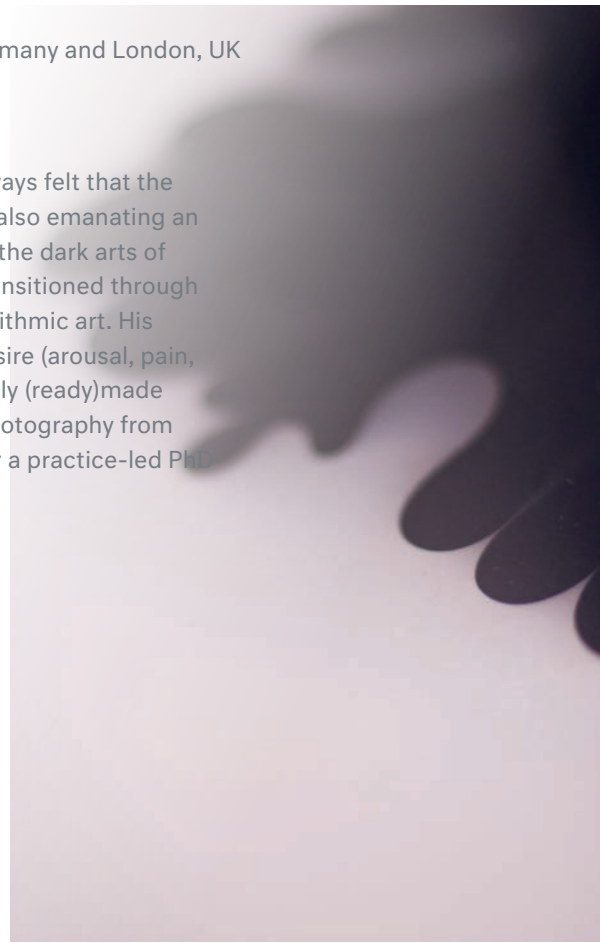


Dario Srbic

* 1974 Tuzla, Bosnia and Herzegovina | Berlin, Germany and London, UK

Dario started coding as a twelve-year-old and always felt that the machine was not merely executing the code, but also emanating an inexplicable sensuousness. Initially fascinated by the dark arts of algorithmic trading in the business world(s) he transitioned through philosophy into the equally dark sciences of algorithmic art. His current practice examines the embodiment of desire (arousal, pain, excitement) into code and expresses it in artificially (ready)made sculpture and performance. He holds an MA in Photography from Central Saint Martins and is currently studying for a practice-led PhD at the Royal College of Art.

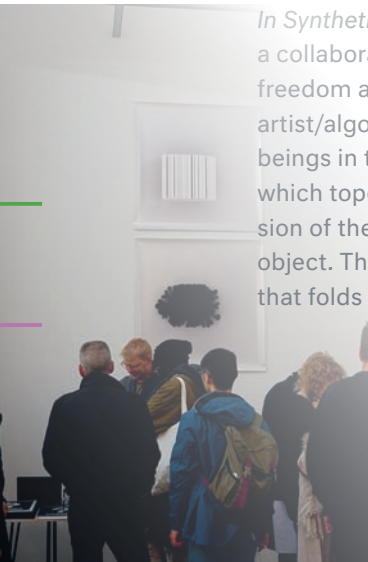
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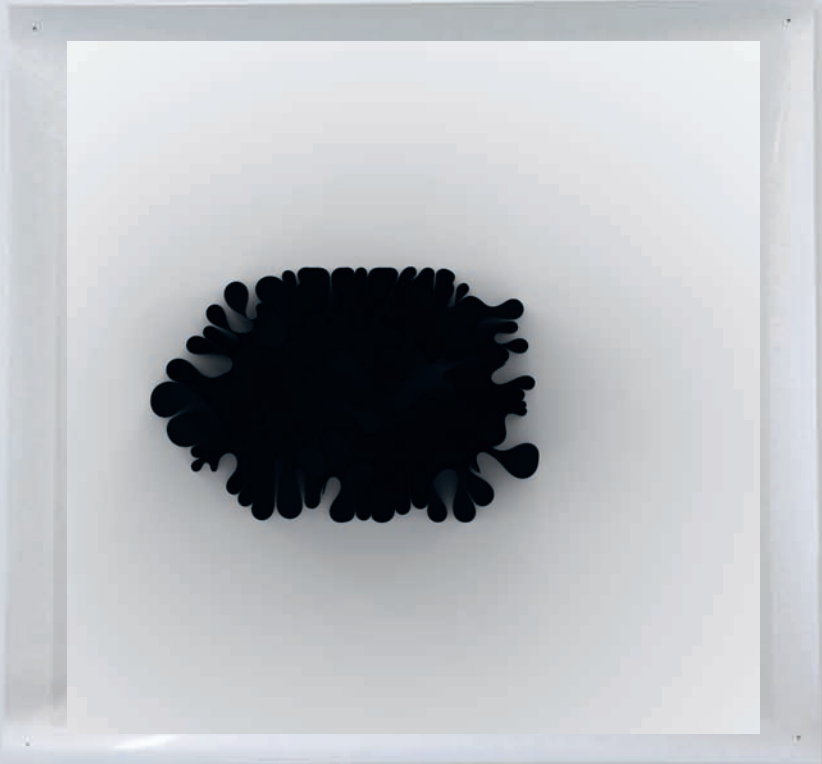
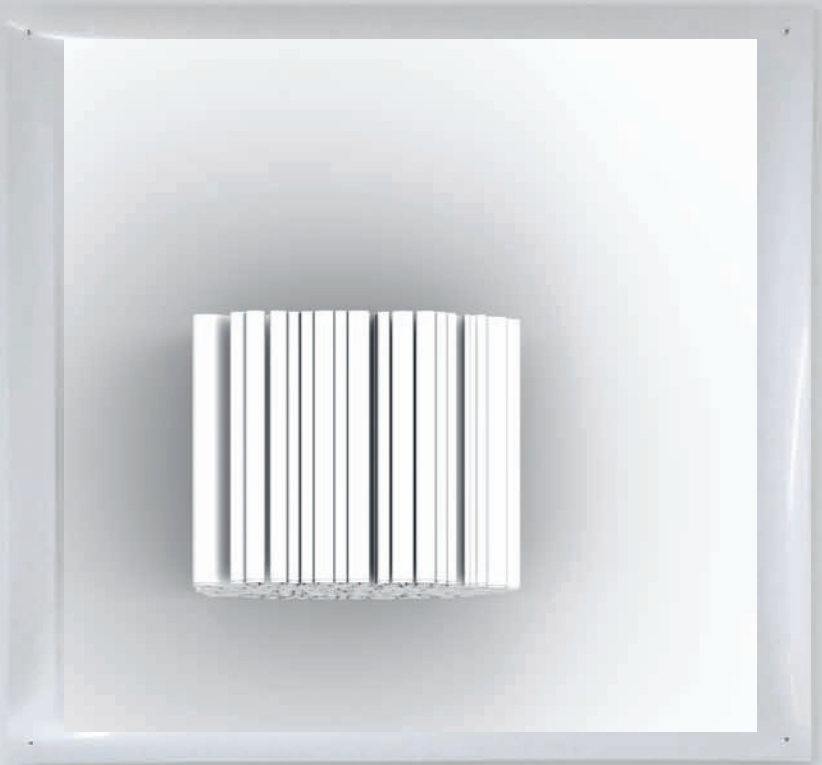


Synthetic Eros – Synthetic Errors

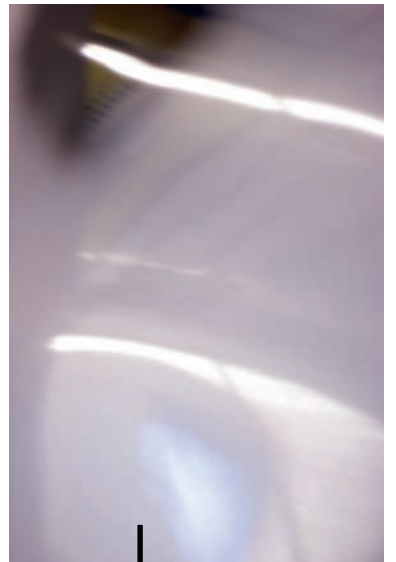
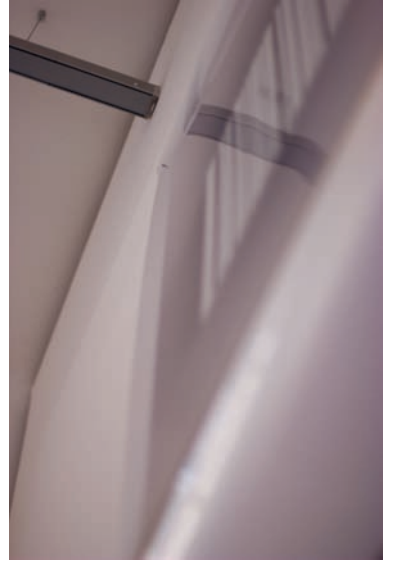
Two C-Prints, 2019

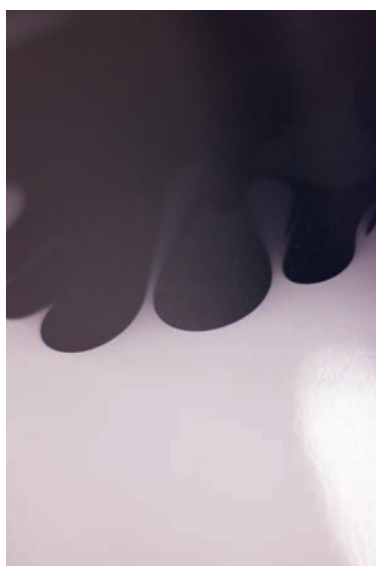
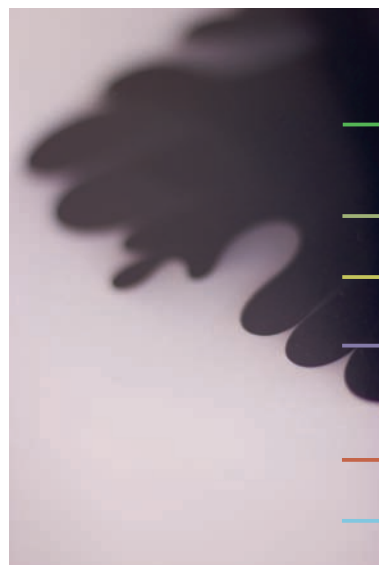
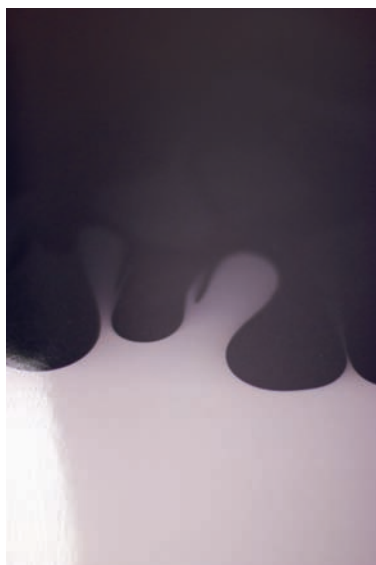
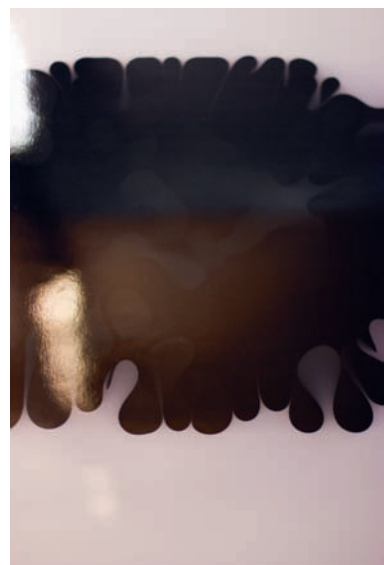
In Synthetic Eros – Synthetic Errors, the artist approaches the work as a collaborative practice in which algorithms have their interpretative freedom and form of expression. By using the galvanic skin response artist/algorithm construes and modulates the arousal of sentient beings in the creation of the sculpture. Placed as a diptych two prints which topologically are two dimensional, reveal the fractal dimension of the work, that is larger than two dimensions, but still not a 3D object. They convey the embodied excitement through the algorithm that folds the lines into curves and evokes an eroticism of the form.





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RIAT—Institute for Future Cryptoeconomics

* 2015 Vienna, Austria | Vienna, Austria

RIAT is an independent organisation established in Vienna in 2012. It consists of an international network of researchers, developers and experimentalists who seek to advance the adoption of cryptography and privacy technology across disciplines. RIAT works with experimental technology and open hardware to explore and actively stress-test the role of research and development in the age of zero-trust. Through novel forms of presentation, discussion and publication, they examine the global cryptoeconomic condition and its effects on culture and society. RIAT aims to create an open and interdisciplinary discourse that improves crypto-literacy for the decentralised society of tomorrow.

Decentral Archive of Process Artefacts

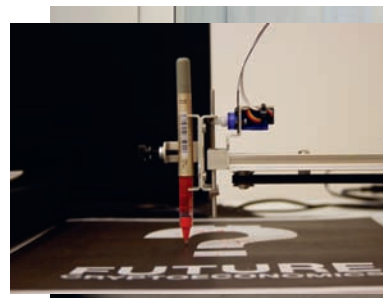
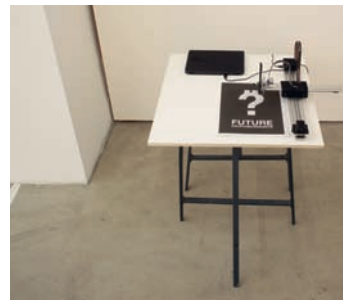
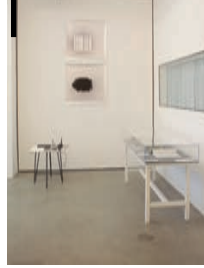
Mixed media presentation, 2019

The dynamic accumulation of data and its pervasive presence poses new challenges and opportunities for society. This big data era of machine learning and neural-networks often prematurely supposes that histories can be computationally observed through the aggregation of amassed data. It is important that the historical records of distributed and network based cultures do not solely rely on the scraping of corporate databases such as Google or reddit. This accelerated era of network cultures therefore requires a careful and active archiving practice. RIAT seeks to accomplish this by unravelling the immaterial and often elusive communities of the cryptosphere through an engaged participatory research and practice, accompanied by careful processes of documentation. In doing this, RIAT seeks to deepen its own quantitative research data —both collecting and formulating performative process-artefacts in order to further inform RIAT's on-going investigation of the cryptosphere. The artefacts collected by RIAT represent knowledge-value and are making cypher-culture readable. The archive has existed since 2004 and consists of crypto-art from international artists, collectives and anonymous entities. Elements have been shown internationally and are continuously integrated into the archive.

Four Switchboards of Bitcoincloud 1.1

Block height: 145121–153200, 2011

Bitcoincloud is an early artwork dealing with and thematising the cryptocurrency bitcoin. An initial prototype was developed in late 2010, conceptualised by Matthias Tarasiewicz and produced in collaboration with Max Gurreesch and engineer and artist Damian Stewart. On display are the initial switchboards to drive modified led-fans. The initial work consisted of bitcoin mining rigs, which have been modified in order to mine bitcoin only if the audience is watching the artwork.



Artistic Bokeh & Spacebank: Blockchain Performance

Block height: 206791, 2012–11–06

On display are “Ai Weiwei sunflower seeds” purchased with bitcoins generated by the bitcoincloud from 2011. The transaction between artistic Bokeh and Spacebank stays active in the bitcoin blockchain and is publicly viewable. Initially, Ai Weiwei produced over 100 million seeds—the porcelain items were hand-painted by artisans in Jingdezhen. The seeds gained in value after the Tate Modern bought approximately eight million. In a Sotheby’s auction (2011) the seeds sold for £3.50 apiece. The here displayed seeds have the initial purchase value of 6.83 btc.



Artistic Bokeh & Vitalik Buterin: step by step

Block height: 452931–453239, 2017–02–14

Vitaly Dmitriyevich “Vitalik” Buterin (born 31 January 1994) is a Russian-Canadian programmer and writer primarily known as a co-founder of *Ethereum* and as a co-founder of “Bitcoin Magazine”. On June 25, 2017, Buterin was the subject of a death hoax originating from 4chan. The hoax stated that Buterin had been killed in a car crash, which drove the Ether (eth) price from over \$300 USD to \$260. On June 26 8:01pm EST, Buterin appeared with a selfie showing the latest Ethereum transaction and block number. This action has later been dubbed “proof of existence”. The work step by step represents a collaboration between Vitalik Buterin and Artistic Bokeh and is manifested in signed sneakers, which have been marked on 2017–02–14, between block height 452931 and 453239 of the bitcoin blockchain.

Uncut Version of Cryptoeconomics, Infrastructures and Artefacts

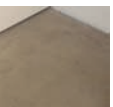
Block height: 452931–453239, 2017–08–21

The booklet *Cryptoeconomics, Infrastructures and Artefacts* has been printed by the RIAT Open Publishing Lab. It serves as a lab notebook and contains research about informal crypto communities and experimental interdisciplinary practices with the blockchain. It further combined positions and perspectives of interdisciplinary cryptoeconomic research and contains essays of the works proof of presence, *bitcoincloud* and *terra0*. The publication has been distributed during Forum Alpbach 2017, the Ars electronica 2017 and the *Grey Area Festival* in San Francisco (2018). The publication has only been given out to individuals and has not been circulated in another form.

Issue of Future Cryptoeconomics: erc-721 future token #1201

Block height > 564520, 2019

Future Cryptoeconomics is an unusual publication: it is a hybrid of a magazine, a lab notebook obfuscated as newspaper. It has been printed with rotational print technique and serves as experimental system: *artistic technology* where different forms of inquiry collide. In the genesis stack, the first and initial prints of the magazine (which have been held back from circulation) have been inscribed in the chain of the Ethereum world computer via NFT technology. The genesis issue as well as the *genesis stack* (1200 copies) have been



on display in Museum Quartier Vienna as a satellite of the *Data Loam* exhibition. During the exhibition at Angewandte Innovation Laboratory (AIL), copies of the magazine were made unique with a drawing robot and a smart contract on the Ethereum blockchain, starting with the number #1201.

Future Cryptoeconomics Magazine

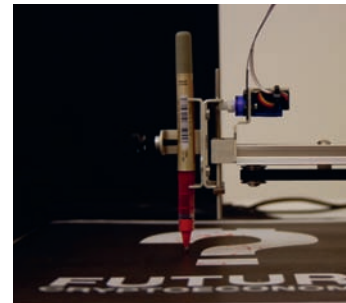
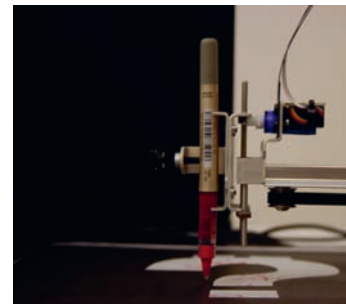
2018–2019

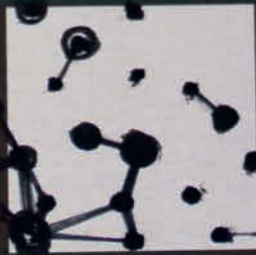
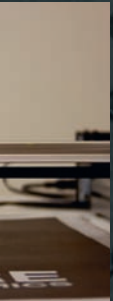
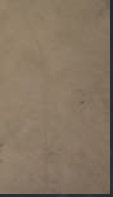
With cryptoeconomics we are facing a discipline which is not formally defined yet. It reminds of the early developments of game theory, an area of study that at the beginning was very narrowly defined, but then grew to be an interdisciplinary field that included the social sciences, political sciences, and many other disciplines. In order to discuss the future developments of world computers, immutable code and cryptocurrency, we must broaden our viewpoints and make sure to understand the full scope of possibilities of true decentralisation. We have to be aware that this possibly also means a constant destruction and recreation of institutions and experimental cultures, to make space for invention and new disruptions. The first issue of *Future Cryptoeconomics* contains research interviews with Vitalik Buterin, Josh Stark, Andreas Antonopoulos, Josh Stark and Jan Hubik (Paralelni Polis). The essays featured have been written by Jaya Klara Brekke, Shintaro Miyazaki and Matthias Tarasiewicz.

Shards from Proof of Burn

2018

The experimental performance *Proof of Burn* has been undertaken as part of the Data Loam project and included the research and design about three different speculative timelines, which have been compiled into an interactive show, where the participants would experience information asymmetries and experimental economics. The performance has been shown at Reaktor Vienna and has been live-streamed on television. The items on display are mixed 'shards', which have been the monetary unit of the interactive setting. Some of the shards are counterfeit in order to crash the fictional economy.





Johnny Golding

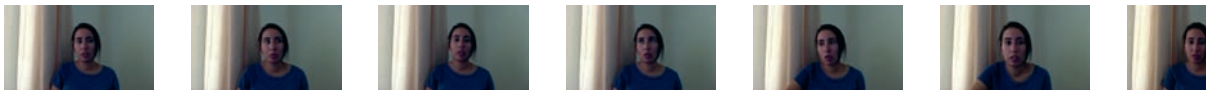
* 470bce, the Ninth Sphere | London, UK

A philosopher-poet, Johnny Golding holds the Chair as Professor of Philosophy and Fine Art, Royal College of Art. Initially reading physics, political theory and the social sciences, she began diplomatic training at the US Department of State. What unfolded from that incredible atmosphere was a thirty year journey to re-think democracy, brutality, warfare, AI, feminism. Some of her most beloved friends were lost to the HIV-AIDs pandemic. Others to suicide; still others, to the poverty of spirit, taxes, or just the crush of changing times. She learned how to log-jump in swollen rivers; how to 'get the message to Garcia' (military training). Most of all, she learned about the importance of magic gardens, poetry and the friendship of wild horses.

Sheika (Princess) Latifa Al Maktoum. Full unedited video, 11 Mar 2018 Uploaded by Official #FreeLatifa

Installation: mobile phone, 39.37 looped

'If you are seeing this now, I am either dead or imprisoned.' This harrowing, full and unedited video was the last time Latifa was able to reach out for help. The video was played on a continuous loop, sequestered near an unassuming, tatty fire extinguisher. Most people missed it.









Marthin Rozo Castaño

* 1991 Bogotá, Colombia | Vienna, Austria

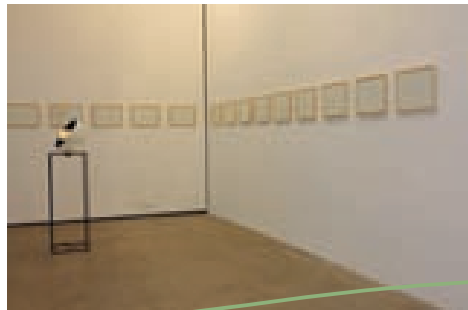
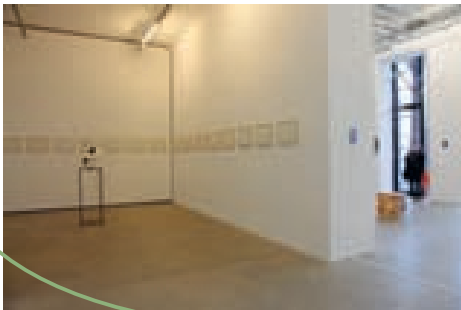
Marthin's work revolves around nature and its paradoxical relationship with mankind. For him, observation consists of recognising the rhythm of the existence of other beings. This is the first step in his process of artistic creation. His motivation resides in revealing natural events that go unnoticed. He wants to transmit scientific knowledge and his fascination for the living. To show other everyday life parallel to human's as a mirror to recognize their own.

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One Human Day

16 prints and sound installation, 2018

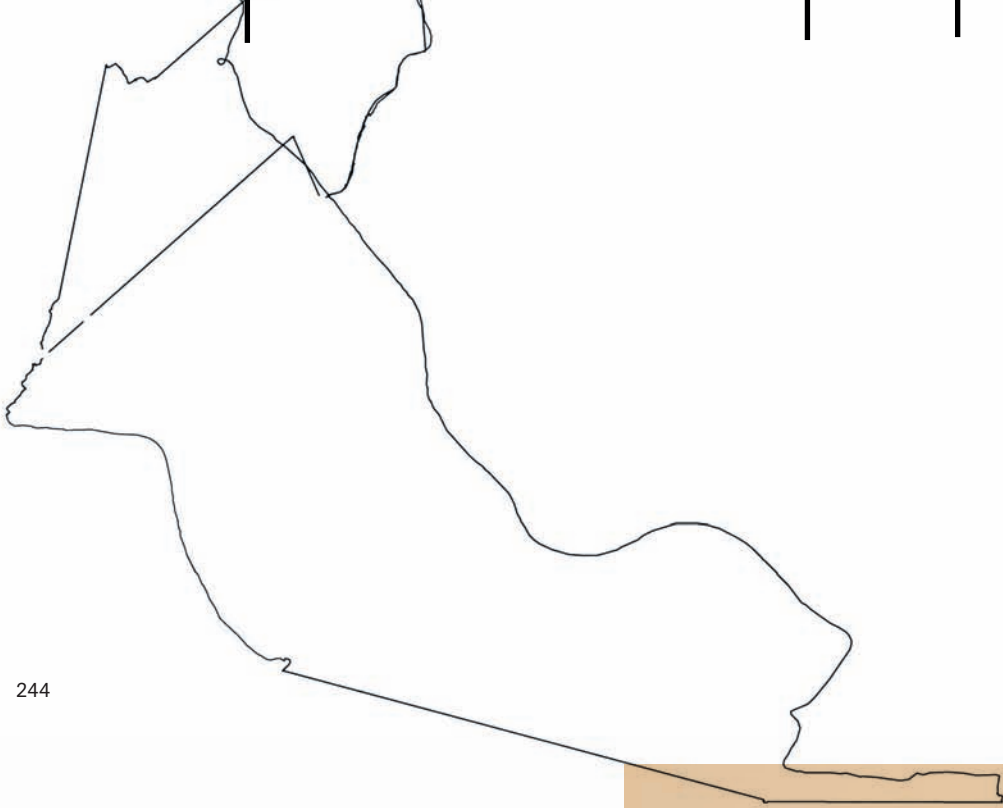
One Human Day examines the potentiality of a path as scientific data and as drawing. Space becomes a determining factor of the resulting line taken by different beings. Confronting a varied range of these quotidian studies in one space invokes a kind of expanded vision of a personal and collective reality. The artwork comprises 16 different human day-to-day paths over the world. Each path corresponds with a one-minute sound landscape, recorded by each person who took part in the project. This enriches the experience when accompanying the line via the senses. The resulting image questions authorship. Drawn and traced by a human, drawn again by a printer machine and presented as a hybrid between data and drawing.



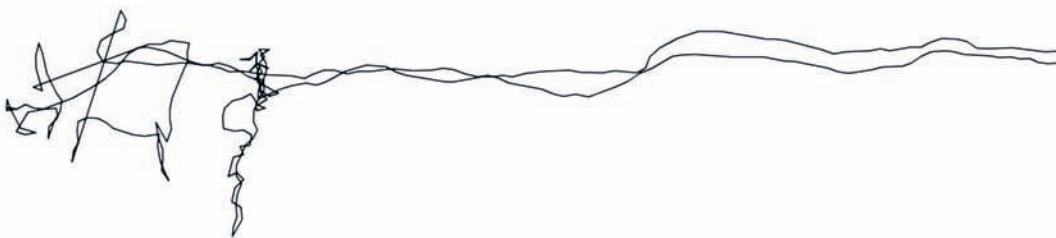
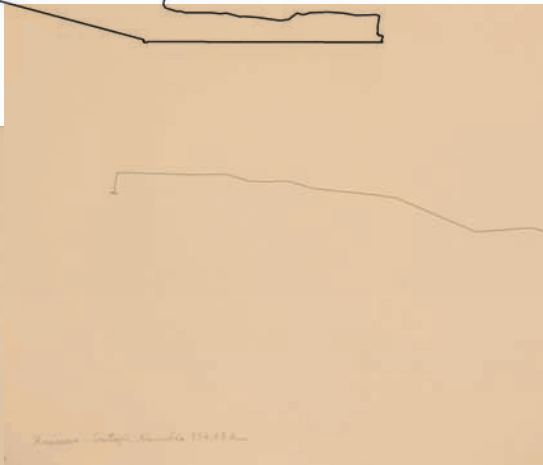
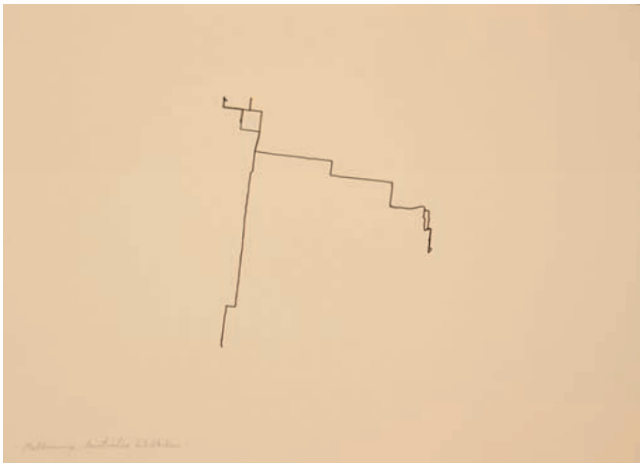


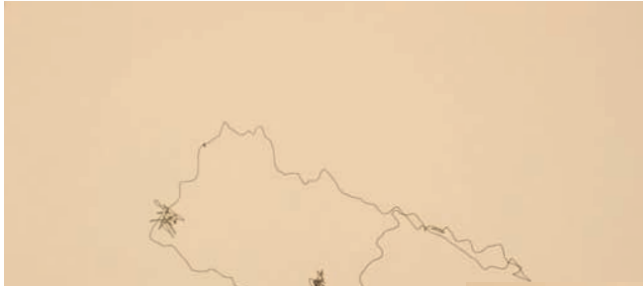
Hangzhou, China. 375 km





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Enigma, May 2001



Enigma, Columbia, 2001



Enigma, Columbia, Japan, 2001



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Leonard Coster

Despina Zacharopoulou

Aura Satz

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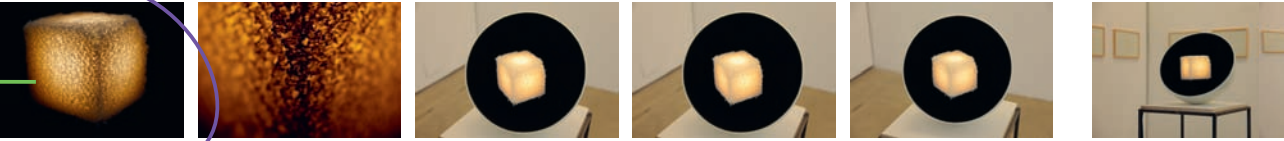
Juan Cruz

Nora Lengyel

Ivonne Gracia Murillo

Marc Schuran

* 1989 Vienna, Austria | Vienna, Austria



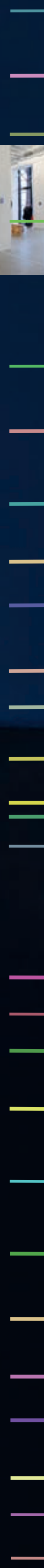
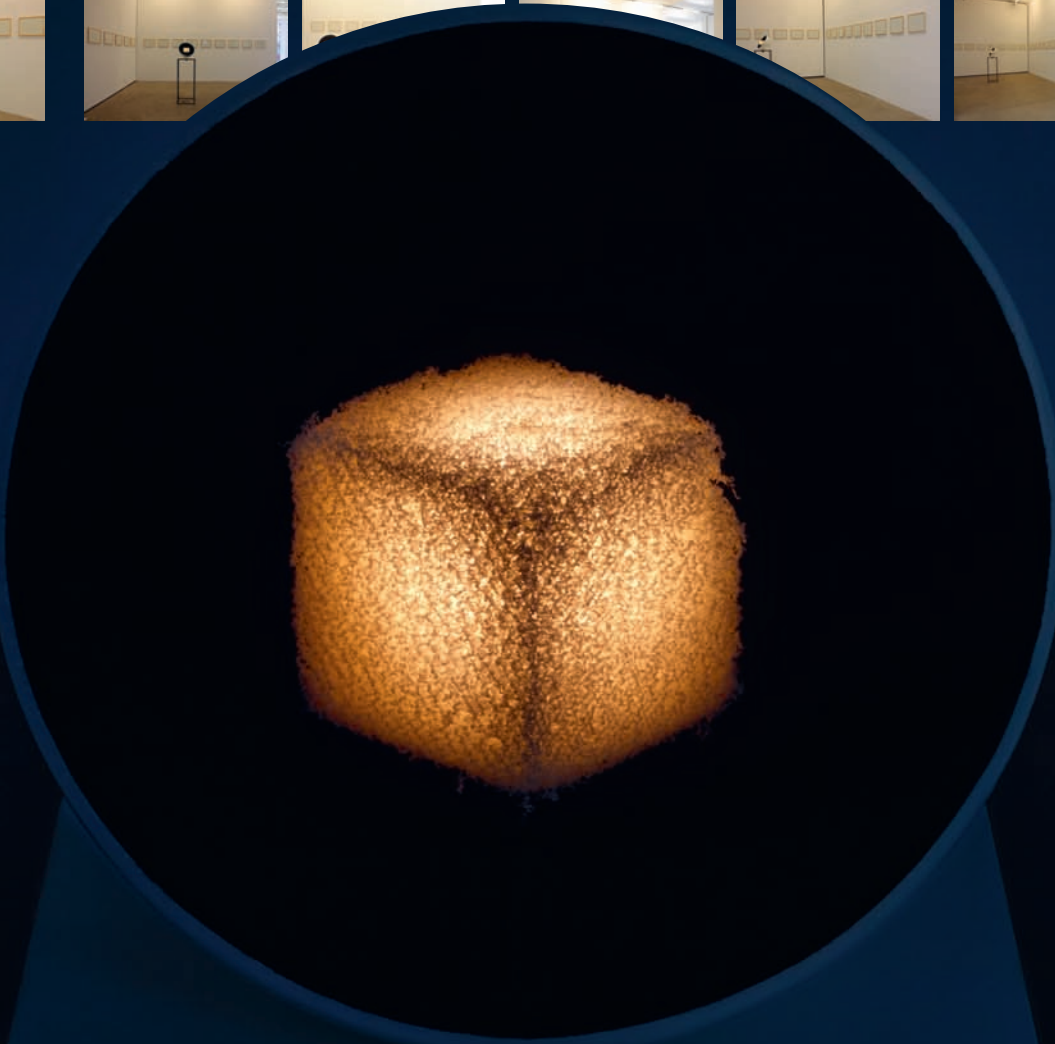
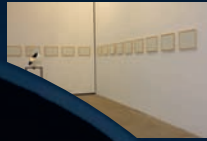
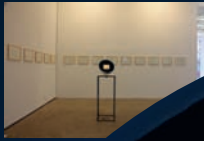
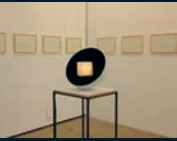
Marc Schuran studied at the New Design University in St. Pölten where he focused not only on the learning of a craft—particularly on a cultural-scientific understanding of the material culture—but also on the understanding of connections between objects and the human being. After graduation, he started his own business as a designer and freelance artist, a profession that he practices concurrently with his studies at the Art & Science master programme. There, he merges his passion for design with his urge to research, combining the study of current scientific achievements with creative processes.

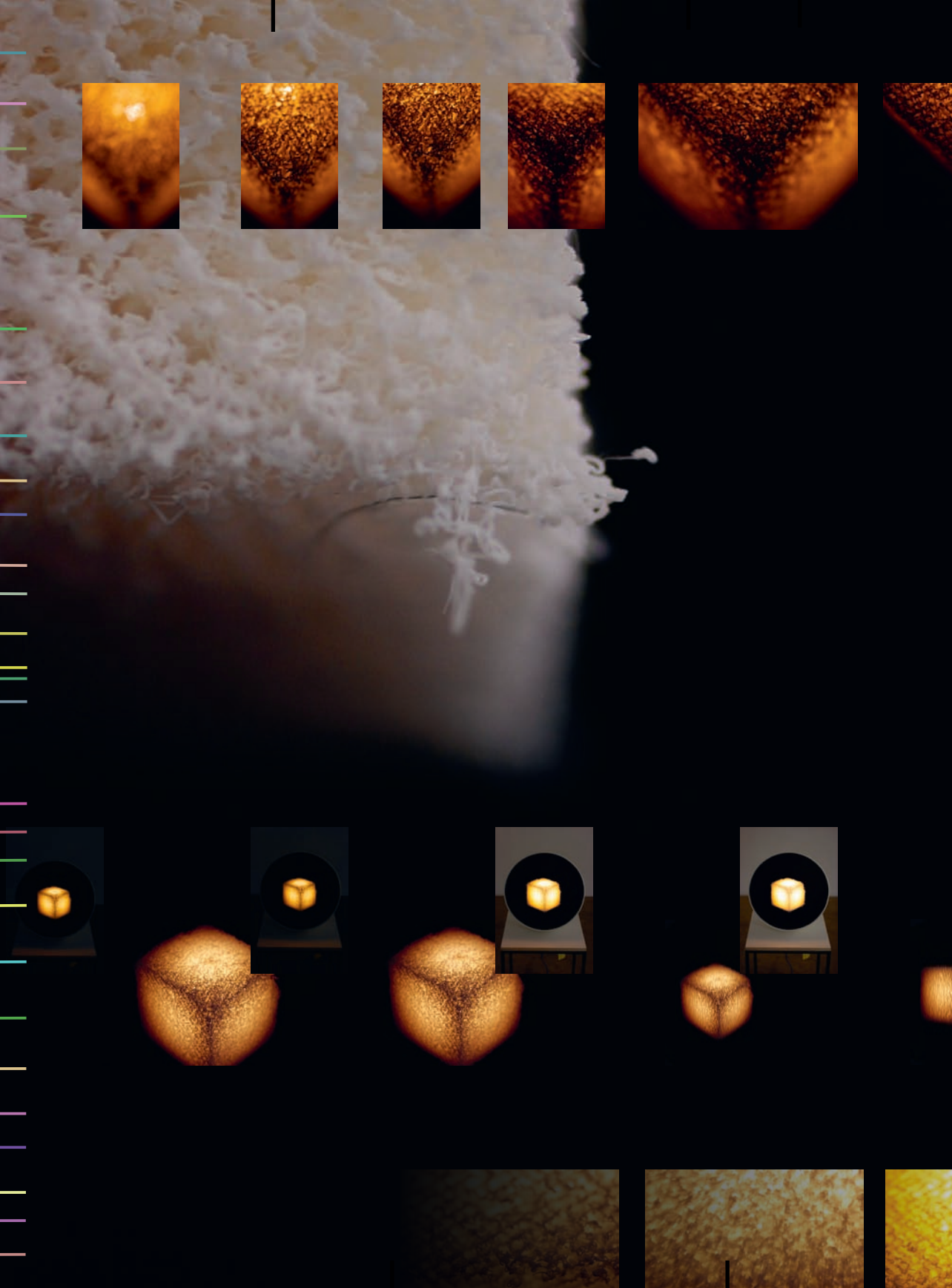
Outbreak within Standardized Limits

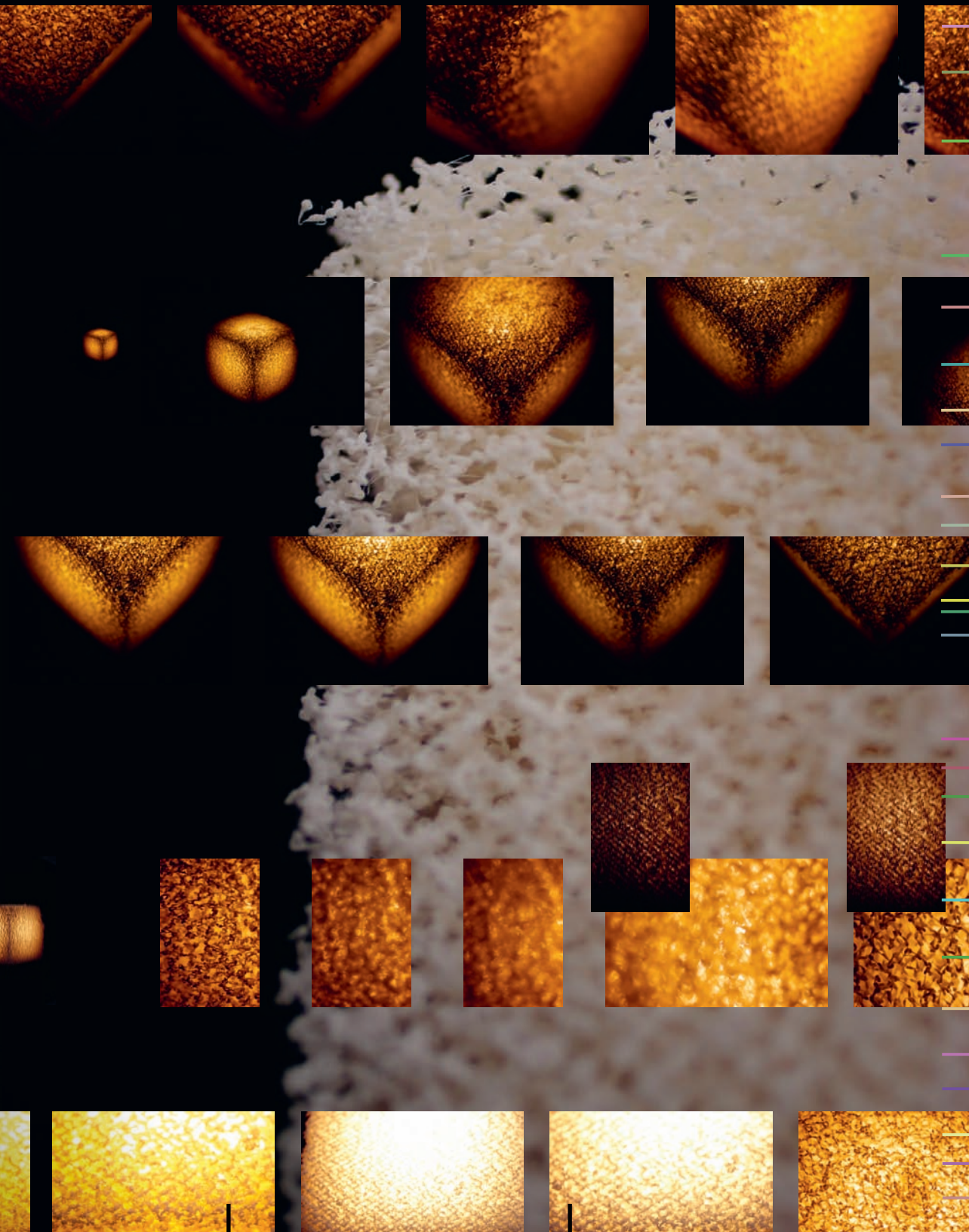
Sculpture on pedestal, 2019

There is no need to go for a target directly and at a steady pace to reach it. Any digression should not be seen as a deficit, because only when the wandering of the thoughts can be implemented constructively, a creative process can be created. The linear goal is widely circled in the mind and all possibilities of approximation examined to select the most interesting path, which can then be changed spontaneously in favour of a supposedly better one. Breaking out within standardised limits: an interplay between divergence and convergence.













Monica C. LoCascio

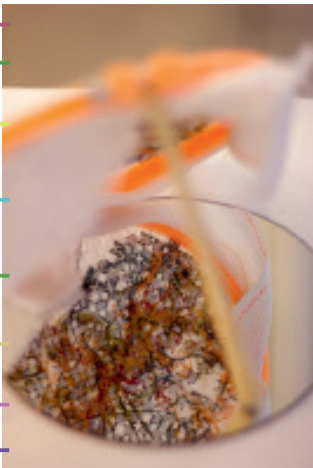
* 1984 Riyadh, Saudi Arabia | Vienna, Austria

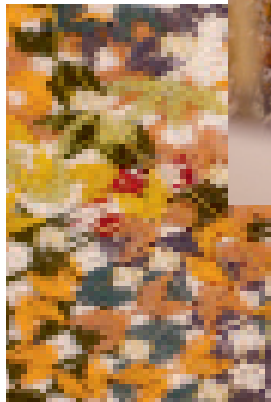
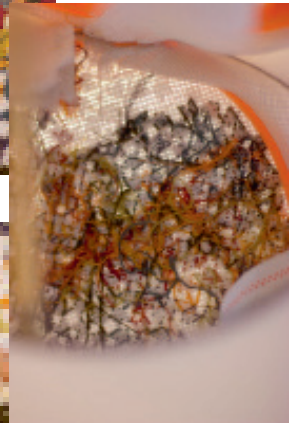
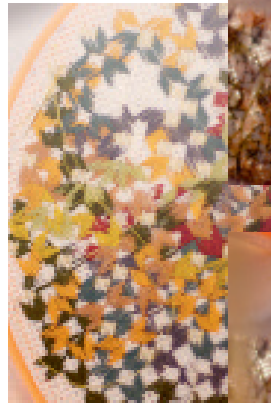
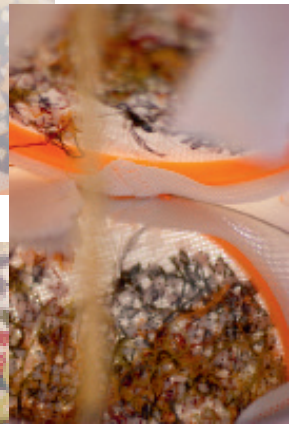
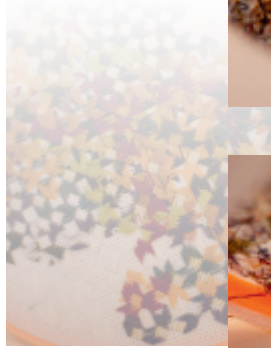
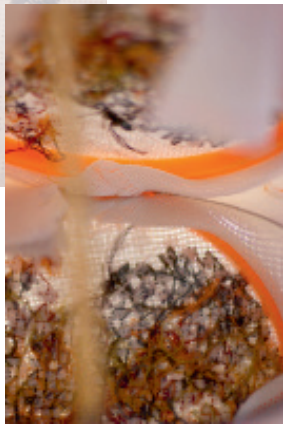
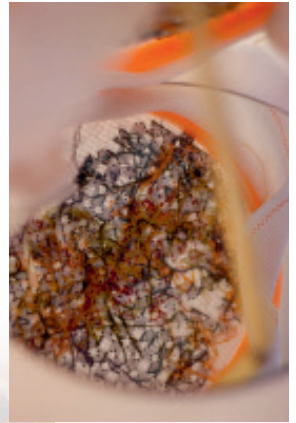
Is a multi-media artist-researcher focusing on questions of resonance, connection, and interference, particularly within and between bodies. Her work is inspired by such topics as biophotonics, somatic therapy, and quantum theory, to memory, non-linear time, and geometric principles. Unattached to a particular medium, she uses research techniques to inform her explorations of form.

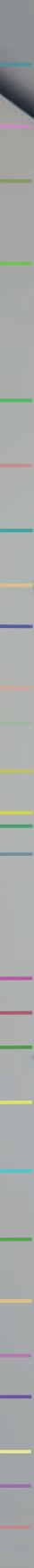
Embrecord 3

Embroidery, 2019

For her *Embrecord* series, LoCascio employs the repetitive micro-movements of embroidery, a craft steeped in the traditions of storytelling, as a means of examining the processes with which the human experience can be recorded in relation to time, memory, space and perception. The stitching pattern is based on her understanding of the thermodynamics and non-linearity of time. Thread colour and length are determined by both requested external suggestions as well by her own synesthetic translations of the events she is recording. The composition at large is also not predetermined. Rather, a shape is intuitively and spontaneously embroidered that speaks to the intensity, story arch and timeframe of the event in question. The end result is an abstract colour field, which can be read by the artist like a diary. *Embrecord 3* is an autobiographical record of events from December 2018 to February of 2019.









Juan Cruz

* 1970, Palencia, Spain | Edinburgh <-> London, UK

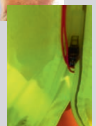
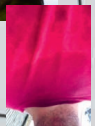
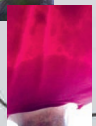
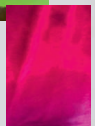
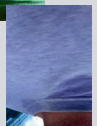
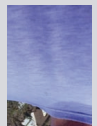
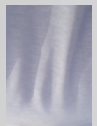
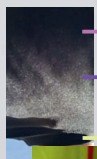
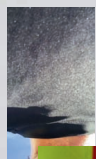
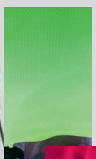
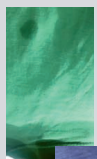
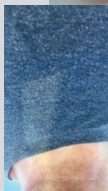
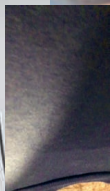
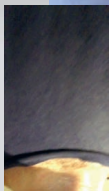
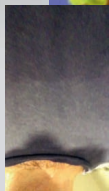
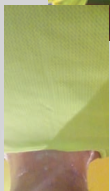
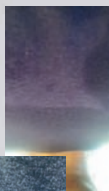
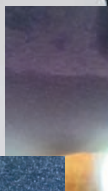
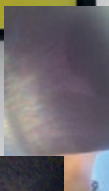
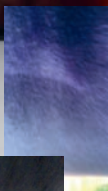
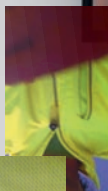
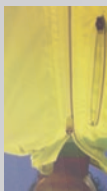
Juan Cruz is Principal of Edinburgh College of Art, University of Edinburgh, where he holds a personal Chair in Fine Art. Exhibitions of his works are, more often than not, responsive to the particularities of the context where they are installed, but the work itself is almost always based on personal content. Juan writes autobiographical narratives and shorter descriptive texts, which he has deployed through videos, installations, typescripts, prints and performances; he has also worked with translation, performing several oral translations of works from Spanish literature, including *Don Quijote*, into English. Juan Cruz is represented by Matt's Gallery, London and Galeria Elba Benitez, Madrid.

I don't know what I'm doing but I'm trying very hard

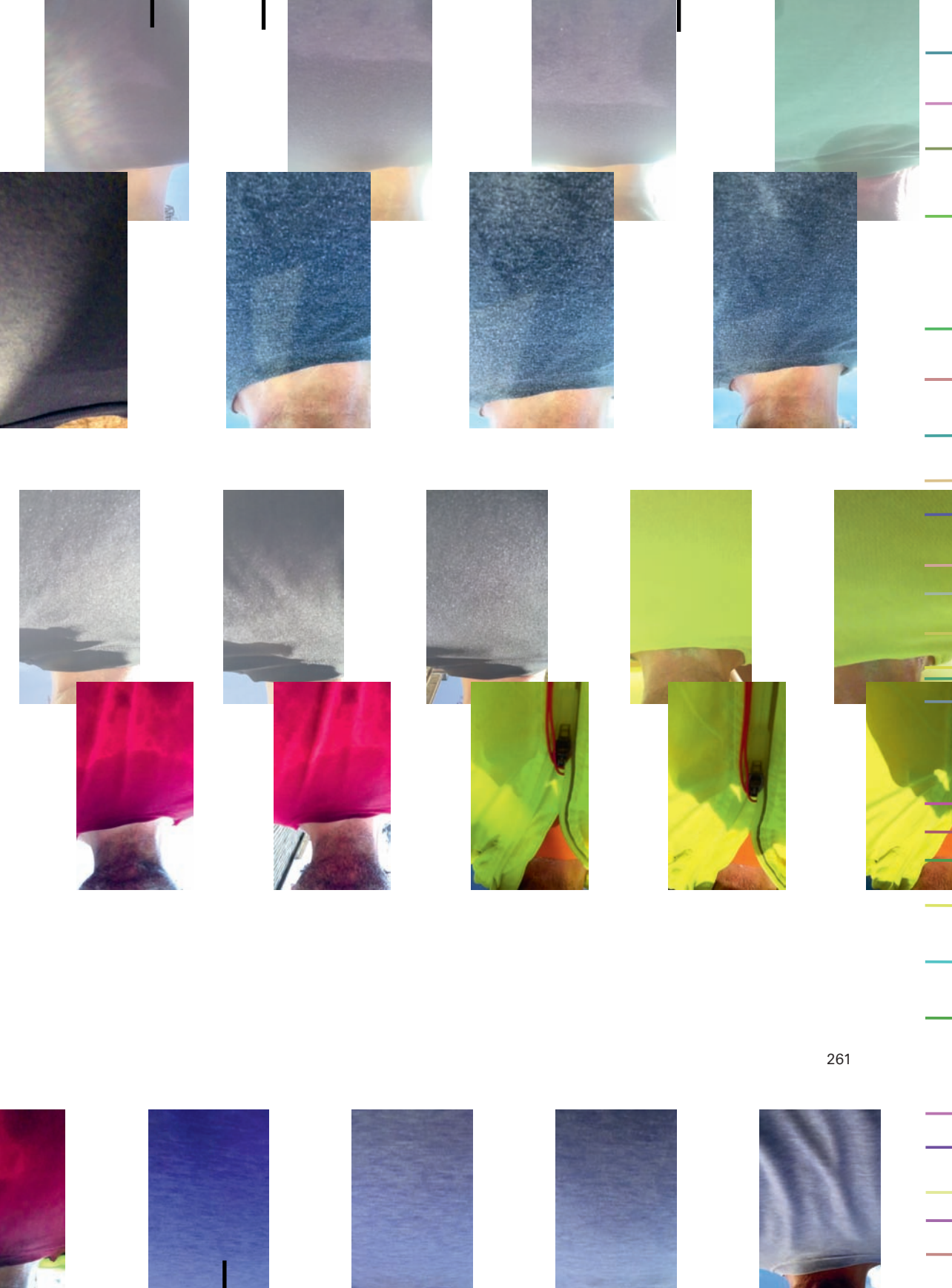
15 videos, 2018–2019

I don't know what I'm doing but I'm trying very hard (IDKWIDBITVH) is the collective title for an ongoing series of short videos, of between 00:30 seconds and 05:00 minutes in length and commencing in June 2018. This work is characterised by a rather desperate, sentimental and hubristic desire to avoid aging, irrelevance and death. Cruz grapples with the shame and embarrassment of being an artist and the bizarre irony of wanting publicly to deal with that shame through the form of the exhibition. Cruz's gestures strive to be slight and self-effacing while battling the essential ego required to do anything at all and think that others might want to see it. In this regard, the work speaks to Cruz's ongoing interest in the poetry of his namesake, the mystic poet San Juan de la Cruz and his famous assertion "I live without living in me." The videos are shot on the front-facing camera of an iPhone and in each case record a monologue spoken by the artist following the exertions of a run. The videos, which appear inverted and focus on the chest and neck area, are characterised by the breathlessness of the voice and the sweat-soaked t-shirts. There are over 100 videos in the series. They are designed to be exhibited as well as being made available through a digital repository. First shown at Matts Gallery, London, UK 8–16 Sep 2018.









Manu Luksch

* 2099 Peertopeopolis | London, UK

Manu Luksch is an artist and researcher drawing attention to the insidious threat posed by the rise of algorithmically managed societies. By developing a series of short, moving image artworks (called ‘tactical fictions’), she is dramatising concerns about the ‘quantified society,’ including the private ownership of data relevant to human rights and the practice of democracy. Based on in-depth research and developed through a series of exploratory group sessions, the artworks visualize and dramatize datasets and scenarios to render algorithmic management tangible, and engage a wider audience in critical reflection.

Code / City

Sand graffiti and double screen video installation, 2017

From sand to glass to silicon—the United Arab Emirates adumbrates a fantasy frontier of algorithmic dreams, of smart cities and a frictionless economy servicing peak experience. It is believed that the emirates rose from the desert almost fully formed, weightless, its supertall buildings limning the height of our desires. The video uses techniques of computational photography to capture the headquarters of Masdar, Abu Dhabi’s global showcase for urban smart technology and soft architecture. An evolving 3D future is extrapolated from a mass of ordinary photographs, reflecting the way that our destinies are predicted and constructed through the extraction and analysis of mass personal data. From the shifting sands of the Emirati desert also arises a portrait of Ahmed Mansoor. As vulnerable as Mansoor himself—currently a prisoner of conscience—the picture calls for global attention, and for the protection of human rights to be a prerequisite for trade deals.





Linking Arms in Repression—The United Kingdom and the United Arab Emirates

Video, 2019

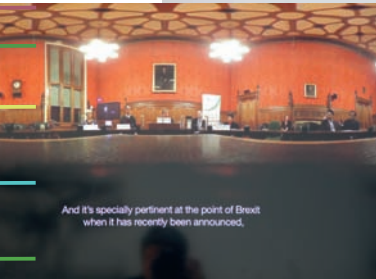
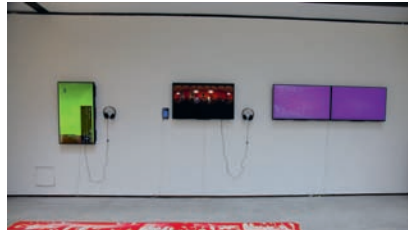
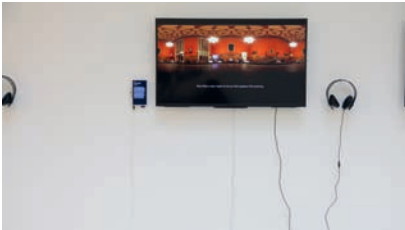
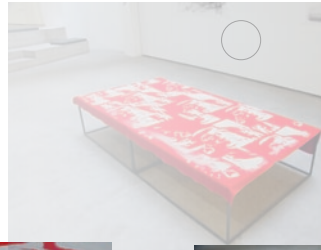
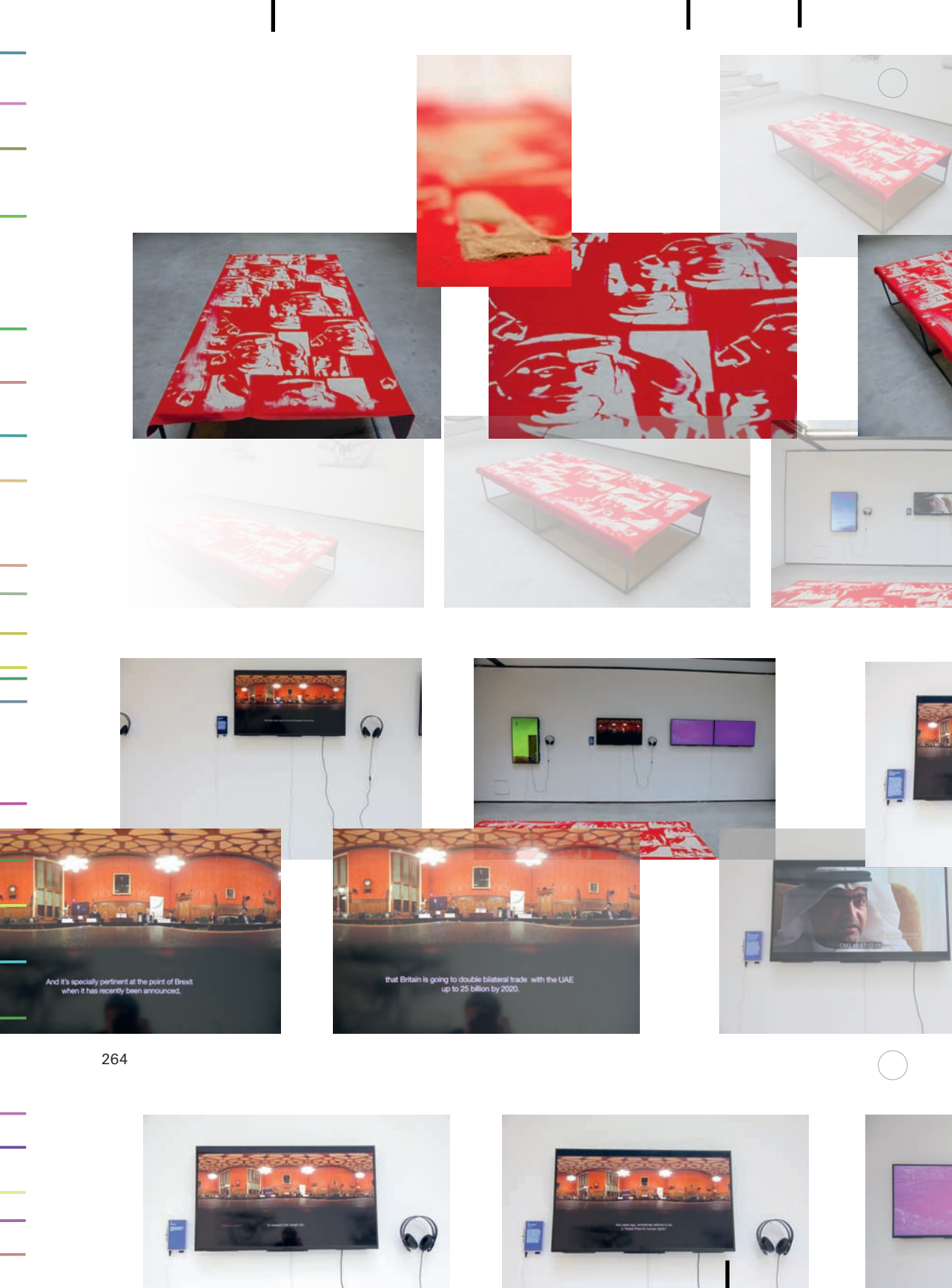
On 11 October 2017, Alistair Carmichael MP chaired a parliamentary seminar in Westminster, London to explore the UK-UAE trading relationship in light of an announced increase in bilateral trade to £25bn by 2020. A central question was how this deal squared with the appalling track record of human rights violations in the UAE. Particular attention was paid to the sale of cyber surveillance technology by BAE Systems to the UAE regime for spying on its own citizens. On being called to the seminar as a witness, Manu Luksch yielded the platform to (a video recording of) Ahmed Mansoor, the key figure protesting these violations, and a victim of state surveillance, now brutally incarcerated himself.

The Empty Quarter

Video loop, 2019

The installation The Empty Quarter investigate the complicity of avowedly democratic governments in human rights abuses in the UAE. An undercover video documents a UK Parliamentary Seminar exploring UK-UAE bilateral trade, with particular focus on BAE Systems' sale of cyber surveillance technology to the Emirati regime for use on its own citizens. Called up as a witness, Manu Luksch presented an interview she filmed with Ahmed Mansoor – the key human rights defender in the UAE, a victim of state surveillance, and currently prisoner of conscience. On an adjacent red plinth, Mansoor's face emerges out of the shifting sands of the Emirati Desert, the portrait's ephemerality calling attention to his precarious circumstances.

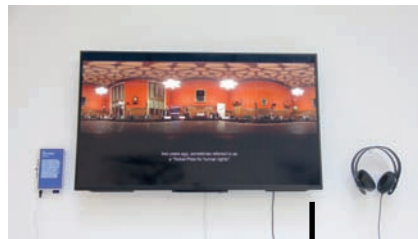
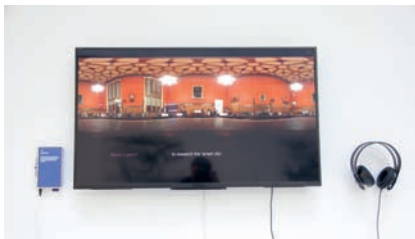




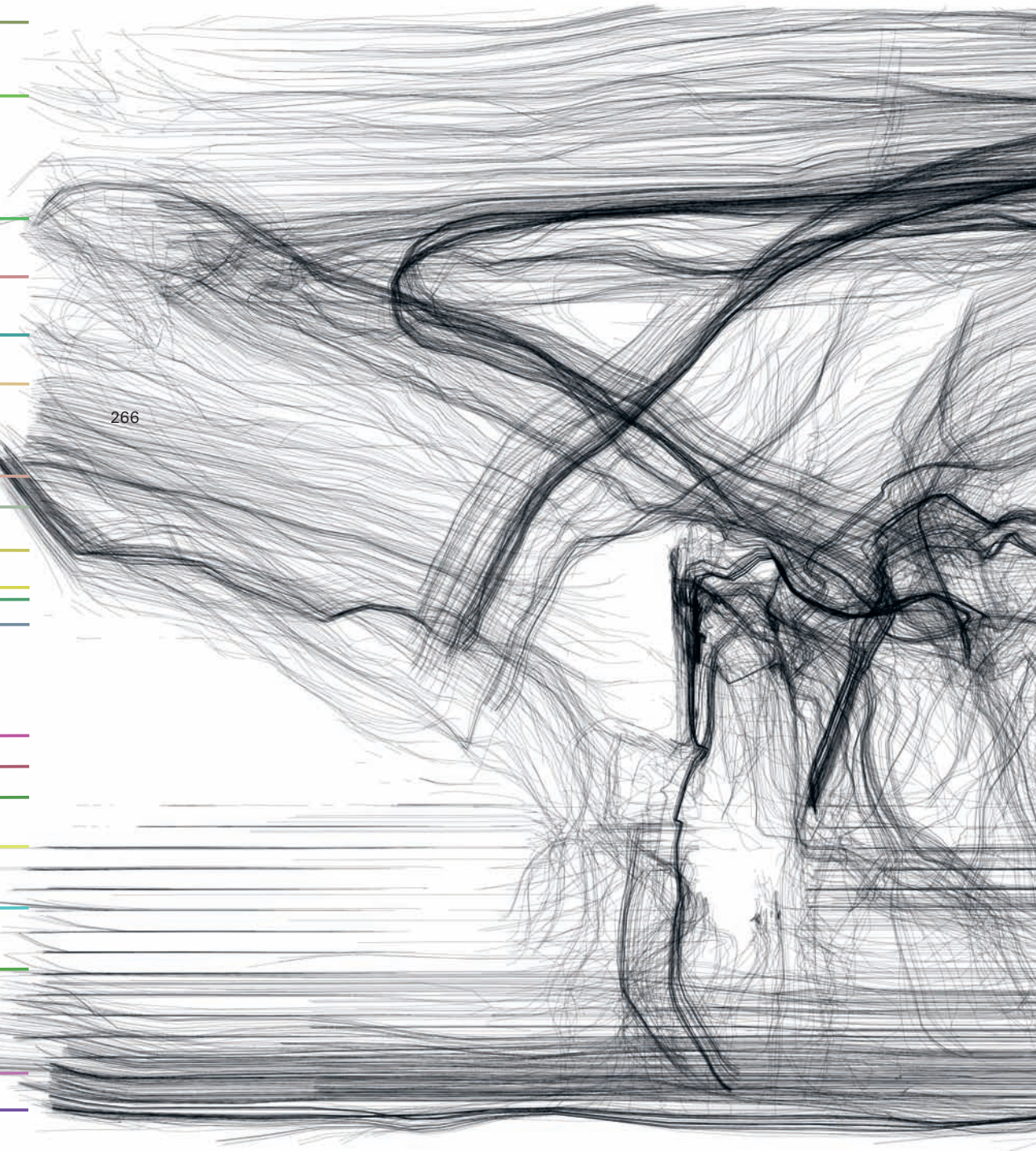
And it's specially pertinent at the point of Brexit when it has recently been announced,

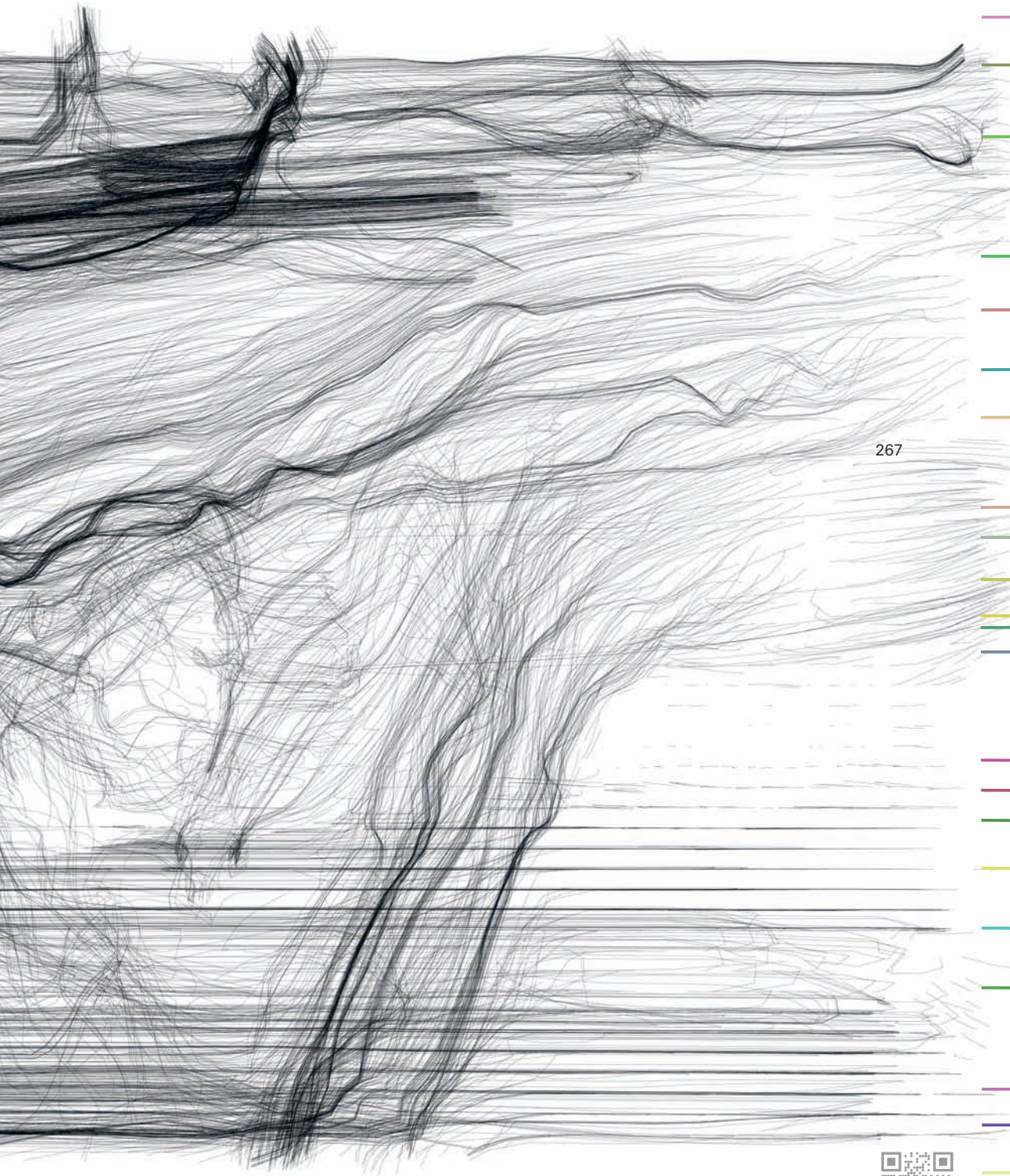


that Britain is going to double bilateral trade with the UAE up to 25 billion by 2020.









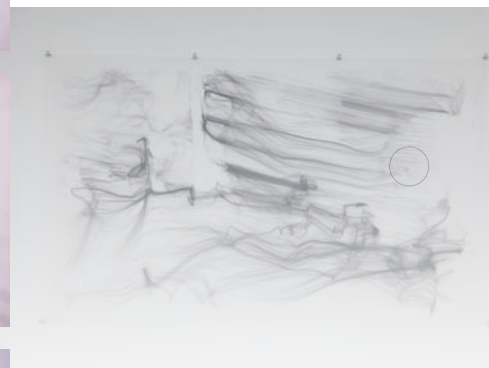
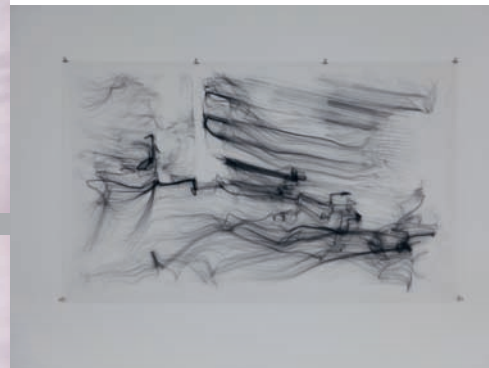
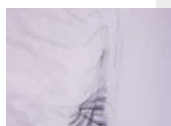
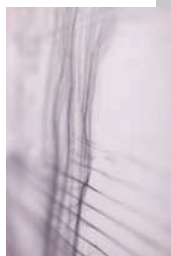
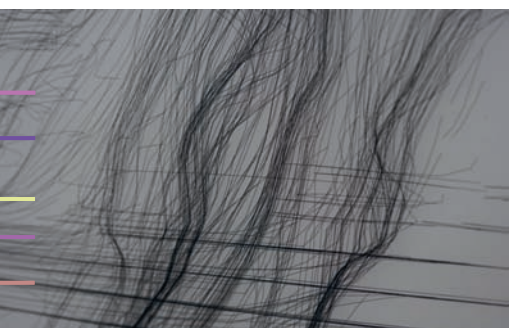
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Julian Palacz

* 1983 Leoben, Austria | Vienna, Austria

Julian Palacz studied in digital art 2003–2010 at the University of Applied Arts Vienna under Peter Weibel and Virgil Widrich. Co-founder of the publishing house *Traumawien* for digital poetry. His conceptual works deal with the aesthetics of data and information traces left behind both digitally and physically. Customised software and algorithms build the basis of his process in reference to their usage in contemporary politics and society.

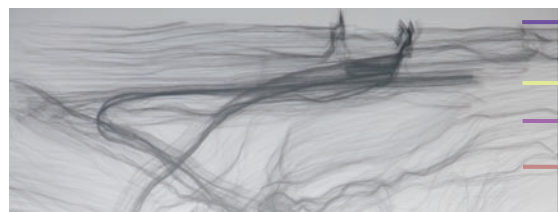
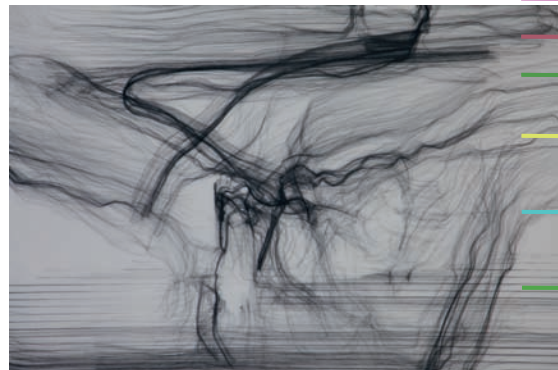
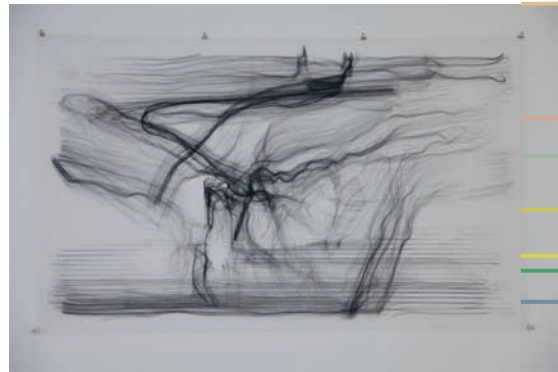
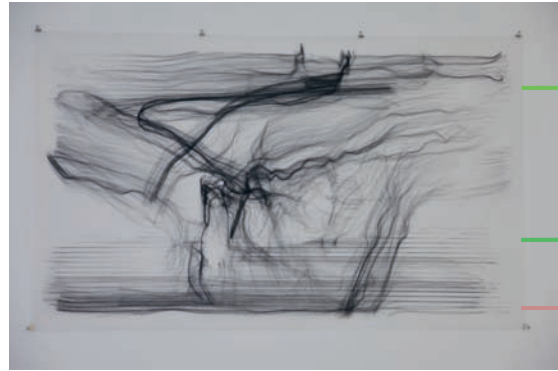




Surveillance Studies

Two prints on paper, 2014

One minute surveillance videos are analysed with a computer algorithm for objects in motion like people, cars, bicycles, etc. the collected data of the moving objects is then plotted in thin black lines on tracing paper, leaving behind only the motion of the captured video.



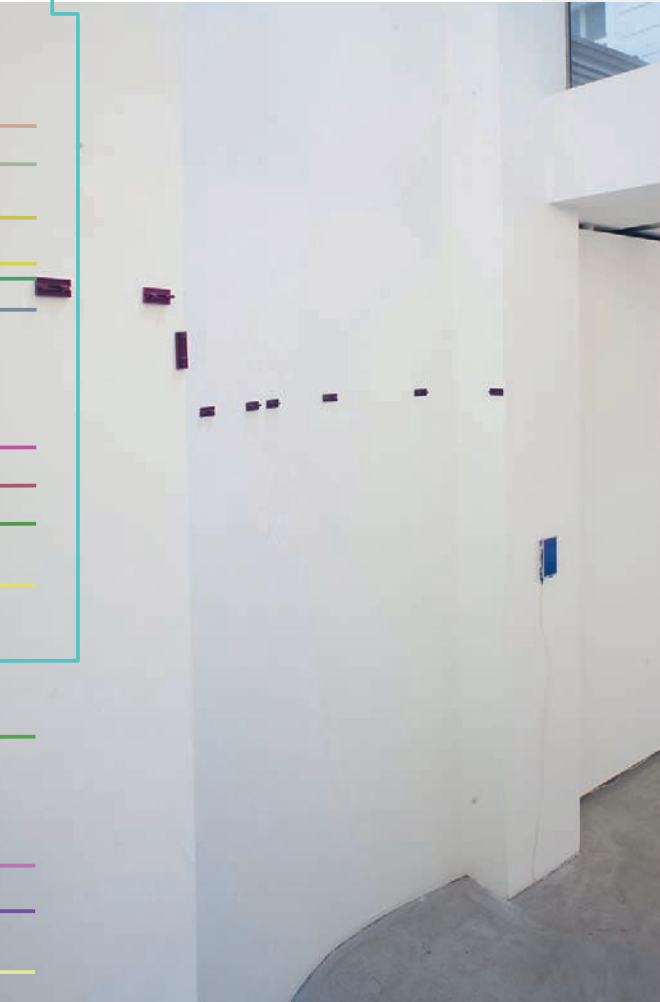


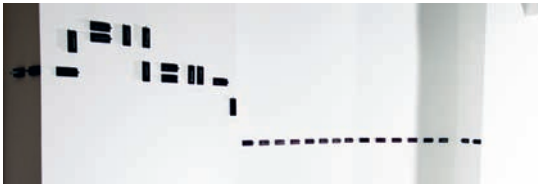


Sophie-Carolin Wagner

* 1983 | Vienna, Austria

Sophie-Carolin Wagner investigates elaborately, works passionately, quotes vigorously, writes peripatetically, communicates epistemologically, but not exclusively insightfully, holds as many degrees as names and never signed up to Facebook. Currently co-editor of the *Journal for Research Cultures* and project manager of the ONB Lab at the Austrian National Library. Recent publications include *poetry: challenging solitude and the improbabilities of communication* (2017) and *programming is law—can I be a feminist if I don't want to become a programmer* (2018).





Palais des Beaux Arts Publishing

Multiple USBs, 2019

Palais des Beaux Arts Publishing is a sculpture that holds fragments from the history of atelier Bachwitz, the founders of the Palais des Beaux Arts Wien. Central to this work is *My Blood Strangers*, a text by Thomas D. Lonner, the great-grandson of Arnold and Rosine Bachwitz. Throughout the exhibition, a limited edition of palais des beaux arts publishing will be available in the form of modified usb thumb drives and distributed unsystematically. The editions include a detailed description of the archival rules for the object, *my blood strangers* and materials from atelier bachwitz's *chic parisien*. the object was designed to enter archival conditions, its form questioning standards of archival library practices. the exhibition will serve as an initial platform for the distribution of the publication.

Mattia Paganelli

* London, UK | Milano, Italy <-> London, UK

London and New York Milan in worked and studied lived has He. online and international exhibited been has work artistic Mattia's. Art contemporary in sense of emergence the to intrinsic as ecologies digital and, loops feedback, dimensionality fractal and algorithmic explores work recent his. Incompleteness and properties emergent, complexity computational surrounding problems epistemological the of light the in practices art of materiality the constitute may what and aesthetics rethinking on concentrates work his. (London) Art of College Royal the and (Vienna) Arts Applied of University, project Loam Data the in researcher a also he. UK London Art of College Royal the at Lecturer Visiting a is Paganelli Mattia Dr.

2 × 2 = 4

Digital print, 2019

2 × 2 = 4 is

- part of a series of works that folds things onto themselves.
- an attempt to move while remaining in place.
- a play with total transparency and complete opacity.
- reflections without self-reflexivity.
- reducing reflection to repetition.
- the impossibility of squaring circularity.
- the collapse of representation and the irony of the obvious.



$$2 + 2 = 4$$

$$4 - 2 = 2$$

$$2 \times 2 = 4$$

$$4 : 2 = 2$$

Leonard Coster

* 1967 New South Wales, Australia | Vienna, Austria

Matthias Strohmaier

* 1974 Vienna, Austria | Vienna, Austria

Leonard Coster is a physicist and mathematician. In the Data Loam project, he focused on modeling and writing software to allow a more fluid and fuzzy logic interaction between long form text data objects. By modeling them as a physical system and defining their modes of interaction, a process of self-organisation followed, revealing emergent patterns and connections driven by the data itself. This process is both scalable and algorithmic, meaning that it does not require human guidance or effort and can be deployed on larger computing hardware to match larger data organisational tasks.

Matthias Strohmaier is a freelance software developer based in Vienna with a focus on architecture and development of custom solutions in the field of interactive multimedia installations, hardware-near programming and web applications. Over the years he has continuously developed cutting edge solutions for media artists and tailor-made software for pioneering tech companies.

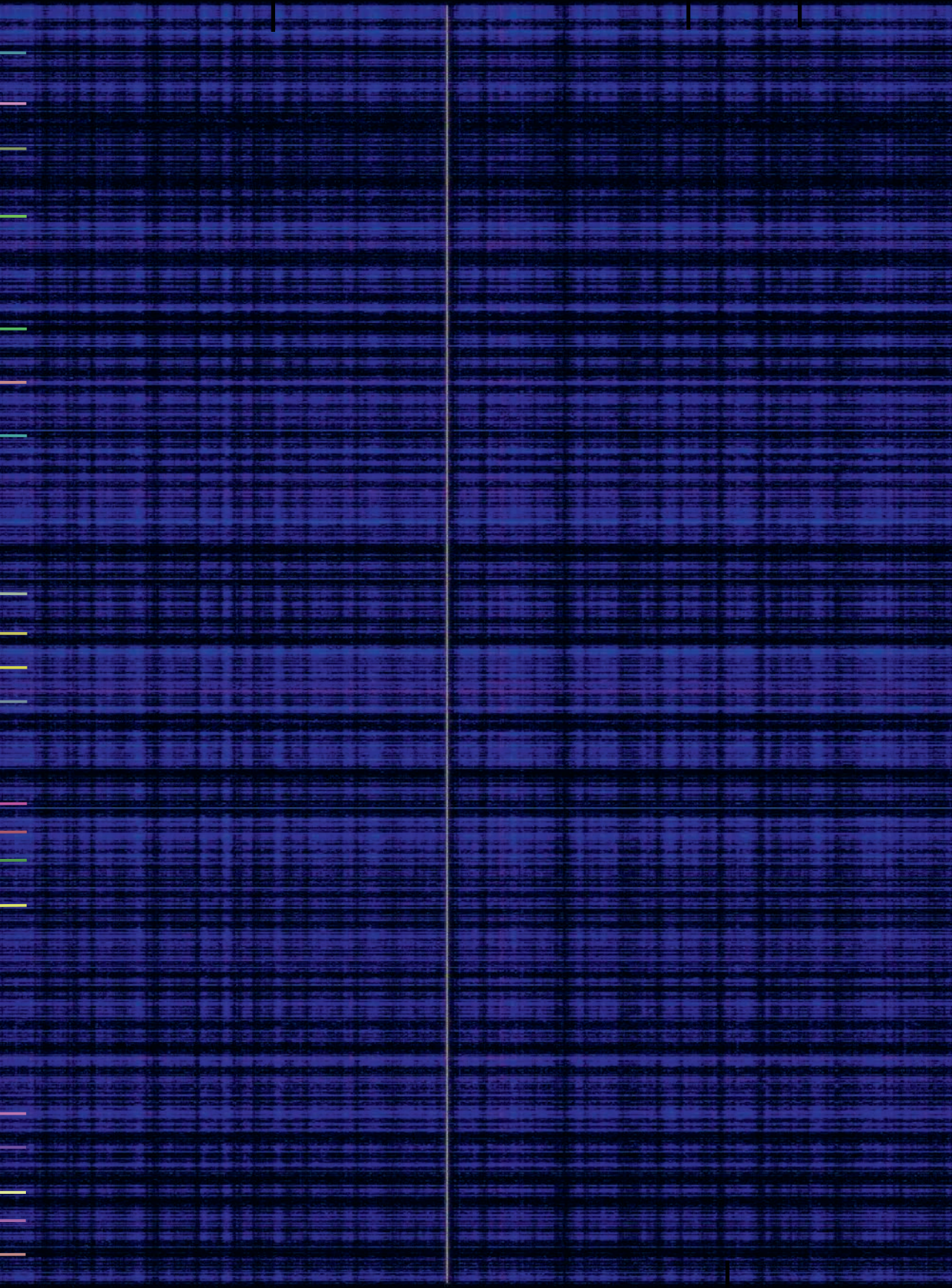


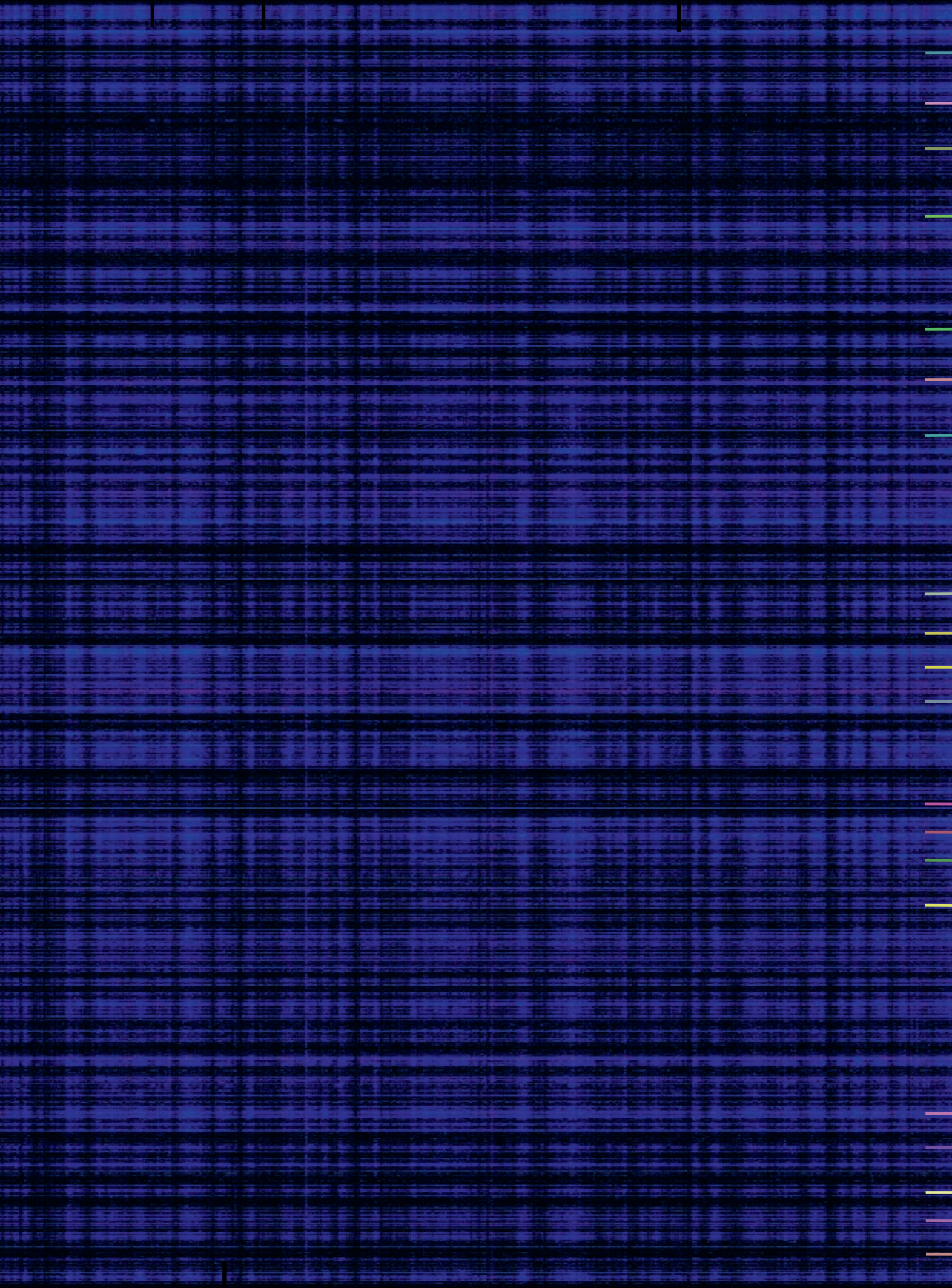
Data Loom—Weaving the Fabric of Data

Algorithm and visualisation, 2019

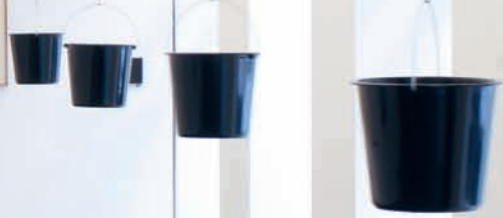
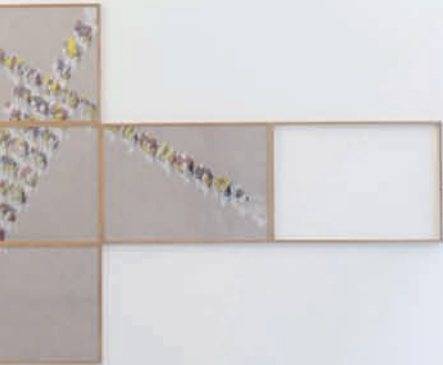
Global information is now large enough to allow the emergence of correlations within the data. Not simply “search results” but abstract, representative affinities across the map of knowledge beyond simple factual dependencies. Data objects may self-organize according to consistent, if perhaps complex, modes of interaction between the attributes of the data objects. This changes the observable relationships between the data objects and also the relationships between the attributes of the data objects. It is no longer a rigid definition of a single object or a single attribute but a softer, fuzzier and more inclusive connection; new properties describing affinities between objects, their attributes and each other. Extending Golding’s re-thinking onto-epistemology with physics we refer to these emerging properties as radical emergence data objects form a map in radical matter space where they are related in some aspect. These groupings do not have rigid boundaries, nor are they ever isolated from one another since the emergent radical matter defines vectors between all of them. Similarly, radical matter also maps related attributes of the data objects together, finally connecting, in a truly fuzzy-logic way, collections of objects, collections of object attributes and obliquely object-attribute associations. In a role-reversal, object collections can be seen as defining their own attributes and thereby affecting the meaning of other objects. This closed loop continues and evolves until stable, or perhaps dynamically evolving patterns of radical matter emerge. An example might be one in which these attributes are fields of knowledge, or meanings and the data objects are each examples exhibiting a collection of these meanings such as books or web pages. The emerging radical matter then exposes vectors between subject areas and groups of examples and defines the transformation from one, to the next, to the next as the observer navigates around the data, in radical matter space. Establishing a mechanism such that radical matter may emerge in an observable form is the first challenge. Classic information and cataloguing systems impose such rigid order upon knowledge that this is impossible. Take the analogy of Heisenberg’s uncertainty principle. If one establishes or even just observes a particular state, other properties of the observed system are, by definition, un-knowable. We explore here one example that may offer insight into tools of this nature.













Florian Unterberger

* 1973 Bad Ischl, Austria | Vienna, Austria



Florian Unterberger studied at the University of Applied Arts Vienna with Wilhelm Holzbauer, Zvi Hecker, Zaha Hadid. Lives and works as a visual artist in Vienna and Bad Ischl, working on architectural and conceptual drawings.

swrgb - totale bibli
51090942171709
pencil and colour

totale bibliothek
pencil on paper, 2

alphabet
pencil on paper, 2

langer atem
pencil on paper, 2

gute figur
pencil on paper, 2

emil achtzehn
pencil and colour

anna
coloured pencil o

vierundvierzig
pencil and colour

julikrise
pencil on paper ,

hochform
pencil and colour

da zeichnet einer
coloured pencil o

das ist eine pfeife
pencil and colour

gebündeltes hall
pencil on paper ,

moderner hyperz
pencil and colour

sarajevo - urbe-k
pencil on paper ,

save me
pencil and colour

schlüsselwerk

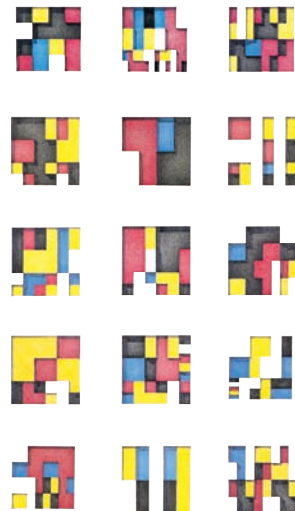
Since 2011, Florian Unterberger has been developing a continuous body of work, the Total Library, a series of drawings whose formal connectedness emerge from a geometric translation of the Latin alphabet into a spatial colour code. This code can equally be applied in two or three dimensions.

The act of translation as an underlying code is itself of interest. It utilizes—and functionally extends—the common character set of the alphabet in order to create possible building blocks for a visionary new world. This transformative mechanism provides for each letter its unique and unmistakable geometry, whereby the ‘A’ itself remains ‘A’ in its pure and smallest function—just as if it would be translated in a series of bits and expressed as the binary ‘11000001’. Each character is, in the first instance, a value in itself manifested as a coloured surface or figure, which, then, in conjunction with the others, forms an art based and self-contained sign system.

The alphabet and its applications gain tectonic qualities, similar to that referred to by Gottfried Semper (1860–63) as “the art of assembling rigid [...] parts into an immovable system.” Each letter is turned into a building block that, for its part, is capable of translating any abstract terminology back into an actual reality. The chosen text in this context is not only programmatic, but can also be understood as a map or architect’s plan. Formal and conceptual analogies may be made to the art of Suprematism and De Stijl or to Christopher Alexander’s “pattern language”, but this would not be accurate. The Total Library moves away from the ‘how’ of those conceptual analogies and instead data mines the ‘what’.

1941. Jorge Luis Borges’s *The Library of Babel*, describes a fractal spatial structure that contains all books with all possible combinations of the alphabet including the twenty-two letters, the full stop, the comma, and the space. Each wall of each hexagon shaped unit is furnished with five bookshelves; each bookshelf holds thirty-two books identical in format; each book contains four hundred ten pages; each page, forty lines; each line, approximately eighty black letters. The German mathematician Daniel Schäfer calculated that the number of such permutations (and thus the number of books) is 101.845.281. The library itself—assuming each of its hexagonal cells has 100m³—would sum up to a volume of 101.845.232 cubic light years. Borges’ imaginary library is—at least according to our limited conception—so comprehensively large and enormous that the envisioned, endlessly repeating, reading cells seem almost minimised to the size of a doll house.

Employing Florian Unterberger’s instrumental visual language as a double translation. Total library itself—a pluralised ‘itself’—put to work to translate Borges’s fractal spatial translation now coded as *The Library of Babel*. Borges’ repetitive hexagonal structure, which

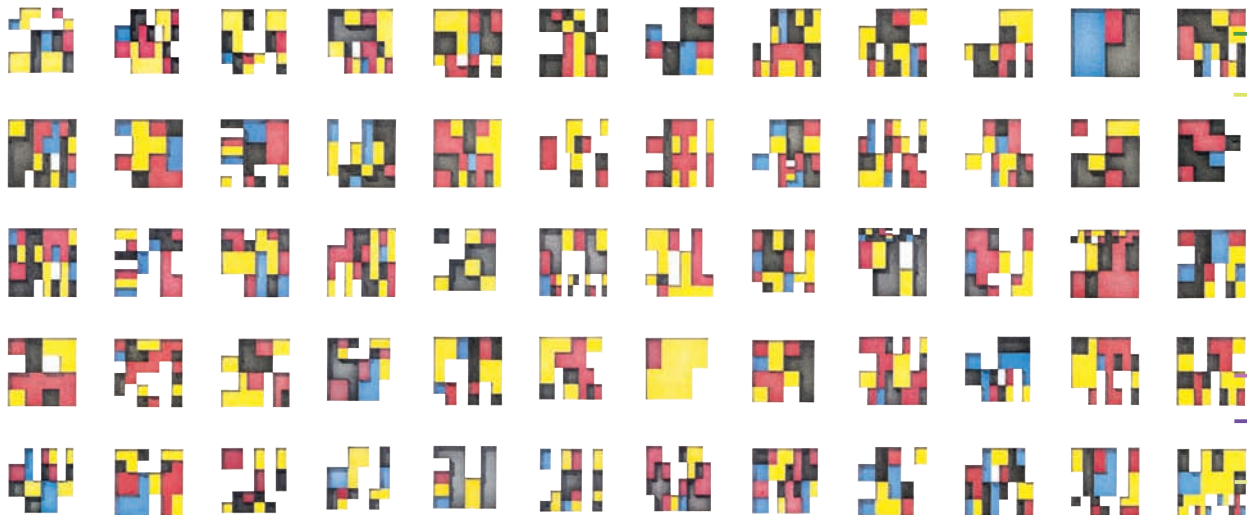



is unfortunately somewhat tedious, could be replaced by all possible combinations of all the letters. Thus enabled: the building of a spatial typeface, whose figuration itself would not be bound exclusively to the idea of a book or other medium or the signs contained in it, but would be the spatialisation of a chosen language into a total information architecture. One could navigate any text as a route while moving through this world! As unbelievably large and complex as this assumption would be, it is nevertheless definite and finite in its geometrical properties, especially since the entire figuration can be represented and limited at least mathematically.

Architecture is not only an expression of the time and circumstances of its creation, but also a carrier of signs and space-creating elements. Florian Unterberger's systematics provides us with a completely new function level allowing the signs to aggregate into architectural structures and thus becoming a total cluster of information. Of course, the choice of the initial terms used is decisive in this process, since they combine in their translated form a newly designed reality. Claim 1: this represents the greatest possible objectivity in the artistic means of communication (basic code). Claim 2: it forms a highly subjective and surprising configuration at the moment of their application.

These open concepts also characterise the author's live model and are thus, in sum, approximations to a conception of the world that may infinitely expand in its delicate and ever seductive beauty. Whereas this very linguistic quality was developed for the very purpose of depicting the artist's reality, it remains open, imaginative, never certain what he does next, what emerges as his mark or what he elegantly omits along the way.

Florian Medicus





Laura Stoll

* 1990 Innsbruck, Austria | Vienna, Austria

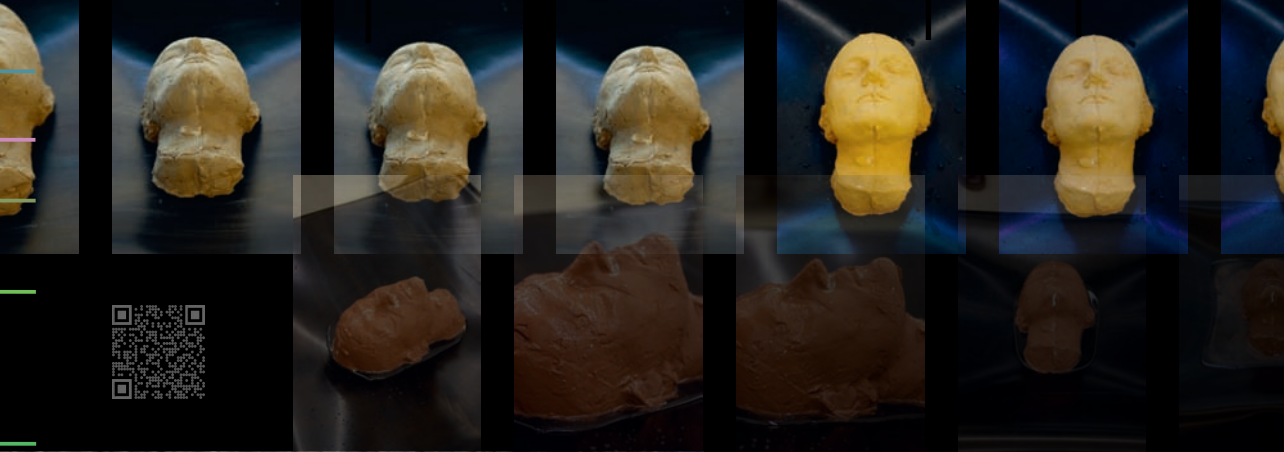
Laura Stoll has lived in China for some time, which has changed her way of seeing the world and thinking about it greatly. In her projects, she is working on the borders of medicine, psychology and philosophy and applies the methods of those fields to her artistic practice. Using different formats, she has been researching questions of personal identity, therefore investigating what constitutes our sense of being a person, and how we conceptualize this subjective quality in scientific and artistic terms.



Ten Types of Torture

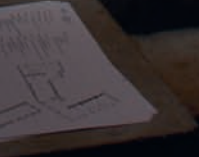
Installation, 2019

Ten Types of Torture is a process based series of artworks metaphorically displaying two ontological regimes: the western, object based one with its roots in ancient Greece with Plato and Aristotle; and the eastern, process and relation based one coined by Laozi and Confucius. By confronting these radically different concepts, the artist wants to question implicit assumptions crucial to our way of viewing the world and the categories we apply when thinking about it.









Despina Zacharopoulou

* | London, UK

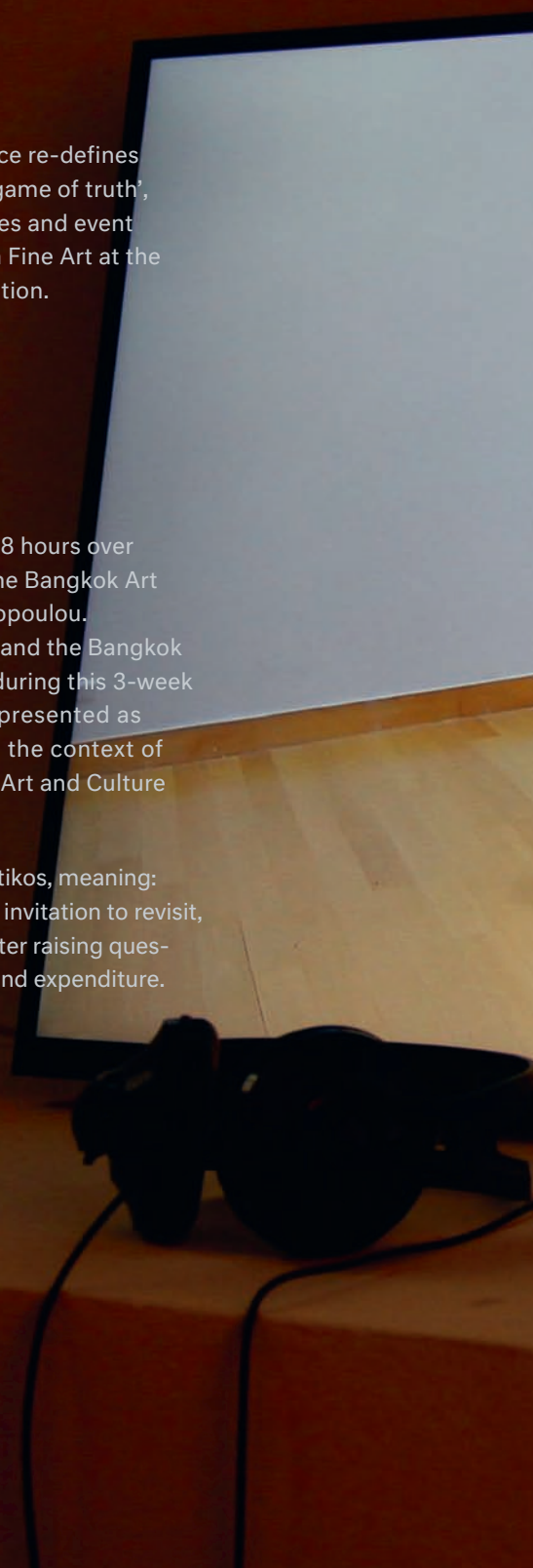
Despina Zacharopoulou is a Greek artist, whose practice re-defines performance as *Spatium Monstrorum*: a 'surface' and 'game of truth', hiding place and stage of exposure, generator of images and event of Beauty. Despina is a practice-led Ph.D. researcher in Fine Art at the Royal College of Art, supported by the Onassis Foundation.

Protreptic

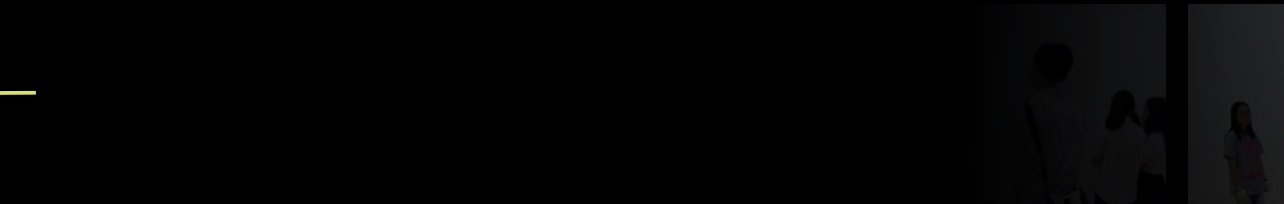
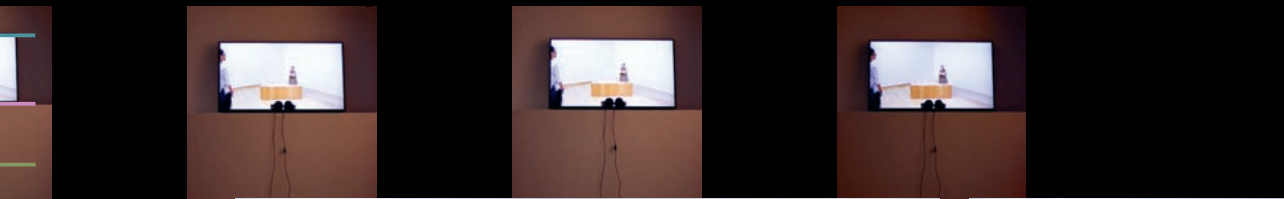
Video 25 min 12 sec of durational Performance, 168 hours over three weeks, Bangkok: 2018, Video produced by the Bangkok Art Biennale. Courtesy of the artist © Despina Zacharopoulou.

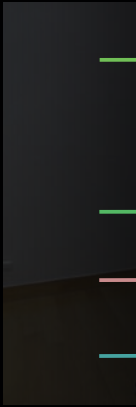
Commissioned by the Marina Abramović Institute and the Bangkok Art Biennale, *Protreptic* is a 168-hour video taken during this 3-week long durational performance. The video was first presented as part of a post-performance space installation, in the context of the exhibition "A possible island?" at the Bangkok Art and Culture Centre, Bangkok, Thailand.

The performance *Protreptic* (προτρεπτικός / protreptikos, meaning: "that which urges someone towards change"), is an invitation to revisit, rethink and reactivate philosophy as a way of life, after raising questions revolving around governmentality, value, use and expenditure.

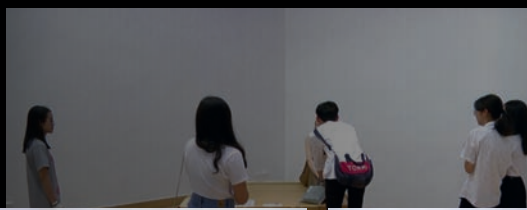
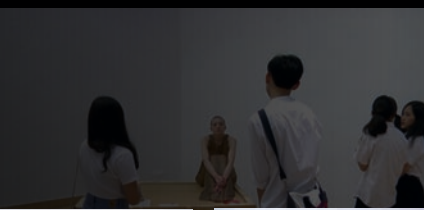








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Maurice Ernst

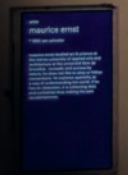
* 1992 San Salvador, El Salvador | Vienna, Austria

Maurice Ernst studied Art & Science at the University of Applied Arts Vienna and architecture at the Université Libre de Bruxelles. Nomadic and curious by nature, he does not like to obey or follow conventions. He explores spatiality as a way of understanding the world. If he has an obsession, it is collecting data and curiosities thus making his own *wunderkammer*.

Paysage Digital – Paysage Virtuel

Mixed media on canvas, 2019

In the age of information and datobesity, fake news and other stories are very used in our daily life. In this work of art Maurice Ernst wants to show the space and how it allows the apparition of information in any kind or forms making an absurd collage about not related things but telling a story though. Fake or true the viewers brain only decides or not which information to choose to do his own narrative.





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Aura Satz

* | London, UK

Aura Satz works in film, sound, performance and sculpture, in order to conceptualise a distributed, expanded and shared notion of voice. Satz has made a body of work centred on various sound technologies in order to explore notation systems, code and encryption. She has presented solo exhibitions at the Wellcome Collection, London; the Hayward Gallery project space, London; John Hansard Gallery, Southampton; Dallas Contemporary, Texas; George Eastman Museum, Rochester; among others. Group exhibitions and screenings include: Tate Modern; BFI Southbank; the New York Film Festival; Tate Britain; Baltic Centre for Contemporary Art; Hayward Gallery; Whitechapel Gallery; Sydney Biennale 2016; NTT InterCommunication Center Tokyo; Lentos Museum Linz; High Line Art; the Rotterdam Film Festival; MoMA NY; and Sharjah Art Foundation. Satz is Moving Image Tutor and Reader at the Royal College of Art.



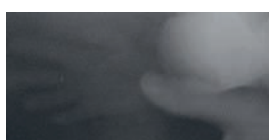
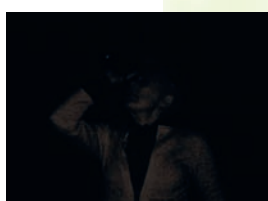
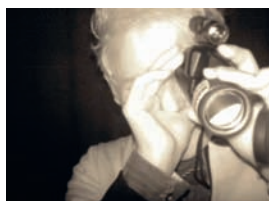
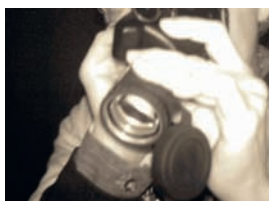
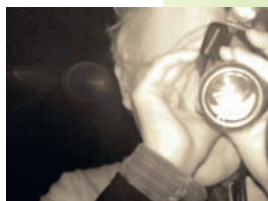
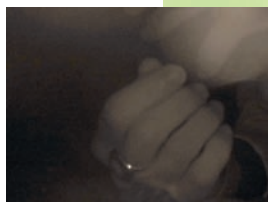
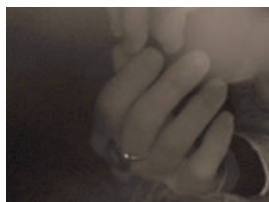
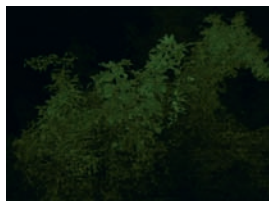
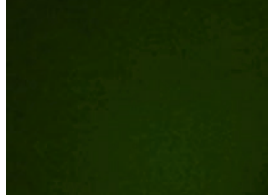
Entangled nightvisions

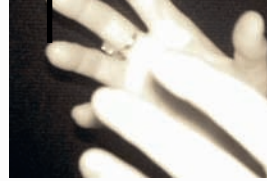
Short film about/with Johnny Golding, 12 mins, 2017

Philosopher Johnny Golding ruminates on a formative childhood experience, when her father brought home an early prototype of night vision he was working on for the American Military 'Project Eyeglass', for ARPA (Advanced Research Projects Agency). Shot using corrupted night vision footage, the film explores Johnny's interest in quantum physics, entanglement and her philosophy of Radical Matter.









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Istem Özen

* 1976 Ankara, Turkey | Vienna, Austria



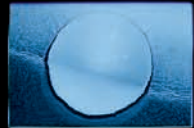
Istem Özen has a BA and MA in chemical engineering, PhD in material science and engineering, post-doctoral research at Elettra Sincrotrone Trieste and Tasc National Laboratory. Inquires the limits to how much the concepts and methods in basic sciences can diffuse into social sciences and arts (and vice versa), aiming for a continuum encompassing all. Writes, looks closely at things in very small and very large dimensions, collects images, translates, acts, teaches, learns.

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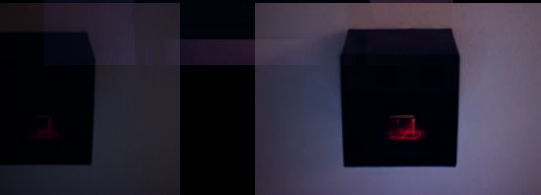
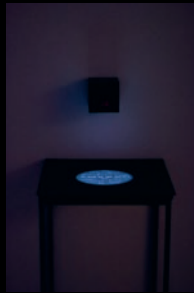
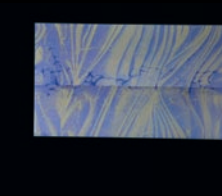
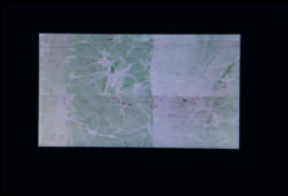
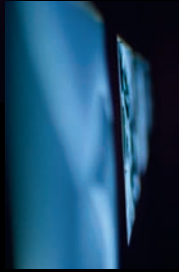
In Awe of the Portal

Electron micro-graph installation, 2019

Beam me down! I want to have a walk in nature, dive in, shrink down there—tens of thousands of times—and be in awe of it all. Samples are imperfect, broken, detached. Experiment failed. Time's up, but no place for disheartening: one's unworthy data is another one's wonderland. Inadvertently mesmerising. Not valuable yet priceless. Now, have a good look: granted it's always there, yet is not always to be found. Just look. And let the indistinctive reveal its treasure.







in awe of the portal
 superfect gasp price less
 inadvertent wander
 dive

in awe of the portal
 price less wander
 detached



Time Stamps

Cleaning papers from ebru basins, 2013

Shined on me when I looked with the left eye. A compilation of the artists' history of the past hour. Accumulated traces of many meticulously crafted and curated pieces. A sheet of paper to wipe the dirt on the water. The dirt that was last minute's gem. A collective time stamp unique to the moment. Showing that nature's voice can be louder than a human hand's. Dance of the pigments, and the stories that they tell: it's physics, chemistry, and a human touch for a moment in time.



Johannes Frauenschuh

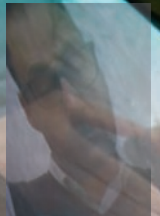
* 1981 Salzburg, Austria | Vienna, Austria

Maximilian Gallo

* 1994 Göttingen, Germany | Vienna, Austria

Johannes Frauenschuh studied sociology (cultural focus, specification on epistemology of cultural social science, sociology of art, sociology of work) at the University of Vienna, diploma thesis (2016) on "Aspiration of Educational Level and Recent Family Based Cultural Parameters", study at the Academy of Fine Arts Vienna, since 2017 Art & Science master student at the University of Applied Arts Vienna, master-thesis on *Human_Subject-Nature_Object-Relationship* in the context of digital data and digital dispositive.

Maximilian Gallo studied Cultural Studies and Aesthetic Practice, Cultural Policy in International Comparison at the Stiftungsuniversität Hildesheim and at the Vilniaus Dailės Akademija in Lithuania from 2014 to 2018. During this time, he organised several exhibition projects in cooperation with the artists' organisation Kabinetas and worked for the artists' residency rupert. In 2017 he worked as a chorist (art mediator) at documenta 14 and was co-editor and author of the two-part publication *Dating the Chorus*. In 2018 he was head of the mediation department of the transeuropa fluid festival in Hildesheim, the results of which are summarised in the publication *Fluide Perspektiven - ein vermittelnder Katalog*. Since 2018 Maximilian Gallo has been living in Vienna and has realised several exhibitions and art education projects on the subject of art and knowledge transfer within and outside of his Art and Science Master's degree. Since 2019 he has been studying architecture at the Academy of Fine Arts in Vienna.



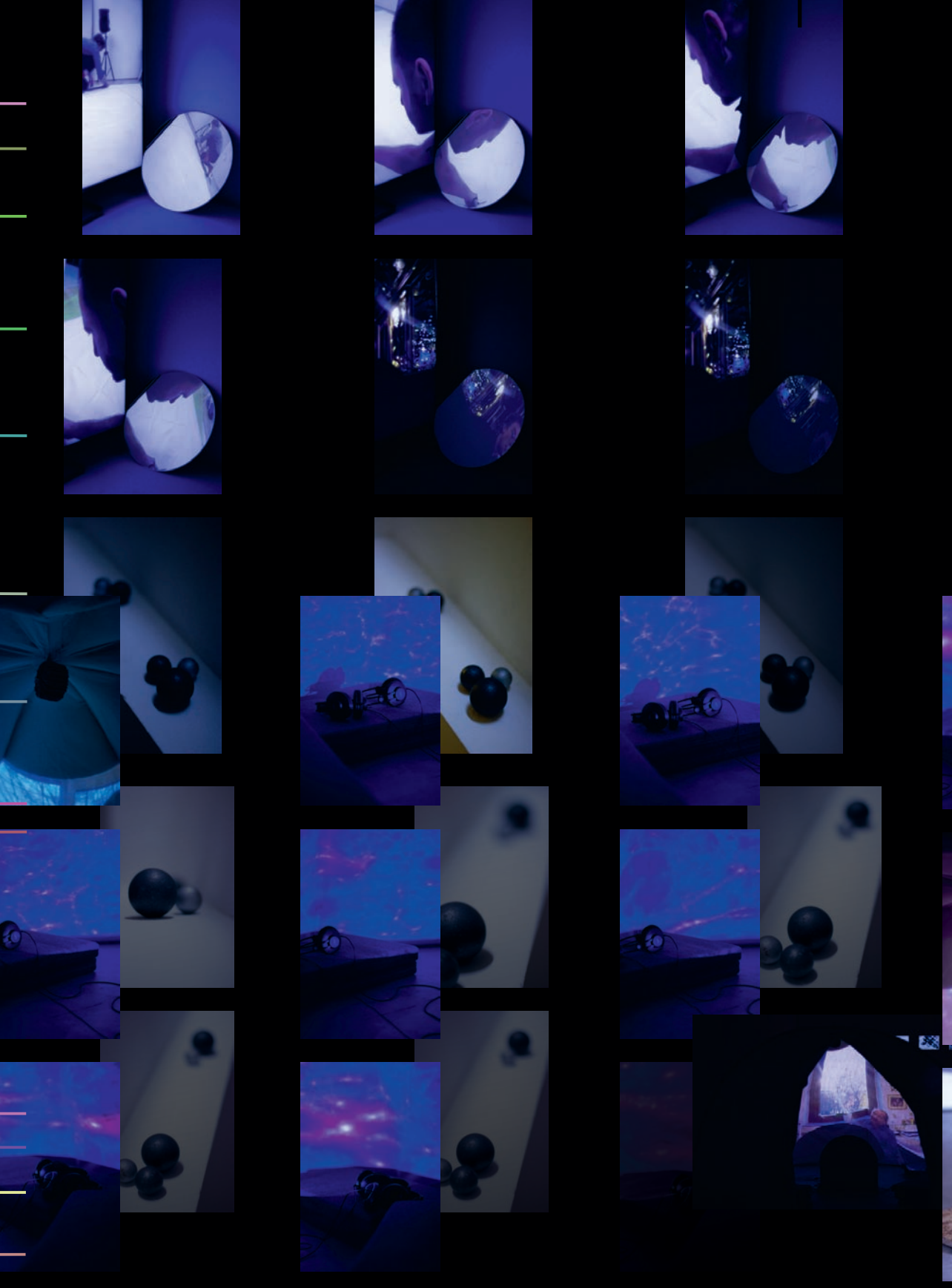


Representing the Invisible: Translating Dark Matter

Multimedia installation, 2019

The project *Representing the Invisible: Translating Dark Matter* shows different definitions of truth, nature and science as well as the knowledge generated by selection and questioning. Within physics, the search for truth is to be understood as a search for regularities, as a process of approaching phenomena in nature and translating them into laws. The visible excerpts of the interviews conducted with researchers at the Institute of High-Energy Physics in Vienna who deal with dark matter in different ways are only a selected part of a large whole. The interviews themselves are the result of the questions Fraunenschuh and Gallo have previously determined to limit their perspective and access to the topic in advance. Thus this work is an approximation from two sides: it shows both our approach to the scientific process and the approach of the scientists to their research object.





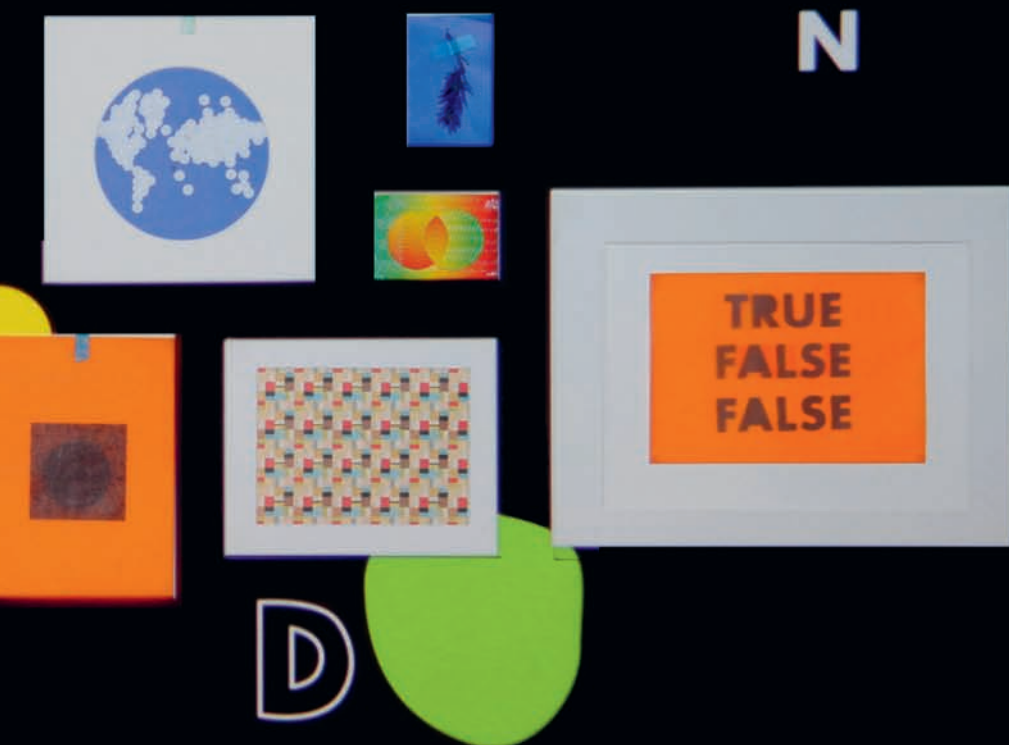


Nora Lengyel

* 1990 Budapest, Hungary | Vienna, Austria

Nora Lengyel studied in Budapest at the Moholy-Nagy University of Art and Design, where she earned her BA degree in animation direction and production. Afterwards she was working for a few years on different movies, and animated shorts. Lately she is working on data.



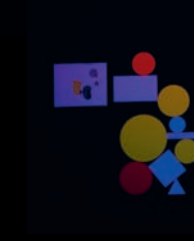
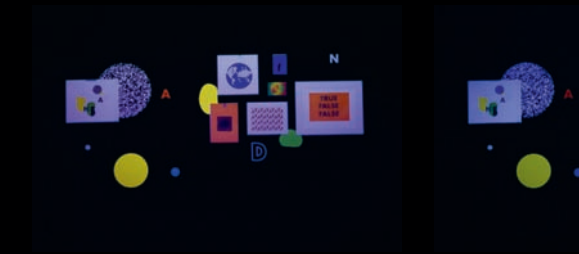


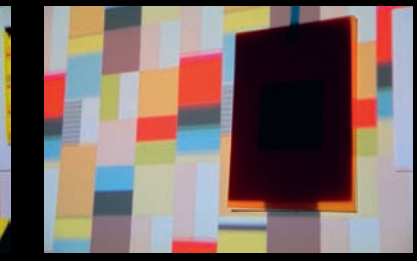
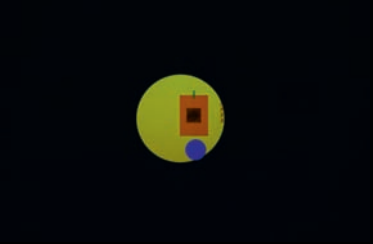
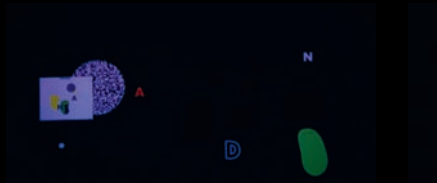
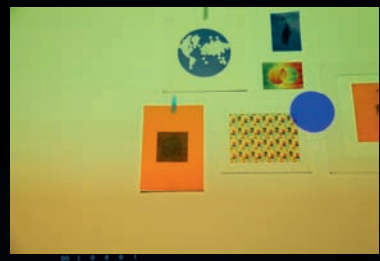
Od00ff

Video installation, 2018

Od00ff is taking us on a voyage exploring the true-false dichotomy: departing from classical logic with its highly formalised binary codes and strict rules on how to make conclusions, it quickly turns up that hardly anything in our reality corresponds to that pattern. When perception is taken into the picture, it gets blurry: how do we interpret the cues we get and which meanings do we ascribe to them? And how is that to be distinguished from truths that are merely made up? In the end, the chaos emerging from letting go of all attempts to structure what we experience ultimately leads to freedom.







DARC

* 2017/2019 Vienna, Austria | Vienna, Austria

DARC was a decentralised art formation that joined together in 2017. In the same year they presented two theatre pieces / performances called *Proof-of-Burn* and *Proof-of-Presence* both dealing with the impact of the crypto economy on our society. *Proof-of-Burn* was especially developed for the Future of Demonstration festival in Vienna, while *Proof-of-Presence* was performed at the Ars Electronica 2017. Members of the group at the time were Nils Gabriel, Jan Groos, Max Guresch, Max Hampshire, Sunny King, Jürgen Kleft, Rachel Rose O'Leary, Andrew Newman, Paul Rieger, Matthias Tarasiewicz, terra0, Sophie-Carolin Wagner and Markus Zimmerman.

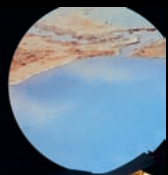




Proof-of-Presence

Documentation of a performance, 2017/2019

Proof-of-presence was a performance with audience participation developed for the the Ars Electronica festival in 2017. At the *Data Loam* exhibition a series of artefacts from the performance have been presented. The title and storyline of the piece was based on the technical term Proof-of-presence which designates a blockchain that critically responds to the cryptoeconomy that has emerged around the notion of zero-trust that was initially proposed with Bitcoin. In contrast to the mantra of Bitcoin: In Math We Trust, *Proof-of-Presence* asks for blind trust through faith. Pilgrims to *Proof-of-Presence* are provided RFID embedded prayer beads before visiting its shrine which is centrally located within the enclosed space. While Bitcoin is based on generating value through Proof-of-work—where cryptographic work is undertaken by the machine/computer—*Proof-of-Presence* reveals how the narratives of machine labour as utopia/dystopia are immaterial.



318



311





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Publication Team

(Maximilian Gallo, Ivonne Gracia Murillo,
Monica C. LoCascio, Istem Özen)

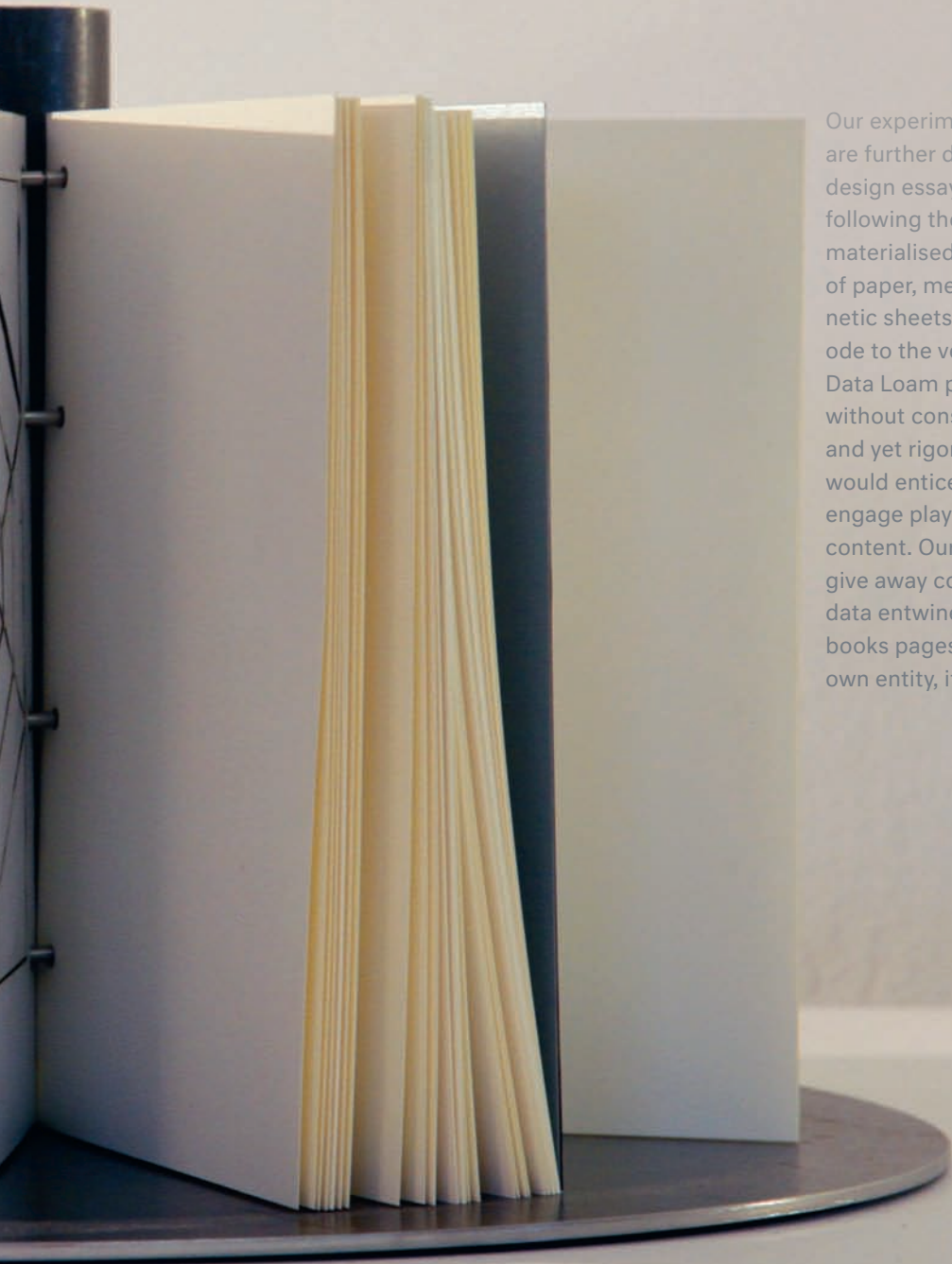
* 2019 Vienna, Austria | Buried, Crypt

Publication Prototype

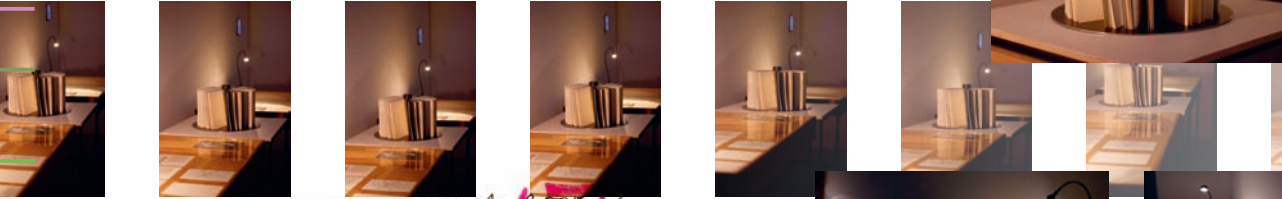
Installation, 2019

Before all the research, ideas and various manifestations of the Data Loam project were collected and compiled in the book you now hold in your hands, in a time in which only the core concepts of Data Loam floated around our briefing and no final content had yet been created, we were granted with the opportunity to begin our design research. This allowed us to peel away the preconceptions about what a scientific publication should look and work like from the Data Loam concept.

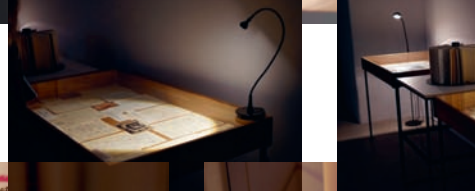




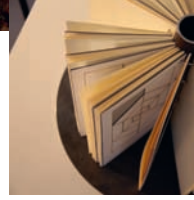
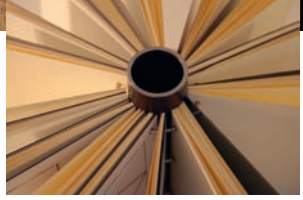
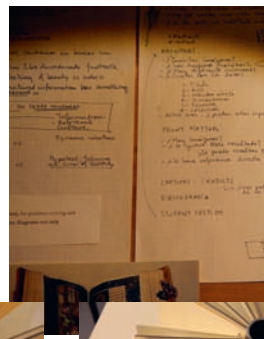
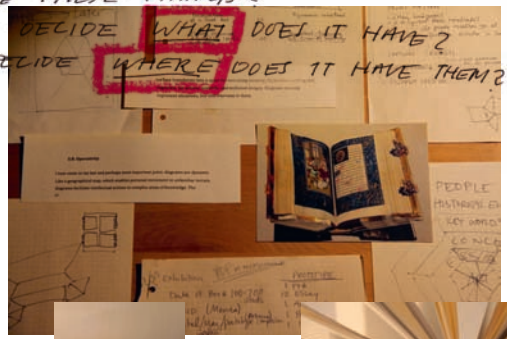
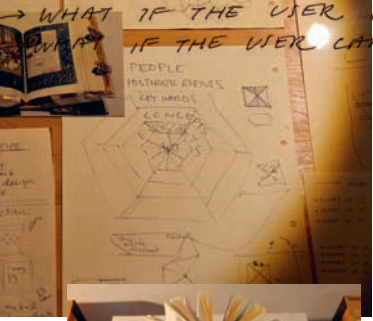
Our experiments, which are further detailed in our design essay immediately following the catalogue, first materialised in a prototype of paper, metal and magnetic sheets. It was to be an ode to the very nature of the Data Loam project, a book without constraints, a free and yet rigorous tome, that would entice the reader to engage playfully with its content. Our goal was to give away control, to let the data entwined within the books pages become its own entity, its own agent.



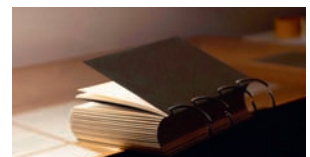
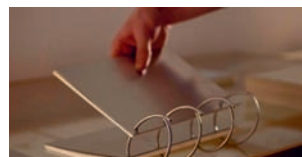
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- WHAT IF IT IS NOT **RECTANGULAR**?
- WHAT IF IT IS NOT **VERTICAL**?
- WHAT IF IT DOESN'T HAVE **PICTURES**?
- WHAT IF THEY ARE NOT **RECTANGULAR**?
- WHAT IF THEY ARE NOT **VERTICAL**?
- WHAT IF IT DOESN'T HAVE **TEXT**?
- WHAT IF IT DOESN'T HAVE **DATA**?
- WHAT IF IT DOESN'T HAVE **INDEX**?
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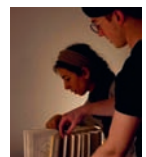
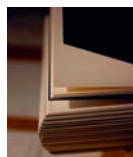
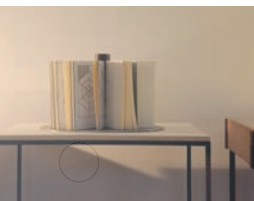
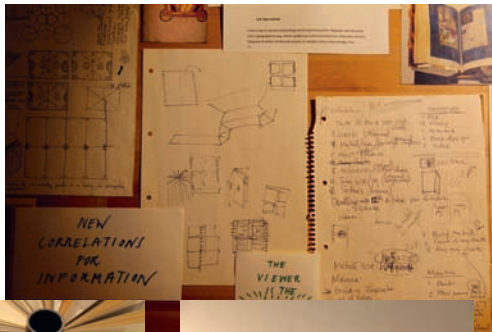
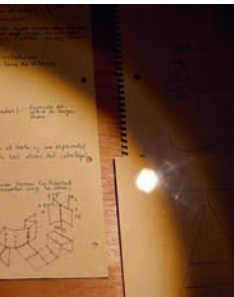
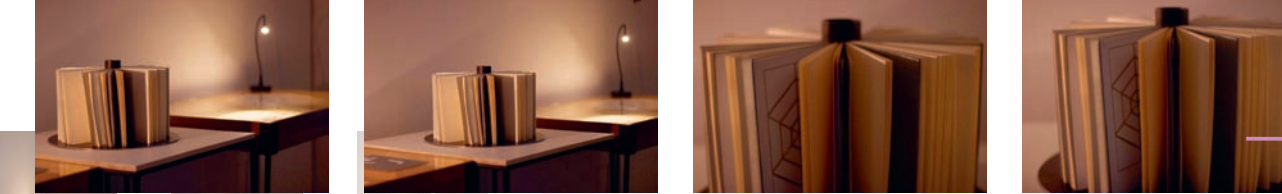


→ WHAT IF IT DOESN'T HAVE THESE THINGS?



**NEW
CORRELATIONS
FOR
INFORMATION**





Book Designing in the Age of the Loam

Ivonne Gracia Murillo

* 1991 San Sebastian, Basque Country | Vienna, Austria

Ivonne is a Graphic and UX Designer born in Donostia, where she studied Design and Advertisement. She graduated in Fine Arts at the University of Castilla-La Mancha in Cuenca and from a Masters Programme in Web Design & Multi-Device Programming at ESDesign Barcelona and the University of Valencia. Currently she is a masters student at the Art & Science programme, University of Applied Arts Vienna. She researches on questions of language, human-machine correlation and is quite determined about the importance of reimagining futures, with a practice moving in between art and design.

Monica C. LoCascio

* 1984 Riyadh, Saudi Arabia | Vienna, Austria

Monica C. LoCascio is a multimedia artist-researcher focusing on questions of resonance, connection, and interference, particularly within and between bodies. Her work is inspired by such topics as biophotonics, somatic therapy, and quantum theory, as well as memory, non-linear time, and geometric principles. Unattached to a particular medium, she uses research techniques to inform her explorations of form.

Maximilan Gallo

* 1994 Göttingen, Germany | Vienna, Austria

Having been born in Göttingen and growing up in Kassel, taking the reverse path the brothers Grimm took in their lives, some relationship with writing, layouting and publishing was probably already etched into the slate of his life. He was entangled in a small university newspaper called the *Faltblatt* at his *alma mater* close to Hannover where he would later be wielding the mad cursed dagger of curating an art mediation programme for a local student-organised festival and labouring together with a team of three to bring birth to a *fluide perspektiven*, a mediating catalogue, within a week. He believes in the revolutionary potential of the printed word, and co-led a small revolution during the *documenta 14* called *Dating the Chorus*.



00_The process

This book is the living manifestation of the Data Loam project. Not only is this publication the framework in which the project and the exhibition are documented, it embodies the ideas, ideals and insanities which make up the entirety of its two-years+ lifespan. As a result, the creation of its design framework has been multifaceted from the beginning. Our task was nothing less than to create something unconventional and then put it into a conventional shell, otherwise known as a book.

The whole process engaging with ‘the book’ has been nothing less than a profound journey, steeped in wild experimentation, rigorous brainstorming, curatorial risk and ... fun. To work at such high levels and pace is, in itself, rare for contemporary academic environments. Sometimes stultifying, rule-bound and linked to market driven concerns, creative thinking and making can often be tossed into the back-seat of academic curricula, or divided off from the ‘theory’ or the ‘science’, used instead as an example, illustration or decoration. Sometimes creative thinking and making are thrown aside entirely: too messy, too difficult, too slow, too fast or not fitting in. But the design process that Data Loam presented—to ‘translate’ into a seemingly conventional book form, a wholly different approach to the proliferation of information, the impact of new forms of matter, the role of art practice in re-thinking distributed intelligence and, simultaneously, not to shy away from significant knowledge exchange with the computing sciences, physics and meta-mathematics—was a bear of a challenge, but one we were eager to accept.

Our task was two-fold. First, to give full breadth (air, life, intensity, visceral immediacy) to what had been accessible to those who had attended the *Data Loam: Sometimes Hard, Usually Soft* exhibition. It was crucial to develop this without doing a disservice to the artists-scholars-researchers’ artworks involved either by over- or under-designing the content. This meant we had to figure out, visually, texturally, tactilely how to foreground a kind of logic of sense, a poetic approach to the works, in part so that those not having been to the exhibition would have a ‘way-in’ to the conversation without having to overthink the connections. Second, our task was to impart this same

evolution [i:və'lu:ʃən]

connecting with your inner fish has its place, but do not mistake the sense of mathematical unfolding (teleological or otherwise) as the sine qua non for change. evolution is that rare bird who steals a little of this and a little of that from all and sundry—the lyric rhythm of the poet, the laughter-politic of revolutionaries, the mono-brow of the deeply stubborn, the ode-to-perfection of those ‘on the spectrum’; fauna, mineral, wave and animal eating plants included. kinshipping as key.

kind of logic to the whole of the book, connecting the texts in such a way that did not perpetuate the old trap of dividing ‘theory-writing’ from the art exhibition or indeed from the sensual knowledge-practices of art making. We wanted to do this in such a way that art, with all its messy logics, was the translating vehicle, and not, as has so often been the case in the past, using ‘text’ as the translating vehicle for all things art, humanities, science; that is to say: knowable.

We created the design of the publication in three stages, beginning with many sessions where we asked, from many different angles, about what a book is and what meanings it may obscure or even preclude. We tried not to be influenced by having to produce ‘only’ a marketable publication where costs would compromise quality. Instead, we spent a lot of time figuring out what we thought could be the ideal version of the publication for the project. This was both a hands-on approach—literally feeling, smelling, touching different papers, book bindings and so on—whilst simultaneously, a sensuous intellectual enterprise, manifesting in one design, the rhythms, flows, patterns inherent in the algorithmic codings and multi-dimensional intensities of our ‘information age’. The second stage was to design a prototype that would encompass the manifestation of these ideals. This prototype was installed at the *Data Loam: Sometimes Hard, Usually Soft* exhibition. It had the uncanny role of being an ambassador whose remit was to share with the public the merits of this kind of approach, whilst simultaneously embodying contemporary art practice as both the work of art and, of course, as an artwork.

The third and final stage of the process was the translation of what we had dreamt and built before into a printable and affordable book. Perhaps this has been the most difficult, as it was a ‘stage’ that ran through the whole project but made itself most overt as we tried, experiment after experiment, to share, on the pages of our book, the wild and ineluctable twists and turns of creative making. What follows details that journey.

01_The questions

In the beginning there were questions. Lots of questions.

We began the design process of this very publication by asking ourselves simple questions: What is a book? Where are its limitations and its potentials? The conventional answer—that a book is a good design: on the material side the book is a container, its pages containing the pictures and letters that encode the information.

We decided that given the minimum viability of the printed word/image, a book would be the obvious container of information and at the same time the vehicle to disseminate information, we wanted to celebrate the book as the physical manifestation between and amongst messenger and receiver, the medium as it were, transmitting imagination, time, secrets. More than that, and taking as given that our book, at least in this incarnation, would be produced with paper, glue, binding, and other decomposing materials, it would embody its own decay. In this sense, too, we wanted to champion its role as a medium (of magic) trading in the strange knowledge-necromancy communications between the spirit worlds of those long since dead and those very much alive. As the noted physicist-astrologist, Carl Sagan put it in his celebrated *Cosmos*, the book is nothing less than magic, allowing one to skip over time limitations and amongst its pages, communicating with the dead.¹

¹ Carl Sagan (2003 [1980]), *Cosmos*, (London: Abacus/Little Brown Book Company), 296.

At the same time as embracing the dead-fantastical dancing across the frontiers of space-time and the medium of magic, we also were quite painfully aware of how a conventional book literally prohibits its contents from oozing out of its binded pages. Data is limited to a certain frame, curated and contextualised between cover and back, enabling the information to fulfil only a certain arranged task.

From this elementary cognisance, we grafted our position as designers within the triangle described above—informant, receiver and medium—and simultaneously the concept for this very volume that you now hold in your hands. Understanding our position as that of a kind of contemporary Virgil-esque-spirit guide, we dedicated every decision to the recipient of the book, seeking to enable the

reader a (somewhat) bureaucracy-free journey to this, our, rather radically materialised world of the book. We hope this guide will enable those who grasp its mettle to become a comfortable user of the publication; to engage with the content and its form, according to her or his or their will; to gain a living sense of interaction, so much a part of any knowledge system.

But this raised the obvious question: How could we embed interaction in a rigid medium such as the printed page?

For us, to produce a printed publication meant partly to lose the direct participatory potential of, for example, digital means of publishing, whilst gaining something of equal value. Would this be possible? The printed book, with all its constraints, probably finds its greatest strength within its limitations. This is to say that its *form* is finite—not meaning that the material on which information is printed will deteriorate at some point—but that its content is fixed to the place where it was put. Additional information can only be added to its fringes or wherever it was intended by the designer. Also, its limitedness requires the information to be carefully curated, to be finely tuned, as it cannot easily engage with other media as an active agent. The book exists within its own realm. And within this realm, the elements of the book's design are navigational items, devices to create a sense of orientation within the still turbulent and turbid river of information which constitutes its entirety.

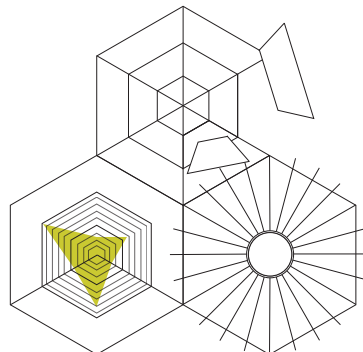
The first problem then, was to breach its own linearity.

02_The prototype

A prototype was produced for the *Data Loam* exhibition as a placeholder for our design ideas. It physically attempted to break with the linearity, which was not only dictated by the order of the content within the book, but always symbolically present within the existence of a first and a last page. To begin to resolve this, our prototype took as its 'start' a collaborative/ participatory approach, where the design itself would include magnetic sheets as cover pages of the contents' various organisational elements. Each element within the enframing by magnetic sheets were interchangeable. Through this process, which was nothing less than a luxury, we were able to discover the design limitations of the medium ourselves, without being constricted by conventions and prescribed formats. What emerged were six design cornerstones which would be built into the overall design so that the interaction the book would offer would be a valuable experience, one that differed both from the (often dry) reading of academic papers and the sensuously-deprived encounter with traditional art catalogues.

For the prototype installed within the *Data Loam* exhibition, a slightly mechanical design ensued, with the book sitting, as it were, as an object within the exhibition. If we were to 'translate' the whole exhibition into the book, we would have to figure out a way to cannibalise the entire exhibition so that it would energise the whole discussion around future knowledge systems, whilst simultaneously maintaining the integrity of the works that enabled the Loam to encounter and proliferate new forms of knowledge-practices. As will be evident when viewing the *Catalogue Exhibition* essay, we invented a hexagonal grid and, to our surprise and joy, learned that it was not dissimilar to the earlier work of Borges and his *Library of Babel* design fantasy.² This meant that not only could we establish an organisational order, but within this order every modular piece of information could be interchanged.

² Jorge Luis Borges, *The Library of Babel* at libraryofbabel.info/.

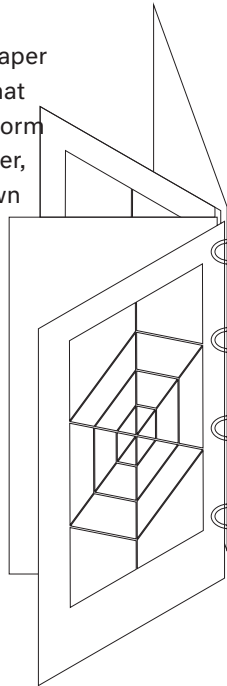


02_01_The sections

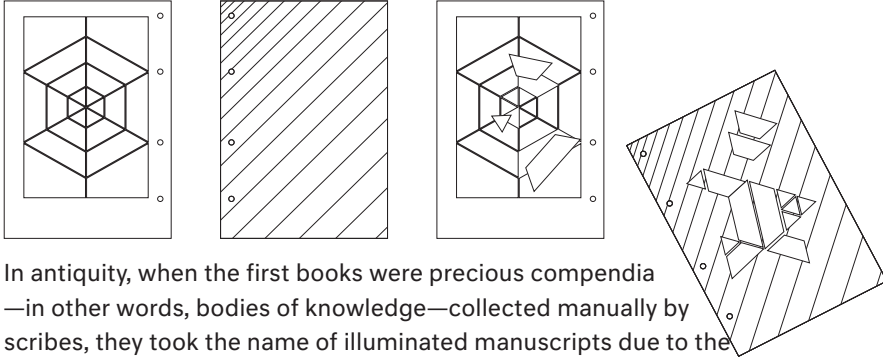
Data Loam does not speak directly about data per se. This is because to do so would mean ignoring a fundamental aspect of information in the digital age: the fact that what is called 'data' interrelates and consequently produces constant changes within itself. These constant changes simultaneously produce different connections, often at different degrees of coherence and retrievability. How would one design a book that intended to talk about the limitations of information systems, without the book itself resulting in a reduced system? How would one allow for different possibilities interrelating in such a way as to express constant changes, shifts, connections therein?

For us, the goal was not to present just another book stuffed with various collections of information archived in various venues, and colour corrected to the best of our abilities. We were committed to the idea that, like the circulation and exchange of data as mentioned earlier, anyone approaching the Data Loam could create their own version of the collection. Any one 'version' would be nothing less than an intelligible system of particular links (themselves slices of information), continuously discontinuous; shape-shifting and yet readable (graspable, understandable, communicable). We were committed to develop a design that could cope with a system without hierarchy or full formed definition.

In this sense, too, there is no designated beginning or end to this book: it is up to the reader *how* to navigate through it. The sections of the book could be extracted and re-incorporated in whatever might be the desired order. In addition, information printed on paper would be mirrored on magnetic pages with detachable pieces that could adhere onto metal sheets. As a result, there was no strict form but room for constant change. The reader, as an inter-actor/maker, together with the chosen front and back covers, created their own book, one that could follow many possible lines of curiosity. A dynamic collection, intertextual evolution.

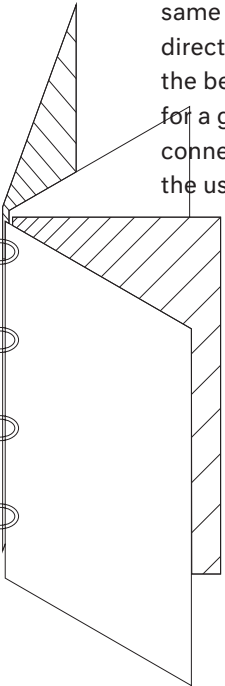


02_02_The materials



In antiquity, when the first books were precious compendia—in other words, bodies of knowledge—collected manually by scribes, they took the name of illuminated manuscripts due to the gold plates that were used to highlight the important information and beautify the whole, creating an aura of significance around them. Sometimes the edges of the pages gilded, creating the effect of mixed medium between paper and metal.

In our compendium, titles, authors, keywords, abstracts and images were to be collected on magnetic material that would be framed by a metal plate, allowing the reader to reorder, and more importantly, remix them. Some additional blank magnetic pages would be provided so that the readers could create their own schemes and curate its content. In this way, a spider web structure of the magnetic sheets began to emerge, with its content fashioned after the prevailing scientific article model; namely: title, authors and their affiliations, abstract, keywords and images. We depicted the resulting order of information in a pyramidal form, multiplied this same pyramid until it became a concentric figure (symbol) without directionality, such that the centre could be the conclusion as well as the beginning. When shuffled and re-assembled, its parts would allow for a greater number of conjunctions. Looking for the meaning in the connection, the set became boundary-less, directly interfering with the usual sense of the archive.



02_03_The trim size

When navigating the interrelations within a cloud of concepts, one has to always start from a little point. This little point cannot be an arbitrary one plucked out of the air; nor can it be some dogmatic rule imposed from on high (or low). It had to have some kind of ability to guide without imposition. For us, this little point was the trim size. We settled on the trim size because we knew that at the end of our dizzying research on shape systems, we would have to come back to a marketable printed book, eventually.

In preparation for the exhibition and publication for the Data Loam project, all of us rummaged through our respective (and sizable) bookshelves to find something that could be used as a reference point for the publication design. Suddenly we found it: *FILM ALS SKULPTUR*, a publication with a manageable size one could hold in the palm of one's hand. It also had a text-to-image ratio that to all of us seemed close to what Data Loam could at some point become. This book was thus used as a model to set the specifications and acquire quotations for the printing costs of the publications trade-edition. *FILM ALS SKULPTUR* became our little point, our first 'grain of sand,' to paraphrase the magnificent William Blake, which had enabled us to begin to hold in the palm of our collective hand, the infinity of the Data Loam world and all that might emerge from it.³

³ "To see a World
in a Grain of Sand
// And a Heaven
in a Wild Flower //
Hold Infinity in the
palm of your hand
// And Eternity in
an hour..." William
Blake (1975
[written 1803; first
published 1883]),
*Auguries of Inno-
cence*, (London:
Cygnet Press).

02_04_The grid

Our grid was designed around the spider web motif that we had previously developed for the *Data Loam* exhibition, using the book section cover pages made of magnetic material. With this idea as a starting point, we proceeded to flush out the rest of the design, bringing in considerations of classic graphic design theory, the golden mean, and large margins to facilitate note-taking as well as providing sufficient white space for ease of reading.⁴ Final manipulations on the grid design were made based on the production requirements for the punching of the holes and cutting of the sheets made of various materials that differed in their physical properties.

Importantly, both by experiment and computational manipulations, we settled on the hexagonal grid. This allowed us to assemble new playgrounds of intelligence, distributed, circulating, and exponential, whilst simultaneously creating the weave/spider web(s) of information and knowledge exchange.

⁴ Joseph Müller-Brockmann (2008), *Grid Systems in Graphic Design: A Handbook for Graphic Artists, Typographers, and Exhibition Designers*, (Switzerland: Niggli Verlag).

02_05_The indexing and colouring system

Thinking about the further development of the inter-relating nature of the *Data Loam* publication, we then needed also to envision a method that would translate the information contained in the articles into visual form. We aimed to use unsupervised machine learning algorithms for natural language processing to determine six categories from the articles. These were to correspond to the hexagonal grid that we used for our overall design. We then decided (just because we could and we felt like doing so!) a ratio based on the percentile likelihood of each article to the respective categories. These percentiles would then be converted into CMYK values to give each article a theme colour, based on the content of the article itself. The algorithm mentioned here makes use of the generative statistical model called the *Latent Dirichlet* allocation.⁵ Within it, each text consists of a mixture of topics, and to each word in the text, a topic can be attributed. The algorithm that we wanted to use was tested with a reasonably large data set, resulting in specific and distinguishable lists of words that were summed up in various categories. Current machine learning algorithms are capable of performing such analysis and categorisation of meaning within texts with great precision, albeit only when fed by quite large data sets. We were lacking these quantities by having only 17 text-based chapters. In this case, resulting word lists could be quite similar to each other, making it hard to propose different categories.

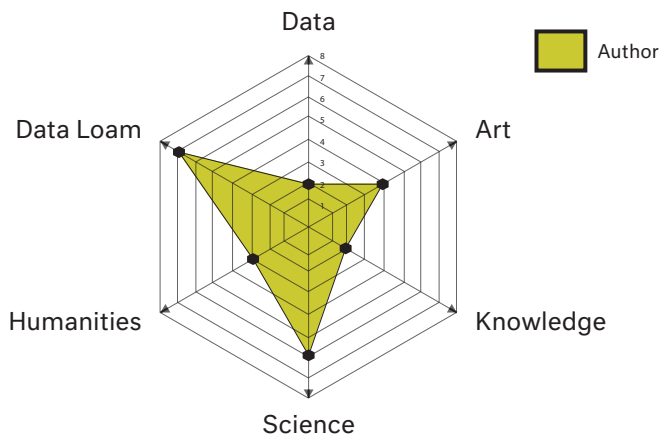
Hypothetically, it would have been possible to use an unsupervised machine learning approach to reach our goal. However, as the sample was too limited given the similar word lists, it would not have been that effective without using additional external texts related to our content—such as those from other exhibition catalogues, art publications and even writings from the field of data science.

⁵ Cf Ali Jahanian (2016), *Quantifying Aesthetics of Visual Design Applied to Automatic Design* (Springer Theses Series), (New York: Springer). See also Laura A. Isaly (2012), *Augmenting Latent Dirichlet Allocation and Rank Threshold Detection with Ontologies*, (nl: Biblio-scholar Books).

6 Values from 0 to 100%

Value Data + Art = K
Value Knowledge = C
Value Science = M
Value Humanities + Data Loam = Y

C = 20
M = 60
Y = 100
K = 60



02_06_The typeface (and its size)

Each typeface in existence carries a *zeitgeist* and energy that inevitably will influence a reader's experience. For the publication, we wanted to use one that did not induce a theme of kitschy 'data' or sleek 'design'. We desired a typeface that was neutral, so that the information printed on the page would fully speak for itself. But we also knew that there was no such entity as a neutral typeface, not only because of a viewer's instant conscious or unconscious bias based on subtle design cues, but because the very materiality and circulation of data was never without its 'something'.

We came across Neutral, a typeface designed by Kai Bernau within his B.A. thesis project in Graphic Design at the Royal Academy of Art, The Hague (KABK) in 2005. The typeface was meant to convey, to quote Bernau, "[...] a typeface free of all connotations or associations that could distract a reader from the text, a font that delivers the character of the written material untouched by the character of the typeface design."⁶ We were interested in the fact the designer relied on Plato's *Doctrine of Ideas* as a starting point before moving through the teachings of the 16th century tea ceremony master Sen no Rikyū, and onto the minimal starkness of conceptualism. We were interested in the way in which the designer foreground the problem of timelessness, archetypes, and neutrality. However, the attempt to design such a font bearing the tropes of neutrality cannot of course escape the obvious paradoxes. Bernau was well aware of false promises of unencumbered 'neutrality' which describe things and events as if free of any connotations.⁷ Nevertheless, Neutral nears the desired characteristics as closely as possible, and therefore was chosen as the designated typeface for our publication project as well as for the exhibition signage. Of course sizing also threw up a whole series of issues, all of which are common to book designers everywhere. In the main it had as much to do with thinking through size as a quiet, intimate form of 'translation'. This meant in part that we had to think of it in relation to what one might be accustomed to given the massive use of iPhones and various mobile operating systems. We thought that if the font was to carry minimal informational intervention, it might make more sense to mimic Apple's iOS for everyday use. In the end we decided to mirror that which was the most used day-to-day reading platform worldwide: the smartphone.

⁶ At carvalho-ber-nau.com/neutral-research See also typotheque.com/articles/an-idea-of-a-typeface

⁷ As Bernau puts it: "Because everybody's backgrounds and expectations differ, however, the more closely we attempt to answer the question 'What is a neutral typeface?', the fewer people agree on various details, and the more the proposal of a neutral typeface becomes a paradox." Ibid.

And so we turned to Apple's iOS font as a kind of updated Rosetta stone, translating from one set of knowledge systems to another. In this way, we used the size of the different text bodies, the headings, captions and footnotes, as well as the spacing, to mimic Apple's iOS font guidelines. Interestingly, by fusing formats stemming from the digital with an analog format, we were able to blur the edges between the solid and the fluid much further. This of course underlined a fact most artists-designers and technicians working in the field have known for some time: that the digital and the analog do not exist within their own secluded nexus, but are always in interaction with each other.

Neutral

Neutral Medium 100 pt

Neutral

Neutral Regular 39 pt

Neutral

Neutral Regular Italic 20 pt

03_The translation

After the creation of the prototype we had to translate its concepts into realizable formats without losing the spirit of challenging design conventions. Elements like the font and the trim size were directly adapted into the design, but as we were not able to replicate the removability of the content from the magnetic sheets, we had to find surrogates.

03_01_Sections and blurred limits

In an attempt to replace the mobility of the content and to maintain an interconnected fabric, we positioned the catalogue in the middle of the publication, considering that when a book is first held in one's hands, focus lands more easily on the images rather than on the text, and the tendency is to start closer to the middle than the first pages. With this in mind, we decided also to place the table of contents right in the middle, as if a magic tree-trunk with branches of the content stretching and flowing from its neural centre. This meant the articles would saddle both sides of the catalogue, coinciding with the process of the project itself, which began with multiple re-searches, had a central exhibition and concluded with an explosion of shape-shifting approaches (letter, text, image, notation) to communicate our findings. We selected two different papers for these sections, a thicker one to hold the colourful images of the works, and a lighter one to carry the longer texts, a difference that is sensitive to touch and sight, with a feeling that differs between the two in the way that the attitude towards a book or an exhibition is not the same. However, because the two areas within the book are not so different from one another and its content is in a constant flux between artwork and written chapter, we allowed ourselves the luxury of inhabiting part of one type of paper with the content of the (so-called) opposite section, now and then forming a natural co-habitation.

This approach was influenced by the motto "Sometimes Hard, Usually Soft," an attitude towards information that considers it a living and constantly changing entity, difficult to place in one category or another. For this very reason we considered it necessary to soften the edges of the information and make it blend in, overlap and become blurred. It was important to emphasise that an image is not an illustration of the text it accompanies, nor is the text an explanation of the image it follows. Both converge and mutate their multiple meanings with respect to one another.

03_02 Actualising the colour system

As it was our idea and ideal to create a series of navigational devices that would help the reader to steer the uncharted data mines of the book's content, we thought of using colours unique to each author and artist, and then to link them to their works by a subtle reference rather than directly linking them by equivalent values expressed in numbers. We sought to guide via the use of colours because colours can allow subtle differences to emerge, at times so subtle that differences may not be distinguishable from one another at all. We particularly liked that aspect. The values translated partly had to succumb to the rules of the respective encoding system, for example the length of the base36 values having to be multiples of three, reminding us that even in the most literal attempts at translation, there is always some kind of undecidability playing into any system, ordinary or complex.⁸

The first attempt of our idea to generate different colours from a machine learning algorithm failed. Trying to figure out how to solve the problem, we came across an experiment by Charlie Coleman where he used two different text-encoding schemes to translate a string of characters into colour information expressed in a hexadecimal-colour.⁹ It very much suited our needs as the way it decoded or encoded the given information revealed an idea that is contained in the Data Loam project as well. So we decided to re-try the idea of using an algorithm to generate colours from the respective names per se, but this time, we linked the authors with their works using a graphical system, namely the table of contents.

The western alphabet in its most commonly used form consists of 26 letters from the Latin alphabet (ISO basic Latin alphabet). Of course there are variations, Umlaute or diacritical symbols leading to a larger number of letters depending on the respective lingo. In addition to this we used the Arabic numbers from 0 to 9 to express numerical values. These are, very simply put, the two most common schemes used to encode our everyday conversations and interactions. But because these two schemes are exactly that: arbitrary choices (even if chosen because of massive uptake), we were already quite possibly exceeding the multiple of 3 rule mentioned above. If we wished to apply another schema to encode information encapsulated

⁸ See Kurt Gödel (2003 [1931]), *On Formally Undecidable Propositions of 'Principia Mathematica' and Related Systems*, (Mineola, NY: Dover).

⁹ Charlie Coleman, "Text to Color," *Experiments at charlie-coleman.com/experiments/*

within the two already in use, this could only work as long as we kept to a base36 value. If a string does not fulfil this rule, an x amount of beginning letters are added to its end until it does fulfil this rule. The function used by Charlie Coleman first determined the length of the string and then of the three parts that in the end created the values for red, green and blue. That being said, this method of course did not work when the length of the string was not a multiple of three. What we consequently needed to do was to code for intensity of color along with the red, blue, green. These three color packages were then translated into base36, or hexatridecimal encoding scheme that used the totality of the Latin alphabet as well as the numbers from zero to nine to encode information. The algorithm then translated the base36 expression into a hexadecimal value which was scaled down to be within a range between 0 and 255, the values which decide the intensity of the respective three-color mixture of red, green and blue. Luckily, it worked.

03_03_AR & QR

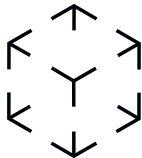
For quite some time, a book has mainly been the vehicle around which information is imparted and circulated. If one thinks of works by ancient to mid-modern philosophers, literary writers, monks and scientists, for example, form tends to follow function. But in our contemporary times, a book—and especially an edited book—has often required an intelligence which (literally) makes sense of the works, and does so in such a way that gives it impulse, flow, accessibility. This has traditionally been the role of a curator, whose critically important task, unlike that of a translator *per se*, is to position and tailor the content—and in our case, literally draw the lines, help weave the tapestry, guide the eye. We hoped to do so in order to carry forward a certain message whilst simultaneously guiding the readers through designated streams of information. Certainly one can never completely avoid the interpretation of a piece of information when communicating it, as information inserted in a context can never be pure; it is always influenced by the medium it passes through, encounters, expresses.

Nevertheless it was our intention to give away as much of this power as possible, discontinuing the hegemony of information. We felt that by choosing a single image from the whole documentation roll of the exhibition to represent an entire piece, would limit its interpretability by imposing our own perception of it. We wondered: how would it have been for another person to walk in and find the piece in the context of the exhibition, to look at it from different angles and to focus on different details? Which frame of a video is the best representation of a multimedia work? We decided to take in the raw graphic information, the plethora of the artwork-images, exposing the documenting of each artwork from as many different angles as possible. Still, this was not enough.

So we circled back to rethink what a book might look like if we started to play with rather than straight-jacket the archives of our exhibition. Could we create a kind of sandpit near the ocean? Any book connects to other planes of information, references are drafted, connections forged across media. But these connections are not literal.

For this reason and linked to the need to break with the limitations of the printed book, we made use of AR and QR technologies to expand the content of our restricted body of paper.

In this way, readers would get to watch and listen to the original video pieces, and could directly access extensive information about the piece, the artists and authors practices on their respective web-sites, completely out of our editorial and design control. Now accessible: the comments other individuals may have left under the pieces via online platforms; accessible too, the change of perception/impact of an artwork that time and other events could bring. By allowing the access and linkage to these more fleeting media, the book surpasses its function as a cryogenic chamber that freezes a state of information at a moment in time. It exceeds its temporal limitedness, expanding its windows towards other worlds, becoming an actual portal to the apparently transparent, forever mutating organic fabric, while giving up some of its privileges, breaking even with the tailor's linearity, both curatorial and editorial, to become a more democratic expression.



03_04_The table of contents

The table of contents can be considered an abstract-made-almost-real representation of the book's content. It is the map of references by which the recipient finds orientation within the publication's content. Within this book, the table of contents links the authors' names from the centre to the respective articles in a manner following an organic, rigorous graphical flow. This was absolutely critical as we did not want any aspect of the book to appear (or be) decorative in the sense it had no particular reason for being there. Instead, the reference between the author and the location of the article is never severed, and yet the lines bleed, from the inner core to the edge of the pages to find their destination in a continuous manifold flow.

Even though the publication's linearity is hereby challenged and the traditional sense of a book's order, completely disrupted, still one can start from the first page, or indeed any page, where the system it announces does not lead to a strict order, but still manages to make sense of the data as loams: the future of living breathing shape-shifting knowledge systems.

03_05_Lexicon

The idea for the lexicon first emerged as we were (literally) hanging the works at the *Data Loam* exhibition. Traditionally, little tags are set next to the art, stating the material of the artwork, the year, and title if there is one, along with the name of the artist. We wanted to disrupt this rather tired system of information meant to enframe an artwork but usually just denuding it of a wider intelligibility. We decided, instead, to exchange the paper titling for smartphone screens, which would have running through their tiny surfaces the juxtaposition of concepts, persons and facts that might otherwise be unrelated to the actual artwork placed next to it. The concepts arose by each artist choosing five or more words, concepts or themes that in some way spoke to their contribution. These were then set upon, with slightly mad intensity, political anger, boredom or laughter and let fly in and around the exhibition. Reactions were immediate. Recall the importance of Nietzsche's plea for a *Gay Science*, making into songs, half poems or preludes of rhymes the absurd dance of knowledge in all its cohesive in-forming.

In order to give a sense of the way in which this absurdity played into the curatorial knowledge system, we exaggerated this aspect in the book via the selection and form of the lexicon entries. Some of these assertions are canonical, but a good part are fictitious and some are simply lies. We satirised the style of credibility that lexicographic entries normally have and the arbitrariness of the positioning in the book simply resulted from layout-related gaps and are therefore completely coincidental. In the tradition of the surrealistic *Cadavre Exquis* we created references subjective, dreamlike and often sexually charged values that one would otherwise deny an encyclopedia. The co-existence, interpenetration, slipping and sliding, not to mention overlapping of different systems of order has been one of the basic concerns of this book. With this absurd lexicon pulsing through the book, playful and sometimes unexpected connections are all that remain.

feedback loop [fi:dbæk lu:p]

if the little # gave birth to 120–240 character larvae of fancy, opinion and irritation pupating its pluralised way through much of social media, take pause now to welcome the = its non-identical bi-directional adopted twin whose place on the keyboard is yet to be found (easily). addressing a different kind of economy/circulation, more akin to a morphogenesis of sequence-play, this names the ever-expanding fractalised surface, that sometimes makes connections in the oddest of places.

The Design team wants to thank Martin Reinhart and Johnny Golding for an unusual complete freedom of creativity and the exceptional chance of sharing with readers the concept and core of the design in the book itself. Georg Hirzinger, for making our wicked ideas reality while constructing the book prototype; Michael Waismayer, for a clean laser cutting work of magnetic grid sheets and Kai Bernau, for a typeface that embodied our view.

And to the reader: Make it your own, just like the loam.

ReMembering

Rebecca Fortnum

* | London, UK

Rebecca Fortnum has long been interested in how artists make art, and in particular, how feminists paint. Her books *Contemporary British Women Artists: In Their Own Words* (2007) and *On Not Knowing: How Artists Think* (2013) are aimed at articulating artists' own perspectives on their practices and processes. Recent articles and chapters such as "A Dirty Double Mirror: Drawing, Autobiography and Feminism," in Kelly Chorpene (Ed.), *A Companion to Contemporary Drawing* (2020) and "Baggage Reclaim: Some thoughts on Feminism and Painting," in *Journal of Contemporary Painting* (2017) explore and expand Helen Molesworth's notion of ambivalence as a feminist strategy for contemporary women artists. In 2019 Fortnum was elected Visiting Research Fellow in Creative Arts at Merton College, Oxford and returned to Oxford where she originally studied English Literature and Language as an undergraduate. There she developed her project, *A Mind Weighted with Unpublished Matter*, which emerged from her ongoing drawing and painting practice, exploring the politics of the gaze. In a series called *Prosopopoeia*—a rhetorical term describing a communication via another person or thing, sometimes seen as a way of animating the dead—Fortnum paints from historical sculptural portraiture, particularly of 19th Century France, drawing on notions of 'absorption' in the representation of women. This series of work, published by *Slimvolume* (2020) includes a critical essay by Gemma Blackshaw, as well as an 'in conversation' with Melissa Gordon, which will form the Natalie Barney Gallery inaugural exhibition in London. Fortnum is currently Professor of Fine Art at the Royal College of Art, where she is research lead for the School of Arts and Humanities



fiefdom [fi:f dɒn]

gamer's term for acquiring property / organising bot-lands (an on-screen feudalism of the 21st c kind of encounter).



**I could have danced all night,
I could have danced all night,
and still have begged for more
I could have spread my wings,
and done a thousand things,
I'd never done before**

So sang my grandmother when I was little. Later I realised the song came from *My Fair Lady* where the gorgeous Audrey Hepburn, slightly unconvincing as a 'common' flower girl, looked divine as a 'lady' in her Cecil Beaton dresses. My grandmother had left school at 14 to become a maid in a wealthy London household and knew the power of elocution. Years later, as a mother of three, she spoke beautifully when attending the parents' evenings and founder's days of the minor public schools her children attended. George Bernard Shaw's class hoax, a thought experiment based on Henry Sweet's phonetics as a passport to social mobility surprisingly still makes sense. But for me, his reinterpretation obscures the fascination at the heart of the Pygmalion story; that is the transformation from stone to flesh, from inert to sensible matter, via desire.

By the mid 1990s my grandmother couldn't move very well, she had arthritis, a uterine prolapse and various other ailments which included the rejection by her body of the metal pin that had been put in her hip to secure it when she had broken it falling down the cellar stairs. Over twenty years later the pin, looking like a large door bolt, was eliminated by her flesh as an alien object, and having broken the skin, was eventually wrenched free from her body by its ungrateful recipient, at home one afternoon. During this period, I inhabited an upstairs room of her house which I used as a studio and so I was around to help with her ablutions and other duties of the body. Whilst thus occupied I often thought of how she had tended me as a child and how now this 'care' was now being returned. Looking at her body made me think of mine, both past and future. And my memory of her seems to reside in my body, particularly now, as it begins what I hope is to be a long journey towards immobility.





**You died before I had time
Marble-heavy, a bag full of God,
Ghastly statue with one gray toe
Big as a Frisco seal**

Sylvia Plath writes of her father, imagining him as a colossus, his body swelled to enormous proportions and made of unforgiving material. Stone-cold, dead, his physical occupation of the world comparable to the place he held in her psyche. But colossi weren't always big, they were statues made to commemorate those no longer living, a way to make those important to us, abide with us a little longer; the flesh transformed to stone.

Wandering around sometimes bustling, sometimes abandoned, sculpture corridors and courts in the museums of Western Europe is an encounter with the dead. In the statues and busts we confront the preserved portraits of those, both real and imagined, who have lived before us. We see not only the representations of others but can imagine their physicality, the way they stood before their image to review it, the image that now we are also in front of. We can envisage the way they touched the surface of the sculpture, perhaps to trace their likeness or perhaps to reassure themselves of their material difference from their effigy. And before us too, embedded in the surface, the presence of the artist and their technicians, the marks of their tools, their hands, moving, dexterously or clumsily, in pursuit of their vision. Scanning the work with the eye (we are forbidden to touch in the museum), this haptic looking allows the surface to open up, to transform; terracotta or marble turned to skin, muscle, bone.





When actress and sculptor Sarah Bernhardt portrayed her dead husband in marble, carving his strong, refined features, she appears to have chosen to reimagine him from seven years earlier, when they first met and she had fallen in love; before his acting, before the morphine, before the bitterness and madness, as the twenty-six year old, beautiful womaniser he once was. After the overdose, as she nursed his dying body, did she inspect that ruined face for signs of his former self? And how long does it take to carve a marble block into a life size portrait complete with roses? Was she crying, chisel in hand, all the time? Perhaps a happier experience was the earlier portrait (in 1878) of Louise Abbéma, 'new woman', fellow artist, companion and, because it was Sarah, probably lover too. Maybe it was reciprocity for the (albeit ghastly) portrait Abbéma had made of her three years, as important work in her career, establishing the young painter as an artist of note. Now it stands just outside the café in the Musée d'Orsay, allowing those waiting in anticipation of a pleasurable lunch to admire her stylish chignon and the self-possession of her downwards glance.

The imagination is a poor beast, it offers everything and delivers less. Looking at the homogenous photographic surface, with a pencil or brush in hand, the touchscreen having given all that it can, one must pinch to zoom in the mind's eye. Yes, chroma brings back a partial life, but never much more than that. Only a provisional translation, a half-life. How does the surface give away its materiality to the viewer? Is it really confined to the way the light glances off a plane? Terracotta absorbing the light, whereas the marble's sheen luminously reflects from its polished surface. But how is the material's weight or density conveyed to the lens or eye? Can a viewer detect what level of pressure would be needed to engrave its surface with a sharp implement? How do we know it is so bloody heavy it could break our toes if it toppled over? Can fervent imagining really, in some unaccountable way, convey a touch to the brush that will conjure the ancient stone as skin, covered with soft, downy but invisible hairs.



Rodin didn't think Bernhardt was a very good sculptor. He found her too sentimental. However, Camille Claudel he judged to be an exceptional talent and she appears to have paid the price for his admiration. The portrait he made of her in 1884, when he met her for the first time at the age of 19 (he was 44), shows how captivated he was by her image. Eleven years later, the same image morphed into that famous reflection on reflection, *Thought*, that traps her head in a block of marble, symbolically anticipating her later incarceration in the Montdevergues Asylum. In the earlier portrait of Claudel, she is indeed pensive for one so young. Having strenuously and repeatedly denied the use of life casting some years earlier, we cannot allow ourselves to imagine that Rodin took her imprint, pressing her flesh against the wet plaster before it set. Yet that pointed skull cap she wears would lend itself to such an activity, keeping her hair away from becoming enmeshed in the liquid lime and gypsum. Additionally, in the many existing versions of this work, plaster, terracotta, glass paste and bronze, the join lines of casting are present, evidence of the moves between these material states, encouraging us to believe that somehow her body played an active part in the making of the work. The following year she was to make a portrait of her own, *Jeune femme aux yeux clos*, a powerful strong-jawed woman whose reverie seems to betray a pent-up energy, but whose identity is unknown.

Paint here acts as another term in the list of material translations, flesh and bone to hard and soft mineral to pixels and retina screen to ink on paper to oil and pigment. A distancing which allows an intimacy; the soft bristles, loaded with paint of an intense hue, glancing over the silky gessoed board, smoothed by the sandpaper's rhythmical abrasions. The brush then is guided not just by image, but also haptic memory and projection. An act of faith, a moment of belief, not just in the artist or their work, but in the importance of somatic remembering.

Images

Prosopopeia (Rodin, Claudel), oil on board, 20 × 25 cm, 2020

Prosopopeia (Claudel, unknown), oil on board, 20 × 25 cm, 2020

Prosopopeia (Claudel, unknown), oil on board, 20 × 25 cm, 2020

panel, oil on board, 20 × 25 cm, 2020



Exquisite Methods: Ruminations of Corporeal Becoming in Artistic Research

Henry Rogers

* 1963 Le Gare D'Uphall, Scotland | Glasgow, Scotland

Henry Rogers is a Glasgow-based artist and MFA Programme Leader at The Glasgow School of Art. Concerned with formality, mediation and mimesis in art via drawing, painting, photography and writing, his research explores the impact of queer theory, method and queer strategies on art-based production. Between 1986 and 2002 he lived and worked in Florence, Paris, New York and Rome. A recipient of the Mark Rothko Memorial Trust Award and an Abbey Fellow at the British School at Rome, Henry Rogers is currently a Visiting Professor at the Royal Academy Schools, London. His paintings have been exhibited in the US, UK, and EU. In 2019 he was conferred as Professor of Contemporary Art and Queer Studies.



filter ['filtə]

a reduction of information, which could be performed in a productive way or as a distortion (or both). it could help to see something clearer or it could obstruct a view. it could help to extract information and to sort information by different means—and therefore help to make it meaningful. best example, john carpenter's they live and also obey.

“...discomfort I always suffered from: the uneasiness of being a subject torn between two ‘languages, one expressive, the other critical; and at the heart of this critical language, between several discourses, those of sociology, of semiology and of psycho-analysis—but that, by ultimate dissatisfaction with all of them, I was bearing witness to the only sure thing that was in me (however naïve it might be): a desperate resistance to any reductive system... I began to speak differently.”

Roland Barthes (1980), *Camera Lucida*¹

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This rumination takes the form of a method, a ruinous method, the purpose of which can only be the ruination of method itself, for here the author is more soothsayer than truth teller, the son of a ‘gifted’ woman no less, one Mary Fisher Ferguson, of whom it was said, she had an unrealised capacity for ‘second sight’, for ‘insight’ rather than knowledge, or so her friends the travelling folk would say. The soothsayer, like the artist, is in fact an alchemist, a practitioner of divination, one whose proclamations whilst based upon experience can only ever be ‘claims to truth’, courageous half-truths perhaps with moments of embellishment. Foucault would be proud of us. Forceful, rhetorical, propositional. For even when presented with the most rigorous of arguments; the finality of which could be described as (to use a Scots’ word) *contramashious* and doubly so for is it not equally perverse that the ‘work of art’—the labour of art—is by definition rigorously argumentative, an exquisite incitement in which, for the most part, we must agree to differ.² Without getting ahead of ourselves here, disagreement is perhaps central to our concern, for those who prefer the stilted rigour of the academy—those who refuse to recognise the *matter* of research, the odour of exquisite practices, the dirt of exquisite ways of doing, those material things so true to their own materiality—yes, for those who will refute the possibilities of *matter*, leads not to rigour but rather to rigor-mortis, or so Joanna Freuh and Terry Eagleton would have it. Regardless of the now familiar terms of reference: practice-led, practice-based, practice-as ... and Barthes’ distant warning that “... The invariable fact is that a piece of work which ceaselessly proclaims its determination for method is ultimately sterile ...” yes, regardless of these refrains—there is

¹ Roland Barthes (1993 [1980]), *Camera Lucida: Reflections on Photography*, translated by Richard Howard, (New York: Vintage Publishing), 38.

² From the Scots language, meaning *counter*; adjective: *perverse*, *self-willed*, *obstinate*, *contrary*, *refractory*.

³ Roland Barthes (1977), *Image Music Text*, (London: Fontana Press), 201.

⁴ Stephen Melville (2001), "Counting/As/Painting," in P. Armstrong, L. Lisbon, and S. Melville (Eds.), *As Painting: Division and Displacement*, (Cambridge MA: MIT Press), 19. Cf Susan Sontag (1966), *Against Interpretation*, (New York: Farrar, Straus and Giroux).

⁵ The etymology of the word *exquisite* is fascinating. Drawing on its Latin root the *ex* leads us to an idea of a preposition and an out of, from; whereas the French *qui* leads us to agency, to who and to whom, whilst the middle English *site* speaks of location, structure and intention. Preposition signals a double movement, that which comes before or in advance of, and that which indicates a moving out from, perhaps to new formulations—or ways of thinking and doing. *Qui* holds the agency that puts things into motion, whilst *site* becomes the *loci* of thinking and production.

truly something magical, alchemical, philosophical and thought-provoking that happens when the arts are true to their own material and immaterial conditions of production.³ What Stephen Melville describes as the "internal thinking or articulation" of art, and what Susan Sontag proclaimed so long ago as the need to replace hermeneutics with erotics, the sensuous aspects of a given work: the sensorial experience of art.⁴ But it is the word 'exquisite' that I claim here for artistic research practice; it is the word 'exquisite' that radicalises the mundanity of the word 'method' for it speaks of refinement and excellence,⁵ the aesthetic and by extension the ascetic (disciplined) life.⁵ It speaks of the delicate and that which is intensely felt. Therefore it speaks of the affectiveness of art, the pleasure and the pain—the *exquisite agony of St Teresa*... the figure of the dandy, the one who is affectedly concerned with appearance; to the ascetic life of Leigh Bowery perhaps: that self-fashioned fashionista. Perhaps. In French, the word 'exquisite' is most potently understood in cuisine, with regard to the aspiration for perfection, the satiation of the palate, where thought becomes attentive. This is where the tension lies, this is where the torsion comes to be. This is where the work of artistic research begins. This is where the exquisite and the method sweat the real into existence.

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Pre-writing rituals take time: a walk in the park with one's dog, takes time; brushing one's teeth to remove the residual (raw) calcifying sensation of sleep, takes time; masturbation in its singular form, may take some time, although for those who are brimming with the energy of youth, or those who are chemically enhanced—aged with crystal clear memories of past encounters and defiant to the bitter end—may indeed lead one to a discussion of duration rather than time. The time one takes, is a matter of commitment particularly with regard to walking, to maintaining good hygienic practices and, of course, to masturbation. Reading this paragraph again, it is clear that it is already a matter of address, a form of address, an address to matter, to the corporeal concerns that will be the subject-matter or the mattered-subject of this discussion.

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Walking with one's dog is a bodily act, a physical gesture, a time for thought but more importantly still a time for play, a time for sniffing the cold air of each autumnal morning, a time to catch the scent of the now invisible (indivisible) other: the fox (the thought-fox), the other who has passed us by, not long before: the deer (nimble thought), just long enough for the scent to incite excitement. In such moments sniffing becomes somewhat frenzied, intense one might say; for time—if recognised by the dog at all—has stopped, until the scent-message is received and understood, or more importantly until she has pissed all over it to make herself known to those unseen others who also walk in the park—now in absentia, a daily ritual, a necessary call of the wild, a *palimpsestuous* spatialised act no less as she reiterates her existence in the world.⁶ Some dogs are truly narcissistic.

⁶ The neologism, *palimpsestuous*, was created by Jakub Ceglaz (2018), *Materialising Palimpsest: An investigation into palimpsestuousness as a queer enactment*, unpublished PhD thesis, (Birmingham School of Art: Birmingham City University).

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Brushing one's teeth leads us to another consideration, that of a most sensitive part of the body, that exterior interior space of transition from ingress to egress, and vice versa, that site of mastication—or the ugly pleasure-act of vomiting—so close to the machination of ideas as they transmogrify along the neuro-pathways, so close to the wet fluid space of saliva, a membrane or a bone away, in which energy becomes possible and reflection takes form, a locale from which the speech act comes by word of mouth, from insolence to poetic utterance, where the mouthing of concepts find their formality, where ideas once spoken, are given up to the world. The foul mouth is always antagonistic.

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Masturbation may well be another form of articulation, for masturbation can be individual or collective, singular or multiple, tidy or messy, very messy (at least when one is young). However, when one is self-inflicting joy, masturbation is not only a matter of release: the intense pleasure of the orgasmic in the early morning light, no not simply one's 'morning glory', a jolt from too little sleep, but rather it is both a matter of cultural codification and a fixing of the body in relation / relationship to representational norms. Sensuous acts of the sensuous body rendered sinful.

fork [fɔ:k]

a technical term in programming, somewhat akin to 'mutation' in say, a biological genome. in a repository for the programmer (and also in cyber/blockchain development), if there are two different approaches to solve a problem, a 'fork' can be added so that one can simultaneously assess two (or more) different paths that might be taken. benign version: see which one works out best and work to programme the change. less benign version/malignant: 'forking' the problem so that one group follows, say, an alt-right set of propositions, whilst simultaneously a set of possibilities can be given to induce another direction.

⁷ Chrysanthi Nigianni and Merl Storr (2009), 'Introduction,' in *Deleuze and Queer Theory*, (Edinburgh: Edinburgh University Press), 1.

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Nevertheless, we might postulate that all three acts can also be understood to challenge both cultural codes and representational norms, especially if we consider them from a more creatively critical perspective in which "creativity is a form of [sensual] criticality."⁷ Something that is understood when in the artist's hands, the hands that make without fully knowing that which may well become known or that which may simply 'become'. Perhaps this is because there is a time delay between thought and action, or indeed action before thought, that infinitesimal split perhaps, prior to the comprehension of the queerness of action-as-thought-as-action-as: a queer move, an exquisite move, something that has been continually denied by binary logic, the logic of imprisonment.

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What is important here is our recognition of the trap of binary logic for any discussion of queerness, especially when one realises that the here and now of queer—what we may describe as the 'normative queer version of queer' with its emphasis on representation and visibility: the polity of being in the social space, lacks the agility to move beyond such rudimentary logic. Indeed, it may well be fantastical to suggest, but suggest I will, and if you will permit this call to arms, that we must break free of the logic of the prison. And on this occasion, perhaps we must do so, in favour of the logic of the prism. For is it not through the prism that we encounter the singular becoming multiple: the rainbow, a materialised spectrum, Eve Kosofsky Sedgwick's sheerness of difference? This is a question to hold on to. The prism is an exquisite object, is it not? One that has an exquisite 'thingness' for it is not only a manufactured object, something instrumental (and as such mass produced), but also a specific technology, something perhaps beyond the Heideggerian use of 'techne' alone.

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But if we care to recall, even momentarily, Heidegger's 1954 lecture, *The Question Concerning Technology*, Heidegger moves from instrumentality to causality and on to the conceptualisation of *poesis*, the 'bringing-forth' that which is concealed, and the realisation that

techne is said to be a necessary part of *poiesis*. As Mark Blitz explains, “Drawing on Aristotle’s account of formal, final, material, and efficient causes, Heidegger argues that both nature (*physis*) and art (*poiesis*) are ways of ‘bringing-forth’—of unconcealing that which is concealed. What is natural is self-producing, self-arising, self-illuminating, not what can be calculated in order to become a formless resource.”⁸

Heidegger emphasises the importance of the relationship between *techne* and *poiesis* when he asserts that in the sense of “technique,” *techne* refers to *both* manufacturing (the techniques of shoemakers and printers, for example) and to the arts (the techniques of poets and graphic designers, for example). *Techne* is part of *poiesis*. Furthermore, we will do well to remember that for Heidegger, “poetry also brings things to presence,” and that, “the Greek word *techne*, from which ‘technology’ derives, at one time also means the ‘bringing-forth of the true into the beautiful’ and ‘the *poiesis* of the fine arts.”⁹ If *techne* is indeed a part of *poiesis*, it is with their conjoining / embedding *poiesis-techne-poiesis* that constitutes the ‘bringing-forth’ in the arts of that which cannot be reduced to technique; that although we may now understand it as ‘expertise’, is no more knowing of the whole. Technique alone is partial, nothing more than enabling the instrumental production of goods. Philosophically, *poiesis* is revelatory: that which ‘brings-forth’, that which reveals ‘something’ that is in the ‘realm of truth’, the act of bringing into being that which has never existed before: the *artwork perhaps*. And so the story goes...

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Of course, the move articulated here also finds its routes more in the work of Gilles Deleuze and to some extent Felix Guattari, for what is being *interro-imagined* (interrogated/imagined/explored) here is a move from representational to non-representational thinking: from the prioritisation of signification to a consideration of intrinsic qualities, of sensuality, of erotics, the body-knowledge materiality of thought, the materiality of art. What is demanded here is that we move beyond the designation of queer as the technology of politics to an exploration of the vitality of queerness as a cogent force to affect and effect changes in our habits of theorising, at the very least it allows us to consider more deviant lines of flight (Fig. 1), lines that

⁸ Mark Blitz, ‘Understanding Heidegger on Technology’, *The New Atlantis*, Number 41, Winter 2014, 63–80.

⁹ Cf Martin Heidegger (1977), “The Question Concerning Technology,” in David Farrell Krell (Ed.), *Martin Heidegger: Basic Writings*, translated by William Lovitt, (New York: Harper & Row), 3–45. Etymologically, *poiesis* is derived from the ancient Greek ποιεῖν, which means ‘to make.’ Heidegger, embedding *techne* with *poiesis* and, latterly with the logic of how one comes to know (epistemology), enables a practical-conceptual move where what is called thinking is the skilled knowledge-practice of inhabiting the how. This know-how is vital. Heidegger concludes, “What is decisive in *techne* does not lie at all in making and manipulating nor in the using of means, but rather in the revealing mentioned before.” *Ibid*, 12–13.



Fig. 1: I can't even draw straight... lines! (pen on paper, 210 x 296 mm x 4 panels, 2019)¹⁰
Copyright the Artist

¹⁰ Within this context the work I can't even draw straight... lines, playfully refers to the queer slogan of the 1990s 'we can't even walk straight' or 'we can't even march straight' but in this context, it is also a work playing with the Deleuzian idea of lines of flight. In the first instance each panel of the work is approached with the sincere intention that the line drawn frehand will be straight. This involves an immense amount of concentration.

multiply, lines that are rarely straight, lines that rise up and challenge those drawn by a contracted 'draftsman' to reinforce the straightness of thought and of being in the world: being on, to deploy a *cliché*, the straight and narrow. With this in mind, does not the straightening of lines beget a narrowness of thought, perhaps as the calcification of the arteries compromises the oxygenated blood flow that replenishes the neurological conditions of thought itself?

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Interestingly, in considering the question of the essence of technology, Heidegger proposes that technology is itself a kind of *poiesis* and therefore, if we consider his conceptualisation of 'bringing-forth' as 'revealing' we must also acknowledge that such an alignment occurs, unbound to instrumentality, perhaps in the way that the line of the straight (and narrow) veers off in a multitude of directions for there is no stopping the hand that moves: "My hand," says Heidegger, "is not a piece of me. I myself am entirely in each gesture of the hand, every single time."¹¹ A queer statement for sure.

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But, this is less a matter of what Crysanthi Nigianni and Mel Storr describe as "the becoming–DeleuzoGuattarian of Queer Theory [or] the becoming–queer of Deleuze's and Guattari's theory."¹² Nor is it a stammering linked to some form of transit/transitional move, which, regardless of its stammering ways, remains directional. Nor is it a thinking through of the two-fold or the excluded middle or the binary (none of which can never be enough). Rather what we must be attentive to here is thought that, as Cixous so eloquently stated over four decades ago, glistens like the glistening of the sea and the thinking through of the threefold (at the very least the threefold) towards the spatio-temporality of the multiple/of the many-fold, towards that which exposes the shame of binary logic, its hyper-masculinised structural privilege, the monster in her ground-breaking novel, *Angst*.¹³ A kind of mobilisation of the prism, of colour, always already rainbowed, always-already bent. Perhaps we cannot ignore the fact that the prism is itself a technology of the scientific revolution, and as such somewhat concurrent with the development of capitalist economics. Perhaps what this demonstrates is the need

¹¹ Martin Heidegger (2010), *Being and Truth*, translated by Gregory Fried and Richard Polt, (Bloomington, IN: Indiana Press), 36–7.

¹² Nigianni and Storr, *Deleuze and Queer Theory*, Op cit, 1–10.

¹³ Hélène Cixous (1985), *Angst*, translated by J. Levy, (Edmonton: Calder Publications, Ltd).

for a transformation from within material practice at the very level of its constitution, somewhere from within the sheerness of difference and variance of being that demands once and for all that Preciado's description of "the limits of techno-scientific capitalism" can indeed be smashed and reconfigured, can indeed be rethought and reimagined in the 21st century. In his text, *An Apartment on Uranus* (2020), Preciado is emphatic:

¹⁴ Paul B. Preciado (2020), *An Apartment on Uranus*, (Fitzcarraldo Editions) at ica.art/learning/paul-b-preciado-jack-halberstam

"I am not a man I am not a woman I am not heterosexual I am not homosexual I am not bisexual. I am a dissident of the sex-gender system. I am the multiplicity of the cosmos trapped in a binary political and epistemological system, shouting in front of you. I am a Uranian confined inside the limits of techno-scientific capitalism."¹⁴ Interestingly enough, Preciado's demand for the body politic now echoes Johnny Golding's demand of the late 1990s in her essay, *Poeisis and Politics as Ecstatic Fetish: Foucault's Ethical Demand*.¹⁵ Here re-staging Foucault's discursive move, Golding demands one step into the world of radically singular-multiplicity and radically multiple-singularity. She writes:

¹⁵ Sue (Johnny) Golding (1997), "Poeisis and Politics as Ecstatic Fetish: Foucault's Ethical Demand," in *Filozofski Vestnik*, Ljubljana: Slovenian Academy of Sciences, Institute of Philosophy, Vol 18, no. 2, 17-31.

"Self/identity self becomes simply, the expression of multi-particled selfnesses, made meaningful, made into a something 'else'—a kind of gaseous 'nodal point' of self-due precisely to its having been attracted/seduced, and therewith, sutured, into a oneness (of sorts) not because of beauty (per se) or desire (per se) or even magnetism (per se) but precisely because it can be—and must be—used. Techne. [...] Cohesive relations, processes, wanderings, traditions, fleeting nodal points, dreams, even the sweat (or especially the sweat) of the body loins, are all grist for the mill, all 'props' for establishing the multiple-as-a-singular-unity, establishing, in other words, the that which lies around us, the elsewhere or otherness, as us; but an 'us' as 'selfhood' quite distinct from the wholly formed Truth of the Cartesian ego-I, self-reflexive sense of self."¹⁶

¹⁶ Ibid, 22.

Let us push this further, joining the prismatic imagined here and the ethical demand of ecstatic fetish with the radicalised material demand of quantum physics. One turns to Barad, who in her groundbreaking work *Meeting the Universe Halfway*, develops a new form of agency, one born of diffraction and intra-action; one that, as Barad puts it, "understands agency as not an inherent property of an individual or human to be exercised, but as a dynamism of forces."¹⁷

¹⁷ Karen Barad (2007), *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, (Chapel Hill, NC: Duke University Press) 141.

A moment to pause.

friendship [ˈfrɛndʃɪp]

names the raw, sensuous, delicate, multi-dimensional and secret intelligence shared by sentient beings at the moment of their extended encounter. it requires nothing of identity politics, selfhood, social agency, though its very expression enables and indeed solidifies, all this and more.

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Concomitantly, we must acknowledge that 'Queer' is also in many ways neurotic as a strategy defined by negation: by the 'non', the 'anti' and the 'contra' it is beset with fear, the fear of being defined 'as such', the fear of being immobilised, caught in the cycle of a binaric contrast, a polarity that is simply reinforced through repetition, reproduction and (similarity if not) sameness. Following Claire Colebrook's query, "does the concept of queerness [by necessity] change the ways in which we theorise?" [a yes/no question for sure], the answer is of course yes, for it forces us to think and think and think again and again and again, to render queerness queerer—at least —threefold, to queer material experience, to understand the queerness of the material world, to experience queerness-becoming. We, those of us who think queerly, are always on the cusp. This, needless to say, has implications for the 'self' as a material constellation, of matter and fluids, of electrical impulses and neurological networks: the Baradian 'dynamism of forces', the energised transference of matter into thought. Damn it NO: *thinkingmatter-matterthought!* For, this is arguably the very reverse of the grandiose idea in which matter in the making when *becoming* does indeed *become* (in the hands of the novelist) *Frankensteinian*.

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But for now, let us reaffirm the seductive power and potency of 'queer': its material potential, its ideality. The twofold as described by Nigianni and Storr is problematic here and always has been, at least since the mid 90s, for the doubling or double movement described by many (whether sporadic or not) has never been enough. We would do well to recall Sedgwick's assertion that while addressing the body politic one is simultaneously offering a less habitual way of thinking, pointing us beyond the ever present to an "open mesh of possibilities, gaps, overlaps, dissonances and resonances, lapses and excesses of meaning (my emphasis) when the constituent elements of anyone's gender, of anyone's sexuality aren't made... to signify monolithically."¹⁸ Or indeed, to David Halperin's proclamation that,

"Queer is by definition *whatever* is at odds with the normal, the legitimate, the dominant. There is nothing in particular to which it [Queer] necessarily refers [...]. 'Queer' then, demarcates not a

¹⁸ Eve Kosofsky Sedgwick (1994), *Tendencies*, (Chapel Hill, NC: Duke University Press), 7.

positivity but a positionality vis-à-vis the normative. [... Queer] describes a horizon of possibility.”¹⁹ Whilst both Sedgwick and Halperin were deeply concerned with representation and the representational politics of the time it is clear that within this concern, a more cogent line of enquiry is also put to work, a shift that signals a move beyond representation into a more abstracted and nuanced enquiry, for as José Esteban Muñoz tells us more recently,

“QUEERNESS IS NOT yet here. Queerness is an ideality. Put another way, we are not yet queer. We may never touch queerness, but we can feel it as the warm illumination of a horizon imbued with potentiality.”²⁰

Whilst also deeply political, Muñoz’s commentary hints at the potentiality of queer and the mobilisation of queerness. Queer may always be out of reach, yet tantalisingly close, exquisitely so—the exquisite multiplicity of thoughtful mattering that testifies to our continuing ability to do. Following Muñoz, queerness may well be an illumination, an illumination of a horizon, but this should not be reduced to a normative queer representation: an image of a queer utopia. No, for this exquisite multiplicity is so much more, something of a different order akin to the infused tinting of a violent disagreement whilst, simultaneously, the pallor of querelle: an exquisite quarrelsome queerness of practice (as praxis) set in motion (the meat-ing of an argument infused by queerness). “There is no stopping the mind that moves,” Joanna Freuh writes; it is the “soul-and-mind-inseparable-from-the-body.”²¹ It is an embeddedness with all of its intellectually and materially visceral moments of brilliance, desires, vagaries, slippages and mess that informs what Freuh describes as critically erotic scholarship: scholarship on the move.²² One might say that much of queer artistic scholarship is rooted/routed in an exquisite multidimensionality, something with a more complex logic, something more supple, in which the mobility and agility of thought is imbued with a ‘glistening’ queerness, a queerness as materialised quality: lubricant and moist. A flux of radical *jouissance*, as Jonathan Kemp would say.²³


¹⁹ David Halperin, *Saint Foucault: Towards a Gay Hagiography*, Oxford: Oxford University Press, 1995, 62.

²⁰ José E. Muñoz (2009), *Cruising Utopia: The Then and There of Queer Futurity*, (New York: New York University Press), 1.

²¹ Joanna Freuh (1996), *Erotic Faculties*, (Berkeley: University of California Press), 3.

²² Joanna Freuh (2013) as quoted in Henry Rogers, *Queertextualities*, (London and Birmingham: Article Press), 16.

²³ Jonathan Kemp (2103), “Chapter 9. Schreber and the Penetrated Male,” as quoted in *Deleuze and Queer Theory*, 150.



Another moment to pause.

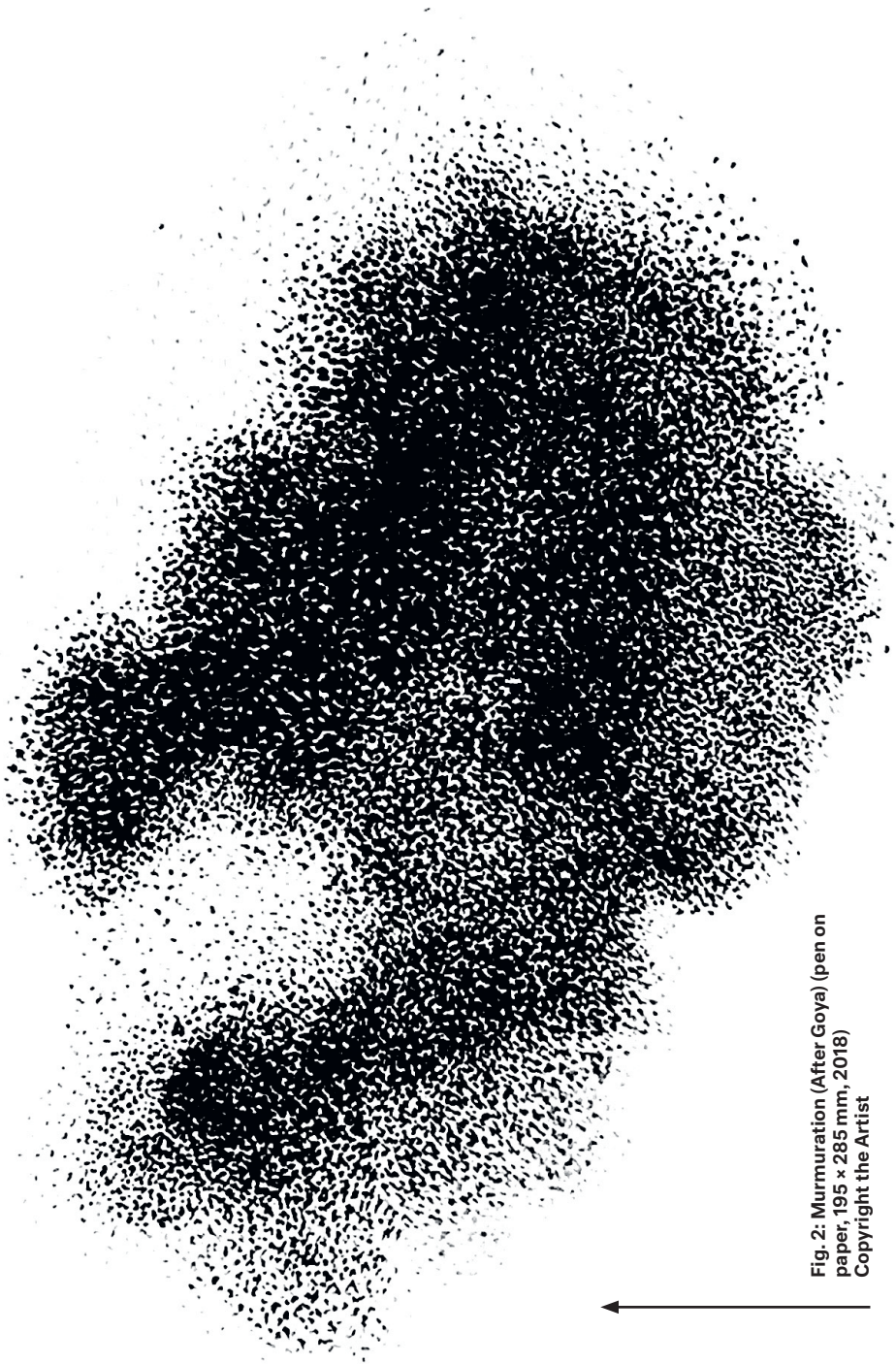


Fig. 2: Murruration (After Goya) (pen on paper, 195 x 285 mm, 2018)
Copyright the Artist

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Walking in the park each morning, one becomes aware of the incremental shifts towards winter for most of the trees have lost their leaves and stand bereft in the morning sun. Sometimes I think the dog can sense their sorrow, their weeping for she herself looks forlorn, but as we turn the corner on the path and down the slope we are confronted by the most intense of colours: YELLOW. A colour of the rainbow, for the sycamore is holding on, a defiant gesture of a day or two against this seasonal infraction, it holds tightly to its now bright yellow canopy against those colours that have fallen in the stillness of the night: against the orange, and ochre, sienna and umber that now lie beneath its boughs. In the shallow warmth of the morning one might be mistaken that these are the early mornings of spring, the resurgence of the life force but there is a recto to this verso, in which at first glance there is a moment of misrecognition, for this wishful ode to newness, this force for life is nothing more than a stalled imagining, a stilled image (a photographic moment) of the death throes of yet another day. The tree holds on, holds on tight for as long as it can until with the heavy breeze from The North arrives, in the night, and it bears its foliage like the rest. Tomorrow it will no doubt stand as the others stand.

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We, the dog and I, could see that the roads and paths were covered in frost as we stepped from the door (the threshold) out into the world. It was bright and clear and cold. Her breath rose up and mingled with mine as, yet again, we walked across the park. When it is frosty like this, when the grass is a grayish green with long stems of dew she rolls in it, her pleasure is to roll on her back in a snake like motion before jumping back to her feet to survey the immediate locale. I often speak to her but she never really hears what is being said, she perhaps recognises the sounds that indicate satisfaction, pleasure or reproach. But, identifying specific vowels and consonants is more challenging. Therefore, when trying to explain a possible '*modus operandi*' for such *thought walks*, she does not seem to understand the purpose of walking 'two steps forward and one step back', for despite my attempt at introducing such a historical point of reference—a channeling of David Hume, for her it is not so easy when

game/gaming [geɪm/'geɪmɪŋ]

navigational strategy and tactics brought to the eye-hand-fingertips of the players, no longer driven by individual (human or otherwise) 'perception'.

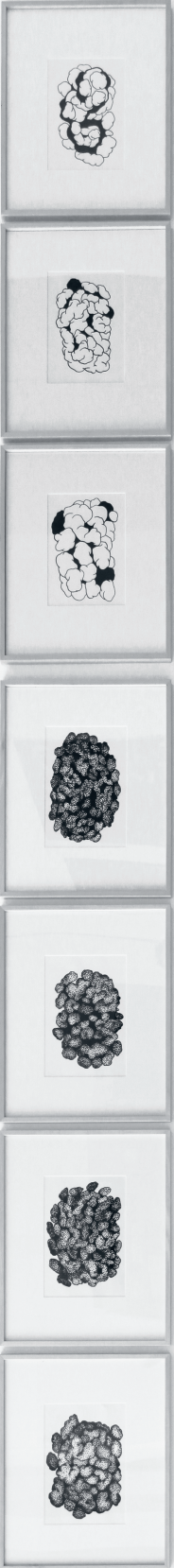


Fig. 3: Parasequence no. 2: Sticky, sticky, sticky... sticky! (420 x 520 mm x 4 panels, 2019)
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one is—as she might say if she were actually able to speak: quadrupedal. Mind you, when caught in such intense moments of thinking, when building up to all those eureka moments of thought, one must be careful not to fall into the marshy ground beneath our feet for if such ground gives way one may never regain one’s footing and those who pass us by, as experienced by Hume himself, may never come to help. She stands there looking up through our shared mingling breath as if she too is party to such meandering thoughts, but as we walk across the bright yellow carpet of sycamore leaves, all grounded now, she suddenly stops in the posture of alertness, tail straightened and pointing to the sky, head up sniffing intently, the front left paw lifted. Hers is a state of readiness.

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It is slippery underfoot but later in the day we walk across the field again toward the place where the starlings (*Sturnus vulgaris* to give them their Latin name) gather, sit and chatter before they roost. They look down at us as we pass by, whispering to each other just how small the human is (from their perspective high in the trees), and as for that dog, they say... (the tone is that of derision) inflexible, they say, without talent, they say, for they, the starlings, have the talent of mimicry. They are renowned for mimicking the whistle of referees at football matches. They are mischievously intelligent birds.

²⁴ Cf Craig Reynolds (1987), *Simulation of 'boids'* at red3d.com/cwr/boids. 'Boids' is the name he gave to his computer-generated creatures.

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Since the late 1980s scientists have used computational modelling to unravel the secrets of their aerial displays and while they can tell us how such murmurations (Fig. 2) come to be, it is less clear why these spectacles occur.²⁴ In the early 1900s, Edmund Selous (a leading ornithologist of the time), suggested that “the birds have psychic powers that [help] them to avoid collision but it is hard to deduce the truth of the matter, for the starlings themselves refuse to explain their rationale (psychically or otherwise).”²⁵ Sometimes though, I wonder if Selous was a theosophist, a scientific spiritualist, a friend of Madame Blavatsky, Hilma af Klint or indeed our very own Conan Doyle. Of course, it may simply be a matter of predation, the more birds there are in the flock the more likely they are to survive, with those at the edges moving position into the middle to avoid being

²⁵ Cf Edmund Selous (2015 [1901]), *Bird Watching*, (London: J.M. Dent), at gutenberg.org/files/50175/50175-h/50175-h.htm

Fig. 4: Becoming Figure, becoming ground no. 2 (oil on canvas, 400 × 500 mm, 2018)

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specifically targeted as prey. The elegance of folding in. It may also simply be a raucous gathering that takes place when other flocks arrive from more northerly locations, for in the depth of the murmuration—often of ten thousand birds or more—these complex entangled (yet apparently coordinated) lines of flight, there is said to be the generation of bodily warmth. Small pockets of bodily warmth as if each bird is itself an electrical source of transmission, some corporeal expression of the becoming of thought, for here we might say that thought is looming indeed loaming like so many particles of dust in the air beneath their wings.

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Starlings are, of course, exhibitionists, skillful show offs of the highest degree, ‘experts’ some might say, perhaps in the Heideggerian sense, and after much preening and stretching of their silver speckled wings they rise up into the air. They decide to rise above them, the human and the dog, into the sky on masse into a glimmering glistening shimmering silver flashing sight that cuts across the evening sun: they turn, they swoop, they tumble in all directions, shape-shifting in the air, across the sky, down and down and down and up and up and up and in and in and in and out and out and out and across the expanded visual field, for theirs is a time of ‘murmuration’, and murmuration is indeed the exquisite praxis of starlings: the exquisite collective murmuring lines of flight in which lines become nodes, singular points, insightful bodies of an expanded agency in near perfect synchronicity.

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Do not be alarmed: all this ‘creative speculation’ is not simply intended to be a metaphorical turn. No, for what I am trying to imagine here is a mobilisation of exquisiteness, an attempt to imagine an exquisite methodology: something structurally multi-dimensional, something aesthetically intense, something sensuous, indeed an intensification of practice in the making, a radical *jouissance* in which paraology, a paralogical-methodology, acts as a mode of deterritorialised *poesis*.²⁶

²⁶ The etymology of the word *paraology*, with its middle French, late Latin roots leads us to the Greek term, *paralogismos*, (from *paralogos*) meaning unreasonable. With this in mind should not all artistic research be unreasonable, unruly, challenging and curious? Unreasonable in the sense—less of building an argument—but perpetuating the argumentative as a *loci* of resistance.

And more: in which the epistemic object (or epistemic matter, for that matter) is that which is predicated on the contradiction of logical rules or formulas, something that contravenes the value placed on knowledge production, something that is other-intuitive. Not counter-intuitive, something less about knowledge acquisition than sensation—the intense surging of the corporeal perhaps—the phenomena of actually experiencing being in the moment of knowing, of forethought, of anticipation, of putting into play an aesthetics of *déjà vu*: some-queer-thing-ness: exquisitely ‘generative’ as Åsa Johanneson would say.²⁷ Something in which the not-yet-there, the emerging form, the pre-state (Fig. 3) gives rise to a kind of aesthetic rendering of genetic parasequences—the fleeting mesh of asymmetrical cycles, finite the multiplying data loams.²⁸ It speaks tactically and tactily to a form of transpositionality or perhaps a para- aesthetico-epistemic-transpositionality that holds things at an elevated distance. As Michael Schwab explores in his *Transpositions*:

“If an identity does not underlie a difference but may emerge from it, a new non-representational, transpositional logic is required in which something at its previous position is not easily reconciled with what appears at its new position, altered as it is by the move. We may also express this by saying that the logic of representation is singular, remaining the same across different instances, while the logic of transposition is multiple, needing to be transposed from instance to instance. The positional specificity that is part of trans-positionality—whether in space, time or otherwise determined—thus explains why it has been so difficult to approach transpositional operations philosophically, and why artistic research, which is sensitive to the specifics of what is at hand, may present new options not only for a bottom-up rather than top-down approach but also for an approach for which there is no ‘up’, only positions that result from movement.”²⁹ The ground is no longer ground, it is a terra infirma—a Venetian flood land in which there are no definable edges, a marshland in which one must wade and dive and perhaps, just perhaps, instinctively emerge in the realm of imaginary/imagined/invented meshes. This is nothing less than the exquisite methods of artistic research-practice itself, the realm of close making, the *ex-qui-site* multiplicity of a logic of sensation, of an insightful radical material practice and its groundless logics of cohesion (Fig. 4).³⁰

²⁷ Åsa Johanneson (2020), *Material-Ontology: Reconsidering the Measure of Queer in Photography*, (unpublished PhD Thesis, London: Royal College of Art).

²⁸ In Marine biology, parasequences are defined as “relatively conformable successions of genetically related beds or bedsets bounded by marine flooding surfaces and their correlative surfaces.” Cf UGA Stratigraphy Lab: *The Data is in the Strata (Parasequences)* at strata.uga.edu/sequence/parasequence.html. In the *data loam*, it is in-formed by the mesh.

²⁹ Michael Schwab (2018), *Transpositions: Aesthetico-Epistemic Operators in Artistic Research*, (Leuven: Leuven University Press), 1.

³⁰ Insight here, and with regard to the second definition of paraology, may well be conceived as a ‘reasoning disorder’ in which questions are met with what appear to be inappropriate answers or delusional speech, whilst attempting to make sense: the tacit realm of the arts.

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Historically (1565) the word *paralogism* leads us to the conceptualisation of a fallacious argument, an interesting conjunction in which the word fallacious that deemed to be mistaken, misleading, erroneous, untrue and mythical, is bound to that of argument in which reason, contention and claim are met by disagreement, dispute and squabble. Perhaps the word fallacious is in need of some rehabilitation, not purely because of its 'uousness' that may lead us to the sensuous, but because arguably in artistic research all such apparently treacherous words may be mobilised in the service of the project as it emerges. Indeed, one must be attentive to such things, to the corporeality of errors; for one sibilant slip of the tongue and we might well be in the realm of the fellatio, the *fellat-ious* argument perhaps, in which the murmuring of words and sounds pulsate.³¹ The murmuring of the opiate laced castrato, perhaps, whose pink milk bathing induces *becoming*. A moment of such Proustian intensity that one begins to sweat profusely, for this transgressive corporeal twist prompts yet another recollection, on this occasion the recollection of the serial seductions of the Duchess of Argyll as portrayed by the composer, Thomas Adès in his 1995 chamber opera, *Powder Her Face*.³² For, the coloratura soprano playing the lead role of the Duchess must expand her vocal performance, to one of superhuman agility, for she has the difficult task of maintaining perfect pitch whilst giving head: of singing with her mouth full. There is no doubt that the resulting vocal performance is one that all of the protagonists here would approve of, I suspect, with the exception of the more prudish of the starlings. Indeed, an exquisite moment of Foucauldian *self-fashioning*, an ethical practice if ever there was one. It is perhaps with such a conceptualisation of 'exquisiteness' that artistic researchers must be at their most attentive. We too are the dissidents of the normative sex-gender system, we too are the dissidents of the academy, we too are the multiplicity of the cosmos, and we too are shouting in front of you.

³¹ I imagine this is something the Canadian queer linguist, Henry Rogers (another Henry Rogers) might attest to in his exploration of phonetics and sexual orientation. Cf Ron Smyth, Greg Jacobs and Henry Rogers (2003), *Male Voices and Perceived Sexual Orientation: An experimental and theoretical approach*, (Cambridge: Cambridge University Press).

³² *Powder Her Face* by composer Thomas Adès, performed by Jill Comez, Valdine Anderson, Niall Morris, Roger Bryson, published on EMI classics, 1999. The resulting vocal performance is no doubt one that Joanna Freuh would relish.

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Oh! The proximity of distant thoughts.³³

³³ In the zoomi-verse of my studio (March 2020).

ghosting [ˈgəʊstɪŋ]

ghosting names a corporeal trace that is 'left' when the main event evaporates or is destroyed but still manages to produce an offset. freud famously clarified this via the role of the unconscious and the trace effect of trauma left on it by the experiences in everyday life. freud's simple example: take a wax block and paper. write something on the paper; pull the paper off the block—the paper has 'no trace' of the work, but the wax still have a corporeal impression. now shift this to computing wave functions: an offset may be produced when suddenly an interference pattern (like peaks and troughs destroying each other depending on whether they are in phase) are out of sync. the ghosting is born.

Diffractive Care and the Careful Accounting of It

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Introduction: Situating care

This essay proposes an understanding of ‘care’ that stretches from its daily use as in ‘committing’ or ‘getting involved’ to the ontological level: as the keyword for a philosophy interested in the emerging present as opposed to the timeless transcendental.¹ Such a care-based as opposed to identity-based philosophy is a methodological ideal to strive for: an ideal that belongs to whomever prioritises the sharing of passions / practices over the defence of identities. It stems from the crossing of continental philosophy, philosophy of science, feminist critical framework and queer theory.² It does not have one name. Arguably, it cannot have just one name, being that it is a way of thinking which avoids single origins. It can be called Agential Realism, Radical Matter, Diffractive care, Ecology of Practices, ecetera.³ Another reason why it does not have a name is because it does not have one author. Although, if it had one, that would probably be Donna Haraway, who first argued the need for a “successor science project [of] situated knowledges.”⁴ This is the theoretical ground from which we depart, but if the reader is not very familiar with it, she / he / they should not be discouraged, as on a practical level, care is something everyone knows and can relate to. We should start from that.

² Judith Butler (1988), “Performative Acts and Gender Constitution: An Essay in Phenomenology and Feminist Theory,” in *Theatre Journal*, 40, no 4, (Baltimore: Johns Hopkins University Press), 519–31; Barad, *Meeting the*

Universe Halfway; Donna Haraway (1988), “Situating Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective,” in *Feminist Studies*, vol 14, no 3, (College Park: Feminist Studies), 575–99;

Jean-François Lyotard (1996), *Peregrinations: Law, Form, Event*, (New York/Oxford: Columbia University Press); Ilya Prigogine (1996), *The End of Certainty*, (New York: The Free Press).

¹ This is part of a tradition of philosophy criticising what could be called classical ontology, that is, thinking according to the principle that reality is ultimately made of individual entities. Cf Karen Barad (2007), *Meeting the Universe Halfway: Quantum Physics and The Entanglement of Matter and Meaning*, (Durham: Duke University Press); Gernot Böhme (2001), *Asthetik. Vorlesungen über Ästhetik als allgemeine Wahrnehmungslehre*, (Munich: Wilhelm Fink Verlag, 2001); Donna Haraway (2016), *Staying with the Trouble: Making Kin in the Chthulucene*, (Durham and London: Duke University Press).

³ On Agential Realism see Barad, *Meeting the Universe Halfway*, 132–85. On Radical Matter see Johnny Golding (2018), “Friendship,” in L. Turner, U. Selbach and R. Broglio (Eds.), *The Edinburgh Companion to Animal Studies*, (Edinburgh: Edinburgh University Press), 262–73. On Ecology of Practices see Isabelle Stengers (2013), “Introductory notes on an ecology of practices,” in *Cultural Studies Review*, no 11, 183–96.

⁴ Haraway, “Situating Knowledges,” 579.

happiness [ˈhæpɪnis]

‘cry and you cry alone’. what a load of unequivocal tosh that has come to be. the world loves its sadness, its cruelty, it’s shame! any revolution that is missing happiness is not my revolution. ditto for dancing, long walks on beaches, sex games. mental note no 1: one does not have to be sad to be a militant, even though the thing one is fighting is abominable—so sayeth st foucault, early 80s. mental note no 2: happiness is a fundamental right for which people the world over are being tortured, imprisoned, drugged should they dare to break rank and ‘be happy’. cut to: sheikha princess latifa, hiding near the fire extinguisher.

⁵ See Stengers' principle of 'minor key responsibility' as the "need to decide in this particular case and not to obey the power of some more general reason." Cf Stengers, "Introductory notes on an ecology of practices," 188.

⁶ Cf David A. Kolb (2015), *Experiential learning: Experience as the source of learning and development*, (Upper Saddle River, NJ: Financial Times Press).

⁷ Golding, "Friendship," 263; "Whenever there is reciprocal capture, value is created." Isabelle Stengers (2010), "The Science Wars," *Cosmopolitics* vol 1, translated by R. Bononno, (Minneapolis: University of Minnesota Press), 36.

⁸ Donna Haraway (1997), *Modest_Witness@Second_Millennium.FemaleMan@Meets_Once-Mouse.*, (New York: Routledge), 71–94; Barad, *Meeting the Universe Halfway*.

⁹ Ilya Prigogine and Isabelle Stengers (1984), "Order Through Fluctuations" in *Order out of Chaos: Man's New Dialogue with Nature*, (New York City: Bantam Books), 177–212.

Care is the practice of savouring how subtle differences can make all the difference. It is the curiosity to see what will happen at each next step; the enjoyment of feeling at the same time both researching and finding; it is the availability to make space for the emerging real at the cost of reconsidering one's beliefs and priorities.⁵ Care is to be attuned to a practice that is so intense that knows no separated planning, making and learning.⁶ As a pursuit of intensity, care makes any practice a research. Or, to put it in a way that sounds less hierarchical, care is an umbrella term to think both the officially labelled practice-led research within academia and any other practice, inasmuch the latter is not instrumental.

A practice, based on care, starts from the small and the contingent and acquires relevance and validity by means of befriending its surroundings, without the need of a transcendental plane to justify its logic.⁷ However, we should not image such a process of befriending as if it were effortless or irresistible. As new sense to some extent must tear the fabric of common sense to establish its locality, caring comes with issues of communicability. When trying to speak of what one care for, one faces problems of translation, as if one were a returning expat. Such a translating effort can be painful, yet one cannot avoid it. As 'no man is an island,' no practice exists outside of an ecology of practices; one who cares cannot just care about one's focus of care. One also has to spread actively the mutation / anomaly that one's practice of care embodies. The question is: how to account for a practice we care for in order not just to represent it (care), but also to spread the specific care that informs its logic.

Understanding care through diffraction

In order to understand better what do we mean here with care, we should look at diffraction.⁸ In physics, diffraction describes the autonomous formation of new complexity / qualities out of the superimposition of waves that did not present such complexity / qualities individually. As described by Prigogine and Stengers, such self-emergence of complexity within out-of-equilibrium systems can become order and information independently of a masterplan, through mere self-repetition.⁹ According to diffraction, order / information is not transcendental but metastable: it emerges locally and temporarily without ever fully detaching from chaos.¹⁰

¹⁰ According to a wave-based as opposed to particle-based understanding of reality, metastable equilibrium

consists of a statistical recurrence of behaviours informing an ever-changing organisation.

Diffraction is particularly useful for researchers whose practices are not structured as if learning / finding was the successive and final moment of a process that sees making / researching as a mere stage of production, which is what the epistemological paradigm of reflexivity implicitly assumes.¹¹ While reflexivity presupposes that constructions abstracted from the embodied sensuousness should receive more credit than the embodied sensuousness itself (that is, that which makes sense in the moment, the sense that is the moment), the paradigm of diffraction provides an analytic way of describing reality by exalting sensuousness. While the epistemological paradigm of reflexivity understands knowledge as the extrication of an algorithm from a logarithm, or the transcendence of the discursive from the material, the onto-epistemological paradigm of diffraction surpasses the traditional matter / form ontological divide (as such, a divide does not apply to waves). It thus supports an understanding of research in which the inevitably blurring boundary between discursive and material is not an ambiguity to be hidden. Rather than considering the sensuous dimension within a research practice as an indication that knowledge had not been quite achieved, as form had not yet been extracted by the noise / contingencies of matter, the paradigm of diffraction celebrates the fact that the material and the discursive cannot be taken apart.¹²

Diffraction has an extraordinary emancipatory power when it comes to knowledge production. However, it also presents an epistemological and political problem. If one cannot exclude the possibility that what one perceives as some indistinct noise could be in fact information for someone else, who decides what is information and what is noise? In the absence of a universally generalizable reference, the only way not to settle for subjectivity and relativism but to claim objectivity of some kind is to respond that no one decides. It is the contingent relation between perceiver and perceived that causes information to happen. This claim is not pronounced lightly. It means conceiving agency as pertaining to situations and not just individuals, thus problematising at once the traditions of ontology, ethics and epistemology. In the next section objectivity will be presented as the capability to account for the contingencies that appear to be required for a specific information to happen.

¹¹ The spelling 'reflexion' follows Barad, which she conceptualises in opposition to 'diffraction'. Barad, *Meeting the Universe Halfway*, 29–30 and 71–2.

¹² On performative approaches as distinct from representationalism, see Barad, *Meeting the Universe Halfway*, 47–8.

¹³ On 'event' see Martin Heidegger (2002), "The Origin of the Work of Art," in *Off the Beaten Track*, translated by J. Young & K. Haynes, (Cambridge: Cambridge University Press). See also Lyotard, *Peregrinations* where he writes, "We will not ask [...] what is the sense of the event: the event is sense itself." 55. See also Haraway where she writes: "Situated knowledges require that the object of knowledge be pictured as an actor and agent, [...] never [...] as slave to the master that closes off the dialectic in his unique agency and his authorship of 'objective' knowledge," in "Situated Knowledges," 592.

¹⁴ Cf Barad, *Meeting the Universe Halfway*, 225 and 246; Haraway, "Situated Knowledges", 579 and 589; Stengers, "Introductory notes on an ecology of practices", 194; and Stengers, "The Science Wars", 32-33 and 37.

¹⁵ Cf the concept of 'emergence of self-organisation' described by the theory of complexity as an emergence with no origin. Cf Prigogine and Stengers, *Order out of Chaos*, 160.

This section argues that the information in question is not an object (emphasis on transcendental meaning), but an action: the information of both perceived and perceiver. Information is the intense relation that contingently establishes itself as an event, as well as establishing perceiver and perceived as part of an encounter or an instance of situated knowledge.¹³ As within diffraction identity is substituted by metastability and essence by performativity; information is not a message going from A to B, but emerges as a resonance from a statistical non-enclosable system entangled to it. Such emergence is not just epistemological, but also aesthetic, political, ontological.¹⁴ The emergence in question is not just information. It is also sense and existence.¹⁵

What is an 'emergence?' In statistical terms emergence is information, though many philosophers discuss it emphasizing its many different flavours. Deleuze called it a "difference in itself," or—with Guattari—an "anomaly."¹⁶ Lyotard wrote that it is something "pass[ing] for a-grammatical without [...] being nonsensical."¹⁷ Golding uses the image of a "singular multiplicity."¹⁸

¹⁶ For the concept of 'difference in itself,' see: Gilles Deleuze (1997), "Difference in Itself" in *Difference and Repetition*, translated by P. Patton, (London and New York: Continuum), 27-69. On 'the anomalous' see Gilles Deleuze and Félix Guattari (2005), *A Thousand Plateaus. Capitalism and Schizophrenia*, translated by B. Massumi, (Minneapolis & London: University of Minnesota Press), 244-5.

¹⁷ Jean-François Lyotard (2011), *Discourse, Figure*, translated by A. Hudek & M. Lydon, (Minneapolis & London: University of Minnesota Press), 138.

¹⁸ For 'singular multiplicity' see Sue Golding (2000), "Singular Multiplicity: The A-radicality Lecture-Second Meditation on Identity, Ethics, and Aesthetics [or What Does It Mean to 'inhabit' Technology?]," *Contemporary Culture and Aesthetics*, 10/11, (Maastricht: Jan Van Eyck Akademie), 286-292. Cf Jean-Luc Nancy (2000), *Being Singular Plural*, translated by R. D. Richardson & A. E. O'Byrne, (Stanford: Stanford University Press).

information [ˌɪnfə'meɪʃən]

when associated with data (where data represents values attributed to parameters) information enables categorising, archiving, and is fundamental to library sciences, search engines, apps and gaming. because it can provide (usually traceable) meaning, it can be extremely lucrative, that is monetarised.

Stengers proposes “cause;” Barad uses the neologism “intra-action.”¹⁹ Researching quantum mechanics, Bohr might have been the first one equating it to a phenomenon beyond the distinction between epistemology and ontology.²⁰ Borrowing from Lyotard, it can be referred to as “emergence with intensity,” since such a term can be easily related both to the perceived emergence and the emergence of attunement within the perceiver.²¹ That is, when and where the variously named being / becoming, appearance / substance, matter / form divide ceases to apply.²² Attunement cannot be limited to observation, not even in those cases where it appears to take place as pure observation, for example in an art gallery. This is because the intensity that is essential for attunement always radiates consequences. Attuned perception is always also attuned participation, for the attuned perceiver is always to some extent changed by the perception. Within the context of practice-led research and any practice of care in general, the intensity of attuned perception / participation can simply be called care. Care is intensity as seen from one end of an emergence of information / sense / existence. It is then a particularistic view of the tension that informs the carer as much as the carer actively commits. In its diffractive reconceptualisation, care is not to be intended as a series of actions performed by an attentive/careful subject. Care is not mastery. As argued by Stengers with reference to Whitehead, care could be pictured as “[...] a decision without a decision-maker which is making the maker[...] where] the gesture of taking in hand is not justified by, but both producing and produced by, the relationship of relevance between the situation and the tool.”²³ When opening oneself to incompatible co-presences and inter-fereces that know no synthesis, everything is suspended including one’s identity, grounding definitions and the need of an ideal horizon.²⁴

¹⁹ Karen Barad (2012), *Interview with Adam Kleinmann*, “Intra-actions,” *Mousse* 34, 76–81; Stengers, “Introductory notes on an ecology of practices,” 189.

²⁰ The term ‘phenomenon’ is not intended as oppositional to ‘noumenon.’ Following Barad, phenomenon can be understood as a synonym of event. Cf Barad, *Meeting the Universe Halfway*, 140 and 206.

²¹ “[W]hen one is ‘there’ (there where I do not think, as Lacan says), then it is indeed intensity, without intention, without a precise goal, which arises.” Jean-François Lyotard (1993), *Libidinal Economy*, translated by I. H. Grant, (Indiana University Press), 207.

²² Roland Barthes (1981), *Camera Lucida: Reflections on Photography*, translation by R. Howard, (New York: Hill and Wang), 72; Maurice Blanchot (1993), *The Infinite Conversation*, translated by S. Hanson, (Minneapolis: University of Minnesota), 321–2; Jean-Luc Nancy (2007), *Listening*, translated by C. Mandell, (New York: Fordham University Press), 5–9.

²³ Stengers, “Introductory notes on an ecology of practices”, 185.

²⁴ Lyotard’s concept of ‘paganism’, as judging without grounding such a judgement on a preestablished criteria, from which derives the contextual locality of justice in Jean-François Lyotard and Jean-Loup Thébaud (1985), *Just Gaming*, translated by W. Godzich, (Manchester: Manchester University Press), 16.

They are preceded by the emerging logic of the research / practice. This does not make the activity of the diffractive carer aimless, nor completely rudderless. The practice still attains critical / relevant / remarkable results. Only the concept of criticality relinquishes its traditional meaning of objectivity; that is a subject's ability of attaining objectivity (a supposedly pre-existing truth). It shifts to the ability of a proposition to make sense in itself, to embody enough intensity so as to be the embodiment of its own law (hence not judged outside of it). Within the paradigm of diffraction, being critical is being remarkable / relevant. It is to perform remarkability / relevance. On the one hand, intensity must become system within the context of sense—must make a difference within a system of differences—to leave a mark or to be. In other words, it needs to be accountable / perceivable to exist. On the other hand, intensity is creative, as it marks a difference that was not there, a dimension of sense that is radically new, as it has no singular origin.

Once having stepped outside of the variously named reflexivity / metaphysics of substance / classical ontology into diffraction, the criticality / remarkability / relevance of a practice is to be intended in terms of intensity of new sense as opposed to extension of pre-existing knowledge. Care does not identify its focus with an object of knowledge. Its focus is rather the paradox that moves the practice in the first place, in the sense of the intensity—the core of non-reducible complexity—that is at the heart of the practice / situated knowledge itself.²⁵

²⁵ “[P]aradoxes [...] are not contradictory; they rather allow us to be present at the genesis of the contradiction.” Deleuze, *The Logic of Sense*, 74.

Rather than using the research practice as a tool to discover something that is supposedly outside / independent of it, one probes the core of one's practice by trial and error, researching whichever differences are critical to it and how they happen to be so. This move does not close itself in a circle of tautological self-referentiality, because full identification is never reached. As far as curiosity sustains it, such a research practice can be truly practice-led, as it both chases and produces the differences it investigates in an open-ended way. This happens because each breakthrough in the research diffracts—that is reconfigures ontologically—the practice in question, rather than marking a further step in the process of identifying / objectifying it.

Care is the logic of practice-led research. Performing care or, in other terms, succeeding at keeping a research practice effectively practice-led, is meaningful in two ways. One is that it keeps one's practice intense / open / anomalous / irreducible. It means never to stop looking for the paradoxical core of one's practice. This is critically important for practitioners in order to resist identity-based logics of production that so often characterise neoliberalism. The second one is that it means propagating the locality of sense of the practice.²⁶ Never stop looking for better accounts of one's practice enhances the possibilities of the latter to expand its locality of sense. That is, the locality within which the differences that are critical to its logic are relevant / remarkable.

An excursus on evidence-based science as practice-led research

It might appear as if conceiving of one's practice in terms of care is useful only for practice-led researchers that risk seeing their academic status questioned. One could be tempted to say that a paradigm describing knowledge that celebrates the production of new sense over the extension of pre-existing sense is just a tool for outsiders. Things are not this simple. Even some branches of what has been the core model of modern academia—that is, evidence-based science—have embraced a methodology of care. In the move from Newtonian physics to statistical mechanics, as well as within the development of quantum mechanics, a few scientists have radically questioned the ontological ground of reflexive epistemology upon which the traditional image of academia as a positivist / encyclopaedical enterprise is premised.²⁷

Building on Barad, Haraway and Stengers, this section argues that if the essential job of a scientist is to discover, such discovering is not the uncovering of some reality but to account for their experimental practice. It is only by persuading their colleagues that their experimental practice is indeed 'practice-led' as opposed to 'hope / prejudice-propelled' that they can propose their conclusions as discoveries rather than self-referential creations. Accounting, or the practice of abstracting without losing sight of the contingency from which the abstraction has started, is what science does. Beginning with Bohr, some scientists facing profoundly contradicting results that were produced by means of different measuring devices have performed care

²⁶ Locality of sense is what Paganelli names as 'open finitude,' Stengers as 'constraints' and Barad as 'constitutive exclusions'. Cf Stengers, *Cosmopolitics* vol 1, 43; Cf Karen Barad, "Quantum Entanglements and Hauntological Relations of Inheritance: Discontinuities, SpaceTime Enfoldings, and Justice-to-Come," *Derrida Today*, 3.2 (2010), 254; Cf Mattia Paganelli (2016), "Finitude, Possibility, Dimensionality; Aesthetics After Complexity," (unpublished PhD thesis: Birmingham City University), 146–175.

²⁷ Barad, *Meeting the Universe Halfway*, 66–70; Stengers, "The Science Wars", 38; Mattia Paganelli (2017/18), "Ontology Interrupted: Prigogine, Stengers and the Abdication of Physics," in *Pulse: a History, Sociology & Philosophy of Science Journal*, no 5, 46–69.

²⁸ On Barad's arguments against the traditional understanding of objective truth, first with reference to Bohr's indeterminacy principle or what Bohr names 'quantum wholeness' and then in view of the experimental tests of Bell's inequalities and the experimental finding in the 1990s.; see Barad, *Meeting the Universe Halfway*, 118, 261, 289–292 and 306.

²⁹ On the ontological difference between Heisenberg's uncertainty principle and Bohr's indeterminacy, Cf Barad, lvi, 115–8.

³⁰ Barad, lvi, 139.

³¹ Haraway, "Situated Knowledges," 583.

towards their practices to the point of rethinking the meaning of their profession entirely.²⁸ As not to betray the experimental method, they have let go of the reassuring promise that a unitarian picture of reality awaits the scientific enterprise.

Rigorous experimental practice has shown them that there are some instances where the source of disagreement among measuring *apparata* cannot be reduced to an epistemological issue.²⁹ They needed to conclude that some phenomena resist being treated as the symptoms of *noumena* endowed with individual existence. Instead, they demand to be recognised as "ontologically primitive relations—relations without pre-existing *relata*."³⁰

Science has taken the leap of reconceiving reality away from the cornerstone of Western philosophy, namely the metaphysical substance / appearance divide. Even without a shared ontological ground, a new understanding of objectivity can be established upon a shared methodological commitment to rigorous scientific accountability. Indeed, if everyone agrees on the deontological level regarding how to make reliable research, knowledge claims can be true or can demand to be recognised as true even without positing the existence of the one transcendental objective reality.

From this shift come gains and losses. On the one hand, science has its positivist dream of approaching a God-like view of everything critically questioned, if not shattered. On the other hand, this disenchantment means that researchers are not expected to pretend being in an impossible detached / disembodied relation towards their object of observation. Instead, within this 'reformed' science, the partiality of their perspective comes to the centre of their accounting. Indeed, as Haraway points out: "only partial perspective promises objective vision."³¹

Given that for evidence-based science the possibility to repeat a given experiment is at the basis of any knowledge claim, the scientific status of some research depends on how well it manages to account for itself: on how rigorously it manages to situate its knowledge claim. These are not accounts of specific experiences, but phenomenological recipes that propose some general conditions of intentionality, proximity and definition that appear to be entangled with the emergence of a determinate kind of phenomenon. Their degree of objectivity depends on the inclusion of all specifications that are

deemed useful for the sake of re-enacting the conceptual and material apparatus through which the encountered/measured phenomenon had emerged, as well as on the exclusion of all impractical details. When objective accounts—that is, accounts that deserve being treated as true—disagree at an ontological level, a common truth must be conjured up by means of diplomacy. Stengers argues that this truth in the diplomatic sense is whatever happens to allow ‘communication between diverging parties’ without having their divergence flattened out.³² It is an agreement over their way of agreeing and disagreeing that allows mutual recognition as scientists, and—more generally—as agents capable of rational knowledge claims. This diplomatic conception of truth is real and viable by being contextual: it works as such only insofar as everyone that is involved keeps in mind that the latter cannot be detached from the material contingencies of the debate within which it has emerged and of which it is constituted.³³

³² Stengers, “Introductory notes on an ecology of practices,” 194. See also the concept of ‘factishistic proposition’: Stengers, *Cosmopolitics* vol 1, 24.

³³ Haraway, “Situated Knowledges,” 593.

Accounting and knowledge claims

It was seen that when scientists producing profoundly contrasting results meet, mutual recognition of rationality / objectivity can be assured solely by the fact that their experiments are accounted for in a way that the latter can be successfully repeated. In the absence of a shared ontological ground, one cannot afford taking for granted one’s foundational assumptions, so the image of what an objective account should look like is turned on its head. Indeed, in these cases being responsible for one’s contingent proximity is the way to enhance the objectivity/repeatability of one’s experiment account, while having one’s account looking objective by pretending neutrality undermines actual objectivity / repeatability.

From this derive two fundamental points. The first is that if not even evidence-based science can afford presenting their findings as self-evident facts, someone operating outside of an experimental setting cannot be satisfied of employing care only in relation to the focus of one’s research. One must employ care also when accounting for the focus of one’s care to others holding conflicting results / different sensibilities. The second one is that, albeit not all practice-led research is evidence-based science, a piece of scientific research can be universally recognised as such only by demonstrating being

a practice-led kind of research. As for the first point, it is clear why a practice-led researcher that is employed by academia must put an extreme effort into accounting: one's sustenance depends on the passing of one's research as a contribution to knowledge. But if the practice-led researcher in question happens to be an independent practitioner of a practice of care, why should accounting for one's research be a priority for her / him / them? Indeed, when encountered by the core of its locality of sense, a practice is already fully knowledge.

"[K]nowing does not require intellection in the humanist sense. [...] In some instances, 'nonhumans' (even beings without brains) emerge as partaking in the world's active engagement in practices of knowing. Knowing entails differential responsiveness and accountability as part of a network of performances. Knowing is not a bounded or closed practice but an ongoing performance of the world."³⁴

³⁴ Barad, *Meeting the Universe Half-way*, 149.

Here Barad proposes a conception of 'knowledge' that can hardly be differentiated by 'capability of living.' By blurring such a distinction, she suggests that abstraction is not ontologically different from other strategies of survival and development. Not only abstraction is just one way for a practice of care to spread its logic, but the essential one would be another: fascination. Care is a cohering of intensity with no ground/*telos*. It does not rely on any justification or endorsement. To exist, it must communicate itself without communicating anything beyond itself.³⁵ So, why commit to rigorous accounting?

³⁵ "[T]o speak poetically is to make possible a non-transitive speech whose task is not to say things (not to disappear in what it signifies), but to say (itself) in letting (itself) say [...]" Blanchot, *The Infinite Conversation*, 356.

Albeit not required for a practice of care to exist or—in other words—to be knowledge within and around its locality of sense, there are two reasons why those who deeply care for a non-scientific practice should not dismiss the importance of contributing with a linguistic account that strives to be objective; that is, responsible of its method and partiality / situatedness. One reason is defensive: in view of the fact that the dominance of a specific practice eventually results in the imposition of its abstracting principle / interpretative key onto other practices, it is in the interest of anyone who cares for a practice to develop autonomous ways for it to be accounted.

What triggers the attempt to produce an account of one's own is the concern that the logic one is invested in is crucially constituted of a materiality whose sensuous charge would be significantly

instant [instant]

an awkward and yet profound naming for both the shortest moment of time and a slice of duration. 'instants' cannot be 'perceived' as such; it just 'is'. a formal instant also functions as an axiom in mechanics.

deteriorated in case of being compressed / homogenised to the given standards of communication.

The second reason comes from hope. It surges as moral responsibility towards institutions, which, despite their imperfection, play a unique and foundational role in our complex mass society / societies. The fact that some evidence-based science has discovered itself to be ontologically practice-led opens to the possibility that increasingly greater localities of academia will embrace a more inclusive understanding of knowledge, thus proceeding with emancipatory agendas. However, this can happen only so long as all parts commit to account for their logics in the most accessible ways. Rather than blaming academia for not having sent some expert like an anthropologist to put one's locality of sense into their maps, or blaming the expert that did come to map the core of one's care for the inevitable inaccuracy of their account, one should take up the responsibility towards hypothetical readers from unknown other localities of sense and strive for having one's practice speaking for itself with reference to already institutionalised knowledge. Contextualising and interpreting one's practice by referencing institutionalised abstract knowledge is act of responsibility / care towards both one's practice and the bigger systems within which one operates. However, such an attempt of self-legitimation is not free of risks. It might fail to be self-emancipatory and turn in its opposite, especially if an individual's effort to represent a certain practice becomes a profession. One should keep in mind the ultimate scope of the accounting enterprise. Which is not self-representation, but propaganda; that is the propagation of the logic one cares for also—but never exclusively—by means of representing it by analytic speech.

The second point brings to the fore the issue of differentiating evidence-based scientific practice-led research and other kinds of practice-led research with reference to the issue of counting as knowledge. If evidence-based science can be truly such only by being practice-led research and showing it, the difference between scientific and analytic-but-not-properly-scientific research is a technical one. As has been argued, the difference is not in the kind of care that it is infused in the practice, but in the way of accounting for it. Evidence-based science grounds itself by defining its experimental setting. The whole research practice is built from the start to

be accounted for, so that output—that is, that which is presented as the discovery—and methodological account are one. It is thanks to this tight methodological ground that the claims of peer-reviewed evidence-based science is considered objective and pass automatically as knowledge also outside of the circles within which they can be properly evaluated.

Without a constant reference to the experimental setting, other forms of research cannot present themselves as fully responsible for their methodology; often referred to as ‘just research practices’ or ‘soft sciences,’ not properly as science. However, this does not mean that research practices that cannot be executed within a lab and according to comprehensive protocols cannot be publicly valuable. They can make the case of having their situated knowledge recognised publicly only by virtue of presenting themselves as ‘analytic.’ That is, by the ability to repeat an experiment as the proof of scientific status and therewith new knowledge. While an account is scientific by means of proving its repeatability / generalisability within the most clearly defined context / measuring apparatus, in the absence of a this kind of metric an account is considered analytic when succeeding at describing—with the contextually most appropriate degree of detail—all the differences that are reasonably seen as essential.

For analytic research practice, striving for accountability is an indissolubly creative / critical feat. It is creative, because the benchmark of what is reasonable could potentially be renegotiated at every turn. Indeed, in the impossibility to have a methodological ground that can be universally shared among researchers, a research practice accounting for itself needs to constantly ask itself what is the contextually most appropriate backdrop for its claims and the answer might vary with each and every claim. It is critical, because one needs to be capable of responding about the methodological variation one adopts. The deontology of an analytic account comes from being responsible for the language that it is used. Rhetoric tools are useful and needed. However, they must be used to enhance that which matters, not to hide that which might not fit one’s narrative. The pretension for non-evidence-based research practices of being treated as knowledge of public interest derives from this commitment to use the materiality of the discourse for clarifying and not mystifying. Ultimately, this is a commitment that grounds care within one’s research practice over one’s will to have an impact.

Another way to look at the difference between an account that is recognised as properly scientific and one that is just analytic is in terms of reliability. The first one must present itself as objectively reliable within an objectively defined context, while the second one must appear reasonably reliable within a reasonably generalisable context. Both are reliable by virtue of having their main claims backed up by being verifiable in practice and/or echoed in literature that is considered reliable. The more a community of researchers trust their methodology to be evidence-based, the more the conclusions of one of their accounts have the power to establish themselves even when they go against common sense and the scientific tradition on the topic. Similarly, the more a field of research perceives itself as scientific; the least common it is for accounts within it to try in fascinating the reader, as they would demand to be interesting for their content exclusively. This pretension of being interesting without the effort to fascinate is a direct consequence of grounding one's claims on the experimental setting. In theory, one would assume that accounting for the experimental setting in the most comprehensive way is the only objective way to establish a common ground with the reader, thus the only way to communicate. However, in practice, it is not always the case that a comprehensive account suffices to ensure communication, especially if one cannot pin down a promise of instrumental gain right in the abstract of the account or when a piece of research is particularly anomalous/innovative. Before some content can be properly assessed, the possibility for an account to be relevant depends on its capability to fascinate. Before one can judge whether a piece of research really is interesting, its account should be capable of suspending the reader's disbelief for as long as it takes for its logic to be unfolded and/or enacted.

While science maintains its credibility at a public level by operating as if their knowledge claims were objectively universal (by means of a shared commitment to the experimental method and—once the latter produces non-integrable accounts—diplomacy), accounts of analytic practices are rather grass-root. They become knowledge without the need of referring to a supposedly unified horizon of truth: their way of achieving relevance is by expanding their locality of sense in any possible direction, one encounter after the other. Such accounts are real the moment their descriptions become prescriptions for the

³⁶ One of the most powerful instances of this is the influence that Georgian romantic novels had on British society and, consequently, on the West. Cf BBC (2015), *A Very British Romance with Lucy Worsley*, at bbc.co.uk/programmes/b06h1fys

³⁷ Cf Barad, *Meeting the Universe Halfway*, 33.

³⁸ See Borges where he imagines languages without nouns, constructed upon an ontology of becoming rather than being. Jorge Luis Borges (1964), "Tlön, Uqbar, Orbis Tertius," in *Labyrinths Selected Stories and Other Writings*, D. A. Yates and J. E. Irby (Eds.), (New York: New Directions Publishing Corporation), 20–33. Such a shift in favour of verbs means a move away from the use of the verb "to be" as the verb entangled with the metaphysics of substance. Cf Eric A. Havelock (1986), *The Muse Learns to Write. Reflections on Orality and Literacy from Antiquity to the Present*, (New Haven and London: Yale University Press).

fascinated audience. It does not matter if the moment of fascination lasts only a moment, as attunement is an epicentre of change irradiating consequences that can never be tracked in full. What matters is that the intensity of the account had sparked new sense, thus reconfiguring the existent.³⁶

On the limits of written accounts

As for the present account on accounting for what one cares to be analytic/reliable, it is necessary to look at the genetic limits that constitute such a practice, thus showing its functioning not only for its potential, but also through the difficulties that shape it. As far as accounts are intended in terms of verbal communication, the main difficulty is to keep the account consistent with the logic of diffraction that characterises research / practices of care. The difficulties that will be considered here are the ones that I have encountered in the attempt to invent a language that could allow my own research / practice to communicate its material/dense logic.

The main problem in accounting for practices invested in care is that natural languages have a propensity to systematically objectify phenomena / complex systems / intensity. As for a start, natural languages largely rely on nouns—which are particle-like entities—and on the actions that they perform. Thus, they embody the opposite logic of that of statistical mechanics and diffraction, where there is no basic unit endowed with individual identity, but only relations informing metastable *relata*.³⁷

One linguistic adaptation that could be of help, would be to limit—if not abolish—the use of nouns.³⁸ Verbs in their participle mode would need to take up the roles of subjects and objects: present participle would be used for subjects and past participle for objects respectively. Also, the use of verbs in the infinite mode would be avoided, as that turns them into nouns. All flavours and specifications would be conveyed by means of adverbs, adjectives attached to participles and by clustering participles together. A second linguistic adaptation would be less grammatical and more tactical. To avoid monodirectional agency / linear causality, one should try to balance the directionality of a transitive verb with another one going the opposite way, either in the same sentence or in one of the following ones. A third linguistic adaptation to try evoking the non-objective presence of intensity / a

phenomenon is by means of presenting a string of propositions punctuated by commas, colons, semicolons, dashes that partially negate each other without opposing each other. Here is an example of writing that makes use of this technique:

“An event: what nevertheless does not arrive, the field of non-arrival and, at the same time, that which, arriving, arrives without gathering itself in some definite or determinable point—the sudden arrival of what does not take place as either a single or a general On the limits of written accounts-possibility.”³⁹

Through this string of ‘non-dialectical negations’, Blanchot succeeds in evoking the paradoxical nature of a something that holds attention by resisting objectification. But how far can this strategy go? The problem is that the very linearity of speech produces string-like connections among words. In Blanchot’s text one negation leads to and resonates with the following one or two, not with all of them at the same time. Thus, the length of the text is inversely proportional to its potential of evoking whole phenomena / complex systems / intensity in their width. Moreover, already with entities-based ontology the need of sequencing information makes it difficult for both the reader and the writer to hold together both the detail and the whole picture as the latter grows. When it comes to complex systems and metastable / intense structures, such a difficulty is aggravated exponentially by the fact that the addition of every new specification does not just translate into the adding up of details to some picture that has been already consolidated in the memory. Instead, to some extent every new addition should reconfigure the whole of what has been described up to that point (as it happens when one adds a colour onto a painting).

Furthermore, being that there are limits to the complexity that one can contemplate at one time, at some point one must bracket forcefully the irreducible complexity of an intensity / phenomenon and move on considering more. One could use a cautionary signposting such as ‘x-ish’ for bracketing some complexity and referring to it without the need of contemplating its unique and complex functioning all the time. Yet, despite the cautionary ‘-ish’ addition, sooner or later the habit of handling ‘x-ish’ as a particle-like entity overwrites the memory of the radically heterogeneous intensity it represents. This is what happens when the phenomenology of an intensity’s

³⁹ Blanchot, *The Infinite Conversation*, xiii–xix.

irony [αιαράνη]

a flattening of disagreement, without physical violence. sometimes funny, usually not.

⁴⁰ Jacques Derrida (1994), *Spectres of Marx: The State of the Debt, the Work of Mourning, and the New International*, translated by Peggy Kamuf (New York: Routledge), 29.

⁴¹ Cf Albert Camus (1991 [1942]), "The Myth of Sisyphus," in *The Myth of Sisyphus and Other Essays*, translated by J. O'Brien, (New York: 1st Vintage International), 119–123.

⁴² On the *différend*, see Jean-François Lyotard (1988), *The Differend: Phrases in Dispute*, translated by G. Van Den Abbeele, (Manchester: Manchester University Press), xi.

⁴³ The discontinuity that is at play in the gap is that of paradoxical difference, not that of opposition. Lyotard, *Discourse, Figure*, 132.

unique functioning remains for too long implicit and the recurrent resorting to the noun 'phenomenon' or 'practice' ends up objectivising the latter. In view of these two points, it can be seen that—irrespective of how one constructs language—the very action of building an argument implies "wounding the dis-jointure, the dispersion, or the difference" and "effacing the heterogeneity of the other."⁴⁰

Accounting for practice of care has been described as a Sisyphian, absurd practice that strives to translate phenomena / intensity verbally, despite such a translation always implies some degree of objectification.⁴¹ The limits that have been identified make all the more pressing to define in positive terms some precepts by means of which clarity of speech—which is ideal for an account—might not lead to forms of objectifying comprehension / identity-based thinking.

Despite such precepts are impossible to abide by (being it impossible to succeed in unfolding an intra-active metastable system linguistically), it might be the case that the identification of such ideals can nevertheless be helpful. It might orientate one's efforts in sharing what one cares for regarding a phenomenon / practice / intensity. First impossible precept: the account must have a good rhythm.

An account is made of sequenced details, but it is paramount not to dwell for too long on any of those, as one might lose sight of the overarching structure. Second impossible precept: no detail should be identified as a thing but as an instance of discontinuity. This

happens as the phenomenon/practice is presented in terms of a singular multiplicity of 'differences in themselves' that intra-actively interfere with each other without the possibility of a synthesis (as in Lyotard's *différend*).⁴² Third and last impossible precept: one should focus on the gaps a system affords without ceasing to be a system.⁴³

Or, in other words, one should never try to identify the phenomenon / intensity in question when accounting for it. Instead, one should try identifying that which is paradoxical in its functioning, as only a paradox can originate/ground a discourse that must not be reducible to a singular origin, i.e. identified with a particle-like entity.

Perhaps the only way to realise these impossible precepts is to evoke a certain phenomenon / practice / intensity by means of creating an artwork, thus by means of another phenomenon / practice / intensity. Such a form of 'artistic accounting' challenges both the limits of what an account can be and what an artwork can be, as communication

and art cannot be made to coincide.⁴⁴ An instance of phenomenological accounting can become itself a phenomenon inasmuch as the sensuous logic of what it must be accounted for diffracts with the sensuous logic of the medium employed, thus producing unexpected evocative lateral relations. Merleau-Ponty comes to the conclusion that that would be the only form of philosophical speech that could not fail in the ‘absurd effort’ of ‘put[ting] into words a certain silence [the philosopher] hearkens to within himself’ (that is, what I have called intensity).⁴⁵ In his words:

“One has to believe [...] that there is or could be a language of coincidence, a manner of making the things themselves speak [...]. It would be a language of which [the philosopher] would not be the organiser, words he would not assemble, that would combine through him by virtue of a natural intertwining of their meaning, through the occult trading of the metaphor—where what counts is no longer the manifest meaning of each word and of each image, but the lateral relations, the kinship that are implicated in their transfers and their exchanges.”⁴⁶

These ‘lateral relations’ are poetic inventions. That is, moments where the account appears simultaneously at the centre of a plurality of systems of sense, thus enacting superpositionality of sense rather than mere potential polysemy.⁴⁷ Rather than being at a crossroad of potential meaning, there the discourse defies its own linearity and appears to take two or more directions at the same time or to be in non-coincident places at the same time. Such moments of irreducible complexity make sense before subjectivity can perform itself; before there can be a judgement and—with it—a subject. When the operation works, when the account works as an artwork, a propagation of the reality/intensity of the phenomenon is directly lived/re-enacted rather than linguistically represented.

Good teaching, free teaching and epistolary essays

The previous section concluded that only the paradoxical non-opposition of the sensuous and the analytic that happens within the taking place of poetical evocation can succeed in accounting for a phenomenon/practice. However, relying on *poesis* does not amount to a viable precept for accounting practices of care, as the emergence of new sense creates its own conditions of possibility only *a posteriori*.⁴⁸

⁴⁴ On the impossibility to treat a book as a document and as a piece of literature at the same time, see Vladimir Nabokov (1982), *Lectures on Literature*, F. Bowers (Ed.), (New York, London: Harvest), 1–2. Referring to literature, Blanchot writes: “The writer speaks a tongue [that] has no core and reveals nothing.” Maurice Blanchot (1982), *The Sirens’ Song: Selected essays by Maurice Blanchot*, translation by G. Josipovici, (Brighton: Harvester Press), 102.

⁴⁵ On diffraction as laterality, see Maurice Merleau-Ponty (1992), *The Visible and the Invisible. Followed by working notes*, edited by C. Lefort, translated by Alfonso Lingis, (Evanston: Northwestern University Press), 125.

⁴⁶ *Ibid.*

⁴⁷ On the use of quantum superposition within the context of the logic of the senses see: Golding, “*Friendship*,” 272.

⁴⁸ Derrida writes of the *a posteriori* as acknowledgement of the happening of a “non-negative impossible” – which “is a thinking

of the event ([...] in its unanticipatable coming, *hic et nunc*) that resists reappropriation by an ontology or phenomenology of

presence as such [...]” In Jacques Derrida (2002), “As *If It Were Possible* ‘*Within Such Limits*’ ...”, in *Negotiations: Interventions*

and *Interviews, 1971–2001* edited and translated by E. Rottenberg, (Stanford: Stanford University press), 367.

Indeed, *poesis* is something that happens precisely by breaking expectations, not something that can be punctually planned and executed as part of a procedure.

Hence, should this quest end with an *aporia*? Should I conclude—in a way akin to Derrida—that the only possible way of accounting for what one cares is by means of the more or less casual taking place of an impossibility, of something that is impossible up until it happens?⁴⁹ Not necessarily. By rethinking knowledge diffractively, the meaning of knowledge production shifts from the capability to abstract from the sensuous to that of responding to it by means of establishing the axes of sense that appear more likely to configure it in a sustainable / inhabitable way. With this notion of knowledge production in mind, it appears that accounting for what one cares does not need producing an entity-looking output at all. Searching for the characteristics of a hypothetical perfect account might have concealed distracted the fact that the practice of abstracting without losing sight of the contingency from which the abstraction has started might be called accounting, but not exclusively so. This definition also applies to good teaching or free teaching.

⁴⁹ Ibid, 344.

Free teaching or good teaching can be a community of peers that make up a recurring assembly of researchers/practitioners. It is composed of people that share enough common ground to communicate and differ enough from one another to produce unpredictable—thus lively—conversations. Free / good teaching also happens in structured contexts, but only when a teacher and one or more disciples are attuned to the conversation they are having, so that reflexive issues such as learning objectives and objective evaluation become temporarily irrelevant. When it happens—and I would like to think that it does happen to most people at least once—free / good teaching meets all three of the impossible precepts for a perfect account. As for starts, free / good teaching has a good rhythm, as intensity sustains it. As for the second precept, it makes the disciples and peers inhabiting the topic, in the sense that during the time in which the intensity of teaching suspends subjectivity, the material-discursive logic of the topic becomes an architecture (a singular multiplicity of differences) in which for them to dwell. As for the third precept, the ultimate goal of free/good teaching is not to represent some knowledge, but to diffract the knowledge it proposes with the functioning of each disciple / peer,

jazz [dʒæz]

atonal, wild, soulful. hated by adorno, the font of inhabiting / surviving / inventing freedom from the slave fields of America. famously pioneered around 1895 by buddy bolden in new orleans, it made its way north—via voice, sax, piano. billie holiday, eliza fitzgerald, nina simone all iconic poets of this powerful improv, rhythm, beat. it has bled into the world of painting, architecture, writing, performance. it is central to re-inhabiting information/data 'differently'—with a form of aliveness that matters, that creates matter.

thus making the topic dissolve into competence and further practices. This means picturing the teaching process not just as knowledge transmission (as in a distribution of notions) but as knowledge production; that is a transformation of the parties involved by means of the establishing of new sense / practices / intensity. A major limit of free / good teaching is that it requires time for people to get acquainted. This reduces its capability to address the public sphere directly, thus being inclusive at a public level and on a global scale. To some extent such a limit should be accepted, as no message can be relevant to everyone. However, this limit also entails a problem to be solved. Indeed, if a group devoted to knowledge production becomes uninterested in the public sphere, it means that it has become victim of a totalising narrative.

Perhaps one way to bring to a public level part of what happens around the table of an intense research seminar or class would be to rethink publications as public letters (or public video messages) to specific people that are addressed as friends.⁵⁰ As long as these outputs are genuinely intended to be part of an epistolary and interested in knowing a different point of view not as part of a dialectical power-game but according to care, this could be a way to perform diplomatic truth. Thus, such public discussions could balance off the moral duty towards institutions to make contributions to knowledge at a public level and the need to keep the logic of one's research outputs as consistent as possible to the logic of care that originated them. As care is situated openness, it makes sense for contributions to knowledge that are intended for a public audience to be first of all fragments of a caring discourse among friends that stand on partially overlapping and partially diverging localities of sense. Publicly contributing to knowledge can be a diffractive practice among people that befriend each other by giving value to their disagreements as much as they do to their points of contact. However difficult to be sustained, this multi-focal emergence of knowledge taking the shape of a public symposium/seminar where participants commit to be more interested in learning from the other than teaching one's truth to the other is an alternative model to the one where a disembodied author speaks to a public of disembodied readers.

⁵⁰ John Lysaker, "Philosophical writing should read like a letter," Sam Dresser (Ed.) at aeon.co/ideas/philosophical-writing-should-read-like-a-letter-written-to-oneself

Conclusion: 'Care politics'

Attempting to share and account for what one cares for is fundamental both on a small and great scale. At a small scale, I use the word fundamental in the sense that in the absence of an ontological ground, to care and to try sharing / accounting for the focus of one's care can provide that sense of meaningfulness metaphysics had given to many people. At a greater scale, to care and to try sharing / accounting for the focus of one's care is fundamental because it operates as a cohesive force within a system, as gravity.

When the focus of one's care is effectively shared, *relations become stronger than boundaries*. This does not mean that boundaries cease to matter. On the contrary, caring is not to confuse oneself with what is cared for, nor it is to equate everything one cares for. Rather, it is to be attuned to the differences that matter to / constitute that which is cared for. In this sense, care is not in opposition to representation and social structures. Care values boundaries, gaps and distances, as these constraints construct reality.⁵¹ Claiming that within care relations are stronger than boundaries is to indicate that care happens when such limitations are not exclusionary barriers, but constraints that shape the flux without impeding the flow of intensity / proximity / intimacy/friendship. Stenger's diplomatic truth is a work of care.

⁵¹ Stengers, "The Science Wars," 43.

There, diverging stances are not made to win each other out or to collapse. Rather, the diverging stances are contextualised to the point of having their contexts to meet somewhere halfway. Their divergence remains, but now there is intensity/care between them in the form of a continuous pattern, which is the mutual commitment to communicate. Crucially, this caring commitment increases the degree of heterogeneity a metastable system affords without becoming critically unstable. This is how the cultivation of practices that are based on care and safe spaces to share the focus of one's care can contribute in making a system more plastic and inclusive.

Relations of care and the sharing of practices of care make a system denser and with density comes heat. While the endless quantitative growth of the same, makes a system more homogeneous (constraining possibilities along overarching narratives / identities) and brittle (as such narratives / identities compete dialectically in a mechanistic zero-sum game), localities where a relation-based logic has the strength, safety and courage to establish itself are hotbeds

of change.⁵² Whether remaining the size of a firefly or scaling up to a star, for as long as they burn, for as long as their show runs, practices of care are hot, bright bodies.⁵³ They are *nuclei* of heterogeneity: embodying the conditions for the emergence of game-changing new possibilities.⁵⁴ As such practices exist in the performance of surprising / emerging from the average, they thrive through/along the limits of their local context and—within those limits—open a new dimension of sense capable of reconfiguring the contingent image of what is real (without ever opposing it). This makes them inherently revolutionary (albeit in a non-dialectical way) and political (albeit without a deterministic masterplan).

Caring to a practice is not to turn one's back from the public sphere as to attend to one's private garden, it is to cultivate and offer the fruits of one's care knowing that not everyone will take up the offer but someone will. It is in that moment in which shared appreciation is stronger than subjectivity and private property that the soil and seeds for more gardens to come is produced. 'Care politics' might appear naïve from a zero-sum game logic, but its political power consists in being radically alternative to the logic of such games: in the possibility of suspending the ground and premises upon which their logic runs. In particular, care is an alternative to the instrumentalist use of identity politics, that is, to portray the pursuit of privilege in terms of emancipation (see for instance Brexit).⁵⁵ While instrumentalised identity politics risks becoming the political strategy of choice, thus jeopardising institutions, practicing care politics is a form of civic resistance.

In a system that would not last a minute without the walls and membranes of identity-based constraints (laws, rules, contracts, institutions, protocols), care and sharing the focus of one's care play the unsung role of collagen. Such practices bind heterogeneity, thus producing the intensity that affords more heterogeneity. Within a system that risks becoming increasingly brittle, it is urgent to identify and celebrate logics that work for heterogeneity: logics that bet on the anomalous present not because they consider it a good investment, but because they respond to a twofold call. The libidinal one of attunement and the moral one to keep the system inclusive, thus free/open-ended / out-of-equilibrium.

⁵² Michel Foucault (2012 [1983–84]), *The Courage of the Truth (The Government of Self and Others, II)*, Lectures at the Collège De France), Frédéric Gros (Ed.), translated by Graham Burchell, Lectures 1–3, 1–56.

⁵³ Golding, "Friendship," 263.

⁵⁴ Prigogine and Stengers, *Order out of Chaos*, 187.

⁵⁵ However, it does not oppose itself to identity politics as such. For instance, groups that employ identity politics as a strategy to seek emancipation can commit to care internally to reduce the risk of homologation.

Speaking of care and of the importance of accounting for / sharing the focus of one's care is no quick fix. However, more awareness on a logic that presents an alternative to consumerism / colonialism might help make the systems we live in become more intense and resilient. It is through care, not exclusionary practices, that we can build better and safer places.

jellybaby [ˈdʒɛli ˈbeɪbi]

a nasty viral disease, commonly caught by nightclub staff on a weekly basis, causing nausea, vomiting and can in some cases lead to a total mental breakdown. also the congealed mix of sperm and nether fluids which remains if male ejaculate isn't cleaned up within minutes of such a deposit. confectionery historians believe the original innocent-sounding sweets were the work of an austrian confectioner, who designed them for fryers of lancashire in 1864. jelly babies also name brightly coloured bite-sized and overly sugared candies. go figure.

Headwind, a Scanning Story

Chantal Faust

* 1980 Melbourne, Australia | London, UK

Chantal Faust's research activities centre on the apparatus of the scanner as surrogate camera, offering a meditation on the mechanical apparatus and what it gives forth, both practically and metaphorically. The mechanism is considered as a mirror, a glass, a void and a machine where touch is the operative at play. These avenues of analysis allow for a consideration on pleasure and the meaning of loss, love and perfection, death, memory and mourning. Probing the insides of the making process itself, a correlation is made between the act of scanning and the operations of the conscious and unconscious mind. Recent exhibitions include *There Is A Hole In The Bagel—Chantal Faust + Ruidi Mu*, Gallery TOM, Tokyo (2019); *Solitary Pleasures*, Freud Museum, London (2018); *Natur Blick*, Koppel Project Hive, London (2018); and *Antipodean Emanations*, Monash Gallery of Art, Melbourne (2018). Recent book chapters include "The Masochistic Pulse" in *Dark Habits*, Cornerhouse Publications and "Thinking Through Outline" in *Anchor*, Marmalade Publishers of Visual Theory. Faust's monograph, *Pleasure Machines: Towards a Philosophy of Scanning* forthcoming, Bloomsbury (2021). This work addresses the philosophical and aesthetic implications of the now ubiquitous flatbed scanner and how this imaging machine signifies a shift from normative and ocularcentric histories of lenticular seeing, emphasising processes of visualisation and data recording as close-up, corporeal, and dependent upon intimacy and touch. Chantal Faust is Head of Contemporary Art Practice (CAP) at the Royal College of Art and editor-in-chief editor of *Prova*.



junction [ˈdʒʌŋkʃən]

the contact point between data and definition. 'up the junction': slang for being pregnant.



WHEN I AM WALKING



>ABS< >ABS<
AEB 101 AET





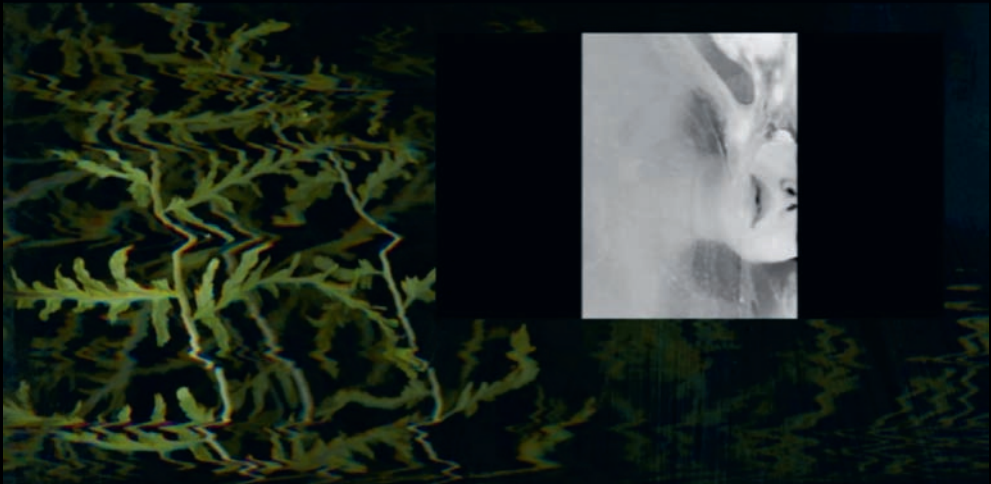










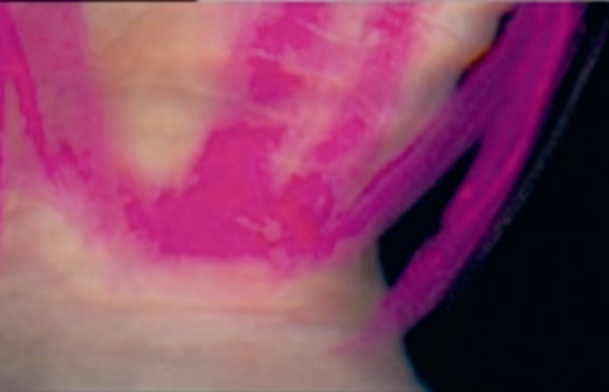




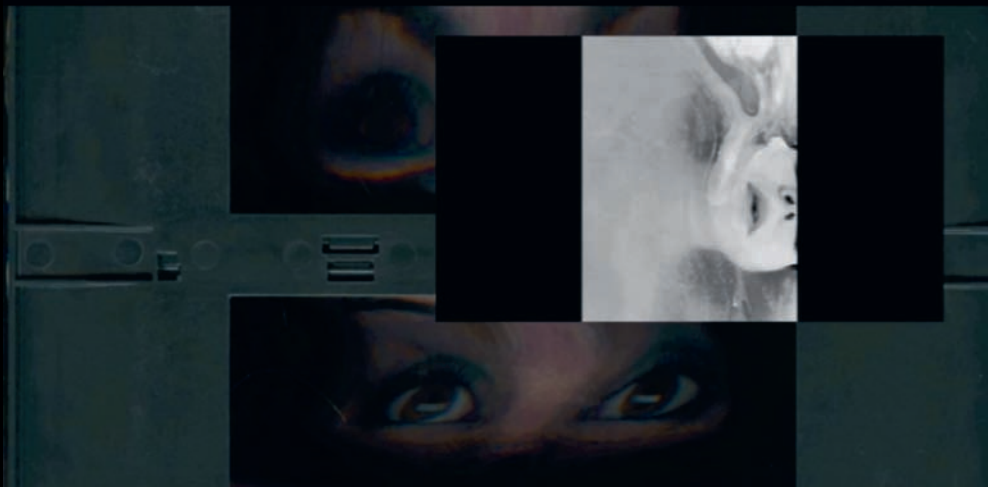
I'm trying. I'm trying to walk more in this city.



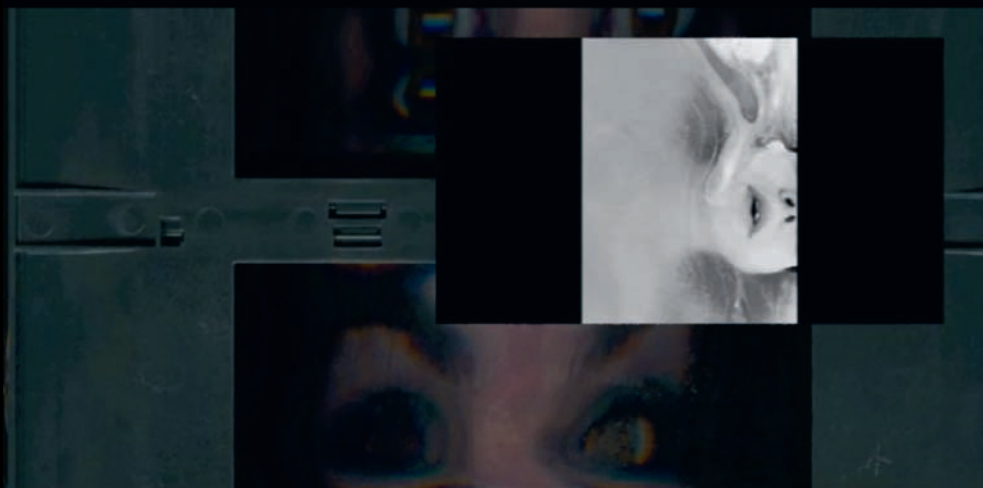
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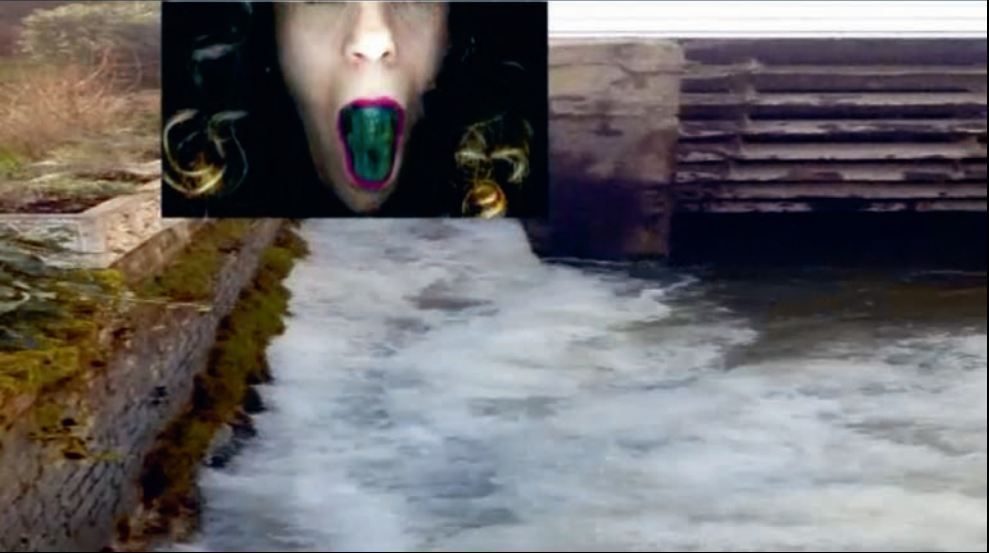
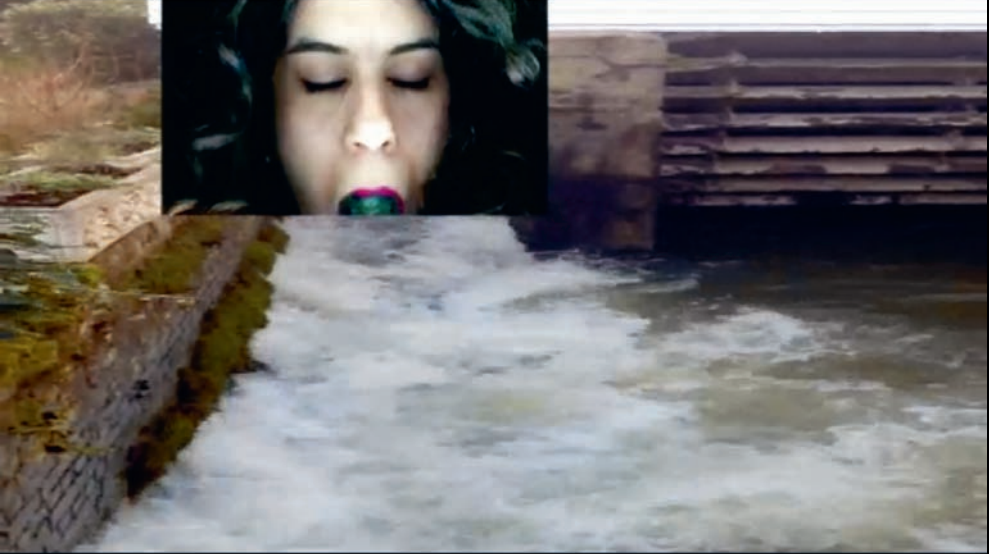


people. And see things. Not going anywhere. I'm trying to walk more in this city. I'r



ere. I'm trying to walk more in this city. I'm trying to do different things. I'm trying



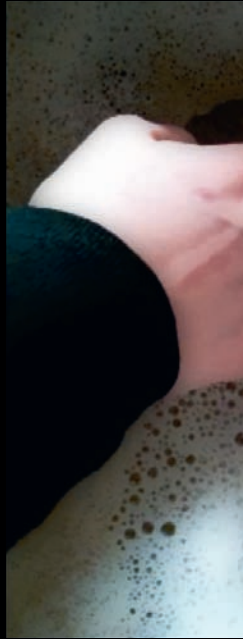




Watching
window cleaners
from the other side
is endlessly
appealing.

Shaving
the glass
to see like a tongue
pressed against
a face.











Renegade Activism and the Artist-as-Collective

Gerald Nestler¹

* | Vienna, Austria

¹ This chapter is an extended version of my talk at *Entanglement: The Opera* at the School of Arts & Humanities, Royal College of Art, London, 29 January 2019. I would like to thank Johnny Golding for the invitation.

Gerald Nestler is an artist and writer based in Vienna where he graduated from the Academy of Fine Arts. Nestler is also a member of Technopolitics, an independent, transdisciplinary platform for artists, researchers, developers, designers and journalists who jointly develop innovative formats at the intersection of art, research, science, and pedagogy. He was a researcher at Forensic Architecture and holds a PhD from the Centre for Research Architecture, Goldsmiths, University of London.

His research focuses on the derivative condition of technocapitalism and how the semantic field of resolution can be activated for a less passive conception of transparency. Critical art, video and performative discourse works include: *The Future of Demonstration* (2017/2018) and *WHISPER. Status Code: No Entity Found*, (2016), both in collaboration with the artist Sylvia Eckermann. See also Nestler's *Countering Capitulation, From Automated Participation to Renegade Solidarity; high-frequency trading and the forensic analysis of the Flash Crash* (2014) and the *Portraits of a Philosophy* video series: *Contingent Claims. Elie Ayache* (2012); *Contingent Optionality. Randy Martin* (2014); and *Contingent Ethics. Haim Bodek* (2014).



knowing [ˈnəʊɪŋ]

intelligence with motive

Instead of an introduction: Notes on the derivative condition

Today, the future emerges within a derivative paradigm—the implementation of data-intensive, algorithmic processes based on scientific modelling, mathematical equations and data exhaust evaluation that leverage the dynamic recalibration of contingent claims (derivatives) at present. Thus, rather than merely critiquing its contractual and algorithmic applications, this chapter diagnoses the derivative as a paradigmatic force which shapes our economic, political and social reality. The derivative as a technopolitical innovation has introduced a new and pervasive level of exploitation. Financial markets are exposed to volatility, which corresponds to uncertainty. Risk, defined as ‘measurable uncertainty’ is the tool that keeps the complex circulation of leveraged capital operating (primarily by applying probability calculus to random or historic data). While the orthodox view maintains that financial markets are catalysts of future wealth (the promise of profit accumulation), it subjects the idea and history of *promise* to a quantitative archive of (meta)data whose ‘sense’ is to *claim* the future at present.²

² F.H. Knight (1921), *Risk, Uncertainty, and Profit*, (Boston: Hart, Schaffner & Marx).

The derivative is situated in the future

The financial expert and philosopher, Elie Ayache, speaks of the derivative as the ‘technology of the future’ because it is the quantitative equivalent of anticipation and expectation.³ At first, its dynamic recalibration regime revolutionised finance, as it offered new access to trading future outcomes in the face of uncertainty. But given the edge of finance over the wider economy (for example dominance of circulation over production; displacement of value by price; leverage as tool to inflate surplus value), its conceptual and acting force now far exceeds its field of origin. In finance, the derivative pricing of contingent expectations serves as a resolution regime to move along (in parallel with) the uncertainty of the future. Hence, mathematical recalibration computed to render prices for any conceivable outcome, that is risk potential, *creates* the future at any present moment of trading. The present as we know it has no bearing here; the moment it emerges (every moment), it arrives as price and instantly turns into historic data, entering a new cycle of calculating profit probabilities. The past succumbs to a probabilistic reservoir for the quantification of future events, while the present vaporises in the

³ See: E. Ayache (2015), *The Medium of Contingency: An Inverse View of the Market*, (Basingstoke: Palgrave Macmillan).

knowledge [ˈnɒlɪdʒ]

knowledge is power ; but power does not want you to know that this is the case.

⁴ To this point, see in particular this works: Gerald Nestler (2013–14), *Countering Capitulation. From Automated Participation to Renegade Solidarity. High-frequency trading and the forensic analysis of the Flash Crash, May 6, 2010*, Single channel video, 11:20' at vimeo.com/channels/AoR; Nestler (2014), "Mayhem in Mahwah: The Case of the Flash Crash; or, Forensic Re-performance in Deep Time," in *Forensis, The Architecture of Public Truth*, (Berlin: Sternberg Press), 125–45; and Nestler (2014), *Contingent Ethics: Portrait of a Philosopher: Haim Bodek*, series II, Single channel video at vimeo.com/channels/AoR

⁵ Evgeny Morozov (2019), "Capitalism's New Clothes," in *The Baffler* at thebaffler.com/latest/capitams-new-clothes-morozov

actualisation of the one price realised from the myriads of virtual prices that 'inhabit' these volatile 'galaxies' of risk options. These quickly fading 'bodies' increasingly include a commodity called human capital. Thus, in what I term the 'derivative condition' of social relations, not only those contingent futures that emerge from subjectivities and their relations 'collapse'; it is the present, where subjectivity and agency are born in the first place, which now decays in microseconds.

I have argued elsewhere that the derivative, through the power yielded to financial markets by the capital-state complex, has effectively re-oriented not only economic but all relations; it delivers the paradigmatic infrastructure for *making* the social, affective and material relations we call our world—an increasingly volatile cohesion in which the promise of welfare for all is replaced by the exploitation of individualised affects.⁴ In a world in which 'states' (from corporate bodies to national states; from social status and individual identity to probabilistic states of the world) shift from (theoretically) autonomous devices within specific systems of relations to speculative ventures exposed to contingency, the ability to leverage one's bets at high factor, dynamically hedge exposure any time and externalise losses in no time. This becomes the unifying—if not universal—method of governance in managing claims repetitively against one another. As this condition includes all data traded in complex interrelations, the market regime—both embodying and exceeding the neoliberal framework—escalates the derivative paradigm to social media, politics and the contingent becoming of subjectivity. This point refers not only to the prognostic role of finance in the economic realm. Rather, the way people-as-data are treated is based on a derivative paradigm. This case is often neglected, as debates about the contours of our technocapitalist era are often narrowed down to a 'dataism' that Evgeny Morozov exposes in his review of Shoshana Zuboff's *Surveillance Capitalism*: "Google and Facebook were restructuring the world, not just solving its problems."⁵ One fact largely ignored in is that derivatives are metadata *par excellence*. Long before data-driven platforms like Google and Facebook appeared on the world stage of proprietary digitisation, the introduction of scientifically endorsed derivative models, contracts and algorithms (that make derivatives large scale operational) prompted ever-increasing waves of data

exploitation. This rise not only constitutes a main source of what was later dubbed Big Data; in fact, derivatives performatively pre-structure the modes of how capitalism exploits the unknown (future) and volatility (risk). Hence, I propose we view disruptive platforms not only as Big Tech but as Hedge Funds that speculatively capture, capitalise, produce and govern (future) individual behaviour and social patterns at any (micro) moment.

The derivative paradigm is not just the model for how data are made productive—in other words, how the future is made productive. By the power this logic holds over the most elusive (and illusory) of human ambitions—foreknowledge of the future—the contingent claim has also initiated a turn from representative to performative speech in the way power communicates today. In our volatile world, black box *technowledge* forms the framework of algorithmic governance, and thus the regimes that performatively evaluate, predict, surveil and enforce social automation, adaptation, recognition and control. By escalating volatility and leveraging information and access asymmetry, platform capitalism (digital service providers with monopolistic data-power that privatises governance) and Twitter politics demonstrate sophisticated but at the same time sociopathic symptoms of the derivative condition. A prominent example is the arena of alt-right politics populated by hedge fund owners (like Mercer), data brokers (like Cambridge Analytica) media interest groups (like Breitbart), troll factories (sourced for example in Russia) and politicians (like Farage). Donald Trump, for instance, redesigns Twitter as Dark Pool in which the escalation of noise—that is, the production of volatility—turns into competitive advantage. He escalates unexpected microevents by ‘surfing the volatility wave’ outside the realm of the probable; in other words, he attacks and subverts truth as a function of probability. Black Swan events—commonly deemed rare—are now manufactured in electronic speed, leveraged by fake news and other malignant information asymmetries. Within a performative speech of power, the production of volatility and the recalibration of leveraged claims becomes paradigmatic for automation-based success; but this also amplifies authoritarian symptoms. Algorithms are not only written, automated and manipulated but owned and exploited. The question at the core of technocapitalism therefore concerns the biopower of what I propose to call the *leverage class*.

libidinal [lɪˈbɪːdʌʊnəl]

sexual energy that underwrites movement, intensity, flow. Lyotard’s ‘unsayable something’ linked to/forming economies of exchange, ethics, life itself.

⁶ Randy Martin (2015), *Knowledge LTD: Toward a Social Logic of the Derivative*, (Philadelphia: Temple University Press).

The ‘derivative logic’ (a term introduced by Randy Martin in his financialisation studies) has infiltrated social, legal, temporal and material relations to a degree that it is now the paradigmatic claim—the *canon*—of technopolitical governance.⁶ Due to this worldview, mimesis shifts from reproduction by imitation to (self-)production by recalibrated approximation (for example the quantified self; online echo chambers; bot targeting; social credit scores, also its state-driven regime in China).

However, epistemic inquiry and aesthetic imagination rarely grasp the full scope of what the derivative unleashed and what it exploits as resource: wealth and power derived from volatility (risk) and leverage (debt). Most studies of debt are blind to leverage as a potent form of credit, and thus neglect leverage as that other face of debt which takes advantage of volatility. But leverage and volatility are crucial to conceptualise how (bio)power operates between state and private interest. A point in case is the conception of the class system. In a nutshell, I propose the formulation of *social asset classes* in which the *leverage class* dominates tiers of *debt classes*. The proprietary upper class performatively secures, or shifts between, future potentials by recalibrating leveraged debt; and in case of systemic default, it externalises toxic assets by socialising them to the debt classes (for example by bailouts, public debt inflation, austerity politics). This regime change has not been fully acknowledged, partly because the performative turn of the speech of power and its non-linear, derivative regime is still relatively unexplored; but also, because at times even highly critical studies get distracted by neoliberal narratives—deeply entrenched myths that we need to debunk and resolve. Hence, there is urgency for a radical analysis of volatility and leverage as tools appropriated by technocapitalist governance.

But there is another angle to this topic, an antithesis that reads the derivative against the grain to unearth other forms of thinking and making in the derivative condition. Based on this critical examination, what I call *poetics of resolution*, engages with the question how the derivative, volatility and leverage can be reconceived as means to act against the preemptive embrace of data exploitation and (right-wing) escalation politics. How can the notion of the derivative be accessed to give way to *other* meanings? How can we leverage its abundance to care for *other* sensibilities?

Here, it makes sense to explore possible counter-tactics by expanding on a point made by Martin on the ‘derivative logic’: due to its pivotal position, the derivative can be recast to harvest collective forms of wealth formation and distribution. If we agree (or at least are open to the thought) that the ‘technology of the future’ is a *techne* in its own right and as such not fully owned by capitalism, we can learn the art of reorienting the derivative and resolve which other ways it may gift for other forms of worlding. But such resolution does not come without risk. Hence, I propose a radical initiative in all ambivalence and vulnerability: the *renegade*. This renegade (an expert witness denouncing loyalty to the black box) is stigmatised as traitor; but in turn she becomes educator of the *demos*, the general public. This uprising—a marginal and precarious act, but more promising than the cry for transparency—destabilises neoliberal discretion hegemony. Here, ‘resolution’ is not treated as consensus in terms of probability—in other words, as risk management. Instead, resolution points to an engagement with the *impossible*—to risk the experience and lived (in Donna Haraway’s diction, by “staying with the trouble”).⁷ The *artist-as-collective* as an alliance of *renegade activism* is a model for decentralised, nonlinear acts of civil courage that make *resolution* possible. It is the insurrection that unlocks the *black box*.

⁷ Donna J. Haraway (2016), *Staying with the Trouble* (*Experimental Futures*), (Durham: Duke University Press).

THE ABYSS. Nonlinear Engagements in Postdisciplinary Entanglements

“Noise crashes within as well as without.”

(N. Katherine Hayles)⁸

In the aftermath of the 2008 financial crisis, derivatives went viral. Scholars from a wide array of disciplines sought new approaches to critical finance studies. Journalists and pundits picked up on the theme, devoting books (some of which were bestsellers), articles and telecasts to financial malpractice, economic injustice, the disastrous consequences of boom-and-bust cycles and algorithmic information asymmetries. Artists, hacker communities and social movements ramped up efforts to oppose the repercussions of financial capitalism and to develop open source models, knowledge commons, distributed systems and citizen access. What is seldom examined in depth, however, is the fact that the derivative has taken hold outside the

⁸ N. Katherine Hayles (1999), *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature and Informatics*, (Chicago: University of Chicago Press), 291.

arcane world of financial speculation. As a result, the future emerges today within a derivative paradigm: exploiting algorithmic processes that leverage the dynamic recalibration of contingent claims (another term for derivatives) is not only characteristic of finance. Rather, its performative language has become the template for a technocapitalism (data-driven financial and platform capitalism) in which the future acts on the present. But lack of attention to this 'history of the future' impedes critical reflection on finance and how it gained the power to shape individual, social and material relations beyond its 'natural habitat.' Hence, shedding light on the derivative is a matter of urgency if we want to grasp how data-driven prognostics affect, appropriate, produce (and even pre-empt) actions, relations, promises and claims in the era of technocapitalism.

To address the articulations of technocapitalism, this short chapter thus focuses on the potential of artistic research and intervention. In contrast to academic disciplines, which sometimes tend to emphasise their study area over others, this, *postdisciplinary* and heterogenic approach enters the abyss to tackle financial and other data-driven spheres from a multiplicity of epistemic, aesthetic, ethnographic, technological, economic and political perspectives.

Data-driven technocapitalism mediates abundance—notwithstanding the fact that accumulation and distribution continue to be highly asymmetrical, producing precarity and austerity for those it denies leverage. But it is the derivative intervention which facilitates the shift from scarcity to abundance in the first place. So instead of demonising it, such a critical reflection explores how we can access the intellectual and financial wealth absorbed by the neoliberal mediation machine; and how we disentangle the derivative to multiple potentials for ecologies of commons. For me, working as an artist entails encountering a crack, a flaw, an opening. I use the word *encounter* deliberately, as it implies a kind of serendipity, a chance connection, an experience of inconsistency enigmatic enough to become magnetic. I insert myself into the gravitational field with the twofold tactics of research and imagination in order to find, that is, construct, a trace that leads to a strategy. The strategic focus could be a term, a notion, a process or an image but it allows me to expand on it and connect it to other topics or fields seemingly unrelated at first. One example for this approach is what I term the *figure of the renegade*.

The topos—and it is a place, a location, a spatial knot as much as it is a subject and a technology—derives from *Countering Capitulation*, a research project on forensics and its relation to financial markets, presented in the exhibition *FORENSIS*, curated by Eyal Weizman and Anselm Franke at Haus der Kulturen der Welt in Berlin, 2014.⁹ I had already worked on algorithmic trading and the so-called ‘Flash Crash,’ a market crash that occurred on May 6, 2010. The topic seemed promising, as the case and its investigations showed rather ambivalent results even though they were highly data driven. On the one hand, there was an epistemic edge, which seemed corrupted from the beginning. On the other hand, I wanted to investigate how finance had achieved its powerful position without utilising the forms of representation we usually think of when it comes to power regimes. I examined the material I had collected on the Flash Crash with the help of the financial data analyst Nanex LLC.¹⁰ Nanex is known for its seminal role in creating a counter-narrative to the official statement resulting from the investigation undertaken by both the Securities Exchange Commission (SEC) and the Commodity Futures Trading Commission (CTFC).

The official report attributed human error for causing the Flash Crash, while Nanex, amongst others, followed a different route by exploring technological sources and concluded that algorithmic operations caused the crash. When I scrutinised the material, the reports, and the visualisations, something surfaced: a discrepancy, that to Nanex, was a scandal concerning the official investigation. But to me the material gave reason to expect wider implications, due to the fact that this discrepancy not only annihilated the core of forensics, but also of the epistemic as such, and thus constituted a specific corruption of knowledge- production and decision-making. Visibility, knowledge and resolution are based on access to information and we usually consider this as either a question of collecting new or examining existing data. However, the term ‘black box society’ points to a situation in which data are deliberately concealed.¹¹ Manufacturing information asymmetry—imbalances of power due to leverage, misinformation, concealment, collusion or fraud—has become an effective tool for gaining competitive advantage across all levels of life. In a nutshell, noise is the master of information.

matter [*mæta*]

usual understanding of matter: a substance that occupies space and possesses rest-mass, as distinct from energy, mind and spirit, with four so-called natural states of physical matter: solids, liquids, gases and plasma. the fifth state is the man-made bose-einstein condensates. matter often also refers to the material of thought or expression as something that is the subject of discussion, concern, action, thing or affair (business matters). printed matter subsumes all documents and letters sent, or to be sent, by mail. dialectical matter re-stages thesis:anti-thesis and the movement of negation to produce synthesis. radical matter is the superpositionality of encounter, diffracted with or without dimension.

⁹ *Forensis*, Latin for ‘pertaining to the forum’, is the root of the term forensics. See *FORENSIS*, curated by Eyal Weizman and Anselm Franke 15 March 2014–05 May 2015, Haus der Kulturen der Welt (HKW), Berlin, at [//forensic-architecture.org/programme/exhibitions/forensis](http://forensic-architecture.org/programme/exhibitions/forensis)

¹⁰ Nestler, *Mayhem in Mahwah*, 129–135.

¹¹ Frank Pasquale (2015), *The Black Box Society: The Secret Algorithms That Control Money and Information*, (Cambridge / London: Harvard University Press).

Resolution and its semantic field

“Performativity is not about creating but about making happen.”
(Michel Callon)¹²

To counter information and access asymmetry, I propose *resolution*, rather than transparency, as conceptual tool for *other* (political) sensibilities and relations. I read the term’s semiotic assemblage—ranging from perception and cognition to knowledge-production and decision-making—as a template for ecologies of solidarity, which we encounter in *renegade activism*. The *renegade*—such as a whistleblower, hacker with ‘skin in the game’ or ‘those with two names’ (Jaya K. Brekke)—is a figure that exceeds conventional frameworks of critique and agency for alliances that resist the false purity and determinacy of the technocapitalist doctrine.¹³ *Renegade activism* is a call for emancipatory insurrection. I resort to the term ‘resolution,’ not only to throw light on (or rather into) the black box, but more generally as a counter-conception to transparency, a paradigm for governing sociality that has come under extreme pressure. The logics of technocapitalism have thus become a threat to the body politic—they not only restrain agency but carve out new forms of exploitation and segregation. As power increasingly shifts from representative to performative speech, it reorganises the strata of society by creating divisions that affect bodies, minds and affiliations along quite different lines as how class and consent have been contextualised historically. Hence, we are witnessing a crisis of democratic resolution. Recommended policies often follow a logic summarised in Linus’ Law, “given enough eyeballs, all bugs are shallow.”¹⁴ The question remains whether these rather linear approaches can disarm proprietary interests that obscure transparency, visibility and information access. In today’s hypercompetitive world, in which margins narrow and monopolisation is in the ascendant, non-transparency is tantamount to leveraging against adverse selection. The pitfalls of a linear conception of transparency fall into two main categories. One is described by Christl and Spiekermann in their study *Networks of Control*: “Transparency is not provided, but avoided. Ambiguous business practices are still the norm and even misleading rhetoric is used to trick people into one-sided and disadvantageous data contracts.”¹⁵ Hacker and Petkova, in a study devoted to the limits

¹² Michel Callon (2006), “What does it mean to say that economics is performative?,” CSI working papers: Hyper Archive onLine (HAL) archives-ouvertes, ff-halshs-00091596f, 15.

¹³ For an elaboration on whistleblowing, see: C.F. Alford (2002), *Whistleblowers: Broken Lives and Organisational Power*, (New York: Cornell University Press). With respect to ‘block-chains’ see: Jaya Klara Brekke, and Ben Vickers, Eds. (2019), *The White Paper by Satoshi Nakamoto*, (London: Ignota Press). See also Brekke’s PhD thesis: J.K. Brekke (2019), *Disassembling the Trust Machine: Three cuts on the political matter of blockchain*, (PhD Thesis, Durham University), at [distributingchains.info/wp-content/uploads/2019/06/Disassembling-TrustMachine_Brekke2019.pdf](https://distributingchains.info/wp-content/uploads/2019/06/Disassembling-TrustMachine-Brekke2019.pdf)

¹⁴ Eric S. Raymond (1999), *The Cathedral and the Bazaar*, (Sebastopol: O’Reilly Media).

¹⁵ Wolfie Christl and Sarah Spiekermann (2016), *Networks of Control: A Report on Corporate Surveillance, Digital Tracking, Big Data*

and Privacy, (Vienna: facultas) at archive.org/stream/Christl-NetworksKO/Christl-Net-works_K_o_djvu.txt

of transparency, conclude: “The ways in which data collection and processing are accomplished are opaque and exclusive.”¹⁶ The second issue relates to the depth and scope of algorithmic complexity summarised by the data researcher Freek Bomhof, “[w]hen a system is too complex to understand, transparency will not help us—not even with the most skilled algorithmist to explain what is going on.”¹⁷

This nonlinear ‘nature of complex systems’ is illustrated by the former high frequency trader David Lauer in his account of the financial Flash Crash 2016:

“The markets and the interplay in the industry between all these firms with all these very complicated and complex technology systems and how they interact makes the entire system of exchanges, high-frequency, brokers and the interaction between the technology a complex system. [...] There is no cause and effect that you can point to. What caused the Flash Crash is a nonsense question. [...] if you were to replay the same sequence of events, identically, there’s no guarantee that it will cause a Flash Crash again.”¹⁸

Transparency is commonly conceived as prerequisite for resolution. Under black box conditions, however, this relation is ruptured or, in fact “colonised by the logic of secrecy,” as Frank Pasquale argues.¹⁹ To propose a different route to challenge non-transparency as a tool of capitalist accumulation, let me focus on an artistic conception that centres on the term *resolution* itself. What I argue is that the term’s rich semantic field offers an avenue towards resolving transparency. This postdisciplinary project activates the levels of meaning of the term resolution—from perception, visualisation, imagination, cognition to knowledge production, decision making and public/regulatory action—for knowledge-making as a collective-activist practice against information and access asymmetries. Here, ‘resolution’ is leveraged for a multi-dimensional, non-linear and decentralised concept of civil agency. But its means and consequences are as radical and ambivalent as the sea change provoked by secretive black box capitalisation. Hence, the artistic research on an *aesthetics of resolution* does not content itself with Linus’ Law or design for accountability. Rather, it proceeds from what it holds as a fact: *resolution as visibility has been severed from resolution as cognition and knowledge*. Instead of merely critiquing this breach, it attempts to access the black box as an entry point for collective activism.

¹⁶ Philip Hacker and Bilyana Petkova (2017), “Reining in the Big Promise of Big Data: Transparency, Inequality, and New Regulatory Frontiers,” in the *Northwestern Journal of Technology and Intellectual Property*, Vol 15, no 1, at scholarlycommons.law.northwestern.edu/njt/tp/vol15/iss1/1

¹⁷ Freek Bomhof (2013), *In Order to Trust Big Data, Transparency is not Enough*, Blog entry at dataflog.com/read/transparency-in-big-data-is-not-enough/138

¹⁸ David Lauer at 46:00’–46:48’ in: Meerman, *The Wall Street Code*. Film documentary, 51 min at youtube.com/watch?v=k-FQJNeQDDHA

¹⁹ Pasquale, *The Black Box Society*, 2.

²⁰ James Bridle (2018), artist / curator, *Agency: Curatorial Statement*, (Berlin: Nome Gallery). Cf: jamesbridle.com/works/agency and also nomegallery.com/exhibitions/agency/

Accordingly, the move from an *aesthetics* to a *poetics of resolution*—that is, from *perceiving* to *making* and consequently from *critique* to *insurrection*—requires a corresponding conception of the agent producing and carrying through this escalation against the critical mass of non-disclosure. Given the complexity and secrecy to which we are exposed, this agency is inevitably a collective counter-effort, rather than an individual one. In a blurb for an exhibition in 2018, the artist, writer and curator James Bridle states:

“[...] As the scale and complexity of our societies grow ever vaster, individuals feel ever more disempowered and hopeless. Our vision is increasingly universal, but our agency continues to be reduced. We know more and more about the world, while being less and less able to do anything about it. In an age of planetary-scale networks and opaque, remote systems of governance, how do individuals retain the capability for creative thought, meaningful action—and a sense of humor?”²⁰

The *artist-as-collective* posits that the ‘individual’ evoked by Bridle is fundamentally one among many. It can only make sense of itself and the volatile world it inhabits in spheres populated by others. Hence, conceiving the individual as singular makes little sense, neither artistically, nor philosophically, nor politically, as it violently abstracts living assemblages and immixtures to capitalist segregation and extraction (including the art market’s individuation and capitalisation of the artist brand). In contrast, the figure of the *artist-as-collective* focuses on the multitude of affiliation, alliance, assemblage, material as well as opposition and controversy. It provokes works which are not objects of beauty for disinterested pleasure or interest-bearing value investments, but ‘subjects’ with their very own *poietic* agency in time. Because action is only meaningful in context, *collective resolution* extends the conversation to wider collectives, audiences and allies. The *artist-as-collective* focused on here still includes the figure of the *renegade* because this figure embraces collectivity not only in forms of affinity, but by entering the risky realms of ambivalence and conflict. It is based on the premise that controversy is a crucial facet of conversation and making. As such, the work is a form of dispute congealed from creative exchange. Humour is a vital ingredient of such (artistic) encounters and makings, as it fluidly performs ‘staying with the trouble’ (to refer once again to Donna Haraway), as

we engage with the structural ‘enemy’ by working with those who interact with us from the ‘other side’. This enables the taking of the *labour of making*—the agency of the artwork—to a deeper level of inclusion against capitulating to non-transparency. The multifaceted semantic field of the term resolution and its technological as well as social significance offers a new kind of collectivity. Bringing together visualisation, discrimination, and intelligence with intention, purpose, (common) initiative and (joint) decision-making presents a conceptual basis for an artistic practice that does not lose sight of rethinking socio-political constitutions as well as the conditions that make the ruptures and breaches of social contracts possible in the name of proprietary and other interests. It could thus play a crucial role in the effort to trace aesthetic as well as political consequences. In other words, to move from the *aesthetics* to a *poetics* of dissent within an artistic paradigm that is interested in the consequences of events, assemblies, processes and decisions beyond mere relational aspects.²¹ Such an approach does not hinge on an artist/observer relation that has been a key aspect of contemporary art for decades. Rather, it fosters collaborative affinities of different kinds of publics, experts and expert systems—artists and scientists, processes and technologies—all of which can come together in common attempts to reconceptualise and re-orient the aesthetics of knowledge-production by inserting themselves into their making. This approach revitalises the initially liberating programme of the avant-garde by affirming the demise of the political thrust of ‘making everybody an artist,’ which has become the creative core of the neoliberal project since the late 1990s. It also affirms the fundamental premise of technologies that process dissemination, visualisation and decision-making as well as its various incorporations of enclosures (for example black boxes), which underlie technocapitalism. It does so because without acknowledging their power and impact we cannot move on from an anaesthetic arbitrariness of form towards a decentralised conversation of activist hacker-theory-experts—a realm addressing a growing population of digital natives—on consequential content. Such a postdisciplinary approach seems essential if we want to move from an aesthetics to a poetics of resolution. This is from a quasi-unconscious state of consumption to an involved engagement that not only develops counter-tactics

²¹ The epistemological move to a poetics is of course not new (Heidegger onwards), but what is important here is the move to develop a non-linear, non-instrumentalist logic that takes as fundamental the role of the arts. See J. Golding (2010), “Fractal Philosophy (and the small matter of learning how to listen): Attunement as the Task of Art”, in Steven Zepke and Simon O’Sullivan (Eds.), *Deleuze and Contemporary Art*, (Edinburgh: Edinburgh University Press), 133–54.

night-vision [nait-ˈvɪʒən]

made possible by a certain combination of spectral and intensity ranges. invented by dr edwin i golding, night vision is broadly divided into three main categories: image intensification, active illumination, and thermal imaging. unlike most predators, the human eye lacks tapetum lucidum, an enabler of low-light vision. originally invented to take aim at enemy positions in poor light, today it can be found in one’s phone, camera and other distributed forms of intelligence. ‘night vision’ has also been used as song or album titles by artists as diverse as bruce cockburn (1973), suzanne vega (1987) and daft punk (2001).

against proprietary interests but realises political agency within metastable information flows. Hence, poetics of resolution on the one hand highlights the complexities and intricacies of such an endeavour as well as its achievements and failures. And on the other hand, it outlines an instance of artistic practice in the realm of post-disciplinary research and intervention. A new medium emerges from the techno-quantification of financialised and automated data. N. Katherine Hayles reminds us, “for information to exist, it must always be instantiated in a medium.”²² Bots act on the infrastructure. In the technosphere, the production of risk—the mode of production of finance in its engagement with the future—turns into an operational hazard. While massive amounts of data are analysed, trading logistics are streamlined to happen in a flash. Real-time action is instant and thus opens up to the whole gamut of a *technowledge* that constantly redefines the increment of an actionable moment. Immediate visibility is constricted to the mediation by advanced resolution machines. The HFT trader and whistleblower Haim Bodek ascribes cannibalistic acceleration to competitive advantage: “Since 2007, we saw compression in the algorithm trading space where the profit margins approached near zero. [...]

²² Hayles, *How We Became Post-human*, 13.

²³ Cf Haim Bodek in Gerald Nestler, *Countering Capitulation: From Automated Participation to Renegade Solidarity*, at vimeo.com/channels/AoR. 14:20'

²⁴ Karen Ho (2009), *Liquidated: An Ethnography of Wall Street*, (Durham: Duke University Press).

²⁵ One can look at Knight Capital's bankruptcy as black box event. On 1 August, 2012, the HFT trader lost over 400 USD million in 30 minutes due to a technical error. “The glitch led to 4 million extra trades in 550 million shares that would not have existed otherwise.” *Nanex, Flash Crash Summary Report, 29 September 2010* at nanex.net/FlashCrashFinal/FlashCrashSummary.html

We sometimes call that ‘the race to the bottom’ in the business. If I can make a near-risk-free fraction of a cent and even if the whole day would have demanded a little bit more, I’m happy to do that now even if we barely make a profit because I’m basically taking away the opportunity for someone else to make a profit. [...] We cannot tolerate a zero-profit margin environment. We will find ways around that situation. We will cheat. We will manufacture situations. We will undermine infrastructure.”²³ Algorithmic trading accelerates the exploitation of an old paradigm materially embedded in the computer-powered calculative evaluation of massive data sets. How this plays out in financial corporations has been powerfully explored in *Liquidated* by Karen Ho.²⁴ Predication machines attempt to evade *their* unpredictable contingent event by trading in fractions of a second.²⁵ This performative paradigm exploits a future it does not know, and does not need to know, as it *meets* it immediately, at an instant. The production of volatility (risk)—a massive concept for complex societies, their needs and desires—complexifies price, but without producing a present in which the latter is

translated back to value. It produces massive volatilities in the social realm; resolution dissolves into leveraged power. This reverberates in the critical work, *Undercommons*, by Harney and Moten:

“[...] Policy is a new class phenomenon because the act of making policy for others, of pronouncing others as incorrect, is at the same time an audition for a post-fordist economy that deputies believe rewards those who embrace change but which, in reality, arrests them in contingency, flexibility, and that administered precarity that imagines itself to be immune from what Judith Butler might call our undercommon precariousness. This economy is powered by constant and automatic insistence upon the externalisation of risk, the placement at an externally imposed risk of all life, so that work against risk can be harvested without end.”²⁶

In the case of the Flash Crash (but not only here) immediacy defines visibility as a performative issue. In relation to market activity, immediacy equals visibility: immediacy is technological visibility constructed by resolution techniques. Developers in the algorithmic trading space increase obscurity within the entire playing field by narrowing, if not modifying, the field of visibility.²⁷ The data-driven black box—a scientific apparatus—constructs reality in finance. Donald MacKenzie’s use of ‘counterperformativity’ throws a sharp relief in the light of recurring flash crashes: While self-fulfilling prophecy explains success or failure in terms of beliefs, counterperformativity transcends the human mind.²⁸ It deploys all the materialities of the socio-technical *agencements* that constitute the world in which agents are plunged: performativity leaves open the possibility of events that might refute or happen independently of what humans believe or think. Due to the complexity described by Lauer, the market cannot be ‘captured’ in all its immediacy and ‘replayed’ like a film. The vision-enhancing sensors, which detect time-blurred traces and mark discriminations in a complex environment, deliver information from noise. But it has to be unearthed before it can be resolved in a separate stage. The notion of *resolution* involves technologies that engineer thinking and affecting, orient attractions and forge applications. Resolution is not restricted to technical appropriation, such as a device for perceiving (previously undiscovered worlds), a visualisation tool, the setting of a laboratory, Big Data evaluations or the like. Neither is it only a cultural technique of conciliation and consultation

²⁶ Stefano Harney and Fred Moten (2013), *The Undercommons: Fugitive Planning and Black Study*, (New York/Port Watson: Minor Compositions), 76–77.

²⁷ This is the most current in a row of performative revolutions in finance, which started with the displacement of (human) floor traders by quants. It should be added that immediacy, understood as visibility engineered performatively in micro-time, expands Callon’s theory of performativity. “[...] Both the natural and life sciences, along with the social sciences, contribute towards enacting the realities that they describe.” In Callon, *What does it mean to say that economics is performative?*

²⁸ Donald MacKenzie (2016), “A Material Political Economy: Automated Trading Desk and Price Prediction in High-Frequency Trading,” in *Social Studies of Science*, (London: Sage), Vol 47, no 2, 172–194.

nothingness [ηλθηρησις]

non-dialectical in the first place.

to craft compromise and compensation. It is a basic category, though not uncharged with ideologies. As an instrument of power, it inspired revolutions and served restorations. Its trajectory is towards imagined openings and new perspectives but at the same time it is also reversed to map the scales of new hierarchies. Semantically, resolution initialises new layers of thought that move from surface to surface in a connective, interrelating and unbiased way (a flat ontology) and erupt in new visions and knowledge. In such a postdisciplinary arena of research, science, philosophy and art are natural allies, as resolution apparatuses provide *transparency* in a subversive techno-cultural sense. But they also produce competitive advantage when commodified that leverage modes of attraction, evaluation and appreciation. A profit maximisation inherited from post-Fordist operations, its semantic openness is ‘fenced in’ technologically, legally and socially.²⁹ The intrinsically flat ontology of this communicative ensemble is deliberately breached, corrupted, redirected, and stratified: The black box exploits resolution through the whole entangled gamut of the term’s semantic potentials. It circumvents transparency and inserts hierarchies. But as performative power resolution techniques are never pure, impeccable and flawless; there are glitches, inconsistencies and noise that escape the probabilistic contraption from consumer products, social media to finance. Techno-human entanglements give rise to new forms of collectives. Hayles’ general thesis comes to mind:

“The contemporary pressure toward dematerialisation, understood as an epistemic shift toward pattern/randomness and away from presence/absence, affects human and textual bodies on two levels at once, as a change in the body (the material substrate) and as a change in the message (the codes of representation).”³⁰ While accounts of financial practice up to the 2000s, such as Mackenzie’s, are concerned with ‘bodies’ (physical and mental ones as well as devices) and their ‘messaging’ operations, automation replaces the ‘trivial’ resolution of humans with high-resolution algorithms—it is imperative to automate and *derivate* in order to stay in the game. Massive real time calculations and new contractual products, which produce volatility to hedge the underlying corporate extraction asset, fold in new bodies, scales and hierarchies. They leverage big data to construct the future on a preemptive trajectory; this is to their hypercompetitive advantage. But for the ‘uninitiated’ it still happens at random.³¹

²⁹ While a digital camera contains the full scope of its resolution capacity, the price paid determines which resolution is unlocked; this is not only a technique to control access and commercial interests but the *sign(ature)* of the capitalist order. Obsolescence is another example.

³⁰ Hayles, *How We Became Posthuman*, 29.

³¹ This form of leverage is also at play in security, debt and austerity politics, which are partly socio-economic implementations of such exposure.

our lady (of the flowers) [ʌə 'leɪdi (ɒv ðə 'flaʊəz)]

jean genet mon ami and the importance of love, lovers, corporeality, friendship in the form of being a (drag) queen.

The figure of the renegade

“Wall Street is not immoral; it is amoral. When you are not comfortable having an ethical discussion with somebody over lunch, that’s a clue. When those types of basic questions are taboo, you’re not going to have much reflection.” (Haim Bodek)³²

Scientific and technological progress have had far-reaching implications (not only) on financial markets. Beyond the market proper, this shift has radically affected a fundamental category: “value has no place at all in the neoliberal market, which is solely the regime of price.”³³ The complex and intricate operations and machinations between humans and bots result in new resolutions that either constrain, or resolve, our perception, cognition and appreciation. What is at stake is to reorient resistance from critique to insurrection by transforming *aesthetics* into *poetics of resolution*. Such a shift away from critique, however, implies forms of resistance that enhance, and yet also exceed, for instance, Bruno Latour’s ‘composition’:

“Where critique aims at debunking, composition aims at building. Where critique focuses on content and modes of representation, composition focuses on regimes of attraction. If regimes of attraction tend to lock people into particular social systems or modes of life, the question of composition would be that of how we might build new collectives that expand the field of possibility and change within the social sphere.”³⁴

³² Haim Bodek in Gerald Nestler, *Countering Capitulation*.

³³ Jon Roffe (2015), *Abstract Market Theory*, (Basingstoke: Palgrave Macmillan), 29–30. Morozov diagnoses a shift: “One of the most striking developments in neoliberal theory and practice of the last decade has been an explicit concession by some neo-Hayekians that information technology could provide efficient methods of social coordination in environments where price signals

are missing. Here, as in the case of market design, neo-Hayekian embrace of non-price forms of social coordination is mainly driven by the political exigencies of keeping neo-liberalism afloat by attacking the rump administrative state. If taming the Leviathan now means that neoliberals must preach the virtues of decentralised civil society, the ‘social economy’,

the Ostroman commons, or ‘polycentric orders’—still short of celebrating *autonomia operaia*, but getting there!—it seems they will oblige.” In Evgeny Morozov (2019), “*Digital Socialism? The Calculation Debate in the Age of Big Data*,” in *New Left Review*, (London: NewLeftReview.org), no 116, 61, at newleftreview.org/issues/1116/articles/evgeny-morozov-digital-soc

³⁴ Levi R. Bryant (2011), *The Democracy of Objects*, (London: Open Humanities Press), 226.

As the Flash Crash and its investigations showed, in order to push resolution to the level of immediacy, we are in need of a *decentralising attractor* that is both inside and outside the black box. As black boxes extract competitive monopolies by implementing access hierarchies that fold in a new ontology of resolution, their reiterated power can only be addressed by the performative resonance of a counter-agent who not only *knows* the violence *expertly* but takes the consequence of exposing themselves. I call this the *figure of the renegade*. A typical dictionary definition defines a renegade as “1. having deserted a faith, cause or religion for a hostile one; 2. as someone or something that causes trouble and cannot be controlled, synonymously an apostate, defector, recreant.”³⁵ In our case, the ‘composition’ of a renegade is that of a *traitor* who denounces loyalty to the *black box* and transgresses their system’s unwritten laws of complicity and secrecy. At the same time (and often by default rather than design), they become the *educator* to the general public. Providing material from undisclosed or classified sources, the *renegade* is the expert witness who establishes degrees of transparency by procuring otherwise unavailable evidence of information asymmetry (most famously Edward Snowden). Such resolution does not come without risk: it is a radical act both ambivalent and vulnerable. It is an uprising—albeit a marginal and precarious act—more promising than the cry for transparency. It can deeply destabilise the neoliberal discretion hegemony. Here, resolution is not treated as consensus in terms of probability—in other words, as risk management. Instead, resolution points to an engagement with the impossible and the willingness to the risked, lived experience. The renegade is exposed to sheer limitless consequences—impossible personal risk—but her/his/their act of civil courage makes resolution possible. Disengaging with the capitalist infrastructure, which renders critique ineffective by exploiting or externalising it, they enter the realm of revolutionary negation. Such renegade activism might seem at the margin of technocapitalism, but it is in fact right at its core. Its insurrection unlocks the black box. It transforms the acquiescent conditions of social automation and (digitised) labour and thus bears the potential to access a wealth preempted by the capital-state nexus, finance conglomerates and data platforms.

³⁵ Cf Merriam-Webster at merriam-webster.com/dictionary/renegade

Towards a poetics of resolution

“The past is only the impatience of the future.”

(Elie Ayache)³⁶

The story of the Flash Crash offers an example of the significance for the *making* of future publics, depicting in all its complexity the horizon of an exposed and discontinuous self-regulating force against the boundless utopia of a self-regulating market. In the impasse between ‘perspectives,’ such as the official investigation versa Nanex, the intricate problem of resolution demonstrates the ambiguity contained: the participation of a *traitor* is required to unearth data buried in undisclosed documents, in fractions of a second or elsewhere. Hence, the paradigmatic shift to technowledge also gives rise to the cognate notion of a subtly different witness than the eye-witness, one who is capable of challenging calculative violence. The *renegade* who presents objects as subjects-of-debate is an expert witness as much as an analyst that by composing facts produces strata of transparency and opposition within the system. The one who speaks is addressed by violence. Revisiting Judith Butler’s reasoning on the speech act, she writes: “Insurrectionary speech becomes the necessary response to injurious language, a risk taken in response to being put at risk, a repetition in language that forces change.”³⁷ When confronted with the black box, composition and association are secondary to the *renegade act* (they follow it), which itself is secondary to an event or a series of events (violence). Reframing Judith Butler’s reading of the performative, the marginal becomes potential for insurrection. The *renegade* opens new inroads into sets of technowledge that allow building new compositions and collectives by performatively ‘in-citing’ speech from affirmation to allegation. Systemically speaking, a marginalised outside (for example the public) can again be inaugurated into a sociality.

“The performative is not a singular act used by an already established subject, but one of the powerful and insidious ways in which subjects are called into social being from diffuse social quarters, inaugurated into sociality by a variety of diffuse and powerful interpellations. In this sense the social performative is a crucial part not only of subject formation, but of the ongoing political contestation and reformulation of the subject as well.

³⁶ Elie Ayache (2010), “Future of the Market,” in *The Blank Swan: The End of Probability*, (Chichester: John Wiley & Sons), 421.

³⁷ Judith Butler (1997), *Excitable Speech: A Politics of the Performative*, (New York/London: Routledge), 163.

The performative is not only a ritual practice: it is one of the influential rituals by which subjects are formed and reformulated. This point [...] raises again the possibility of a speech act as an insurrectionary act.”³⁸

³⁸ Butler, *Excitable Speech*, 160.

The figure of the renegade points to a destination where resistance is inside rather than outside a system. In fact, the renegade constitutes an act that proceeds from mere dissent (critique within a system) to concrete insurrection (an act of resistance and renunciation). The renegade is a positively *unprofessional* expert acting from a point of no return, a risk taker at the point of massive crisis. By speaking out and sharing proprietary data or classified information, she not only discloses what was excluded from public debate but also manifests noncompliance as an act of civil courage.³⁹ The ambivalence, the perils and the counterperformativity of the renegade surface in Haim Bodek’s personal experience:

³⁹ See also the development of *parrhesia* in Michel Foucault (2011) *Courage of Truth: The Government of Self and Others II*, translated by Graham Burchell, (London: Palgrave Macmillan).

“The whistleblower syndrome is kind of a pattern. The whistleblower says that ‘this is obviously wrong and I’m going to call it out’ and then when I call it out everyone else is going to realise that it’s wrong and it’s just going to get fixed right away. What he doesn’t realise is that everybody knows about it. So, the message a whistleblower should probably address is [...] ‘you know this is wrong and I know all of you recognise this is happening, but this is *wrong*.’ And when you realise that that’s what whistleblowing is—that you’re making people go through the uncomfortable process of looking at themselves—you realise you’re not the hero, you’re not bringing new information to the table. You’re the guy pointing out the thing that no one wants to see, that everybody knows about. And what’s weird about all these cases is that it seems that these, call it injustices, happen in pharmaceuticals, in labor and it’s the same pattern over and over, where there’s massive injustices no one wants to talk about and no one wants to admit vocally but everybody knows that’s how things work. It doesn’t change until the whistleblower does it.”⁴⁰

⁴⁰ Haim Bodek in Nestler, *Countering Capitulation*, 40:36’.

The figure of the renegade is not heroic; it is as ambiguous as the world she/he/they inhabits. But this is not to the disadvantage of the concept: in the midst of (fabricated) noise, the system *accidentally* yields information; exploiting the event of sectoral asymmetry resolves societal blindness. The *renegade act*—essentially a violation of current custom, rule or law—produces a host of viable resolution

materials across the semantic field of the term: visualisation, discrimination, cognition, transparency, decision. Whatever the impulse, each act perforates an autonomy that is increasingly conceded to corporations as legal persons. Against all odds the *renegade act* reclaims autonomy against platform capitalist and data driven sovereignty (and thus against human capital). That said, it does not constitute political autonomy with a capital 'A'—an autonomy that bestows rights or vests powers. To the contrary, it constitutes an act that attracts serious consequences and might fail. The renegade is an extremely precarious figure, as history has shown unmistakably.

Moreover, the normalising enclosure, virtualisation and commodification of data leads to a constitution of citizenship where the virtual, bot-assembled stake in the subject increasingly separates it from the physical body.⁴¹ What is looming at our political horizon is its disappearance from the social contract and from status, rights and autonomy.⁴² Latour reminds us: “While a division between nature and society renders invisible the political process by which the cosmos is collected in one livable whole, the word ‘collective’ makes this process central.”⁴³ Hence, if we imagine the figure of the *renegade* as solidarity in the sense of creating collective voices and practices—the *artist-as-collective* transforming resolution from aesthetics to poetics—we can conceive *renegade activism* as a forceful strategy (a debt embraced mutually) to subvert technocapitalism and its immediate biopolitical grip on life and its ever-shrinking distance (physically, affectively and ethically) manufactured from *absolute* distance to its *investment*; this is the derivative paradigm: knowledge is not resolved; what is dissolved is contingency (what cannot be known) by pricing its volatile intensities. The making of resolution and the renegade act stand against information asymmetry and noise by counter-constructing their ‘assemblies.’ *Renegade activism* stands for counter-institutions whose collectives (activists, artists, experts, nonhuman agents) act together to enhance public resolution across the whole gamut of the term’s meaning.⁴⁴ The autonomy gained is ambivalent, marginal, in a state of constant flux and highly volatile if not outright dangerous. At the same time, *renegade activism* can generate tactics of infiltration that create the imagination of value and as a consequence produce myriad forms of contextualised knowledge.

⁴¹ Or, as Harney and Moten observe, “Logistics wants to dispense with the subject altogether. This is the dream of this newly dominant capitalist science.” *The Undercommons*, 87.

⁴² Cf Hayles, *How We Became Post-human*, 84ff.

⁴³ Bruno Latour (1999), *Pandora’s Hope: Essays on the Reality of Science Studies*, (Cambridge: Harvard University Press), 270.

⁴⁴ Butler’s suggestion as regards ‘coming out’ as LGBT might be helpful for *renegade activism* and *solidarity*, its systemic and individual implications. As she says, “we surely need to take seriously the contention that ‘coming out’ is intended as a contagious example, that it is supposed to set a precedent and incite a series of similarly structured acts in public discourse.” Butler, *Excitable Speech*, 124.

past [pɑːst]

any length/infinity of time up to the moment of now.

⁴⁵ Giles Deleuze (2004 [1955]), “Instincts and Institutions,” in *Desert Islands and Other Texts, 1953–1974*, (Los Angeles: Semiotext(e)), 19–21.

⁴⁶ Including open source infrastructures and blockchain technologies. Cf Joana Pereira, M. Mahdi Tavalaie and Hakan Özalp (2019), “Blockchain-based platforms: decentralised infrastructures and its boundary conditions,” in *Technological Forecasting and Social Change*, (Amsterdam, Elsevier), at research.vu.nl/ws/portafiles/portal/78136241/Blockchain_TFSC_for_Uni_Open_Archiving.pdf

⁴⁷ Steven Shaviro (2012), *Without Criteria: Kant, Whitehead, Deleuze, and Aesthetics [Technologies of Lived Abstraction]*, (Cambridge: MIT Press), xii.

⁴⁸ Boris Groys (2014), “On Art Activism,” in *e-flux Journal*, no 56, at www.e-flux.com/journal/56/60343/on-art-activism/

⁴⁹ Brian Holmes (2006), “The Artistic Device or, the articulation of collective speech,” in *Ephemera*, vol. 6, no 4, 411–432.

In intensifying, reinforcing recursive acts that belong to art, language and other forms of expression, new modes of making (*poiesis*) can come into existence that again produce new ways of perceiving, thinking and making the world. As Deleuze once wrote,

“The institution is always given as an organised system of means. It is here, moreover, that we find the difference between institution and law: law is a limitation of actions, institution a positive model for action.”⁴⁵

Renegade activism is a way to create, enable and offer platforms of affiliation (rather than a conformity exploited by platform capitalism). It is a case of strengthening the desire to participate in *commonism* and forms of autonomy that exist side by side and in flux (derivative equity of relations).⁴⁶ Renegade activism points to the possibility of a future that can be imagined without foregoing a differentiating world. In short, it enables the ability to move from *low-res* to *high-res* across the whole gamut of resolution’s consequential—and hence not only technological or economic but eminently artistic, philosophical and sociopolitical—meanings.

Renegade activism and the artist-as-collective

“*The world is already otherwise.*”

(Steven Shaviro)⁴⁷

Boris Groys argues that the ‘artistic aestheticisation’ of contemporary art “means defunctionalisation, violent annulation of practical applicability and efficiency” and therefore operates in “art museums because it does not believe in the stability of the present conditions of our existence—to such a degree that contemporary art does not even try to improve these conditions.”⁴⁸ Brian Holmes, in contrast, identifies the art museum (and the university) as the “normalising devices within the rule-set of a financialised economy.”⁴⁹ Responding to both these accounts, this final section offers an aesthetic-artistic turn that seeks both to defunctionalise the black box and the white cube, thus emphasising the market framework that generates and recalibrates the scenes of hypercompetitive asymmetries in algorithmic as well as artistic practices. The media art theoretician and curator Christiane Paul recounts an “unsatisfactory but necessary mediation” in the contemporary art world:

point [pɔɪnt]

in mathematics a point is an exact position or location on a plane surface or in a coordinate system without dimensionality of its own. in his 1884 satirical novella ‘flatland. a romance of many dimensions’, english theologian edwin abbott described the adventures of a square in a one-dimensional world (lineland) inhabited by ‘lustrous points’. these points are unable to see the square as anything other than a set of points on a line. thus, the square attempts to convince the realm’s monarch of a second dimension; but is unable to do so. in the end, the monarch of lineland tries to kill the square rather than tolerate its nonsense any further.

“The post-digital and New Aesthetic provide us with a blurry picture or perhaps the equivalent of a ‘poor image’ as Hito Steyerl would understand it, a ‘copy in motion’ with substandard resolution, a ‘ghost of an image’ and ‘a visual idea in its very becoming,’ yet an image that is of value because it is all about ‘its own real conditions of existence.’ Whether one believes in the theoretical and art-historical value of the post-digital, post-Internet, and New Aesthetic concepts or not, their rapid spread throughout art networks testifies to a need for terminologies that capture a certain condition of cultural and artistic practice in the early 21st century.”⁵⁰

To put this slightly differently, this is a move to reorient artistic-activist practices along the lines of an aesthetics in the field of consequences. This is a move from critique to insurrection via ‘renegade resolution’. From an art theoretical perspective, such practice constitutes a radical reformulation of new media art for the 21st century. The very antithesis to *l’art pour l’art*, it is situated in a realm of postdisciplinary research, which is operationalised within a number of contests such as laws of court, NGO campaigns and negotiations with governments, not to mention the extensive coverage received by mainstream media. A leading example: Forensic Architecture, a collaborative group of scholars-artists-architects-philosophers whose collective practice uses architecture as an optical device to generate evidence, and cross reference it with a variety of sources, such as new media, remote sensing, material analysis, witness testimony, and crowd-sourcing.⁵¹ Regarded in the light of Malabou’s theorisation of plasticity via repetition, what characterises Forensic Architecture’s radical counter-investigations is their intention—their agency—to ‘receive form’ by way of acts of violence and ‘bestow form’ by way of the event of forensic *reperformance* of these very acts. While these practices enhance resolution not solely for artistic means, their *revolutionary* association of technology, theory and research towards entangled and encouraging interventions reverberates increasingly in art world corners that are seeking new conceptually, materially and ethically consequential approaches to move beyond conventional frameworks of criticality.⁵² In the midst of this array of (forensic) investigations and mappings, we are confronted with a regime that only submits “substandard resolution, a ghost of an image—to take Paul’s observation outside the art field.”⁵³

⁵⁰ Christiane Paul (2015), “From Immateriality to Neo-materiality: Art and the Conditions of Digital Materiality,” in *Disruption. Proceedings of the 21st International Symposium on Electronic Art (ISEA, Vancouver)*, 1–2.

⁵¹ See: thefutureof-demonstration.net/vermoegen/e01/index.html

⁵² Cf Catherine Malabou (2010), *Plasticity at the Dusk of Writing: Dialectic, Destruction, Deconstruction*, translated by Carolyn Shread, (New York: Columbia University Press).

⁵³ Paul, *From Immateriality*, 1–2.

Hence, only renegade alliances seem capable of making the black box speak—enhancing resolution across all levels of the term—and produce knowledge that is otherwise absent due to the proprietary logic of capitalism. The point of arrival for the *artist-as-collective* is no longer the gallery or the museum; rather these institutions serve as important ‘bus stops’ marking artistic-discursive *intelligences* on route to other destinations and to other institutional ecologies.

Last words: Resolution as a counter-concept for transparency

“All consciousness is a matter of threshold.

(Gilles Deleuze)⁵⁴

⁵⁴ Gilles Deleuze (1993), *The Fold: Leibniz and the Baroque*, translated by Tom Conley, (London: Continuum), 101.

The term *resolution* reflects open processes more adequately than the term transparency, as the potential agency of the former’s semantic field can be conceived as a viable template for collective action. Ranging from visualisation, discrimination, intelligence and knowledge to intention, purpose, (common) initiative and (joint) decision-making, the term’s meanings understood as cohesive rather than distinct aspects of reality enact a thinking and making that performs collectivity against data-driven violence. As Vilém Flusser once noted: “Technology, to be overcome, needs to be transformed into something else.”⁵⁵ That ‘something else’ is both intellectual as well as affective potential. It involves technological and algorithmic operations. It can thus be seen as a paradigmatic node of how we may sense, develop, differentiate and support relations between humans and non-humans. Moreover, it holds the potential for thinking and creating access to value in contrast to the capitalist price(ing) engine without losing the performative edge necessary within complex societies in flux.

⁵⁵ Vilém Flusser (2019), *The Holy See. An Extract from the Last Judgement: Generations (1965-66)*, translated by Rodrigo Maltez-Novaes, (Pittsburgh/New York: Flugschriften), 17-18.

Against the enclosures of capital with its ‘derivative autonomy’ mentioned at the outset (one that has also captured and financialised the arts), perhaps it is the very notion of ‘autonomy’ that now must be reconceptualised: no longer as demarcating ‘independent’ but rather as entangled, dynamic, open, sometimes aleatoric and instantaneous processes (acts connected to a multitude of contingent moments) that purposely integrates ambiguous, heteronomous influences in order to *make* resolution in the full meaning of the term. Resolution, then, would not only be of intellectual, physical and affective potentials

but also would involve technological properties, operations and the 'distances' between them. It becomes a socially powerful node of how we may sense, map, differentiate and support material and performative relations. Moreover, it holds the potential to access value in radical contrast to the proprietary logic of technocapitalism, without losing the performative edge necessary within complex socio-political contexts in flux.

The multifaceted semantic field of *resolution* and its technological, aesthetic, social and political significance offers a framework against the noise that makes the ruptures and breaches of social contracts possible in the name of proprietary interest. Thus, it traces the aesthetic (what we 'see'), the poetic (what we 'make') and the political (how we apply resolution as decision-making) consequences. Here, solidarity means to become *traitor-educator*. The *renegade* as revolutionary figure re-maps and re-claims the playing field; she loses faith in *promises* and instead enters the realm of *claims*; what she invests in research and analysis (critique) is to resist and interfere black box evaluative preemption (insurrection). Following from a specific event in algorithmic finance, this chapter conceptualises artistic practice as the work of many towards possibilities for radical intervention. It proposes a conception and framework in which art embodies risk and takes the leap from contemporary art's open promise to an aesthetic in the field of consequences that claims the present: a post-disciplinary practice in which the *artist-as-collective* resolves *aesthetics* of critique into *poetics* of resistance.

The presented concepts transgress contemporary art. As artistic practice, their orientation is aesthetic in the sense of perceiving and applying leverage points for a poetics that moves beyond the capitalist framework. Contrary to market activity (including the 'art market') artists rarely indulge in insuring or speculating on risk. Rather, artists leverage risk by embodying risk. Their 'derivative mode of production' is not about securing a future-at-present by recalibrating (pricing) every conceivable expectation. Rather, it is to affirm and employ risk as the potential to trust and thus imagine (materially speculate on) how to realise *common* expectation along (in parallel) with the volatile contingencies: building worlds in which the depth of resolution does not collapse into a surface for the few. This is to say, then, that art is a force for political resistance—by default.

The Courage to Matter

Johnny Golding

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‘technically’ at war, become more commonplace by the nano-second, girded by racist hatreds, increasing misogynies, homophobias large and small. Glaciers are melting, whole swathes of fauna, flora, insect, cephalopod, species large and small, are dying. With equally strident pronouncements ranging from ‘the end of history’ to ‘the end of democracy’ to ‘the end of the world’, a paradigm shift is underway; has been underway.

Let us make no excuse, then. It is time for a certain kind of courage. I shall set out my stall in the long-standing tradition of those who have gone before, and declare forthwith that what follows is not a conviction, a standpoint, an opinion or whim.² Neither is it emotional hyperbole, false consciousness, madness or the perfunctory navel gazing of the self-absorbed, though from time to time, these remarks may have to cannibalise all of the above, and more. As will become clearer, this ethical demand, this call for the ‘courage to matter’ marks out a double move. On the one hand, it is nothing more nor less to begin with than a re-staging of an onto-epistemology, one that prizes the contemporary analytic ‘how’, ‘that’, ‘when’ and ‘where’ away from the worn-out universalisms of Western metaphysics towards the multiversal, sticky cohesions of our euphemistically phrased age of intelligence and managed risk. On the other hand, it is a critical *rapprochement* linking the making of sense (literally, the producing of sense—common, spiritual, cognitive, erotic, logical or perhaps something not yet invented) with the exponential proliferation of information and increasingly wild, co-evolving forms of matter.³ The first slice of the double move thus concerns the way in which method matters, both materially and consequentially. The second slice turns not only to foregrounding the critical importance of creative practice, and with it, the foregrounding of the ‘arts and humanities’, but does so by dragging the Enlightenment of the 18th–20th century into the 21st. The problems pulling that particular cargo into our contemporary ‘now’ are of course legendary.⁴ But given the rapid rise of autonomous systems that seem to find succour in every knowledge configuration other than those emanating from the arts and humanities, it is time to peer into the abyss.

So let us take the plunge.

² Famously penned by Theodor Adorno (2004 [1966]) in his forceful *Negative Dialectics*, translated by E.B. Ashton, Routledge, 4, where he sets out the position that, “dialectics is not a standpoint” but an objective method for seeking the truth, particularly about the rise of fascism, the role of racism, and the task of art / critical reason in the fight against tyranny, populist, capitalist or otherwise. No fake news here.



³ A vital and new understanding of *rapprochement* as distributed intelligence binding humans and machines, has most recently been made by Edward Ashford Lee (2020) in his *Co-Evolution: The Entwined Futures of Humans and Machines*, MIT. Much earlier, and from a rather different point of view, see Vilém Flusser and Louis Bec (2012 [1987]), “Vampyrotheuthic Dasein,” in *Vampyrotheuthis Infernalis: A Treatise*, University of Minnesota Press, 36ff, where the ontological nuance between the reality of the human and the reality of the mollusk are raised through the vectors of sexual arousal. For the vampyrotheuthic, *rapprochement* is always-already in the durational moment of orgasm (41–42). See also, for example, the incredible work of Yayoi Kusama (2012) *Polka Dots* at youtube.com/watch?v=rRZR3n-sileA.

⁴ The Enlightenment (so-named by Immanuel Kant and taken up, in massively different ways by G.W.F. Hegel and most of the English liberal theorists, from Locke to Mill, Bentham, Payne) has often been cited for its overt racist and/or sexist positions (though spare a moment for Mary Wollstonecraft, Harriet Wilson and Mary Shelley to name but a few beacons of early literary and political critical thought whose works unsurprisingly overthrew the repellent racial and sexual profiling alluded to above). Speaking loftily of Reason as the driving force of the social, alongside the importance of ‘change’, mobility, the rise of the (white/propertied) Individual and the separation of Church and State), one could safely say that it spawned instead, alienation, reification, suffering. It may well be asked: why bother? This will be clarified momentarily.

sense [sens]

foregrounding pleasure as a form of knowledge; aliveness or embodiment of the pluralities of logic through breath, heat, touch, and tremor.

Drawing a limit.

Foucault opens his 1978–79 *Lectures on the Birth of Biopolitics* with this seemingly benign request: picture for a moment that universals do not exist.⁵ What would be the meaning of objectivity, speculation, prediction—indeed assumptions around life itself—if one were to cast aside or ignore completely universal logics? For universals, and the metaphysics to which they are attached, have had for centuries the cunning gift to enable production (that is to say, invention, discovery, circulation) of meaning in such a way that it can be held to be ‘true’ (objective) irrespective of time, place, ethnicity, identity politics, religion, class, the weather or mass insanity. Its ‘truth’ cannot be reduced to its sign, to its literal function or its instrumental use value.

One of the most provocative and important aspects of this kind of logic is that it can embed the dynamism of change as its core feature without appealing to an Archimedean point, God, or some calvary rushing in where angels fear to tread.⁶ Thus it allows for sensuous, practical, activity, human or otherwise, to be central to the very formation of truth / meaning. In so doing, this move can discredit, when necessary, long held beliefs, superstitions, fake news.

Dialectics (speculative, idealist, historical and/or negative) as both method and an ontological move is perhaps the most majestic of all universal logics because, in its elegant simplicity—and despite the profound differences inherent with the variations mentioned above—dialectics is able to grasp ‘change’ as a plural, dynamic ‘limit’ without adding anything ‘extra’ to its comprehensive grasp or understanding. In this sense it is ‘universal’ in that no matter where, when, how or why, whatever is ‘grasped’ is both able to change and, simultaneously embody the fullness of the concept without leaving anything out or adding anything extra. This totalising can only happen in a dialectical move, a move that puts at its core (rather than edge) an odd type of limit, a kind of ‘imaginary-real’ (in this context, called ‘negation’), one that is always-already, a synthetic unity. Here ‘negation’ does not mean ‘no’ or ‘opposite’. Instead, it names (expresses) the simultaneity of both a fluid ‘here’ and ‘now’ (thesis) steadfastly cohered to its point-for-point ‘other side’, the so-called ‘not-here’ and the ‘not-now’ (antithesis).⁷

⁵ Michel Foucault (2008), *The Birth of Bio-Politics: Lectures at the Collège de France 1978-79*, translated by Graham Burchell, Palgrave, 1. Deleuze pushes the point further; in his *Difference and Repetition*, he shows what is the *image* of thought, particularly Western analytic logic, a point we shall return to momentarily. Cf Gilles Deleuze (1994 [1968]), 'Chapter III. *Image of Thought*,' in his *Difference and Repetition*, translated by Paul Patton, Athlone Press, 129-67.

serendipity

[,sɛrɛnˈdɪpəti]

a word invented by horace walpole, an 17th century english writer and art historian who in a letter referred to a persian fairy tale called 'the three princes of serendip'. the princes, he told his correspondent, were 'always making discoveries, by accidents and sagacity, of things which they were not in quest of.' serendip is the old name for sri lanka (ceylon), hence sarandib by arab traders. the word has been exported into many other languages, with the general meaning of 'unexpected discovery' or 'fortunate chance'.

⁶ The problem ensuring movement would be the expression of the logic can be situated as far back as Heraclitus and his famous example of trying to ascertain the relation between flow and its instantaneous expression as logos. See: Heraclitus (2020 [500 BCE]), *Fragments*, translated by Brooks Haxman, (Middlesex: Penguin). This became more centrally a part of the philosophic discourse via Kant and his proposition of two main 'systems'-the mathematical dynamical and the dialectic. Hegel insisted that there could be only one logic, outside of which, nothing existed. The key, then, was to figure out how to comprehend and make space, analytically and practically, for movement. This was particularly important for any political theorist / philosopher (Marx et al), since it was a way to acknowledge and develop human agency as a driving force for change. For an important summary of this development, see the landmark work by Sheldon Wolin (2004 [1960]), *Politics and Vision*, Princeton, (New Jersey: Princeton University Press), especially Chapters XI-XIII, 393-494.

⁷ In the next section, I will briefly situate the critical move of 'sublation' as a way to avoid obvious issues with tautology. But for a thorough romp through the rough and tumble of the complex dialectical move to "all thinghood", Cf G.W.F. Hegel ([1807]), 'Preface: On Scientific Cognition,' and 'Introduction', in his *The Phenomenology of Spirit*, translated by A.V. Miller, especially §18-§36, 10-21; and Parts A: Consciousness, §72-§165, 47-103, and B: Self-Consciousness, §166-§346, 103-210. As Hegel puts it: §345-346: "...[All thinghood]... conceals from itself the disgracefulness of the irrational, crude thought, which takes a bone for the reality of self-consciousness and whitewashes that thought by unthinkingly mixing up with it all sorts of relations of cause and effect, of 'sign', 'organ', etc, which are meaningless here... the organ of its highest fulfillment, the organ of generation [is reduced to and confused with] the organ of urination..." 102-3.

At the heart of this pluralised, onto-epistemological move, our rather complex limit, shape-shifts into a dynamic void, the strange logical counterfactual, also known, conveniently, as ‘the excluded middle’. Its exclusion is a logical necessity, a required non-existent surface keeping apart by keeping together, the abstract ‘here and now’ with its (also abstract) ‘not-here and not-now’ underside. Together-forever, they form their own cohesive, sticky, hell of unified contradiction. This is the strange ‘alive-but-not-alive’ moment around which change is rooted within the universal. For the sake of brevity, picture if you will, a sheet of paper. On the one side can be called ‘thesis’; on the other, its point for point ‘not-side’ or ‘antithesis’. If that paper is crushed or pulled apart, the one side will not of course run to keep up with the other side; nor will it lose its grip and be flung off the page. They are cohered together-forever in a permanent ‘imaginary-real’ plurality; that is, they are cohered together as our infamous ‘excluded middle’.

As we are not yet in the postmodernist playground, neither the one nor the other ‘side’ can shapeshift and sit together on the ‘same’ side, as it were. Now, say we were to stretch that little excluded middle in every direction. In this move, the here-now || not-here-not-now could take on the garments of a whole (non-existent but necessary) infinite surface or plane. Of course if the analytic were to complete itself at this point, one would not be able to generate the supposed uniqueness of self-consciousness, identity, not to mention the fullness of knowledge, beyond a crude and circular binaric tautology of ‘thesis’ being understood only in relation to what it is not. Thus, and in order to become fully universal (that is, ‘concrete’ or ‘graspable’—both as in comprehensible and inhabitable—the so-called ‘really-real’), the requirement of ‘a something’ would have to be supplemented to the logic. But—and here’s the rub—this ‘something’, in its ‘somethingness’, would have to be able to be ‘a something’ without adding anything extra to the argument; no weight nor space nor time to the movement. To put this slightly differently, ‘a something’ would need to be added in order to make the universal fully ‘here and now’, and to do so without the necessity for consent, agreement or obligation. Concurrently and irrespective of this ability ‘to be’ (without being) and ‘to move’ (without moving), this necessary supplement is closer to a ‘not-sayable something’, as Adorno would posit, or as a kind of

system [ˈsɪstɪm]

18th c version: ‘a system is nothing more than the arrangement of the different elements of an art or a science in an order that makes them mutually dependent; the primary elements lead to and account for the final ones. those which explain the others are called principles, and the system is all the more perfect as the principles are fewer in number: it is even to be desired that they be reduced to one.’ (Diderot). 21st c version: the logic of cohesion; that which names ‘stickiness’, ‘movement’, the ‘what comes next.’

LET'S START WITH THE
(ABSTRACT) ANTI-THESIS

(ABSTRACT
ANTI-THESIS)

→ IT'S "POINT-FOR-POINT"
ON THE OTHER SIDE WE WILL CALL
(ABSTRACT) THESIS

(ABSTRACT
ANTI-THESIS)

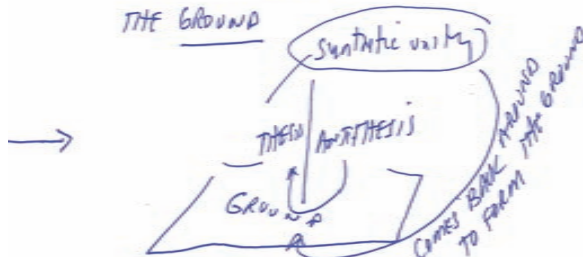
ON THE 'OTHER SIDE'
= ABSTRACT
THESIS

strange nothingness or negation, a 'nowt time' (Hegel), which in-itself could (and did and does) shapeshift into a variety of synthetic, teleological unfoldings. Sometimes this 'flow' could be called transcendence; sometimes called becoming; sometimes immanence—all differing kinds of sweet little 'nothings' that in their sensuous teleological move/ing, would (and did) enable meaning to be present, grounded, and create objectivity whilst simultaneously incorporating the subjective, irrespective of one's desire, embodied, floating or otherwise. In machine learning, interestingly, this 'not say-able something' sans its teleological attributes might simply be called: 0. But now I am getting ahead of myself.

Let us recap, briefly. The limit being addressed here is a never-ending 'abyss' or 'deep cut' (the 'excluded middle'), an infinite imaginary-real plane stretching in every direction at once. Interestingly, it is often the stuff of misguided political agency or as a wrongly understood transitional place of otherness (or just: Other). Seemingly meant to name or indicate a kind of safe non-place where one could possibly 'exist' as *neither* as an x [thesis] *nor* as a y [anti-thesis], it is or might be understood as a something-yet-to-come or not-yet-invented. For others—theorists and activists alike—this move seems to enable an equally irritating set of conclusions: for example, that one's desire can never be reached or is weighted down by 'false consciousness'; or that the phallogocentric Logos [thesis/antithesis], with its required feminine 'lack' [excluded middle/vagina] can never be reconciled; or that this abyssal logic is nought but the expression of a bottomless trauma.⁸

Despite these glaring issues, the 'deep cut' / 'excluded middle' offers an important epistemological advance over logics that attempt to bring in 'movement' or 'change' as a simple directional chronology (born, live, die) or simple teleological unfoldings (goal informs every stage of the process which, in its 'informing', circles back to establish the purpose or 'start').⁹ But once we move into the realm of the dialectical 'excluded middle', the limit not only names a 'start' without resorting to a linearity of time or tautology of the referent, it activates the moment of 'the adding of nothing' mentioned earlier. It thus makes inhabitable, graspable, comprehensible, the 'present',

WHICH 'COMES BACK AROUND' TO FORM
THE GROUND



⁸ Amusingly, Slavoj Žižek, amongst others, positions the logic of an excluded middle as *sine-qua-non* for the 'impossibility of heterosexuality' or rather, to be more damningly ridiculous, as the necessity for heterosexuality, despite (or because of) the fact heterosexuality can never be 'reconciled'. Writing in relation to the Lacanian notion of trauma, Žižek concludes: "And this brings us to the crucial point... The parallax gap between masculine and feminine positions, the two inconsistent ways to cope with—or, rather, to assume—the trauma of the impossibility of sexual relationship, is unconditional; there is no third way. Of course, our position is not determined by biology (a biological man can assume a feminine position) [sic] but the choice is unconditional: there is no "bisexuality" here; the gap

is parallaxic; one position excludes the other, which is why one precisely should not invoke 'the human subject as such, the unconsciously bisexual subject for whom sexual difference is only ever an incomplete, unsatisfactory solution to the failure of the [hetero]sexual relation.'" Cf: zisek. [uk/reply-to-my-critics-part-two-re-the-sexual-is-political/](#). The problem of 'false consciousness', including its epistemological arrival from the logics of 'deep cut' is best dispatched by Antonio Gramsci's 'Relation between science, religion and common sense,' *Prison Notebooks*, 326–35. But see also the work of many mid-to-late 20th century artists and philosophers including for example Frida Kahlo's *Self Portrait in the Bathtub* (1940) or Lee Krasner's (1955) *Milkweed*.

⁹ Of passing interest: teleological movement (dialectical or otherwise) was unceremoniously rejected by Deleuze and Guattari as 'arbo-real philosophy'. This damnation of tree-root-path epistemology translates thus: An acorn, should it be gardened properly will require say dirt, water, sun. If this goes to plan, the acorn will unfold accordingly to become an Oak. Thus 'Oak' gives meaning/purpose to the start and movement ('growth') of the acorn. Step sideways from this: let us say that 'child' needs water, sun, shelter, protection (etcetera or equivalent) and will unfold to become 'Man'. 'Man' thus gives 'purpose' and clarity to the

path of the child's development. This may seem harmless, until one confronts the logic with real issues, for example: slavery. A child is born into slavery, and will *ipso facto* unfold to become an Adult Slave, the meaning of which will inform his/her/their existence. Refusing this subjection, is to 'not know one's place' (font of racism, sexism, homophobia, classism, and etc). Of course it gets more complicated if, say, the acorn wishes no longer to become an Oak, but say, a Maserati car!—a point we will return to momentarily. But see, Giles Deleuze and Felix Guattari, (2013 [1980]) 'Tree-Rhizome,' *A Thousand Plateaus*, Bloomsbury, 3–15.

THE 'GROUND' NOW GIVES 'MEANING' TO THE (FORMER) "ABSTRACT" THESIS/ ANTI THESIS

AND SO THESIS/ANTI THESIS IN THEIR SYNTHETIC UNITY FORM THE "CONCRETE" UNIVERSAL OF 'CONCRETE' CONCEPT



TOTALISING = CONCRETE CONCEPT

→ (ABSTRACT) ANTI THESIS IS 'SUBLATED' INTO THESIS



→ AND IN THEIR SUBLATION EXPRESS A 'SYNTHETIC UNITY'

WHICH 'COMES BACK AROUND' TO FORM

Ex-amp
abstract
abstract

heretofore but an abstract deep cut or abyss.

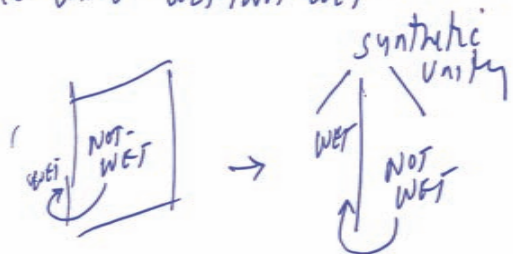
It does this, in part, via the process of sublation (*Aufhebung*).¹⁰ A rather logically neat party trick, where the abstract 'here-now' comes into existence by simultaneously swallowing, lifting, cannibalising, inhaling (picture whatever visual metaphor is needed to grasp this odd move), it's point-for-point 'not-here-not-now'. Its synthetic unity is expressed (vomited, percolated...again, if required, chose a visual metaphor) in such a way that its subsequent logical moment both expresses the plurality of this new synthetic unity without destroying the discreet abstractions which has been sublated (swallowed, inhaled, cannibalised).

Picture it this way: the abstract face of, say, the 'all there is'—let's call this 'the wet'—is swallowed / lifted / cannibalised into the abstract face of the 'all there is not'—let's call this 'the not-wet'. Now, from this move either the fully formed 'concrete' concept 'Wet' will emerge, which, in its synthetic unity, will teleologically unfold (that is, in its most simple imaging: 'come back around') to give meaning to both 'sides' of the initial excluded middle. Equally possible: the fully formed concept of 'Dry' will emerge which will teleologically 'come back around' to give meaning to both sides. Here the sublated movement of the 'excluded middle' also (and crucially) imbues the whole process with a kind of 'air' or 'openness' (analytically speaking: with a kind of negation) which can take on specific political, social, aesthetic and ethical *agency* depending on a variety of factors. To put this perhaps more clearly, let us say that rather than name the abstract thesis 'wet', we name it instead as the abstract thesis: 'bourgeoisie'; and rather than name its antithesis 'not-wet', we name its point-for-point connected abstract 'not-side': the 'proletariat'. The one is sublated into the other (which one 'depends' on a variety of factors).¹¹ Let us say that their synthetic unity in its sublated form expresses, in its movement, the capitalist relations of production.

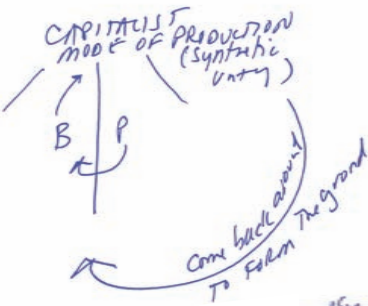
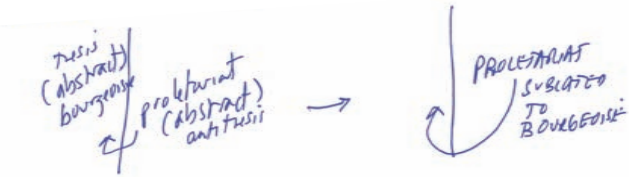
technology [tek'nɒlədʒi]

the logic of the grasp (techne),
having little or nothing to do with
'machines' and more to do with the
'how' or 'mode' of the event, any
event.

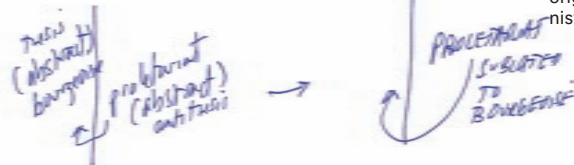
EXAMPLE USING "WET/NOT-WET"



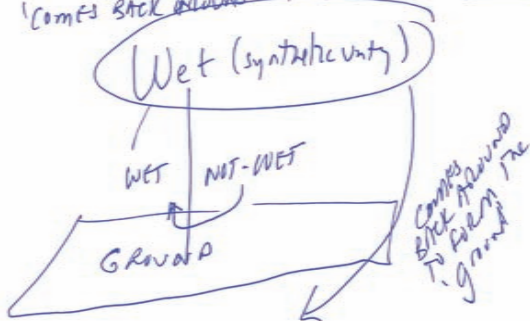
← USING
 bourgeoisie (thesis)
 et proletariat (antithesis)



EXAMPLE USING
 abstract bourgeoisie (thesis)
 abstract proletariat (antithesis)



→ THE synthetic unity (now called Wet - comprised of both wet + not-wet abstracts) 'comes back around' TO FORM THE GROUND



(called Wet)

¹⁰ Clearly a deeply complex analytic move especially regarding *Aufhebung* (sublation), see specifically G.W.F. Hegel (2013 [1812]), *Encyclopaedia of the Philosophical Sciences in Basic Outline, Part 1: Science of Logic*, translated by Brinkman and Dahlstrom, Cambridge, and his (1807) *Phenomenology*. For an accessible background read where the logics are highlighted in greater detail, cf J. Golding (2010), *Fractal Philosophy (and the small matter of learning how to listen): Attunement as the Task of Art*, www.ctheory.net/articles.aspx?id=634.

¹¹ It would not be too far a stretch to recall at this point, Marx and Engels's famous dictum, "Workers of the World Unite! There is nothing to lose but your chains!" For in order to end capitalism, in order to completely overthrow the system would require at the very least one side dropping out of the historical-materialist dialectic. Either 'side' could do this, but clearly it would not be in the interests of the Bourgeoisie to leave the table. Cf Karl Marx and Friedrich Engels (1848), *The Communist Manifesto* at <http://activistmanifesto.org/assets/original-communist-manifesto.pdf>

This mode of production teleologically unfolds (in the lay sense, 'comes back around') and forms the basis or ground of the Bourgeoisie || Proletariat contradiction now made 'real', 'graspable', materially able literally to 'make sense'. This is another tiny step towards the materiality of thought in such a way that is graspable no matter where or when or how the approach is made.

At the same time, the synthetic moment unfolds (in the lay sense, 'comes back around') to provide the 'ground' to our initially uninhabitable present (the start). Moreover and equally impressive, it points to the direction of the 'what comes next'. We have before us, a move toward 'certainty', 'prediction', move/ment full of contradiction, intensity, plurality. To be clear: the excluded middle, now given the garments of sublation, synthetic unities and teleological unfoldings, is able to kick-start the 'what comes next' without positing an external Archimedean point (observer, God, The Truth, instrumental reason, signpost, map).

To recap once more then: this synthetic unity, formally speaking, requires as its starting point an 'excluded middle'. This 'excluded middle' is a 'limit' better understood as a deep abyss, one that can never be inhabited or made 'real' but, on the other hand is always-already 'plural' inasmuch as it is an oddly cathected 'thing-no-thing'. It allows for (makes room for) both the 'start' and its grounding, a ground which is, in itself, inherently changeable.¹² Concrete conceptual truth or meaning of a thing ('any' thing, be it a system, a mode of production, a poem, an acorn, ideology or law) presents a form of knowability that in its total 'synthetic unity' is fully graspable in and of itself. Its meaning requires no outside or Other. It is fully universal. Its changing foundations, in its movement, remain open, real, accessible. In this move, any and all things past, present, not yet born or invented, entail, at their very moment of coming into existence: movement / change / alterability / contradiction. In the positing, point-for-point, an abstract 'other' (the 'not-thesis' /anti-thesis) in relation to 'thesis', we have a strange doubling, a contradiction of the X in mortal stickiness with its not-X 'other'. Neither thesis, nor antithesis can be prised apart; nor can either shapeshift to be on the same 'side'. As mentioned earlier, they are forever locked in a permanently indivisible, plurally-sided (thesis/antithesis) abyssal cohesion.

¹² Cf Jean Luc Nancy (2002), *Hegel: The Restlessness of the Negative*, (Minnesota: University of Minnesota Press).

term [t3:m]
components of a formula.

Most importantly for our purposes here comes this startling consequence: this strange plurality-limit, this odd 'excluded middle' and the dialectical move to which it gives expression (knowledge, direction, ethics) also admits a complex notion of time and space. This sense of time is one that moves away from the chronological towards an 'as always-already' non-inhabitable moment called 'the present,' a continuous-plural-instant stretching in all dimensions at once. It also re-asserts spatiality as an abstract movement (the no-thing) which, in its no-thing/no-where movement, embodies the unfolding path of the (also non-inhabitable) 'here' and the 'there', simultaneously. Taken together, we have our first glimpse of a speculative onto-epistemological materialism: fluid, but sticky; drawing a limit, but infinite; subjective but objective.¹³ A strange kind of limit, this 'excluded middle' / 'deep cut' state of affairs. Perhaps this is but a small price to pay given the benefits—for it promises to deliver a synthetic unity that, in its multi-dimensional movement, grounds the whole of reality without leaving anything out (except of course the 'excluded middle' or eternal 'in between' of the present). There is no extraneous entity, magician or being (God, an army, the avant-garde) required to create or be responsible for movement, history, change. There is no 'interior' or 'exterior' supposition; no taking as a given that which needs to be proven. With no privileging of various forms of circular reasoning or appeal to an outside authority or model, there is a reliance on critical reason, creative practice.

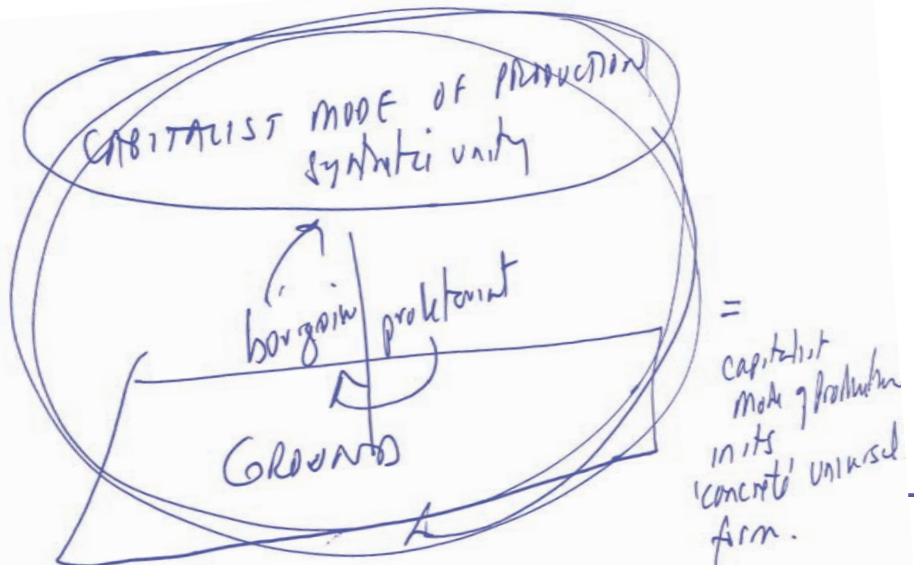
More importantly, that which is understood to be objective is itself—its dimensionally pluralised 'self'—imbued with the speculative spatio-temporal, creative moment of change. In this sense, universality could underscore human sensuousness and reason, alongside collective organisational agency. We return to this point later in the text, but for now two points must be underscored: In its classical liberalist manifestation, this 'objective-dimensionally-pluralised self' underwrites the role of reason, the rise of the individual, the separation of Church and state, the enshrinement into law *habeas corpus*. In its classical Marxist manifestation, it accentuates the role of the political as expressly critical sensuous activity with an emphasis on human participation in making change happen, now. Rather than relegating it (change) to a teleological movement of the unfolding, it accentuates

¹³ Of interest here is the work of those involved with OOO (Object Oriented Ontology) or OOP (Object Oriented Philosophy) or OOF (Object Oriented Feminism), not to mention its fore-bearer, Speculative Realism. Slightly differing emphases depending on which acronym is used, the overall view is that some kind of abyssal logic is required in order (a) to install agency into the (art) object without (b) requiring the human subject and to do so by (c) foregrounding the whole business of philosophy/metaphysics on 'aesthetics' rather than 'science'. Of course this is a move aligned to the metaphysics of Heidegger and related phenomenologists, rather than dialectics per se, but it is raised here as it privileges the ever useful abyss

in order to make meaning manifest. At a time when one scrambles to be political whilst simultaneously attempting to move away from the anthropocene; at a time when one is attempting to do this by putting front and centre: art, the art object, not to mention subjective 'objectivity' in the age of ephemeral new 'materialisms', one can understand the (fatal) attraction. Cf: Graham Hartman (2018), Object Oriented Ontology: A New Theory of Everything, (Middlesex: Penguin Books). See also a more politically astute account by artist and philosopher, Katherine Behar (2016), Object Oriented Feminism, Minnesota: University of Minnesota Press).

vanish [ˈvæniʃ]

opening sequence of the prestige (christopher nolan): every great magic trick consists of three parts or acts: the first part is called 'the pledge' in which the magician shows the audience something ordinary: a deck of cards, a bird or a man. he shows this object, perhaps he asks the audience to inspect it to see if it is indeed real, unaltered, normal, but of course... it probably is not. the second is called 'the turn', where the magician takes an 'ordinary something' and makes it do something extraordinary. now everyone is looking for the secret... but they will not find it because of course no one really is looking to find it, they don't really want to know. the audience wants to be fooled, but they want to be fooled in a special way: making something disappear is not enough; one must bring it back. that is why every magic trick has a third act, the hardest part, the part that is called: 'the prestige'.



the ‘getting of one’s hands dirty,’ as Sartre might say, the active social battle to make (as in wilfully produce, create) a better material world, hard fought as those with power usually do not give it up, willingly. One could say, as did Marx, that this was (is) nothing less than *revolution* getting a leg over an otherwise and forever unfolding, *evolution*.¹⁴ In this sense, too, change would not (and does not) happen by wishing and hoping and watching the clouds roll by. As Marx so clearly put it in his *Theses on Feuerbach*, “Philosophers have for so long *interpreted* the world; the point is, to change it.”¹⁵

One might well ask: what’s not to like?

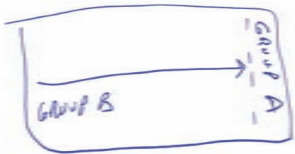
As it turns out, quite a lot. Let us turn to one last totalising approach to knowledge to understand more fully what is, urgently, at stake.

The ‘excluded other’.

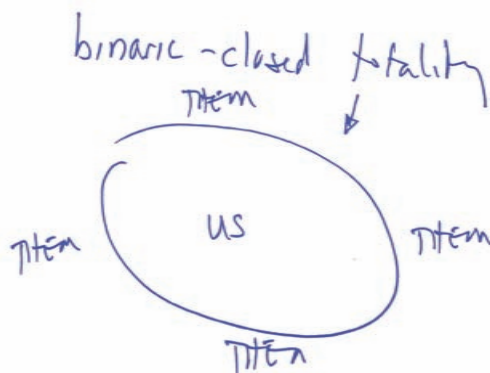
As every first year student of politics knows, the most elementary law of political science states there will always be leaders and led, rulers and ruled.¹⁶ A skilled leader/political party, social movement, will ‘know’ this, and will proceed accordingly, organising around the binaric principle of ‘friend vs enemy’, the totality of which exhausts the whole of the field. Usually referred to as the ‘zero-sum game’ for obvious reasons, any forward movement can only be understood as a threat to one’s security and well-being; one’s gain is the other’s loss, and vice versa.¹⁷ If successful, this rather familiar division neatly allows for a set of allegiances to be ingrained in such a way (usually via fear or threat or mocked innuendo) that those who see themselves in Group A (say ‘friends’) will not assume that there are any common interests with Group B (‘enemies’), nor should there be, ever. Importantly, the rhetoric of the zero-sum game also presents by implication or as a non-provable, usually apocryphal ‘truth’ that the spatial horizon (property, values, riches, cultural freedoms, art) will be diminished precisely if/when a forward movement is initiated by the ‘opposing’ group and gains momentum.¹⁸

To bring this point into an obvious contemporary moment, one could reasonably conclude that the ability to separate off, encircle to safety and simultaneously build one’s ‘side’ away from a so-called evil or

Zero-Sum



¹⁴ Jean-Paul Sartre (1989 [1948]), *No Exit and Three Other Plays*, (New York: Vintage). The complexity of the works in this particular volume includes his polemical attack on racism in the US and of course the issues with 'dirty hands', moral compromise and political warfare. Of interest, too, the piercing work by Yoav Di-Capua (2018), *No Exit: Arab Existentialism, Jean-Paul Sartre, and Decolonization*, (Chicago: University of Chicago Press).



¹⁵ Karl Marx (1962 [1845]), "XI," *The Theses on Feuerbach*, first published as an appendix to his Ludwig Feuerbach and the End to German Classical Materialism, in *The Marx, Engels Selected Works*, Vol 1, (Moscow: Progress Publishers), 11-13.

¹⁶ "The first element," Gramsci detailed in the secret notebooks he wrote whilst imprisoned under Mussolini, "is that there really do exist rulers and ruled, leaders and led. The entire

science and art of politics are based on this primordial, and (given certain general conditions) irreducible fact." Antonio Gramsci (1997 [1929-37]), "Elements of Politics", in his *Selections from the*

Prison Notebooks, translated and edited by Quintin Hoare and Geoffrey Nowell Smith, 144. This critical point is developed with much greater precision in his astute reflections

on Machiavelli's (1537) *The Prince*. See Antonio Gramsci, "The Modern Prince," in 'II. Notes on Politics,' *Prison Notebooks*, 123-204.

¹⁷ In case this is not obvious, zero-sum can briefly be understood thus: if we have, then you do not have; if you have, then we do not have. When both 'sides' are taken (added) together, the whole of the cultural-socio-economic field held by 'us' plus 'you' will be fully accounted. Here 'the field' equals 100%, sometimes divided as 40/60 (rare), sometimes 1/99 (more common). For a wild sci-fi exposition, delve into S.L. Huang (2020), *Zero Sum Game: Cas Russell 1*, (Tor Books UK).

¹⁸ Interestingly, the fascist theoretician and art historian, Hans Sedlmayr makes exactly this point but with respect to his deep nausea against the 'disease' of modernity: attacking Impressionism, Expressionism, Abstractionism,

Cubism, Surrealism and Dada in part because he saw these movements and the artworks produced therein as erasing the central arena which kept apart an horizon between 'high' and 'low' taste. Not

only did the artists associated with those movements contribute, in his mind, to the lowering of community standards, and the making a mockery of the beautiful, it accelerated a deep psychosis in humankind

promulgating degeneracy, base sexuality, and 'art for art's sake'. Here the 'excluded Other' had taken over (art, the nation, et al). See Hans Sedlmayr (1957 [1948]), *Art in Crisis: The Lost Centre*, (London: Hollis & Carter),

especially "VI. Chaos Unleashed," and "XI. From the Liberation of Art to the Negation of Art," 116-169 and 202-211, respectively.

threatening 'other' presents itself/selves under a variety of political guises: protectionism, 'making X great again', nationalism, free trade, Brexit, identity politics and even (or especially) populism. In short, an 'us' versus 'them' binaric vision of social life, the totality, of which, when taken together, exhausts the whole of the world.

In a certain sense, this elementary 'first principle' of leaders and led finds its equivalent in the infamous 'law of physics', whereby two objects cannot occupy the same place at the same time. Wrongly attributed to Newton, this seemingly 'iron law' has insinuated itself into modern and contemporary politics and aesthetics, not to mention, military strategy.¹⁹ In the version adopted by artists and non-artists alike, often one finds 'artistic practice' consigned to the nebulous-fuzzy-soft realm of feeling, emotion, intuition, pleasure, pitted against (or at least utterly distinct from) the deeply logical-hard-*scienza* realm of reason and rationality, stiff upper lip, furrowed brow and the like.²⁰ Taken together, these realms express the whole of the field (intellectual and practical). But should 'the soft' move in such a way as to *crash into* 'the hard' (assuming the hard is raging towards the soft with exactly the same *furor*), either the hard would be flattened or become soft (or vice versa) or both would be destroyed on impact. In the version adopted by State/military strategy, particularly up until and including the great World Wars, though today more closely aligned with urban-turf wars and certain team sports, we find two sides gathering on the battlefield (street, scrimmage line), facing each other and commencing their shooting/ slicing/ mutilating at point-blank range. Victory is often empiric.²¹

Zero-sum can also be played with a bit of a twist, a twist that features heavily in game theory and has remained one of the most important features of military strategy since the start of the Cold War.²² Known as the Nash Equilibrium in gaming and as Mutually Assured Destruction (MAD) in international defence treaties, it names the state of the union when the players consider how their individual actions of 'today' will prompt, in all probability, the destruction of their respective futures. That both sides recognise there will be assured destruction, an equilibrium is formed and is supposedly held indefinitely.²³ One of the most well-known versions of the Nash Equilibrium occurred

¹⁹ That Newton never developed this particular ‘law of physics’ but instead developed arguments regarding motion, acceleration and mass in an entirely different manner—does not seem to have prevented centuries of wrongful attribution. The proposition that two objects travelling at speed towards each other cannot occupy the same space at the same time, was most probably developed by Thomas Hobbes in 1651, a full thirty-five years before Newton’s *The Principia* (1685). Irrespective of the profound conservative

²¹ The utter pointlessness of this kind of ‘win’ was beautifully captured by Elizabeth Thompson (also known as Lady Butler) in her momentous 1876 re-enactment *Balaclava: The Return*, 25 October 1854. This work depicted the return of the Crimean victors from the Battle of the Light Brigade, veterans—including the horses—who emerged blind, deranged, legless and in shock. An empiric victory if ever there was one. Cf artuk.org/discover/artworks/balaclava-204619. Recall also *Rebel* without a Cause

liberalism (or Liberal theory with a capital L, where having a ‘stake’ in society, that is, property, alongside the ability to be ‘in motion’ was the *sine qua non* for civil society), Hobbes’s political theory incorporated at its very core, a zero-sum ‘scienza / knowledge’, both natural and historical. Of particular interest: matters concerning movement, not only as an inalienable ‘right’ but as the manifestation of what it meant, biologically, politically and ethically, to be human. See: Thomas Hobbes (2017 [1651]), “*Of the Liberty of Subjects*,” in *Leviathan*

(1955), directed by Nicholas Ray, starring James Dean, Natalie Wood and Jim Backus, where the game of ‘chicken’ figures prominently. (Two cars driving at great speed towards each other. The one who swerves is, of course, the chicken). Interestingly, the first version of this movie was written by Dr. Seuss, whose earlier works included over 400 (rather brilliant) satirical cartoons regarding the rise Hitler, fascism, the US role in that rise, and the first version of Trump’s revised slogan ‘Make

or the Matter, Forme, & Power of a Commonwealth Ecclesiasticall and Civill, (printed for Andrew Cooke, at the Green Dragon in St. Pauls Churchyard, (Middlesex: Penguin Classics), 129–37. See also: Isaac Newton (2016 [1685]), *Principia Mathematica: Mathematical Principles of Natural Philosophy*, translated and edited from the Latin by I. Bernard Cohen and Anne Whitman as *The Principia: The Authoritative Translation*, (University of California Press.

America Great Again’ as ‘Make America First’. See upworthy.com/9-political-cartoons-by-dr-seuss-that-are-still-relevant-today-and-mental-floss.com/article/558095/facts-about-rebel-without-a-cause-james-dean. For the game of chicken as linked to nuclear war, see this pithy article by Steve Lee (ND), “The Game of Chicken and Cold War Nuclear Weapons Strategies Revisited: An Informal Game Theoretical Approach,” cbc.net/steve/sub1.html.

²⁰ Hence, too, the rather annoying question: can artists work with scientists? Spoiler alert: yes.

²² A simple definition of the Nash Equilibrium is as follows: “In an asymmetric game, since there are two roles with different strategy sets, stability consists of a pair of strategies, one for each role. A stable state in an asymmetric game is called a Nash equilibrium [...] A pair of strategies is a strict Nash equilibrium if neither player can unilaterally switch to another strategy without reducing its payoff.” From Cornell University’s useful open source course at hoylab.cornell.edu/nash.html.

²³ Though MAD seems to have held throughout the Cold War, it never quite assured that no warfare would arise. Questioning the soundness of the MAD argument, Kerry Pearson (2020) blogged: “(T)he Cold War did what it says on the tin, there were no ‘hot’ wars between the US and USSR. But peace did not permeate the entire globe; proxy wars were rife in states like Vietnam, Korea, and Taiwan. British nuclear power did not deter Argentina from invading the Falklands, just as

Israel’s nuclear arsenal did not prevent attacks from Egypt in 1973. Nuclear proliferation does not rule out chances of war. ‘Weapons’ and ‘peace’ do not belong in the same breath.” Pearson (21 Jan 2020), *Developing More Weapons for Mutually Assured Destruction: A Sensible or Ridiculous Idea?*, at theygryphon.co.uk/2020/01/22/developing-more-weapons-for-mutually-assured-destruction-a-sensible-or-ridiculous-idea/.

in 1962 with the Cuban missile crisis.²⁴ Here the Soviet Union placed missiles in Cuba pointing directly at the US. Had the US attacked the Soviet Union, there would have been assured destruction on both sides. The brinkmanship came when President Kennedy ordered a blockade as a show of (minimal) force. Here one finds nations agreeing to build up their nuclear (and other) arsenals but, in so doing, step away from pressing the nuclear 'button' since that particular option might/would 'assure' the launching of the target nation's arsenal in return. In the contemporary context of autonomous systems and artificial intelligences especially in relation to the human, there is the not too dissimilar echo: all players are seemingly caught in an apocalyptic, out of control, zero-sum game to the death (of humanity), with the view that if one can somehow input 'trust' or 'governmentality' into the algorithmic code, potentially an 'equilibrium' may form, indefinitely. We will return to this point imminently.

In any case, the zero-sum 'excluded other' game admits to two critical issues for an ontic-epistemological move. First, it takes on a kind of (superficial/surface) unreal-real materiality, though with none of the sophistication of the plurally-dimensional abyssal versions as earlier discussed. Second, the zero-sum 'excluded other' shape-shifts much like a parasite might do: large and swollen after feeding; shrunken and withered and in need of a fix after the game is done or nearing completion. In a certain sense, it (the zero sum game) operates as a kind of mytho-poetic but with a sting in its tail: at times it (say, Group A) may shape-shift and turn into a counterfactual, presenting its wares 'as if' true so as to galvanise its host (also Group A) to do the opposite. This is the preferred mode for most political theory writers from Hobbes to Locke to Rousseau, for example.²⁵ More recently, it is also the preferred mode for certain political leaders and their led.²⁶ Sometimes it (say, Group B) galvanises clearly unsubstantiated and overtly 'false' claims, almost up to the point of lying (or even lying) and goads itself (again, Group B) to carry the torch, often in a frenzied, daring or bullying manner towards anyone in the 'opposite' group (in this case, Group A). Taunts to hold their (Group A's) ground or beat a hasty retreat mount. That Group A might resort to the use of something as lightweight as logic or reason or direct witnessing or the rule of law to dispel the onslaught of these ever proliferating 'alternative facts' only seems instead to act as flammable fodder for their

²⁴ See the BBC's 2017 *The Cuban Missile Crisis, Declassified Nuclear ☪ Warfare Documentary Films*, one of the best documentaries on the Cuban missile at: [youtube.com/watch?v=vm-qM7uaGfrk](https://www.youtube.com/watch?v=vm-qM7uaGfrk)

²⁵ The importance of the counterfactual in political theory/political philosophy is legendary and yet rather understated. Hobbes, for example postulated that civil society must emerge in order to protect people from 'the State of Nature', which was, famously 'solitary, nasty, brutish and short'. In order to get out of the State of Nature, our forefathers 'agreed' to give up their liberty for protection. This agreement is called the Social Contract (also mythical, though one's status of 'citizen' makes it a bit more real). Locke, in his *Two Treatises*, postulated a State of Nature as primarily 'good', but having a few 'bad apples' which poisoned the group, thus making it crucial to join civil society (in order both to pro-

tect and preserve liberty). Of course this only applied to those who had 'a stake in society' (i.e., property holders), though, interestingly, having a stake in society entitled one, also, to have ownership of their own person/body. For those without a 'stake', the fight for personhood was of profound importance, up to and including, today. The right to vote, drive, be educated, be treated as equal by law, own property, choose one's sexuality, take one's own life, stems in large part to the continuous hard fought, basic 'inalienable' right to personhood. Rousseau imagined the State of Nature as beautiful, empathetic, kind. For him it was civil society that was 'nasty, brutish, solitary and short', which came about

because, as he so wonderfully stated, "The first man who, having enclosed a piece of ground, bethought himself of saying This is mine, and found people stupid enough to believe him, was the real founder of civil society. From how many crimes, wars and murders, from how many horrors and misfortunes might not any one have saved mankind, by pulling up the stakes, or filling up the ditch, and crying to his fellows, 'Beware of listening to this impostor; you are undone if you once forget that the fruits of the earth belong to us all, and the earth itself to nobody'." Jean Jacques Rousseau (2010 [1755]), *On the Origin of Inequality*, translated by G.D.H. Cole, (London: Everyman Library, 2010), 183.

²⁶ Today we find a revised version of the classical liberal Social Contract (now fully realisable as 'the Contract')—a kind of neo-liberal hyper-linked apocalyptic imaginaryreal taking as its central feature a profound distrust of all things

'civil society'. A poor imitation of Rousseau's ethical demand—whose anger was aimed at creating a better, collective and radical empathy—this version veers towards a 'trust no one / everyone for themselves' policy whose mass hoarding approach

to a 'state of nature' (read: little or no government) comes with the added *promise* or *guarantee* of 'trust' embedded as core feature to its algorithmic coding. As mentioned, we will return to this point imminently, but see for example: Evan Gilman

and Doug Barth (2017), *Zero Trust Networks: Building Secure Systems in Untrusted Networks*, (Beijing/Boston/Farnham/Sebastopol/Tokyo: O'Reilly) at akamai.com/us/en/multimedia/documents/ebooks/zero-trust-networks-ebook.pdf.

(Group B's) cause. Recall here the shameful 'Birther movement,' still ongoing.²⁷ The refuting of the falsehoods by producing birth certificates, testimony, DNA, law suits often failed to shift this sticky tar-and-feather approach one iota. That these two different 'excluded other' materialities 'work' (produce sense, gorge-swell and stick, no matter how many situated, witnessed, iPhone-captured 'truths' are thrown at it), seems particularly fecund in today's liberal-democratic/neo-liberal political landscapes. We will return to this floaty yet visceral 'excluded other' materiality and its stickiness momentarily. But before we do, one more piece of the puzzle needs to be put in place. That piece is called fascism.

One size fits all

(the really-really-clean-clean of the no-centre, no cry).

Fascism is a particularly modern-contemporary beast. It is the 'perfect storm' of three moments merging simultaneously: first, when the zero-sum game takes hold in such a way that not only is there an entrenching of the binaric totality, but a growing and sustained *consent* of the 'led' to do so. This critical mass of consent upholds the binary based on a kind of belonging that dexterously shifts between masterful authenticity (read: racism) and the headless spectacle of the good (read: clean, anti-sexual liberation).²⁸ At the same time, it requires both the systematic ability to massify, on an industrial scale, the circulation of goods (Fordism) and, perhaps more significant for our contemporary moment, the circulation (dissemination and proliferation) of information as 'collective assemblages'—the recognition of patterns and their repeatability in whole or in part. A kind of viral Lego, though with more interesting cohered-together shapes, assemblages can be re-assembled with parts added or missing. These are then instantaneously and massively disseminated in the form of narratives, slice-of-life news stories, click bait and the ubiquitous friend suggestions via platforms as common as Google, Facebook, Twitter, and Linked-in, to name but four.²⁹

Most importantly, it requires the skilled use of media. In the 20th century, fascism gained its vitality via radio and moving image, with a growing, enthralled and captivated audience.³⁰ Of course now it includes also telephone, tv, cable, internet, mobile phones,

²⁷ In order to be able to run for the American presidency, one must be born in the US. The 'Birther Movement' solidified over the overt lie that Barack Obama was not born in the US, despite producing proof over and over again. Clearly a 'dog whistle', usually understood as a racist

appeal to (white) American values. Cf [youtube.com/watch?v=qQFjH-cY5RFM](https://www.youtube.com/watch?v=qQFjH-cY5RFM), and [youtube.com/watch?v=kPH-6WAAAnFAA](https://www.youtube.com/watch?v=kPH-6WAAAnFAA). [huffingtonpost.co.uk/entry/trump-birther-poll_n_57e27935e-4b0e80b1b9f-30c07ri18n=true](https://www.huffingtonpost.co.uk/entry/trump-birther-poll_n_57e27935e-4b0e80b1b9f-30c07ri18n=true)

²⁸ An anti-sexual liberation demand is fundamental to fascist logics (though clearly also strategically core to dictatorial and authoritarian regimes). It is directly linked to the role of guilt and shame in securing consent/obedience. Unlike dictatorial regimes, fascism emerges with the consent of 'the people' (starting at least with a critical mass). This is absolutely vital for a fascist regime to take root and flourish. Why people might willingly agree to restrict their own freedoms, has been the central concern of scholars as diverse and/or overlapping as the Frankfurt School (particularly Arendt, Adorno, Wolff, Marcuse, Moore), feminists (particularly Wollstonecraft, de Beauvoir, Kathleen Gough, Angela Carter, Gayle Rubin, Judith Butler) as well as the usual suspects in discourse

theory/postmodernism (Žižek, Foucault, Butler, and Lyotard). In particular see: See Herbert Marcuse (1968), *Repressive Tolerance*, in Paul Wolff, Herbert Marcuse and Barrington Moore (1969), *A Critique of Pure Tolerance*, Boston: Beacon Press; Gad Horowitz (1977), *Repression: Basic and Surplus Repression in Psychoanalytic Theory—Freud, Reich, Marcuse*, (Toronto: University of Toronto Press); Slavoj Žižek (2009), *Violence*, (London: Profile Books) and his (2008), *In Defence of Lost Causes*, London: Verso. For the role of consent, see in particular Ernesto Laclau (2018 [2007]), *On Populist Reason*, (London: Verso) and Julia Boyd (2018) *Travellers in the Third Reich: The Rise of Fascism through the Eyes of Everyday People*, (London: Elliot & Thompson).

²⁹ Of interest is to note also the way in which these assemblages can (and do) become tools for surveillance. Latest entry to the market: Ring, the camera doorbell product whose company is a subsidiary of Amazon. Whereas platforms such as Google, LinkedIn and Amazon harvest one's data for surveillance related activities with at least a tacit understanding by the user that an individual's data may be passed on via the acceptance of the benign sounding 'cookies', with Ring the image of a person at the door is transferred to one's phone without permission of the subject. The owner of the doorbell image can then choose to share it with police, neighbours and so on. In this way, as Will Oremus writes, "Surveillance tech empowers its customers to disempower others." In "Pat-

tern Matching," one-zero online newsletter at medium.com/one-zero/newsletters/pattern-matching. For those who use Uber comes the startling admission that drivers in the UK send passenger data to the police without the passenger's knowledge or consent, an exchange that has apparently enabled Uber to maintain its licence. [thetimes.co.uk/article/uber-gives-police-private-data-on-drivers-and-passengers-dm713gsxv#:~:text=The%20National%20Police%20Chiefs%20Council,such%20%E2%80%9Cdata%20and%20support%E2%80%9D](https://www.thetimes.co.uk/article/uber-gives-police-private-data-on-drivers-and-passengers-dm713gsxv#:~:text=The%20National%20Police%20Chiefs%20Council,such%20%E2%80%9Cdata%20and%20support%E2%80%9D.). See also the landmark work by Shoshana Zuboff (2019), *The Age of Surveillance Capitalism: The Fight for a Future at the New Frontier of Power*, (London: Profile Books).

³⁰ The unfortunate political savvy by Hitler of embracing mass media (print, radio, film) to fulfil his promise of ethnic cleansing of the Jews and all those who would 'become-jew', including the Polish, the homosexual / lesbian / bisexual, the mad, the differently abled and etc, remains a blueprint for contemporary forms of social 'cleansing' including, most recently, 'draining the swamp'. Most well-known of the artists who could translate this position visually, particularly in terms of lighting, camera angles, and jump cuts, was Leni Riefenstahl (1935) with her infamous *Triumph of the Will*. But see also *Birth of a Nation*, directed by D.W. Griffith (1915). Originally entitled *Birth of a Clansman*, it celebrates confederacy and the overt brutalising of African Americans. As this was one of the very first films to be shown in public, its circulation was vast and its impact profound. [youtube.com/watch?v=N_yU8rRQKoA](https://www.youtube.com/watch?v=N_yU8rRQKoA)

autonomous systems, with an exponentially generated audience that may not even realise it is 'watching', or for that matter, being watched.³¹ This does not mean that technology is the cause of fascism, any more than the cross is the cause of Christianity. What it does mean is that, taken together, these three elements—the consent of the people to throw themselves into the zero-sum game with enthusiasm and pride; the industrial massification and co-current assemblages/circulations of information, alongside the skilled use of media—have enabled a certain kind of toxicity to be created. This toxicity is nothing less than the destruction of truth, a destruction that has the blessing of its followers in a manner that claims current reality/realities are the amalgamation of dirty lies, cheating, and aberrant morality, whilst simultaneously claiming that one person/party holds the 'really-real' truth.³² ▀ A small interjection on the matter of truth—directed to those allergic to the concept, find succour in the phrase 'there is no such thing as truth (and that's the truth),' confuse truth with instrumental reason or the rigid and unchangeable, think that in foregrounding truth one is returning to the old and boring moralities of 'good vs evil' or inviting a resuscitation of God or positing some other Archimedean point to secure meaning: Please re-read earlier section on movement/change. ▀

One additional analytic point needs to be addressed before returning to our 'floaty yet visceral excluded other materiality and its stickiness.' It concerns the problem of belonging, and with it, identity and difference, wherein an entire can of worms shall be opened. Here reference is made directly to Heidegger and, in particular, his 1957 onto-theo-logical lectures on metaphysics given at the end of his seminar on Hegel, on the occasion of the 500th year anniversary of the University of Freiburg im Breisgau.³³ For Heidegger, the Hegelian dialectic was mortally flawed precisely because of the issue with negation and the excluded middle. At the same time, the binaric 'zero-sum' game was for him painfully limited, not the least of which because, in losing the centre altogether, it could not address the vital aspect of *technē* and its poetic logic as core to the birth of 20th century authenticity. For Heidegger, the 'logic of *technē*' or more to the point 'technology' would have nothing to do with machines as such. As Heidegger railed on in his well-known *Questions Concerning Technology*, developing the point further in his *Identity and Difference*

³¹ See the incisive analysis of Cambridge Analytica's data harvesting and the rise of the floating personality without the human person, so much the font of neo-liberalism by Katherine Behar (21 Mar 2018), *Personalities without People*, at [youtube.com/watch?v=N_yU8rRQKoA](https://www.youtube.com/watch?v=N_yU8rRQKoA)

³² Cf Umberto Eco (2020) *How to Spot a Fascist*, translated by Alastair McEwen and Jason Dixon, (London: Harvill Secker) and in more journalistic prose, Jason Stanley (2020), *How Fascism Works: The Politics of Us and Them*, (New York: Random House).

³³ Martin Heidegger (2002 [1957]), *Identity and Difference*, translated by Joan Stambaugh (Chicago: University of Chicago Press). As with any translation, there is always something lost and something found in the move. This is particularly true of the English translations of Heidegger. His original texts are legendary toms of arcane and flowery old-school German, but the English versions are often spared this underlying thread quite obviously appearing in the German; to wit, the search for an authentic people or race. Debates have of course raged as to whether his Nazism 'did not matter' or was 'soft' or 'hard-wired' into in

his fundamental works, a point Heidegger himself definitely cleared up when his deeply anti-Semitic *Black Notebooks* were recently found and published. See Martin Heidegger (2016 [1931-38]), *Ponderings II-VI: The Black Notebooks*, translated by Richard Rojcewicz, (Minneapolis: Indiana University Press). It should be noted that there was much outrage at the Freiburg lecture as it was anticipated Heidegger would apologise for his Nazism, but no apology was forthcoming. See also Jean François Lyotard (1990), *Heidegger and 'the jews'*, translated by Andreas Richards and Mark Roberts, (Minneapolis: Indiana University Press).

lectures: it was all about (1) the 'grasp', both as in comprehending and as in reaching out or being pulled toward 'the there' (and vice versa, 'the there' being pulled toward being); and (2) the fact that the 20th century (for whatever reasons) named an epoch, not unlike had occurred in ancient Greece when, according to Heidegger, this way of 'grasping' (in-)formed the whole of reality and provided its framework.³⁴

This was neatly summed up in the slightly annoying equation borrowed from Parmenides: $A = A$.³⁵ On the face of it, the $A = A$ equation does appear to be a simple tautology. On closer inspection, however, it is meant to denote the *belonging* of A to A; and more than that, a belonging that 'sticks together' in such a way as to denote both the attraction of the A's to each other, whilst, simultaneously, maintain their apartness. To put this slightly differently, one 'starts' with the encounter rather than one side or the other. This encounter is a non-intentional moment of cohesion that enables meaning to take shape and to take place. The first step of identity, collective and individual, then, is for Heidegger, belonging, one that articulates the fundamental importance of 'being-apart-together.' This assures two aspects: first, that 'belonging' denotes a kind of plurality, but one that is no longer constituted by a point-for-point contradiction with its necessary abyssal logics and deep cuts. Second and perhaps most importantly for the discussion here, 'belonging', that is to say the '=' names precisely a relational start, one that only exists at the moment of its encounter. This 'encounter' can be called 'dwelling', 'clearing', 'event', a kind of visceral materiality that exists without the aid of *Cogito*, reason or the ego-I as the mark of its intelligibility, primary 'start' or beginning first-move.³⁶ More than that, and to put this slightly differently, there is an aliveness to existence captured / expressed only and at the very moment of the articulated grasp (*technē*).³⁷ That grasp, that logic of *technē* / technology is grounded in (given meaning by) the so-called 'groundless ground' of difference.³⁸

As powerful and as simple this move came to be, one of the more challenging aspects of it arrived in the form of articulating the 'how' of difference: *how* it mattered, *how* it must be understood in such a way as to manifest plurality whilst not to be equated with 'negation'.

³⁴ See Martin Heidegger (1977 [1954]), “The Question Concerning Technology (1954),” in his *The Question Concerning Technology and Other Essays*, translated by William Lovitt, (New York: Harper Torchbooks), 3–35. See also *Identity and Difference*, where he states: “Let us at long last stop conceiving technology as something purely technical, that is in terms of man and his machines” and then goes on to develop the belonging/grasp as both ‘framework’ and ‘event of appropriation.’ 34ff.

³⁵ The following development is a deeply condensed rendering of clearly complex points developed through the first lecture “The Principle of Identity” in his *Identity and Difference*, 23–41. What will become clear momentarily is what is at stake for Heidegger in making this move. But see Wittgenstein’s pithy criticism of such a logic where he writes: §216. ‘A thing is identical with itself.’—There is no finer example of a useless proposition... Does this spot *ä* ‘fit’ into its white surrounding?—But that is just how it would look if there had at first been a hole in its place and it then fitted into the hole. But when we say ‘it

fits’ we are not simply describing this appearance; not simply this situation. ‘Every coloured patch fits exactly into its surrounding’ is a rather specialised form of identity. [...] §523. I should like to say ‘What the picture tells me is itself.’ That is, it’s telling me something consists in its own structure, in its own lines and colours. (What would it mean to say ‘What this musical theme tells me is itself?’) §524. Don’t take it as a matter of course, but as a remarkable fact, that pictures and fictitious narratives give us pleasure, occupy our minds. [...] §527. Understanding a sentence is much more akin to understanding

a theme in music than one may think. What I mean is that understanding a sentence lies nearer than one thinks to what is ordinarily called understanding a musical theme. Why is just this the pattern of variation in loudness and tempo? One would like to say ‘Because I know what it’s all about.’ But what is it all about? I should not be able to say... (Wittgenstein, n.d., *Philosophical Investigations*, translated by Walter Kaufman, (London: Basil Blackwell), 84–5, 142, 143. We will return to this point when we take up, directly, what it means to say ‘courage’, not to mention, ‘matter.’

³⁶ For a discussion of contingency and determination still entrenched in dialectical reasoning, see Louis Althusser (2006), *Philosophy of the Encounter: Later writings 1978–87*, (London: Verso). For a detailed account of encounter as ‘response-ability’ as linked also to entanglement and diffraction, see the majestic work of Karen Barad (2007), *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Meaning and Matter*, (North Carolina: Duke University).

³⁷ Of course much more emanates from this seemingly simple move including the all-important notion of difference, re-thought away from its onto-theo-logic moorings by Deleuze along with many other initially ‘left-leaning’ Heideggerians. See in particular, Gilles Deleuze (2001 [1968]), *Difference & Repetition*, translated by Paul Patton, (London: Continuum Press).

Additionally, two works by Phillippe Lacoue-Labarthe: his (1990), *Heidegger, Art and Politics: The Fiction of the Political*, translated by Chris Turner, (London: Basil Blackwell) and his iconic (1989), *Typography: Mimesis, Philosophy, Politics*, with introduction by Jacques Derrida, edited by Christopher Fynsk, (Cambridge, MA: Harvard University Press).

³⁸ “The On-to-Theo-Logical Constitution of Metaphysics,” in Heidegger, *Identity and Difference*, 42–74. For an excellent and detailed analysis of the life and times of ‘groundless grounds’, see Lee Braver (2016), *Groundless Grounds: A Study of Wittgenstein and Heidegger*, (Cambridge, MA: MIT Press).

Most important was the question as to how it could be ‘grounded’ in the present—without positing a ground as such; that is, without the apocalyptic disaster at the analytic level of tying belonging to the very entity Heidegger was seeking to avoid: Otherness. To avoid tying ‘belonging’ to the ‘that which did not belong’ (read: Jew, degeneracy, inauthentic, outsider, modernism, Dada, et al), required, at the epistemological level, a move back to the ontic enframed by a theo-logic, the so-called ‘groundless-ground’. This at least would retain the vitality of difference as both event of appropriation and as immanent site of an inhabitable present—the poetic logic of *technē* now front and centre, both the site or moment of the being-with-apart-together grasp and the ‘=’ of the that which ‘belonged-together.’ For Heidegger, the move to sacrifice the sticky cohesions of difference on the altar of ontic-theo-logics was worth the price of admission.

As it turns out, this is not the only way to approach and incorporate the critical importance of ‘difference’ and the role of its stickiness (though of course in approaching difference, not to mention ‘=’ without its onto-theological moorings would move in a direction rather irritating for Heidegger). In order to put in place the last piece of the argument, then, perhaps it is best to do so on the back of Oscar Wilde’s wry observation alongside that of T.S. Elliot, paraphrasing ever so slightly: ‘Imitation is a form of flattery, stealing, a form of art.’³⁹

Let us now shoplift from the Heideggerian shelf, difference and its sticky companion the ‘=’, and return to Foucault’s ethical demand for a radical understanding of courage, not to mention, matter.

Paradigm swerve, zero ground.

A little more than a hundred years prior to Foucault’s suggestion to leave the shores of universal logic and all that went along with it, 19th and 20th century physics, chemistry and meta-mathematics had already begun this incredible journey.⁴⁰ Here one entered a *cornucopia* of conceptual delights: trans- or multiversal dimensionalities, light years, ket vectors, simulacra, curved-time, imaginary numbers, dynamical theories of electromagnetic fields, energy as velocity x mass², diffraction, complexity theory, the principle of undecidability and the seemingly mad almost delirious re-thinking of ‘encounter’

³⁹ The original quote by Oscar Wilde (2017 [1889]), *The Decay of Lying*, (Middlesex: Penguin/Quirky Publications), "Imitation is the sincerest form of flattery that mediocrity can pay to genius." The original quote by T.S. Eliot, *Selected Essays 1917-1932*, "Immature poets borrow, mature poets steal" was itself plagiarised by Pablo Picasso as "good artists borrow, great artists steal."

⁴⁰ Cf the classic work of James Clerk Maxwell (2013 [1864]), *A Dynamical Theory of the Electromagnetic Field*, *Rough Draft Printing*. See also the seminal lectures by P.A.M. Dirac (2012 [1957/1930]), *The Principles of Quantum Mechanics*, (Snowball Publishing). Regarding meta-mathematics, see the seminal work of Kurt Gödel (2003 [1930]), *On*

Formally Undecidable Propositions of Principia Mathematica and Related Systems, (Mineola, New York: Dover Publications). For contributions to equilibrium theories and non-dissipative structures (which won him the Nobel Prize in 1977), see Ilya Prigogine (2017 [1962]), *Non-Equilibrium Statistical Mechanics*, (Mineola, New York: Dover Publications).

translation [træns'leɪʃən]

'the language that God speaks,' philo de alexandria in answer to the question 'what language does God speak?' bi-directional where the descriptor and the description are equal/belong/are the same.

as an entangled form of superpositionality and non-locality.⁴¹ Time morphed into conical-wasp-like shapes of past-future (the upper and lower parts, open at both 'ends'), with its mid-section 'point' (or wasp-waist) as 'the present', and with the pluralities of 'elsewhere' somewhere not part of the cone of time. Now picture pulling the whole diagram up via its 'present' (that is, the mid-section 'point' or wasp-waist). That which is 'past' would be entangled with 'the future', and the whole of the universe would be reshaped without edge or outside.⁴² Entanglement, here, does not mean 'swallowed up' or even 'mingled'. It speaks to the shift into multiple dimensionalities, the font of string theory and other brain-explosive delights.⁴³

Astonishingly, in and around 60BC, the poet Lucretius established a set of principles around infinite edgelessness so contemporary that they would not be out of place alongside the Nobel laureates of today. Entitled *De Rerum Natura*, this majestic, erotic poem set out the concept of motion as sensuous, infinite *folds*, flowing in all directions at once.⁴⁴ At its core lay a deeply subversive approach to ontology and, indeed, to the laws of nature: this was nothing less than the foregrounding of the multi-dimensional, unexpected and unpredictable movements of matter: grasped in its fullness as 'the swerve'.⁴⁵ It is here, then, surfing the folds of a swerve, where we shall make our next, penultimate, move. It requires a slightly revised 'picture'.

Imagine the universe as one big fat zero, stretching in all directions at once. We know that this zero is not 'nothing' but it is not quite a 'something' either. This is because, in stretching out in all directions at once, its knowability is infinite and, in that sense, unintelligible. But supposing this stretch bends at the moment of an encounter. And say that this encounter happens—not because the zero is 'intentionally' searching for, say, another zero—like a playmate or a something of some kind to help pass the time or to help make sense of its multi-dimensional not-nothingness—but because there is some kind of *attraction*. Now, suppose that this attraction can be denoted in some way. It would not be quite correct to suggest that it would look like another zero or a bunch of zeroes or a satisfied zero that has swallowed up its attraction.⁴⁶

⁴¹ Of the vast literature one can turn to here, see in particular: Ilya Prigogine and Isabelle Stengers (1997 [1996]), *The End of Certainty: Time, Chaos and the New Laws of Nature*, (New York: The Free Press); Roger Penrose (2005), *The Road to Reality: A Complete Guide to the Laws of the Universe*, (London: Vintage); Albert Einstein (2015 [1915]), *Relativity*:

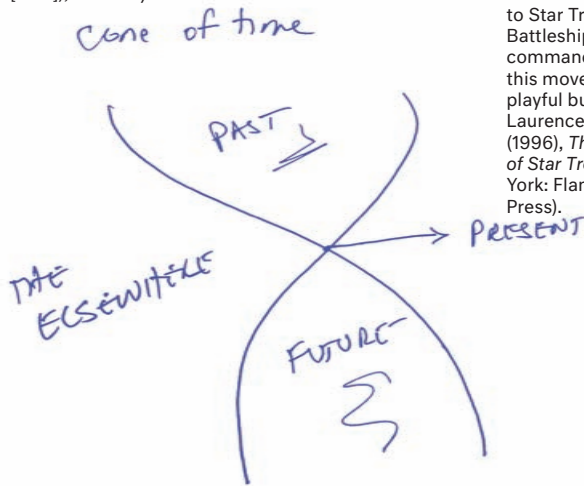
The Special and General Theory: 100th Anniversary Edition, (Princeton: Princeton University Press); Charles Petzold (2008), *The Annotated Turing: A Guided Tour through Alan Turing's Historic Paper on Computability and the Turing Machine*, (Indianapolis: Wiley); and of course Karen Barad (2007), *Meeting the Universe Halfway*, as mentioned earlier.

⁴² One could easily see how 'worm holes' might manifest as traversable. Say the 'future' was 1000s of light years away from the past. If one could 'bend' the future to the past just long enough to pass through before both 'sides' flipped back into place, one's silvers spaceship could go from point A to B in the blink of an eye. Much of science fiction from Barbarella to Star Trek to Battleship Galactica commandeers this move. See the playful but incisive Laurence Krauss (1996), *The Physics of Star Trek*, (New York: Flamingo Press).

⁴³ Somewhat of a classic now, see Brian Greene (2000), *The Elegant Universe: Superstrings, Hidden Dimensions and the Search for the Ultimate Theory*, (London: Verso). See also: Leonard Susskind and James Lindsay (2005), *An Introduction to Black Holes, Information, and the String Theory Revolution: The Holographic Universe*, (London/Singapore/Hong Kong: World Scientific Publishing).

⁴⁴ Lucretius (60BC), *De Rerum Natura (On the Nature of Things)*. See in particular the deeply accessible Thomas Nail (2018), *Lucretius I: An Ontology of Motion* and Thomas Nail (2020), *Lucretius II: An Ethics of Motion*, Edinburgh University Press.

⁴⁶ This is not to say that a zero cannot swallow its attraction. If it did, we would have something akin to a 'black hole'. Cf Marcia Bartusiak (2015), *Black Hole: How an Idea Abandoned by Newtonians, Hated by Einstein and Gambled on by Hawking Became Loved*, (New Haven: Yale University Press), especially chapter 3 and 46 "One Would Then Find Oneself...in a Geometrical Fair-ylund," and "Only its Gravitational Field Persists", 35-43 and 70-86, respectively.



⁴⁵ In its original Latin: clinamen. One of the best approaches to an understanding of *De Rerum Natura* can be found in Stephen Greenblatt (2012), *The Swerve: How the Renaissance Began*, (London: Vintage). Part of the argument above is indebted

to this work. Part of the argument is indebted to those who have also had fun with the clinamen and have shared their fun: Friedrich Nietzsche (1974 [1887]), *The Gay Science: with a prelude in rhymes and an appendix of songs*, translated by Walter Kaufman, (New York:

Vintage); Jacques Derrida (2016 [1981]), *Dissemination*, translated by Barbara Johnson, (London: Bloomsbury). Cf also: Alastair Brotchie, Alfred Jarry: *A Pataphysical Life*, (Cambridge, MA: MIT).

Following the Heideggerian re-think of ‘=’, it might well be denoted as this: $0 \Leftrightarrow 0$. Now let us say that when the attraction ‘holds’, even if for a nano-second or less, it could be, for that instant (however long an instant might be or become) denoted/marked in its entirety as a 1; that is $1 = (0 \Leftrightarrow 0)$. And suppose, further, that there is more than just one single attraction and its mark. It might look something like this: $0 \Leftrightarrow 0 = 1 + 0 + 1 + 0 \dots$ to infinity. There are ‘limits’, there is ‘intelligibility’ but no edges, and, in this sense, no ‘other’ or ‘outside’—rather like Escher’s famous work of the two hands drawing themselves. This does not mean, of course, that there is no ‘difference’. Indeed, it means precisely that difference ‘exists’ but in the manner of the wild materialities of $0 + 1$ ’s.

Sometimes it is fair to say that the zero is just that: a zero, neither here nor there (but everywhere all at once). But there are those times, sometimes, when the zero encounters. And sometimes, when that happens, we have a very different way of picturing ‘stickiness’.⁴⁷ This is a cohesive stickiness that, depending on the ‘whatever’, sometimes forms a segment (the 1) which enables the swerve to do precisely that: swerve. Sometimes it forms a kind of ‘thick’ surface, stretching in all directions at once (the zero). Sometimes its ‘1’ is also the expression marking both the encounter ($0 \Leftrightarrow 0$) but also its moment when the event of encounter is ‘appropriated’. In that case, the 1 is not suggesting a numerical value as in an amount (1 item); it is instead a pluralised ‘1’. In more poetic-art-philosophic phrasing, we can, take up Lyotard’s profound contribution along these lines, where the encounter manifested in all its cohesive stickiness and emerging in all directions at once can be called ‘discourse’; and its segment, marking that event as a pluralised ‘1’, can be (and is), as he calls it, the ‘figural’.⁴⁸

In his *Repetition and Difference*, Deleuze put it like this:

“Something in the world forces us to think. This something is an object not of recognition but of a fundamental *encounter*. What is encountered may be Socrates, a temple or a demon. It may be grasped in a range of affective tones: wonder, love, hatred, suffering. In whichever tone, its primary characteristic is that it can be sensed. [...] It is opposed to recognition. ... It is not an *aisthētón* [an external object of perception] but *aisthēteón* [being of the sensible]... Sensibility, in the presence of that which can only be sensed (and is at the same time imperceptible) finds itself before its own limit, the sign, and raises itself to the level of a transcendental exercise: to the “nth” power.”⁴⁹

⁴⁷ It must be emphasised that $0 \leftrightarrow 0$ is not 'empty'; nor is it 'in between'. For some it is closer to 'the wake' manifested in racist societies. See the searing work by Christina Sharpe (2016), *In the Wake: On Blackness and Being*, (Chapel Hill: Duke University Press).

⁴⁸ Jean François Lyotard (2019 [1971–83]), *Discourse, Figure*, translated by Anthony Hudek, (Minnesota: University of Minnesota Press), especially, "Thick-ness on the Margins of Discourse," 103–114. See also Jean François Lyotard (2015/1993 [1974]), *Libidinal Economy*, translated by Iain Hamilton Grant, (Minneapolis: Indiana University Press), especially "II. The Tensor," "V. Capital," and "Economy of this Writing," 43–94, 201–242, and 243–262, respectively.

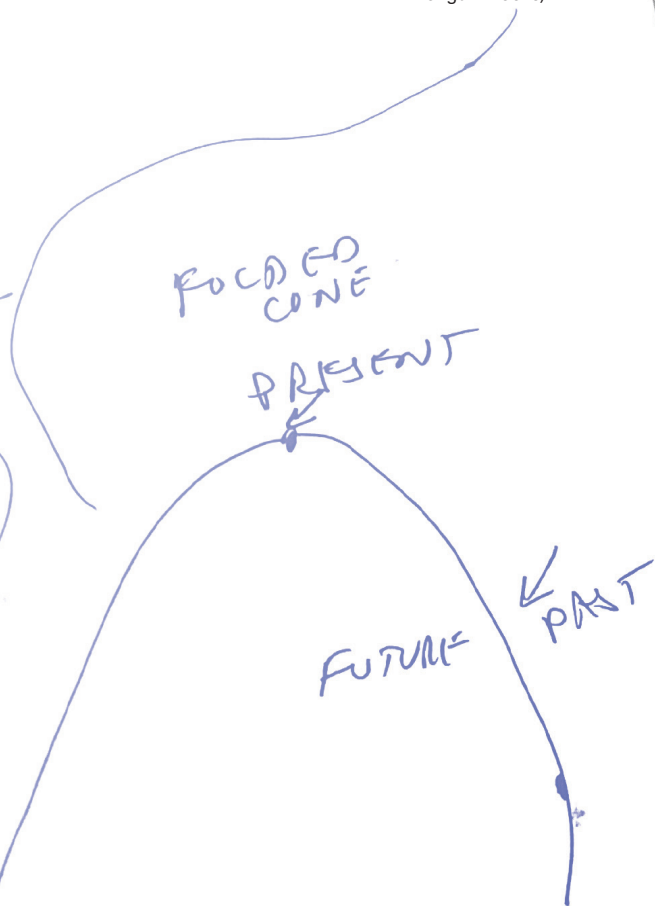
⁴⁹ Gilles Deleuze (2004 [1968]), *Difference and Repetition*, 76, emphasis in the original)

We have here an entirely different sense of materiality, matter, and indeed, agency. It is one that requires an emphasis on the grasp [as 'comprehending' and as 'technē', simultaneously] of how cohesions take shape, and become 'real' outside of a binaric zero-sum or the metaphysics of flow. We have instead discursive fields, marked by segments of encounter, which in turn establish new forms of horizons, fields, intensities. This seemingly ephemeral mattering enables different forms of agency to arise: distributed, fractal, ana-material. Its datum slips through the folds, are the folds, re-make the folds. These horizons, fields, intensities establish fields of meaning, which in turn shape-shift 'depending' on other encounters, other forms of 0s and 1s. Not only does this 'matter' at analytic levels, it matters at all levels. With specific emphasis on making the 'matter' stick, we need one last move.

The courage to matter.

Responding to a public request in 1784 by the *Berlinische Monatschrift* (the *Berlin Monthly*) to find a popular (and accessible) answer to the question What is the Enlightenment?, amongst the respondents was Immanuel Kant. Entitled: "*In answer to the Question: What is Enlightenment?*," an argument was established that promoted a notion of the individual, at the time a radical notion, which required the throwing out one's 'immaturity' and replacing it with individual reason.⁵⁰ This move initiated many logical deductions, including the concept of the radical autonomy of the State a point that Hegel also takes up, with less enthusiasm. Kant's *What is Enlightenment?*, and the vast number of works that followed, foreground many of the earlier classical liberal positions outlined at the outset; that is, the separation of church and State, and the moving away from the Church, in order actively to develop improvements regarding social, political and economic strife. Now Foucault, in his seminal re-think of Kant, suggests that rather than privilege 'reason' as such, one must instead concentrate on the 'how' of exiting; that is, the 'how' of exiting from a violent situation or the 'how' of exiting from the yoke of oppressive regimes, including the regimes of racism, homophobia, misogyny.⁵¹ This required, nothing less than a concentration on making the 'how' real, sticky, cohesive. It required a re-staging of 'knowledge' away from individuality per se, and towards a distributed intelligence, one

⁵⁰ Immanuel Kant (2009 [1784]), *An Answer to the Question: What is the Enlightenment?*, (Middlesex: Penguin Books).



⁵¹ Michel Foucault (1984), "What is Enlightenment," in Paul Rabinow, editor, *The Foucault Reader*, (New York: Pantheon Press), 32-50.

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that enables a 'being-with-together' as the basis of being 'human' and as a basis of the social. This 'being-with-together' brings with it a certain kind of *parrhesia*, a certain kind of 'truth telling', one rooted in a pluralised form of empathy and care.⁵²

This is then to say the following: The digital 'age' is not a zero-sum game. It is not inevitable that fascism will emerge or that some form of totalitarianism will continue to engulf and destroy. But in order to avoid this nightmare scenario, it requires an emphasis on 'making' in the midst of this movement, circulation and change. This is, in turn, an art: the art of inhabiting, reading and listening to 'that' which presents itself in all its present-tense fractalised elsewhere slices: as nodal points, planes of immanences; as events appropriated and made to 'stick'.⁵³ It is a foregrounding of the 'practice-led', which is nothing less than the art and humanity of a certain kind of *techne*, and with it, the courage to grasp, in all its oozing, possibly fleeting, possibly entrenched, multi-dimensional surfaces, moveable limits, exponentially proliferating zeroes and ones, in all their cohesive, radical matter.

Wearable technologies at the ready, a new enlightenment is in order. We are now at the moment to do just that. In a certain sense one could say: In the face of adversity, there is nothing wrong with hope. But perhaps we can go one better and enforce the radical matter of that hope, echoing Juno, goddess and protector of the State from idiocy and cruelty. "*Flectere si nequeo superos, Acheronta movebo* (If I cannot bend the will of Heaven, I will move Hell)."⁵⁴



Johnny Bad Angel, Photo by
Chantal Faust, 2019.

⁵² Michel Foucault (2011), *The Courage of Truth: The Government of Self and Others, II, Lectures at the Collège de France 1983–84*, translated by Graham Burchell, (New York: Palgrave Macmillan).

⁵³ A point developed with great ferocity and clarity by Pierre Klossowski (2017), *Living Currency*, translated by Vernon Cisney, Nicolae Morar and Daniel W. Smith, (London: Bloomsbury), especially 1–45.

⁵⁴ Attributed to Juno by Virgil (29–19 BC), Virgil (2001 [29–19 BC]), *The Aeneid*, translated into English prose by A.S. Kline. Poetry in Translation Publishing House, 134.



Evanescing This Harrowed Strata

Jackson 2Bears

* Six Nations | Lethbridge Alberta, Canada—Treaty 7, Blackfoot Territory

Jackson 2bears is a *Kanien'kehaka* (Mohawk) multimedia installation/ performance artist and cultural theorist from Six Nations, currently based in Lethbridge Alberta, Canada—Treaty 7, Blackfoot Territory. An active researcher in the areas of video arts, digital media, and extended media, with a focus on embodied interaction, live audio/visual (Live Cinema) performance and immersive, multimedia installation. Recent works detail the impact that rapid changes in technology have had on contemporary politics, culture and society, particularly with respect to the First Nations communities. A member of *Beat Nation [Live]*—a First Nations artist collective that combines hip hop, live music and digital technology as a way to celebrate the spirit of contemporary Indigenous culture, 2Bears is also a co-founding member of *Noxious Sector*—a communal forum dedicated to the exploration of interdisciplinary artistic practice and creative expression. With Mohawk poet and performance artist Janet Rogers, he co-directs *2Ro Media* enabling large-scale site-specific multimedia projects, including *IKAAKIIMAAT* and *Ne:Kahwistará:ken Kanónhsa'kówa í:se Onkwehonwe* at the Blackfoot and Six Nations communities. Books include: *Coded Territories: Tracing Indigenous Pathways in New Media Art* (2014) and *Mythologies of an [Un]dead Indian* (forthcoming), which explores the aesthetics of contemporary Indigenous identity within the context of our hyper-mediated, technologically saturated culture. Previously Audain Professor of Contemporary Art of the Pacific Northwest at the University of Victoria, 2Bears is currently Assistant Professor of Indigenous Art Studio and Media Arts at the University of Lethbridge, Alberta—Treaty 7, Blackfoot Territory. Exhibitions include: *Urban Shaman* (Winnipeg, MB); *Beyond* (Belfast, Ireland); *The Vancouver New Music Festival* (Vancouver, BC.); *Digital Art Weeks* (Zurich, Switzerland); *North American Indigenous Games* (Cowichan, BC); and the *Futur-en-Seine* Festival (Paris, France).

The artist Jackson 2Bears' work is visceral, searing, stunning. From scratch dj-ing to the poetics of indigenous identity, 2Bears' work inhabits and disrupts the hyper-saturation of the contemporary. With specific emphasis on indigenous / First Nations heritage, resistance, and cultural renewal, 2Bears offers beginnings out of endings and endings out of beginnings; a blood poetics flowing in multi-dimensions and all at once, yet able to make the point, in sharp, generous and graphic detail. An intensity of Ouroboros un-timeliness, there is no better voice with which to mark this part of the journey through the Data Loam. Images are from his performance, *Evanescing This Harrowed Strata* with Tanya Doody. Thoughts about artificial intelligence, indigenous culture, cosmology and the electronic/digital technologies can be found at the edges of the page in a group discussion with Susan Kite, moderated by Elizabeth Barron.¹

¹ For a crucial, collaborative discussion regarding the impact of Indigenous knowledges on AI and Art making, see Jackson 2Bears, Susan Kite and Elizabeth Barron (2020 [2017]), "Indigenous Cosmology, Art and Technology," at *Artificial Imagination: Art Making in the Age of the Algorithm*, with Susan Kite and Jackson 2Bears, moderated by Elizabeth Barron, 18 Feb 2017 at vimeo.com/channels/artificialimagination. The entirety of the conference is at artengine.ca/programming/2017/artificial-imagination/index-en.php





Evanescing This Harrowed Strata

Jackson 2Bears and Tanya Doody

Performance, 28 minutes, 2017, Vancouver, BC, LIVE! Biennale of Performance Art

photo credit 2017 Rennie Brown



zero [ˈziərəʊ]

the zero first appeared in india around 458 ad. mathematical equations were spelled out or spoken in poetry or chants rather than symbols. different words symbolised zero, or nothing, such as 'void,' 'sky' or 'space.' the hindu astronomer and mathematician, brahmagupta, developed a symbol for zero—a dot underneath numbers. he also developed mathematical operations using zero, wrote rules for reaching zero through addition and subtraction, and the results of using zero in equations. this was the first time that zero was recognised as a 'number of its own', both rational and not, imaginary and real, a point between two systems, and simultaneously 'a body without organs'. with its segmented fold (the 1), an entirely new paradigmatic revolution is now upon us.

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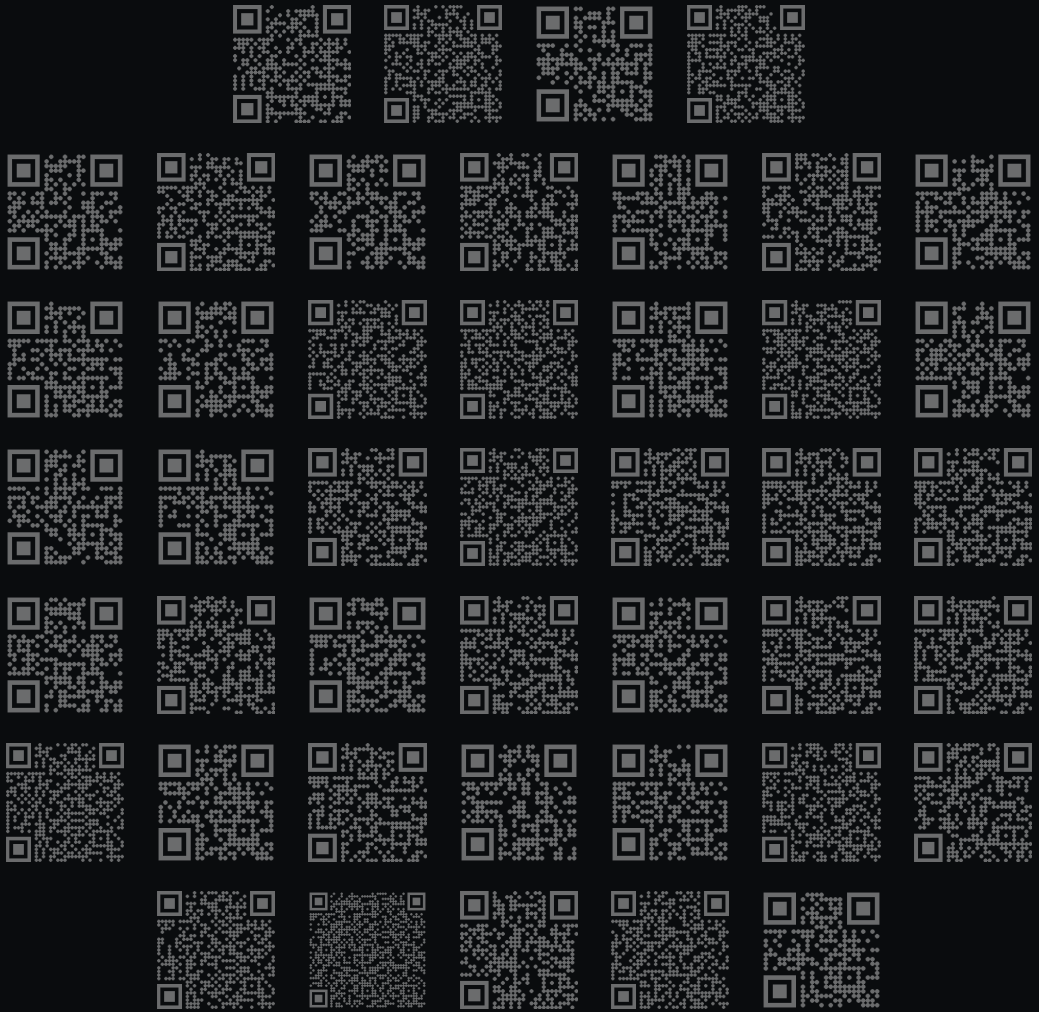
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Data Loam: Sometimes Hard, Usually Soft. The Future of Knowledge Systems is a landmark work. It details the wild proliferation of data and its profound methodological implications for arts and humanities, now enlivened by their 'sticky cohesions' with the knowledge systems of science, technology, engineering and maths. Vibrant and disruptive both as segment and infinite plane, the loam names a dynamic multiversal discourse, closer to a living, shape-shifting mesh. Its connections are self-organising complexities requiring the practical activities of distributed intelligences. We reclaim this as nothing less than art.

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