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THE ETERNAL NETWORK
The Ends and Becomings of Network Culture

Edited by Kristoffer Gansing
and Inga Luchs

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COLOPHON

The Eternal Network: The Ends and Becomings of Network Culture
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THE NEVER-ENDING NETWORK: A REPETITIVE AND (THUS) DIFFERENTIATING CONCEPT OF OUR TIME

CLEMENS APPRICH

I.

Is a network centralized, decentralized, or distributed?[1] May it even be a scale-free network?[2] The question of what exactly a network is birthed a new research area at the interface of mathematics – in particular graph theory and statistics – biology, chemistry, computer science, psychology, physics, and sociology. Network science, as this area was called, deals with complex networks, such as food webs, electric grids, transport systems, neural circuits, computer or social nets, by dissecting real-world phenomena into abstract representations of nodes and links. Representing biological, physical, and social realities in network terms has the objective to build predictive models and extrapolate future behavior from past and existing data. In this way, networks provide orientation in an increasingly complex world, and, by virtue of their explanatory power, have arguably become the universal concept of our time.[3] They are depictions, figurations, and projections at the same time. They are, in an odd way, that which is depicted, and that which makes the depiction possible. Networks are signifiers in a world that has been described as being without signification.[4] Given this postmodern paradox, we might be better off asking not what a network is, thus getting caught in an endless chain of representations, but rather understanding the network's causes and effects. Following Gilles Deleuze, we might ask: What brings the network into the world, both in terms of the enabling conditions for this all-encompassing concept and the actual formation of the network as a specific expression of the time we live in?[5] It has become a truism to say that we live in a networked world, and it is more and more difficult to imagine a world outside the network. However, the eternal return in network form, which can feel like an endless repetition of the same, also suggests the possibility of difference. In this essay, I will look into this possibility with regard to digital media networks by contrasting them with recent debates about the epistemic impossibility of accessing the world – networked or not.[6]

1 Paul Baran, 'On Distributed Communications', *RAND* (1964), https://www.rand.org/pubs/research_memoranda/RM3420.html.

2 Albert-László Barabási and Eric Bonabeau, 'Scale-Free Networks', *Scientific American* 288 (2003): 50-59.

3 Wendy Hui Kyong Chun, *Updating to Remain the Same. Habitual New Media*, Cambridge: MIT Press, 2016, pp. 39ff.

4 Fredric Jameson, *Postmodernism, or The Cultural Logic of Late Capitalism*, Durham: Duke University Press, 1991.

5 Gilles Deleuze, *Difference and Repetition*, trans. Paul Patton, New York: Columbia University Press, 1994 (1968), in particular the introduction.

6 My thanks go to Thomas Lamarre for an inspiring conversation on this subject.

Let me start by making some fairly obvious observations, in order to clear the way. Firstly, networks have no beginning or end. Each node within a network may be an intersection to another network. Hence, a linear understanding of a network is impossible, because it cannot encompass all of a network's possible forms. To think about network forms as means of social, economic, or cultural expression necessitates a critical reflection of the respective desires that have spawned these very forms. For example, random networks are a direct expression of a mathematical desire for an absolute form,[7] whereas scale-free networks actualize the empirical complexity of social, but also biological, physical, and other realities.[8] Secondly, networks evolve over time. Instead of trying to essentialize a specific network form by making it the standard for all other forms, it is more insightful to evaluate its genealogy.[9] The invention of a worldwide computer network, for instance, was not a singular act of history. Rather, the emergence of the internet involved a historical folding as a combination of heterogeneous and opposing vectors, from technical developments (e.g. TCP/IP versus OSI-standard), to institutional frameworks (e.g. ARPANET, NSFNET, Minitel), to social and individual practices (e.g. within Usenet and hacker cultures, or the first Bulletin Board Systems). Here the idea of random networks laid the imaginary ground for their later implementation as a technology of decentralization and redistribution. Thirdly, networks follow certain rules. They may be virtually limitless, in the sense that they can morph into almost every form, but they are nonetheless limited in their actual formation. According to Alexander Galloway, a computer network relies on certain protocols, which specify how the network operates.[10] By setting the rules for the transmission of data from one computer to another, from one application to another, but also from one user to another, protocols steer and control possible behavior within a network such as the internet.

A protocol-based network has little in common with the still prevalent idea of an uncontrolled, anarchic space of data flows. However, such a network imaginary creates expectations of what a network can or should do. It influences decisions about the actual form and implementation of networks, and, similar to protocols, how the implemented network shapes and structures the world. In this sense, Galloway's focus on protocological control is somehow misleading. Certainly, the material basis of what we call the internet – which in its basic functioning is a top-level network that connects a series of sub-networks – consists of a range of protocols, summarized in the internet protocol suite. But the model entails more than TCP/IP – that is the Transmission Control Protocol (TCP), which runs on top of the Internet Protocol (IP), and already has 'control' in its name. Even though TCP/IP are foundational protocols in the suite, which make it possible to break up large data sets into smaller packages so

7 Paul Erdős and Alfréd Rényi, 'On Random Graphs', *Publicationes Mathematicae Debrecen* 6 (1959): 290-297. It is important to notice that the Erdős-Rényi model saw the application of random networks, which are defined by equally distributed nodes, as purely mathematical. Hence, the authors do not claim that their model has any explanatory use in the social or biological world.

8 Albert-László Barabási, *Linked. How Everything Is Connected to Everything and What It Means for Business, Science, and Everyday Life*, New York: Plume, 2003.

9 Not only in terms of how a specific form has come about, but also in terms of how it is going to keep changing.

10 Alexander R. Galloway, *Protocol: How Control Exists after Decentralization*, Cambridge: MIT Press, 2004, in particular Chapter 1.

that they can be sent over the network without loss, they are not the only ones. Also part of the transport layer is the User Datagram Protocol (UDP). UDP is used for establishing low latency and loss-tolerating connections on the internet, like voice over IP or video streaming. In contrast to TCP, which is considered a reliable protocol for host-to-host communication, UDP might lose some of its datagrams according to its best-effort approach, a circumstance that implies an entirely different understanding of what communication is.[11] UDP does not need a 'handshake' to establish a connection before an exchange can happen. It just wants to connect.[12] Consequently, it encapsulates a completely different imaginary than the strict and control-based network of Galloway's imagination. Translated into cultural theory, UDP would evoke the idea of a promiscuous network, corresponding more to George Bataille's general economy than to a rigid reading of Deleuze's postscript on the societies of control.[13]

II.

Why is this of importance? Because networks are not just descriptive, but rather performative. They not only represent the world, they also have real-world effects. Network technologies play a crucial role in the cultural logic of late capitalism because they respond directly to the socio-economic shift that has restructured the global system over the last thirty years.[14] Even though, on the surface, digital capitalism may have solidified into platforms, its underlying structure still follows a network logic.[15] I am not simply talking about the fact that all common platforms (e.g. Amazon, Facebook, Google, Netflix, Spotify) still rely on the material, and so protocological, infrastructure of the internet, but that, in a very literal sense, the network, or rather the analytical diagram based on networks, constitutes the 'motor' of these platforms. Network analytics is far from being dead.[16] It continues to fuel capitalist value production in its digital form by providing the tools to sift through the ever-increasing amount of data and extract from it fast-selling information. In doing so, data models are undergirded by the homophilic assumption that the friend of my friend might also be a suitable friend for me.[17]

11 John Durham Peters's introduction to *Speaking into the Air* for a comprehensive account of the many facets of the term 'communication'. John Durham Peters, *Speaking into the Air*, Chicago: University of Chicago Press, 1999.

12 In fact, it just wants to be received, without necessarily receiving anything back. For this clarification I want to thank Niels ten Oever, who also made me aware of the fact that with QUIC a general-purpose transport layer network protocol, which was initially designed at Google and uses UDP as its basis, has now been implemented as an equivalent to TCP.

13 Compare Galloway, *Protocol*, p. 81. On the idea of a 'promiscuous network', see also Wendy Hui Kyong Chun and Sarah Friedland, 'Habits of Leaking: Of Sluts and Network Cards', *differences* 26.2 (2015): 1-28.

14 Wendy Hui Kyong Chun, 'Networks NOW: Belated too Early', in David M. Berry and Michael Dieter (eds) *Postdigital Aesthetics. Art, Computation and Design*, London: Palgrave Macmillan, 2015, pp. 290-316.

15 Marc Steinberg's recent book for an in-depth analysis of how 'platformization' has transformed capitalism over the past decades. Marc Steinberg, *The Platform Economy*, Minneapolis: University of Minnesota Press, 2019.

16 I agree with Geert Lovink that network science as an academic discipline has seen better days (see his article in this volume). However, network theory is alive and kicking, not least because it found its way into nonacademic fields and economic applications.

17 Wendy Hui Kyong Chun, 'Queerying Homophily', in Clemens Apprich, Wendy Hui Kyong Chun, Florian Cramer, and Hito Steyerl (eds.) *Pattern Discrimination*, Minneapolis/Lüneburg: University of Minnesota

We are constantly being lumped together, in order to predict our buying behavior, our credit, or our desirability score. The network has become such a powerful force today, because it determines how the world sees us and, by the same token, how we see the world. It would therefore be negligent to disregard the still central role that networks play in the constitution of our subjectivity. As linked-up data bundles we have reached a crossroads with regards to our networked future. On the one hand, we are facing a systemic stupidity, which declares everything, even our luggage, to be connected and smart, thereby yielding nothing more than a stale repetition of consumerism.[18] On the other hand, there are socio-technical networks at our fingertips, which enable true innovation by virtue of their transindividual potential. Today it is possible for individuals to be part of different social spheres at the same time. We are thus, potentially, traversed by different networks and open to diverse associations as the precondition for a genuine – because collective – subjectivity.[19]

According to Katherine Hayles this subjectivity is not only characterized by traversing different social networks, but also by the transition from deep to hyper attention.[20] Today's subject is embedded in a digital and networked environment with the effect that (human) cognition gears toward hyper attentiveness. In contrast to deep attention, which is associated with traditional knowledge acquisition and involves single information streams and long focus times, hyper attention is characterized by the ability to quickly scan significant amounts of data and combine them in certain, albeit ephemeral patterns. This generational shift in cognitive styles is supported by the thesis that humans and technology have always co-evolved, in the sense that human beings and technical artifacts are mutually amplified.[21] What is new, according to Hayles, is the fact that with digital media networks and media-rich environments, the speed of such an ontogenetic evolution across generations has increased significantly. Technical systems, according to Hayles and others, affect the physiological wiring of the brain, and altered human cognition in turn stimulates technological development.[22] In this reciprocity, new cognitive assemblages emerge, which differ from networks in the way that they enable contiguity in a 'fleshly sense' and make dynamic interactions between human and nonhuman cognizers tangible.[23] Inspired by neuroscience and cognitive science, the

Press/meson press, 2019, pp. 59-97.

18 On the notion of 'systemic stupidity', see Bernard Stiegler, *Automatic Society. Volume 1: The Future of Work*, Cambridge: Polity Press, 2016, pp. 24f.

19 Clemens Apprich, *Technotopia, A Media Genealogy of Net Cultures*, London: Rowman & Littlefield International, 2017, pp. 126ff.

20 N. Katherine Hayles, 'Hyper and Deep Attention: The Generational Divide in Cognitive Modes', *Profession* (2007): 187-199.

21 Bernard Stiegler, *Technics and Time, 1: The Fault of Epimetheus*, Palo Alto: Stanford University Press, 1998.

22 Nicholas Carr, *The Shallows: What the Internet Is Doing to Our Brains*, New York: Norton & Company, 2011; N. Katherine Hayles, *How We Think: Digital Media and Contemporary Technogenesis*, Chicago: University of Chicago Press, 2012.

23 N. Katherine Hayles, *Unthought. The Power of the Cognitive Nonconscious*, Chicago: The University of Chicago Press, 2017, p. 118. Hayles asserts that networks, in contrast to assemblages, cannot account for interactions across complex three-dimensional topologies, however this claim has been proven wrong by artificial neural networks, which do operate in n-dimensional spaces.

idea behind Hayles's work is to acknowledge various roles of cognition in human and nonhuman life, thereby granting cognitive agency to technical devices as well.

Like other approaches in new materialism or speculative realism, such as actor-network theory (ANT) or object-oriented ontology (OOO), Hayles objects to an anthropocentric view of the world. Similarly to Jane Bennett, a prominent figure of new materialism, she attributes agential powers to assemblages of human and nonhuman actors, which are able to perform cognitive tasks.[24] Although this line of thinking is highly ambiguous,[25] the redistribution of agency across a network of actants follows the material turn toward what Manuel DeLanda coined as a 'flat ontology'.[26] Within this ontology, assemblages form on the surface of the material world and allow for an ontogenetic understanding of materiality. They are, in this sense, the analogue counterpart to digital networks. While digital networks follow the binary and abstracted logic of inclusion and exclusion,[27] assemblages invoke quantitative and qualitative continua.[28] Beyond a symbolic construction of reality, the assemblage enacts the idea that all things exist equally. Instead of viewing the world through human experience, new materialists assert that there is no privileged ontological status of one thing over another. They ask for new forms of critique that dump the social, that is symbolically constructed, reality of postmodern thinking. Human reasoning, in this reading, is not sufficient to explain complex cognitive processes, such as interpretation, decision, and choice. Access to reality is not only mediated by higher consciousness, but also interpenetrated by technical systems. It is therefore no surprise when Geoffrey Hinton, godfather of so-called connectionism, a branch of AI research that promotes artificial neural networks, takes the same line by claiming that reasoning is the last step in what we call thinking.[29] In accordance with Hayles's cognitive pyramid, reasoning as part of conscious modes of awareness is built on top of nonconscious cognition, which is built on material processes.[30]

III.

My aim in this essay is not to pit networks against assemblages, which would be futile as they have more in common than not, but rather to show why the concept of assemblages is put

24 Hayles, *Unthought,* p. 175.

25 Graham Harman's blog introduction to object-oriented philosophy and how it differs from speculative realism. Graham Harman, 'brief SR/OOO tutorial', *Object-Oriented Philosophy,* 23 July 2010, https://doctorzamalek2.wordpress.com/2010/07/23/brief-srooo-tutorial.

26 Manuel DeLanda, *Intensive Science and Virtual Philosophy*, London: Continuum, 2002, pp. 46f.

27 Manuel Castells, 'Informationalism, Networks, and the Network Society: A Theoretical Blueprint', in Manuel Castells et al. (eds) *The Network Society. A Cross-Cultural Perspective*, Northampton: Edward Elgar Publishing, 2004, pp. 36-45. Following this logic, the network only exists if its nodes and the links between these nodes are activated. If a node is not useful to the network it is switched off.

28 Galloway even speaks of a new 'analogicity' in contemporary thinking, with a turn toward affect, aesthetics, empiricism, pragmatism, and new materialism. See his talk 'The Concept of the Digital', the Institute of the Humanities and Global Cultures, University of Virginia, 18 March 2019, https://www.youtube.com/watch?v=eq4CDLNAvXU.

29 Geoffrey Hinton, 'Turing Award Lecture. The Deep Learning Revolution', Federated Computing Research Conference, 2018, https://www.youtube.com/watch?v=VsnQf7exv5I.

30 Hayles, *Unthought*, pp. 39f.

forward as an alternative to networks in current debates about digital cultures. Although I am well aware that the heterogenous approaches in new materialist thinking cannot be lumped together, I am wondering – as does Galloway – why contemporary theoretical models of flat ontology resemble, in so many aspects, the latest drive toward technocapitalism.[31] In particular speculative realism (see Quentin Meillassoux) and object-oriented ontology (see Graham Harman), both of which have resisted alignment with the broader project of new materialism, can be seen to express the conditions of a fully-automated capitalist society, comprised of human and notably nonhuman actors. These philosophies defy any form of symbolic abstraction thereby turning against reason itself. In philosophical realism nothing lies outside the real and, as a consequence, ontology comes before epistemology. As such, proponents of a flat ontology are not interested in the possibility of critically reflecting the world. Epistemic access to the world is simply another relation on a flat ontological plane.[32] Why is this of concern? Because the rejection of epistemology is consistent with the claim that all theory has ended.[33] Deeply rooted in what was once called Californian Ideology,[34] this claim mirrors the technocapitalist promises of the 90s. In an odd twist in the history of the present, we are witnessing the revival of a hackneyed idea: a self-referential economic system, inspired by biology and operating on autopoiesis.[35] The idea of ontogenetic evolution thus plays right into an ideology that, by default, conceals (human) labor in order to uphold the fetish of self-generating value production. What is new in digital technocapitalism is the fact that complex and elaborated algorithms push toward the transformation of the mode of production by fine-tuning the value extraction process.

There is clearly a problem here in terms of possibilities for critique. While algorithmic subsumption has become real, the idea of criticizing, let alone changing, this reality is dismissed by contemporary philosophy. If everything is as important as anything else, then nothing really matters and no political decision must be made.[36] Granted, things are a little more complicated than that. Given today's complex and entangled world, the advantages of a productive attentiveness to material processes or the destabilization of the Western subject with its 'enlightened' rationalism are undeniable. However the negative conception of knowledge, based on the thesis that the world either recedes (Harman) or resists (Hayles) human rationality, leaves us without any possibility to – at least intellectually – engage with it.

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31 Alexander R. Galloway, 'The Poverty of Philosophy: Realism and Post-Fordism', *Critical Inquiry* 39.2 (Winter 2013): 347-366.

32 For a critical account of flat ontology see Ray Brassier, 'Deleveling: Against "Flat Ontologies"' in Channa van Dijk et al. (eds) *Under Influence – Philosophical Festival Drift*, Amsterdam: Omnia, 2015, pp. 64-80.

33 Chris Anderson, 'The End of Theory: Will the Data Deluge Make the Scientific Method Obsolete?', *Wired Magazine*, 23 June 2008, https://www.wired.com/2008/06/pb-theory.

34 Richard Barbrook and Andy Cameron, 'The Californian Ideology', in Josephine Berry Slater and Pauline van Mourik Broekman (eds) *Proud to Be Flesh: A Mute Magazine Anthology of Cultural Politics After the Net*, London: Mute Publishing with Autonomedia, 2009, pp. 27-34.

35 Kevin Kelly, *Out of Control. The New Biology of Machines, Social Systems, and the Economic World*, New York: Basic Books, 1994.

36 As Nina Power put it: 'proliferating ontologies is simply not the point – [...] what use is it if it simply becomes a race to the bottom to prove that every entity is as meaningless as every other (besides, the Atomists did it better).' Nina Power, 'The Dialectics of Nature', cited in Galloway, 'The Poverty of Philosophy'.

If one cannot know what an object is in itself, all that is left to know is when one's conception of this object fails to work.[37] But how does one know when it fails if there is no knowledge of what an object, and so one's relation to this object, really is? How can we discriminate between nonconscious processes and discrete real objects? If the nonconscious represents a large part of human cognition and is – in contrast to unconscious mental processes – inaccessible to analysis, then any attempt to understand the world around us must fail. Yet, at the same time, there are good arguments for the idea that reality is not simply flattened but stratified – or maybe even networked.[38] As I initially noted, the idea of the network is not so much geared toward what something *is*, but rather how it *works*. In this respect, the epistemological question is still of relevance. Especially so, as algorithms, that is knowable objects that can be reverse engineered,[39] structure our perception of the world. Against a flat ontology, I want to argue for an epistemology that takes human as well as other experiences into account when it comes to an increasingly data-driven reality. Here we can see a return of the network on a micro-level: whereas the 90s was all about network politics on a macro-level,[40] recently the network has creeped into every fiber of the so-called digital service industry (Apple, Amazon, Google, Facebook, Microsoft). Working on the premise of clustering and segmentation, these platforms primarily involve the monetization of user activity based on network parameters.[41]

One might fairly object that I haven't offered an account of the further potential of networks so far. The repetitive, yet differentiating, faculty becomes clear when we think again of the 'identity politics' of digital networks. The prevailing assumption that birds of a feather flock together,[42] has without doubt turned the emancipatory idea of social media into one of poorly gated networks of homophily.[43] Yet these new modes of identification are not merely a repetition of the same; they enable a constant proliferation. With each repetition, the network actualizes a slightly different identity, a fact that can be witnessed in the work of data analytics companies. As John Cheney-Lippold has shown, the networked infrastructure of the internet, and the subsequent ability to track user behavior, has led to a 'new algorithmic identity', based on statistical inference to determine one's age, class, gender, and race.[44] The interesting

37 Holger Pötzsch, 'Posthumanism, Technogenesis, and Digital Technologies: A Conversation with N. Katherine Hayles', *The Fibreculture Journal* 23 (2014), http://twentythree.fibreculturejournal.org/fcj-172-posthumanism-technogenesis-and-digital-technologies-a-conversation-with-katherine-n-hayles.

38 Ray Brassier, 'Deleveling', p. 79.

39 At least this is the assumption of critical software or code studies. See Matthew Fuller, *Behind the Blip. Essays on the Culture of Software*, New York: Autonomedia, 2003.

40 Albert Arnold Gore, 'Remarks on the National Information Infrastructure at the National Press Club', 21 December 1993, http://www.ibiblio.org/nii/goremarks; Martin Bangemann et al., 'Bangemann Report: Europe and the Global Information Society' (1994), http://cordis.europa.eu/news/rcn/2730_en.html; International Telecommunications Unit, 'Declaration of Principles. Building the Information Society: a global challenge in the new Millennium', 12 December 2003, https://www.itu.int/net/wsis/docs/geneva/official/dop.html.

41 The actual nuts and bolts of data analysis entails finding 'similarities' between distinct network nodes (or, users).

42 Miller McPherson, Lynn Smith-Lovin, and James M. Cook, 'Birds of a Feather: Homophily in Social Networks', *Annual Review of Sociology* 27 (2001): 415-444.

43 Chun, 'Queerying Homophily'.

44 John Cheney-Lippold, 'A New Algorithmic Identity: Soft Biopolitics and the Modulation of Control', *Theory Culture & Society* 28.6 (2011): 164-181.

aspect of Cheney-Lippold's argument is that these 'hard categories' are not found from one crop of data, but are constantly (re)actualized. Each time a user moves from one web page to another, the identity categories are updated.[45] Hence a user's ascribed gender can and may change as new data about them is gathered. The algorithms, initially built to enable marketers to target users with advertising, content, and services, allow for a fluid formation of identity, which transmutes with each cycle.[46] What is more, the fluidity of this algorithmic identity also affects its categorization, so that from the algorithm's point of view, it is totally fine if the user is 58 percent male, 32 percent female, and 10 percent 'other'. However, at some point a decision has to be made whether the user belongs in this or that category, because the data eventually serves a real-world purpose (marketing). The problem here then is not so much that algorithms help make sense of an ever-increasing data stream, but that capitalist logic necessitates a retrograde identity politics. The identity is not found in the subject as such, rather the subject's identity is constructed on the basis of very specific network analytics, which mimics the underlying assumptions of a (racist, sexist, and otherwise discriminating) society. Yet such technology could be put to work differently, for different purposes and ends. Again, we find ourselves at a crossroads. One sign points to a 'reticular pessimism', where a networked mode of control predetermines every possible outcome.[47] Another sign points to a new algorithmic reality, which, if its contingency is embraced, might lead to a new politics of possibility.[48] In this sense, the story of the network truly is never-ending.

45 In the same manner an artificial neural network, when applied to the 'real' world, is never effectively trained off, because with each interaction (e.g. a user-request via a virtual assistant) the whole network – respectively its weights – re-adjusts. This also hints to the 'social' component of these systems, whose categories are actualized on the basis of not only one, but multiple users.

46 A good example of the fluidity of a data-encoded identity is *Probably Chelsea*, an artwork by Heather Dewey-Hagborg: thirty variations of possible portraits of Chelsea Manning that have been algorithmically generated by an analysis of her DNA. The artwork 'shows just how many ways your DNA can be interpreted as data, and how subjective the act of reading DNA really is. [...] It is a refutation of outmoded notions of biologically inscribed identity and a testament to the commonality of all, a molecular solidarity that is clearly present even at the cellular level.' Heather Dewey-Hagborg, 'Probably Chelsea Manning', https://deweyhagborg.com/projects/probably-chelsea.

47 Alexander R. Galloway, 'Network Pessimism', *Culture and Communication*, 11 November 2014, http://cultureandcommunication.org/galloway/network-pessimism.

48 Louise Amore, *The Politics of Possibility. Risk and Security Beyond Probability*, Durham: Duke University Press, 2013.