**Blind windows**

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**Abstract**

This article analyses Camille Henrot's 2013 film, Grosse Fatigue, in relation to the histories of hypermedia and modes of interaction with the world wide web. It considers the development of non-hierarchical systems for the organisation of information, and uses Grosse Fatigue to draw comparisons between the Web, the natural history museum and the archive. At stake in focusing on the way in which information is organised through hypermedia is the question of subjectivity, and this article argues that such systems are made ‘user-friendly’ by appearing to accommodate intuitive processes of information retrieval, reflecting the subject back to itself as autonomous. This produces an ideology of individualism which belies the forms of heteronomy that in fact shape and structure access to information online in significant ways. At the heart of this argument is an attention to the visual, and the significance of art as an immanent mode of analysis. Through the themes of transparency and opacity, and order and chaos, the article thus proposes a defining dynamic between autonomy and automation as a model for understanding the contemporary subject.

**Keywords**

art, hypermedia, internet, subjectivity, visuality

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At the very end of the landmark volume *Hypertext*, now in its ‘3.0’ version, George P. Landow posed the following question: ‘Is the hypertextual world of the Internet anarchy or Big Brother’s realm?’ Despite a fundamental commitment to the idea that the history of information technology reveals a tendency towards increasing dissemination of power, even Landow could only conclude that ‘At the present moment, it shows the potential to be both, perhaps even at the same time’ (Landow, 2006: 376). Published in 2006, this idea would find fuller expression in the model of ‘control and freedom’ proposed by Wendy Hui Kyong Chun that year in her book of the same name: a coupling epitomised by the democratisation of the media on the one hand and practices of surveillance on the other. Not ‘either/or’ but ‘both/and’, Chun identified a unique framework for critically engaging with information technologies that overturned dualistic appraisals of how power operates within and through them (see Chun, 2006).

It is with this framework in mind that I want to further develop critical discussion of the technology identified by Landow: *hypertext* or *hypermedia*. Comprising just two paragraphs at the end of 376 pages, Landow’s brief remarks only hint at how such a coupling might play out with respect to one of the core technologies utilised by the World Wide Web. Although by no means confined to, or synonymous with, Internet technology, hypermedia has reorganised the way in which information, and indeed knowledge, is accessed and accumulated through its online application. In this article I therefore want to focus on this reorganisation, asking what is the experience of interacting with information through hypermedia? How does it organise knowledge and, subsequently, what formation of the subject does this propose?

Existing studies in hypermedia are predominantly focused around practices of reading and writing, such as in the work of Landow, N Katherine Hayles and Espen Aarseth. Focusing on hypertext fiction, these studies brought to attention a series of literary works that self-reflexively questioned how hypermedia technologies have challenged categories such as authorship, as in Hayles’ discussion of Talan Memmott’s *Lexia to Perplexia* (2000). Yet, despite the significance of hypermedia as a dominant mode of engaging with information through its instantiation in the Web, there are relatively few instances of critical reflection on it, particularly with regards the organisation of knowledge online (see Drucker, 2014; Manovich, 2001). With this in mind, I therefore turn to a recent example from within the visual arts: *Grosse Fatigue* (2013), a 13-minute moving image work made by the French artist Camille Henrot that was first presented at the 55th Venice Biennale, where it won the Silver Lion award for promising young artist. As will become evident, this work directly addresses the above questions, creating a representation of the experience of using the Web, and how it mediates access to knowledge, out of which it is possible to think about how it differs (or not) from traditional systems.

Thinking about how hypermedia has been interpreted through cultural forms, and especially the visual arts, is deeply important not only because these serve as sites of critical reflection – at times calling attention to the entrenched relationships between technology and society and at others subverting them – but because hypermedia is itself primarily a visual system. As such, it offers an immanent mode of analysis that is able to do more than simply illustrate theoretical concepts. This is nothing if not adequate to the questions I am addressing here since, as I will go on to demonstrate, these pivot around the problem of visibility. A key field for Chun, and others interested in the ideologies that underlie the relationship between technology and the subject, the problem of visibility speaks directly to the function of hypermedia: that of mediation (see Cubitt, 1998; Galloway, 2012; Manovich, 2001). Looking at the representation of hypermedia in *Grosse Fatigue*, as well as the formal dynamics of the film itself, I argue that this point of mediation is structured through the themes of order and chaos, and transparency and opacity.

At stake in all this is a question concerning the formation of the subject. While a number of studies in recent years have employed the kind of non-binary approach described above to thinking about the subject, this has tended to take the form of a challenge to ‘digital dualism’, or the perceived split between the on- and the offline self (see Rey and Boesel, 2014). My contribution instead looks at the construction of the subject ‘in front of’ the screen through the forms of mediation engendered by hypermedia. This is not so as to re-inscribe such a split, but rather to focus on how the subject is produced through the experience of using Web technology rather than on how the subject might be represented through it. Developing the control-freedom dyad through the themes of order and chaos, transparency and opacity, I want to argue that the contemporary subject is produced through a defining dynamic interaction between *autonomy* and *automation*.

**Apophenia**

Developed as part of an artist’s fellowship programme at the Smithsonian National Museum of Natural History, the film *Grosse Fatigue* attempted to tell the story of the creation of the Universe from the big bang to the atomic bomb [figs.1 & 2]. The story is told through a sequence of images that are offered up to the viewer in a seemingly inchoate chain of association: we see hands flick through pages of books showing indigenous body markings alongside Keith Haring graffiti, museum staff riffle through drawers of dead parrots while people in white coats conduct experiments, work by Jackson Pollock cuts away to bleach-splattered leggings, oranges become marbles, and images of brains become sponges being squeezed. Accompanying this sequence of images is a rhythmic, intensifying spoken word poem delivered by Akwetey Orraca-Tetteh from the band Dragons of Zynth, which begins with the lines ‘In the beginning there was no earth, no water – nothing. There was a single hill called Nunne Chaha / In the beginning everything was dead’ and ends with the lines ‘relaxation is the settling of a system into equilibrium / Resting, Pan Gu laid down and resting, he died’. Combining the creation myths of Shinto, Inuit, Navajo and Sioux cultures, the poem drew together common themes from these myths into a single, overarching narrative.[[1]](#endnote-1)

For the artist, Camille Henrot, the experience of watching *Grosse Fatigue* is an ‘experience of density’: the whole of time collapsed into a single artwork; a wild heterogeneity of images and ideas corralled into a unified narrative (Henrot, 2014a). This experience is one that concentrates the infinite into the singular, evoking the Argentinian writer Jorge Luis Borges’ short story *El Aleph* in which the narrator is shown a point in space that opens up to reveal the whole universe. ‘A small iridescent sphere of almost unbearable brilliance’, Borges writes, ‘the Aleph's diameter was probably little more than an inch, but all space was there, actual and undiminished’ (Borges, 2011[1945]: 103).[[2]](#endnote-2) Unlike Borges’ Aleph, *Grosse Fatigue* is necessarily partial: like a museum store or an archive, it is at once both overstuffed and incomplete (Derrida, 1996). But what they share is an attempt to represent a whole system of knowledge through a single, visual device. As in other artworks by Henrot, complex systems are unified through the polysemousness of the image. In the series *Is it possible to be a revolutionary and still like flowers* (2012), for example, the artist transformed her personal library into ikebana, the Japanese tradition of flower arrangement [fig 3]. In so doing, Henrot represented entire books – from Joseph Conrad’s *Heart of Darkness* to Gustave Flaubert’s *Salammbô* – as a single image, ‘concentrat[ing] in one object the entirety of a thought’ (Henrot, 2012).

We might say, then, that *Grosse Fatigue* is about the organisation of knowledge. Indeed, the film draws analogies between several different systems, most notably the way in which stories or ideas are collected and preserved in oral history traditions and the natural history museum. However, Henrot was not only inspired by the physical archives that she encountered during her time at the Smithsonian, but by the way in which information was also dispersed across electronic databases: computer catalogues in which one could search for and retrieve details about objects in the archive; long lists that could be ordered and reordered according to different criteria. Consequently, *Grosse Fatigue* does not simply tell the story of the creation of the Universe, but is a response to the very experience of organising knowledge through information technology. As such, the entire film is structured through the visual device of a computer desktop: set against Milky Way ‘wallpaper’, we watch as browser windows appear to pop up, files are opened or closed and Google searches are performed. There is an effortlessness with which this system drives the narrative along, moving from one image to the next in rapid succession.

In thinking about how knowledge is organised through information technology, the primary system that Henrot engages with in *Grosse Fatigue* is hypermedia and its principles of nonlinearity and interactivity. In an interview with *Cinema Scope* magazine given shortly after the first presentation of *Grosse Fatigue* in Venice, Henrot described how her interest in hypermedia developed while working in the archives of the Smithsonian:

During my research at the Smithsonian, I made lists of books that were interesting to me. One of them, *Arénaire Archimedes*, was interesting for a large number of reasons. It describes computers as being calculating machines. The computer supports the excessive size of the world. The curator in charge of the medicine and science division at the National Museum of American History, Peggy Kidwell, gave me a text called *Joining the Network of Ideas, Impact of Digital Information on the General Workflow of Knowledge*. It was on hyper-media and how the computer window has been designed to leverage the possibilities of assimilation and connection. The concept of hyper-media seemed very interesting, and I haven’t found any other system of visual expression that can effectively express the issue of flow and disparity of information we face as humans with the Internet. (Henrot, 2013)

It is precisely this experience of ‘flow and disparity’ that is represented in *Grosse Fatigue*: there is a relentless procession of images in the film, but the connections between those images are not always obvious. As the viewer, what we are shown is an obsessive pursuit of formal or conceptual associations that are highly subjective, constructed around the artist’s own intuitive processes. In other words, *Grosse Fatigue* is a representation of a kind of apophenia: a term borrowed from psychiatry to describe an early manifestation of schizophrenia in which there is a tendency to mistakenly see an order or pattern where there is none. While the implications of this connection to a psychiatric context will become evident later in this article, what I want to emphasise here is the production of a single, subjective viewpoint that gives order and meaning to what we see, even if that is simply an illusion. And I want to emphasise this subjective viewpoint because it is so central to the conceptualisation of hypermedia, a technology which allows one to work across or beyond categorical, typological and even hierarchical determinants that other systems of knowledge organisation and retrieval, such as libraries, archives, dictionaries, maps, museums, files and thesauri, cannot accommodate. Looking at the established narrative of the historical development of hypermedia – a narrative which, as I will go on to describe, moves from the Memex to Project Xanadu® to the World Wide Web – what motivated its conceptualisation and subsequent implementation was an interest in the workings of the human mind and patterns of thought. In other words, hypermedia was built around subjective rather than objective principles of knowledge organisation and retrieval.

The idea of a system that could ‘leverage connection’ in the way described by Henrot was first popularised in 1945 by Vannevar Bush in the article ‘As We May Think’, published in *Atlantic Monthly*. In this article, Bush described a photo-electrical-mechanical device called a Memex, which could make and follow links between documents, providing non-linear access to multimedia information. The Memex worked by enabling the operator to input text or drawings through a dry photocopier or head-mounted stereo camera spectacles, which would be stored on a microfiche filing system [figs. 4 & 5]. A simple code would link related files, and multiple files could be displayed at once. In such a way, one could make trails through large sets of information comprised of different media, and share those trails with other users who could also follow and annotate them. For Bush, these techniques would set the human subject front and centre in the processes of organising information. Indeed, as a portmanteaux of ‘memory’ and ‘index’, Bush specifically conceived of the Memex as a prosthesis to human memory: something that would relieve the scientist, or even ‘the salesman at the department store’, of having to remember ever-increasing amounts of information. The Memex would do this by providing a system of fast and efficient recall that solved what Bush saw as one of the greatest challenges: the *selection* of information. He writes,

Our ineptitude in getting at the record is largely caused by the artificiality of systems of indexing. When data of any sort are placed in storage, they are filed alphabetically or numerically, and information is found (when it is) by tracing it down from subclass to subclass… The human mind does not work that way. It operates by association. With one item in its grasp, it snaps instantly to the next that is suggested by the association of thoughts, in accordance with some intricate web of trails carried by the cells of the brain… Man cannot hope fully to duplicate this mental process artificially, but he certainly ought to be able to learn from it. (Bush, 1945: 121)

In justifying the need for the Memex, what Bush describes here is a mental process that is fundamentally at odds with traditional systems for information storage and retrieval. This comes down to a difference of geometry, in which the lateral associations favoured by the human mind clash with the vertical hierarchies of alphabetically or numerically organised information. But it is also a question of temporality – and hence efficiency – since the human mind can ‘snap instantly’ between items rather than laboriously trace down indices to find what one is looking for. Thus, with the Memex, what Bush was proposing was a system that would not only mimic the processes of the human mind but would actually work *with* and *for* it.

Although the Memex remained a purely hypothetical invention, the ideas developed in Bush’s article were influential for later work, most notably that of the computer scientist Ted Nelson, who coined the term ‘hypertext’ in 1965 in a paper entitled ‘A File Structure for the Complex, the Changing and the Indeterminate’, delivered at the Association for Computing Machinery’s 20th National Conference.[[3]](#endnote-3) As with Bush, Nelson also developed a system of organising information that would both correspond, and yield, to the intuitive processes of the human mind: Project Xanadu®. Developed but not brought to the commercial market, Project Xanadu® aimed to digitally encode and store the world’s documents and make them available to all. Distributed to terminals across the globe, individuals could search through this database making associative pathways between items and, in so doing, continuously create new readings and new texts. As with the Memex, pathways made by an individual would be preserved for others to see and so on, creating networks of knowledge. These pathways would be represented by multiple windows connected by what Nelson would come to call ‘transpointing windows’ that would indicate two-way connections between documents [figs. 6 & 7]. Like Bush, Nelson also stressed the subjective requirements for access to information, and aimed to meet ‘creativity’, ‘idiosyncrasy’ and, even, the ‘absent-minded professor’ on his or her own terms (Nelson, 1965). Thus, his ideas for the storage and retrieval of information were not motivated by the needs of business or scientific data processing – which were well accommodated by hierarchical systems – but by personal activity.

Although I am highlighting these two figures, both Bush and Nelson’s work on the principles of hypermedia and how it might be applied through innovative interface technologies can be seen as representative of a much wider tendency in computer science to develop forms of human-machine co-operation and symbiosis. For example, the broadly humanist message at the core of ‘As We May Think’ is significant in its historical context since Bush’s proposal resonated with other post-war reflections on the role of science in society, of which the Macy conferences on cybernetics of 1946-1953 – and in which Bush’s assistant at MIT, Claude Shannon, played a key role – is perhaps the best known.[[4]](#endnote-4) Likewise, Nelson’s work in the 1960s bears strong conceptual affinities to that of his contemporaries such as Douglas Engelbart, Hubert Dreyfus, J.C.R Licklider and Anthony G Oettinger, who at that time were also exploring the integration of human and machine through the design of ‘augmented interface’ technologies such as the computer mouse or the Graphic User Interface (GUI), developed in the 1970s by Xerox’s Palo Alto Research Centre and subsequently popularised in the mass market by Apple (then Apple Macintosh).[[5]](#endnote-5) Building on the work of Bush and Alan Turing in the 1940s, these individuals developed the core technologies that would come to be central to the field of Human-Computer Interaction (HCI) in the 1970s and 80s, at the heart of which is an emphasis on working *with* human behaviours and mental processes: to become ‘user-friendly’. Thus, hypertext was one of a number of technologies developed throughout the second half of the twentieth century that foregrounded subjective requirements for information storage and retrieval.

Of course, the most significant and extensive framework through which we encounter the principles of hypermedia is the Web, and this technology is important to consider in some detail in relation to the construction of a subjective model of information organisation since it is so directly and explicitly addressed in *Grosse Fatigue*, permeating the film on a number of different registers. Indeed, Henrot began the very process of making *Grosse Fatigue* by collecting found images from the Web and organising them into groupings. She writes, ‘I had prepared tons of folders with very crazy categories of found images from the web for the film, such as nail art, dead animals, decorated eggs, eye irritation, naked bodies, artists drawing in bed, writers writing while standing, water drops, anorexia, bicolour-eyed cats’ (Henrot, 2013). Of these, two sets of found imagery were directly utilised in *Grosse Fatigue*: the first a series of still photographs of white cats with heterochromia, a condition that causes difference in the coloration of the iris; the second a widely watched YouTube clip of a monkey in IKEA [figs. 8 & 9]. Together with the other sequences in the film – the majority of which were not found images but original footage shot specifically for the film using surrogates, purchased via eBay, for objects that had caught Henrot’s attention in the archives[[6]](#endnote-6) – these images were then presented in *Grosse Fatigue* using simulated browser windows and dialogue boxes. As a structuring device, these frame the sequences of moving images and incorporate them – often several at the same time – into the filmic lexis, replicating the experience of having multiple tabs or applications open simultaneously on a desktop. Thus, the Web is central to the film both at the level of production and in terms of its formal content: a meshing evident in the repeated refrain of images of feminine hands with vividly coloured nails, which were included because nail art turns up in almost any and every Google image search, thus symbolising the wild heterogeneity of the Web [fig. 10].[[7]](#endnote-7)

In its initial conceptualisation and development, the Web drew on a number of principles that had been central to the work of Bush and Nelson as well as to discussions around hypermedia more broadly, most notably the rejection of hierarchical models of information storage.[[8]](#endnote-8) These are evident in the earliest documentation relating to the development of the Web, and here I want to focus in particular on a proposal written in March 1989 by Tim Berners-Lee, who was then a software engineer at CERN. Entitled ‘Information Management: A Proposal’, this proposal outlined the rationale for the development of an information management system that would eventually be developed into a ‘World Wide Web’, a technical apparatus that would facilitate the sharing of information using the already-existing infrastructure of the Internet, a network of networks which had existed in one form or another since 1969.[[9]](#endnote-9) Berners-Lee’s boss, Mike Sendall, marked the proposal ‘vague but exciting’ (Berners-Lee, 1989) [fig. 11].

In this document, Berners-Lee proposed three fundamental technologies – Hypertext Transfer Protocol (HTTP), Uniform Resource Identifier (URI) and Hypertext Markup Language (HTML) – that would transform the way that information was stored, transmitted and received.[[10]](#endnote-10) Hypermedia was central to this transformation since it offered a solution to what Berners-Lee called ‘the problem with trees’.[[11]](#endnote-11) The problem being that they are hierarchical, and that one is not only required to know exactly where information is stored (e.g. in which file) but also the means by which to find it (e.g. through a specified keyword). By contrast, the World Wide Web was conceived as a system that could store information in a non-hierarchical fashion, and it did this by eliminating knowledge both of the location of the information and the means to locate it, with the aim of improving access and allowing for unexpected associations. As Berners-Lee has written, ‘The system must allow any sort of information to be entered. Another person must be able to find the information, sometimes without knowing what he is looking for’ (Berners-Lee, 1989). The application of hypertext information organisation and multimedia display to some of the new user-friendly technologies, such as the GUI, thus enabled the World Wide Web to make unique and significant contributions that eluded some of its early competitors – such as the Gopher protocol, developed by the University of Minnesota, and the Wide-Area Information Server, developed by the Thinking Machines Corporation – which were hierarchical and often restricted searches by category.[[12]](#endnote-12)

One particularly interesting aspect of the proposal that Berners-Lee submitted to the management at CERN is that the rationale for such a system was closely tied to the context of working at the European organisation. This can be clearly seen in the opening paragraphs of the proposal, in which Berners-Lee writes:

CERN is a wonderful organisation. It involves several thousand people, many of them very creative, all working toward common goals. Although they are nominally organised into a hierarchical management structure, this does not constrain the way people will communicate, and share information, equipment and software across groups.

The actual observed working structure of the organisation is a multiply connected ‘web’ whose interconnections evolve with time. In this environment, a new person arriving, or someone taking on a new task, is normally given a few hints as to who would be useful people to talk to. Information about what facilities exist and how to find out about them travels in the corridor gossip and occasional newsletters, and the details about what is required to be done spread in a similar way. All things considered, the result is remarkably successful, despite occasional misunderstandings and duplicated effort.

A problem, however, is the high turnover of people. When two years is a typical length of stay, information is constantly being lost. The introduction of the new people demands a fair amount of their time and that of others before they have any idea of what goes on. The technical details of past projects are sometimes lost forever, or only recovered after a detective investigation in an emergency. Often, the information has been recorded, it just cannot be found. (Berners-Lee, 1989)

With its emphasis on human-scale problems and needs, the language that Berners-Lee uses echoes that of Bush and Nelson. What is most striking about this is that although the organisational structure of CERN is here described in terms of the problems it poses for information loss, it also seems to serve as something of a blueprint for the very system that Berners-Lee was proposing: ‘a multiply connected “web” whose interconnections evolve with time’. As with the Memex, which replicated in function the ‘intricate web of trails’ of association generated by the human mind, so might we see the World Wide Web as replicating elements of the organisational structure at CERN. Prompted by the problems of information organisation and loss at CERN, Berners-Lee therefore imagined a ‘universal linked information system’ that reflected the ‘distributed’ structure of the organisation itself (Berners-Lee, 1989).[[13]](#endnote-13) Thus the conception of lateral forms of information sharing and access, which came to be formalised through the languages of hypermedia, was connected to the organisational structure at CERN, which Berners-Lee identified as only ‘nominally hierarchical’.

As we can see from the proposal, a crucial component of this structure was the perception of communication across groups, ‘corridor gossip’ unbounded by hierarchy or project remit, from which we might infer a sort of sharing of expertise. As is well-known, these principles extended to the technical development of the Web itself since, in April 1993, CERN put the following software into the public domain: W3 (for ‘World Wide Web’) basic (‘line mode’) client; W3 basic software; and W3 library of common code (CERN, 1993). As CERN specified in the declaration accompanying this release, the intention was to ‘further compatibility, common practices, and standards in networking and computer supported collaboration’. By making the code available for anyone to ‘use, duplicate, modify and redistribute’, CERN essentially expanded the pool of possible collaborators to non-CERN employees, ensuring the continued growth and development of the Web. This sharing of expertise and emphasis on communication would come to be constitutive of the kinds of applications that the Web was intended to run, such as websites, email, BBS and, later, social media and the platforms associated with so-called ‘Web2.0’.[[14]](#endnote-14) We might say, then, that the ‘common goals’ and ‘corridor gossip’ of CERN are founding principles of the Web since distributed forms of working not only enabled the development of the Web but now constitute some of the primary activities that it hosts.

Tracing this narrative from the Memex to Project Xanadu® to the World wide Web, it is possible to see how hypermedia models itself around human behaviours and processes that at once pose both problems *and* solutions for the storage and retrieval of information. Here the emphasis is on a non-hierarchical structure that yields to subjective modes of interaction.

What I would like to suggest is that the formal dynamics of *Grosse Fatigue* represent this historical development of lateral, or ‘idiosyncratic’, associations in the organisation of information and retrieval of knowledge that hypermedia enables. Endlessly imploding and regenerating according to an internal evolutionary logic built from the artist’s own intuitive associations, the succession of images in the film clearly thematise ‘the complex, the changing and the indeterminate’. In an interview at the Tate Modern in 2014, Henrot described the experience of watching the film in similar terms, invoking a ‘meditative, dreamy state… [in which] the mind can go anywhere: it is not about giving information’ (Henrot, 2014b). As such, the film can be thought of as a representation of the experience of interacting with hypermedia technology, in which a model of thought built around logic and hierarchies of knowledge is replaced with subjective intuition and lateral association.

Although Henrot was concerned that this would not make a compelling artwork, as the simulated computer desktop might feel reminiscent of being at work, the film in fact proves highly seductive and compulsive to watch; the combination of music and images drawing the viewer into the narrative in a mode not dissimilar to cinema.[[15]](#endnote-15) This echoes the kind of compulsion that is familiar from everyday experience of using the Web, following links from page to page sometimes with no end point. Something of this compulsion is alluded to in *Grosse Fatigue* through screen captures of Wikipedia pages related to schizophrenia statistics [fig. 12]. These were included in the film after Henrot became overwhelmed by the constant mental associations between images that she was making at night, causing her to wonder whether she herself might be schizophrenic.[[16]](#endnote-16) Indeed, while researching the database at the Smithsonian, Henrot stated that she was ‘obsessively making screen captures of the strange combinations of images that were appearing on my computer when making “selections” of things I wanted to view’, creating an experience of ‘permanent chaos and cacophony’ (Henrot, 2013). This sense of exhaustion – of a subject overwhelmed by the compulsive pursuit of knowledge – is, of course, inscribed in the title of the film, which is often translated as ‘dead tired’: borne from the mythology of the Web as infinite, fluid and unbounded, the possibility of knowing everything here risks collapsing into the ennui, disaffection and dissociation of knowing nothing.[[17]](#endnote-17)

Thus, compulsion is woven into both making the film and watching it, suggesting an inwards-looking engagement with one’s own mental world. I would argue that this can be explicitly read into one particular scene of *Grosse Fatigue* in which we see a clip of a young white woman in white underwear masturbating at the centre of a cascade of browser windows, the image cropped closely to frame her crotch only [fig. 13]. What we are presented with in this sequence is a thematisation of this inwards-looking engagement: it represents a kind of narcissistic collapse or infinite regression back unto oneself borne from the obsessive pursuit of knowledge.[[18]](#endnote-18) There is an ambiguous politics of looking at work here in Henrot’s choice to signal this collapse through the image of female masturbation, since it implicitly draws on the historical construction of woman as site of visual pleasure and the pornographic trope of the close up. Yet this problematic construction of the female subject as irrational and narcissistic also cuts across a masculinist construction of knowledge as rational and ordered. Thus, what is especially significant about this sequence in the context of my wider argument is that its themes of seduction and compulsion, as well as desire and potentially frustration, are suggestive of the emotional mechanics by which hypermedia constructs the subject as an *individual*. Indeed, by enabling the subject to employ modes of interaction that are ‘dreamy’, ‘idiosyncratic’, ‘indeterminate’ and, even, ‘schizophrenic’ – modes which cut against the traditional geometries of information organisation – hypermedia positions the subject at the centre of ‘the world’s information’.[[19]](#endnote-19) In this sequence, the idea of free association embedded in hypermedia crystallises into a narrative of individualism so that, as the author of a unique constellation of images, stories and ideas, the subject emerges as an autonomous individual ‘in front of’ the screen.

This builds on important early work by Scott Bukatman, Sean Cubitt and Lev Manovich who, amongst other ambitions, sought to address the mechanisms through which the individual emerges out of its interaction with information technology (see Bukatman, 1993; Cubitt, 1998; Manovich, 2001). For Manovich in particular, hypertext is characterised by its harmonisation with a post-industrial society informed by a rhetoric of individual ‘choice’. Manovich writes: ‘every citizen can construct her own custom lifestyle and “select” her ideology from a large (but not infinite) number of choice’ (Manovich, 2001; 42).[[20]](#endnote-20) In this way, hypermedia organisation becomes emblematic of the desire for custom-tailored experiences that inheres within neoliberalism, and chimes with wider a model of the user as an ‘active participant’: a model that intensified following the introduction of platforms and services associated with Web2.0, characterised by peer-to-peer file sharing, collaborative writing or editing of blogs and wikis, and the collective classification of content through tag clouds and folksonomies.[[21]](#endnote-21) In what follows, I want to develop this reading of the subject, thinking about how it is specifically produced through a relationship between transparency and opacity, as well as how these themes might also be suggestive of limitations to this narrative.

**Black box**

Schizophrenia is, of course, about an irrational and disordered mind. In ‘The Whole Earth is Heavy’, a review of *Grosse Fatigue* published in *Artforum* shortly after the opening of the 2013 Venice Biennale, the art historian Pamela Lee emphasised this aspect of the film, arguing that it is structured around a dynamic between chaos and order. For Lee, this is figured through the relationship between *zoe* and *techne*: between the messiness of life and the rationalising order of the Smithsonian’s cabinets; between the objects in the collection and the online database; and between the individual, subjective interests of the researcher and the official histories and institutional protocols of the museum. ‘*Grosse Fatigue* may well tell a story of creation’, writes Lee,

but for this very reason it is just as much a fable of entropy, of the endless dispersion of beings and things into disorder. Yet not even Robert Smithson could have predicted the cosmic scale of this entropic demise, as accelerated by the online platforms enabling Henrot’s research. If Orraca-Tetteh intones about the birth of the universe from diverse religious traditions, what ultimately stays with us is not the genesis but the *exhaustion* of the various objects displayed—their world-weariness—and the dissipating energy demanded to manage them as information. (Lee, 2013)

As I argued at the beginning of this article in relation to Borges’ short story ‘El Aleph’, this dialectic between order and chaos expresses itself in Henrot’s work as a shuttling between the infinite and the singular: an experience of density. In *Grosse Fatigue*, this density manifests as a single vanishing point that buffers against the apparently ‘schizophrenic’ associations between the images. However, this is not to suggest that the film ever resolves itself around a fully coherent narrative. As Henrot has stated, ‘I like the serenity brought about by the image of an organized system, but I don’t like simplification and authority. I’m fascinated by unifying systems because they are fragile and appear like ordered complexity’ (Henrot, 2012). Cutting against the grain of pure scientific merit or taxonomic order, this is nothing if not adequate to the impossibility of telling the story of the creation of the universe: always partial, always fallible.

We might also think about the dialectic between order and chaos as expressed through a play with scale. As Henrot has stated in the interview for *Cinema Scope* magazine cited previously:

I was relieved when I was able to integrate so much of the vulnerability of my own research (the crazy and messy parts of it) in a visual system that would be coherent with the subject… It became very obvious that the ‘general’ and ‘too broad’ characteristic of my research was opposite to the scientific research process which focuses on a certain species within a certain genus, within a certain family, within a certain order and so on… [Hypermedia] creates an order, but the multiplication of knowledge means that the order can only be personal and subjective. This makes sense because that subjective order can include any combination of ideas, whereas with a rational and objective system there will always be blind spots, which it cannot include because it would seem contradictory. (Henrot, 2013)

Here the artist describes how the sheer scale of the endeavour to represent the story of the universe – the aspect of being ‘general’ and ‘too broad’ – results in a disorder that can only be mediated, resolved even, through the singularity offered by hypermedia. Telescoping between the macro and the micro, hypermedia introduces what we might describe as a *constructed disorder* that differs fundamentally from traditional taxonomies and systems of classification. Thus, what is significant about the dialectic between order and chaos represented in *Grosse Fatigue* is that it is hypermedia that holds these two terms together in tension. As the language of ‘telescoping’ and ‘vanishing points’ implies, and building on my argument in the previous section about the construction of an individual subject, what we are dealing with here is the problem of a viewpoint: the single eye/I. This problem revolves not so much around what is seen as what is not seen, left out or excluded. This is coded through problematic racialised hierarchies, not only in *Grosse Fatigue* but in a number of other works by Henrot, including the films *The Strife of Love in a Dream* (2011), *Coupé / Décalé* (2011) and *Cynopolis* (2009) all of which train an anthropological gaze on non-western cultures: a depiction of India born out of Carl Jung’s notion of the country as a ‘dreamlike world’; a record of a land diving ceremony in the South Pacific republic of Vanuatu; and images of dogs scavenging around a pyramid in Sakkara, Egypt. In bearing the traces of a colonial past, these works have been seen to perform a rapacious imperializing gaze that seeks out not only the whole world but, in the case of *Grosse Fatigue*, the entire universe: a desire for infinite knowledge that extends outwards from this single eye/I.[[22]](#endnote-22) The gaze at work here is therefore is at once universal, reproducing the logic of the colonial archive, and yet situated, performing its own partiality. This creates two lines of sight that coil tightly together into a helix at whose centre is a vanishing point.

What I would like to suggest is that, by invoking the idea of a blind spot, Henrot here pairs the formal tension between order and chaos in *Grosse Fatigue* with a tension between transparency and opacity. Indeed, what the artist is describing in this passage is the extent to which blind spots might themselves become visible within different systems for organising knowledge. In *The Order of Things* (1966), Michel Foucault described how, with traditional systems, the structure of knowledge can be reduced to lines, surfaces, forms and reliefs. By rendering the organizational principle as a primarily visual entity it becomes both visible and knowable, since one can grasp the structuring logic, schematised through a catalogue, a legend, a key or a cipher (Foucault, 1997[1966]): 133). The consequence of this is that, with a ‘rational and objective system’ that relies on such formal geometries, blind spots can be identified and, presumably, eliminated. In other words, ‘rational and objective systems’ rely on formal geometries to give an appearance of transparency, in which complete legibility belies any vulnerability in the system in terms of completeness. By contrast, as we have already seen in Tim Berners-Lee’s original proposal, hypermedia instead eliminates knowledge of the location of information and, therefore, how that information is organised. This is understood as constituting a core aspect of the Web’s usability, enabling an individual to find information ‘*sometimes without knowing what he is looking for*’. Borrowing from Jeff Conklin, Landow refers to this as the ‘disorientation problem’: since the structure of the network is unknowable, one is unable to locate themselves within that network (Landow, 2006: 144-6). Thus, with hypermedia, the organisational principle is both invisible and unknowable: blind spots exist anywhere and everywhere but simply cannot be seen. As a result, the organisation of information appears to be inseparable from one’s use of it, bolstering the narrative of autonomy and individualism described above.

This lack of awareness of any apparent structuring logic is important in that it intersects with historical constructions of the computer as a ‘black box’ more generally: an idea in which knowledge that *it works* supercedes any knowledge of *how it works* (see Gere, 1996: 22-5). As notable studies by Alexander Galloway and Wendy Hui Kyong Chun have shown, technologies such as the Graphic User Interface and automatic programming are designed to abstract the user from the material workings of the computer so as to facilitate interaction through a form of de-skilling (see Chun, 2004; Galloway, 2012: 66-7).[[23]](#endnote-23) As a graphics-based front-end environment, GUIs enable the user to automatically run a variety of applications without knowledge of the coding languages needed to run them. Rather than typed commands, the actions in a GUI are performed through the manipulation of graphical elements represented by the ‘window-icon-menu-pointer’ (WIMP) system. Historically, the elements of this system tended to be skeuomorphic devices that corresponded to a desktop metaphor, such as slips of paper, tabs, and folders: design solutions that were already widely culturally integrated and, as such, could be quickly internalised by the user but which nevertheless bore no relation to the underlying processes. As levels of computer usage have increased, skeuomorphs are no longer thought to be necessary transitional devices and since the mid-2000s have been widely replaced by so-called ‘flat design’ and ‘post-WIMP’ systems: a streamlined visual language that does away with gradients and drop shadows in favour of the swiping, pinching and rotating of touch-screens and the sleek functionality of parallax. Indeed, Henrot has suggested that the way in which images can now appear on our screens, with just the swipe of a finger, is like ‘magic’.[[24]](#endnote-24) Such developments, which produce *representations* of the interaction between an individual and a computer, reinforce the idea of a technology that yields to our commands and desires. Being able to meet the ‘absent-minded professor’ on his or her own terms is therefore dependent upon an interface architecture that has been both neutralised and naturalised, so that the relationship between the user and the computer appears as unmediated as possible - an idea that is perhaps well-illustrated by the title of a popular usability design manual from the turn of the millennium: *Don’t Make Me Think: A Common Sense Approach to Web Usability* (Krug, 2000).

What I would like to suggest is that this logic of the black box is contained in the double inflection of the verb ‘to screen’, which refers both to the act of concealing or hiding as well as to showing or display.[[25]](#endnote-25) We might relate this back to the tension between order and chaos, since the very term ‘interface’ derives from studies into fluid dynamics conducted by the engineer James Thompson in the mid-19th century, who used it to indicate the point at which liquid in a state of turbulence met with liquid in a state of laminar flow. As the architectural historian Branden Hookway has argued in his recent work on the history of the interface, ‘In essence, the interface emerge[d] as an analog of the boundary that separates dynamic stability from instability, or rather, from the need to find within those behaviors or events once thought to be unstable and unknowable a kind of knowing and stability’ (Hookway, 2011: 164-5). It is, therefore, from within the field of fluid dynamics that the site of mediation – the interface – both produced and was produced by an epistemological framework of sight and light that mapped over the border between order and chaos. Thus, both on the Web and in computing more generally, interface architectures might be seen to be not only *transparent*, in that they provide a window of apparently direct and unmediated access, but also *opaque*, in that they blackbox the way in which access to information is organised.[[26]](#endnote-26)

What I am suggesting is that hypermedia and ‘rational and objective’ systems differ in the extent to which an organisational principle is visible, but not with respect to whether or not such a principle exists. In this, I take my cue from *Grosse Fatigue*, which does not present a simple opposition between hypermedia and ‘rational and objective systems’ any more than it presents a simple opposition between order and chaos. Rather, the film actually meshes these different systems together, drawing a direct analogy between the Web and the Smithsonian. In one important sequence of the film, for example, a pop-up browser window aligns perfectly with the frame of a drawer in the museum archives containing a number of dead parrots [figs. 14 & 15]. Here, Henrot references the practice of organising knowledge according to layers, predominantly associated with the geometries of ‘rational and objective’ practices rather than ‘idiosyncratic’ ones. But, in so doing, it is the interface architecture of the Web – the frame provided by the browser window – that comes to serve as an ordering principle. As with the filing cabinet or plan chest, the rectangular frame of the browser window here seeks to delimit and define, order and organise, through a universal and universalising framework, establishing a confluence with the logic of the museum, archive or library.

We can think about these underlying organisational principles in very concrete terms. The subjective logic that is thematised in *Grosse Fatigue* is inspired by the heterogeneity of the Google image search. But rather than deliver truly heterogeneous results, Google’s search is always already organised and determined by algorithms which rely on more than 200 ‘signals’ in order to ‘give you back exactly what you want’, including categories such as ‘freshness’, user region and PageRank (see Google [no date]; Brin and Page [no date]). Although these signals are ostensibly developed around the individual, since they aim to give you the result you are looking for, they perform a filtering function that is in friction with the idea of free association and the Web as a place of unlimited access to information. In other words, the personalisation of searches on engines such as Google delimit ones exposure to information from a wide variety of sources.[[27]](#endnote-27) Other ways in which Web and Internet technologies curtail an idea of free and unlimited access to information include: terms of service, which bind users into a contract that governs how a service such as Google can be used; traffic-shaping and traffic policing, which are used to monitor and manipulate network traffic and can result in lack of access to Web sites; and packet-sniffing, which intercepts and logs network traffic. It also includes the locked functionality associated with ‘walled gardens’ such as Cloud-based applications.[[28]](#endnote-28) With Cloud Computing services, and in particular Software as Service (SAS) and Platform as Service (PAS) applications such as Heroku founded in 2007, or Amazon Web Services (AWS) launched in 2006, the service provider has control over content, media and applications. Although such applications are often free, they tend to be fixed and unchangeable in terms of functionality and user interface so that standardisation – rather than idiosyncrasy – prevails. Such technical constraints operate in conjunction with the kinds of barriers to access associated with the organisation of the Web around social, geographic and economic axes, such as one’s ability to configure the necessary browsers to access certain parts of the Internet, availability of technology and government restrictions on browsing activity, epitomised by the so-called ‘great firewall of China’ (see Lippold, 2011; van Dijk, 2013). As the theorist José van Dijck has succinctly summarised in her recent book, *The Culture of Connectivity: A Critical History of Social Media*, ‘the Internet is easier to use, but it is more difficult to tinker with’ (van Dijck, 2013: 6).

What I would like to suggest is that these restrictions and technical processes constitute forms of heteronomy that threaten the narrative of autonomy and individualism constructed through hypermedia’s ability to allow for highly subjective trails and connections to be made. Far from simply yielding to the idiosyncrasies of the user, the Web in fact mediates access to information through interface technologies that screen, or make invisible, underlying forms of determination. Indeed, we might even argue that it is only a function of the technology itself – what Pamela Lee has called ‘capricious algorithms’ in the article cited earlier – that gives *Grosse Fatigue* the semblance of idiosyncrasy, rather than the human mind (Lee, 2013). Thus the subject produced ‘in front of’ the screen must be understood not simply as autonomous but as constituted through a dynamic between *autonomy* and *automation*.[[29]](#endnote-29)

To return to the analyses by Landow and Chun with which I began, it is possible to see how a tension between control and freedom structures the way in which the Web organises access to knowledge through hypermedia technologies, and what the stakes are for thinking about the formation of the subject. This is expressed in *Grosse Fatigue* through formal properties of ‘flow’ and ‘disparity’ that bridge to a thematics of order and chaos, transparency and opacity. Through strategies of seduction and absorption, *Grosse Fatigue* reproduces some of our most entrenched cultural mythologies around the Web as a fluid and unbounded space of infinite possibility and promise: the ‘world’s information’ spirals vertiginously around the single eye/I. But the film also thinks the Web with and through the logic of the museum. Alike in their excessiveness, their failure and their will to order, both strive to mediate between the singular and the infinite, the micro and the macro, the individual and the world. Where one makes its mediating principles visible through rigid geometries that organise the world through a surface logic, the other yields to the obscure idiosyncrasies of the human mind. This difference is expressed through the ‘chaos and cacophony’ of Henrot’s mind as she tries to reconcile the parallel subjectivities of artist and researcher. Yet, in both cases, the will to order exists both within and without the sovereign subject. There is a dynamic between autonomy and automation that is accessed through the problem of visibility. As a work of visual art *Grosse Fatigue* operates precisely in this territory: reproducing, but also revealing, the vanishing points and the blind spots.

1. **Notes**

   . It is important to note that Henrot was careful not to homogenise these myths but to leave some of the differences and tensions between them in tact (see Henrot, 2014a). [↑](#endnote-ref-1)
2. . Much of my thinking about *Grosse Fatigue* has also been informed by another of Borges’ works: *The Library of Babel* (1941). According to the unknown narrator of the story, in the library all possible combinations of the letters of the alphabet are contained so that the library is ‘total’ - perfect, complete and whole. [↑](#endnote-ref-2)
3. . Nelson would reprint Bush’s article in his 1981 book, *Literary Machines*. [↑](#endnote-ref-3)
4. . In her pathbreaking book, *How We Became Posthuman*, N Katherine Hayles has shown how Claude Shannon, along with Norbert Weiner and others, developed a theory of information that would come to be mapped onto the structure of human thought itself (see Hayles, 1999). It is important to note, however, that despite these affinities with the post-war information boom, experts in Bush’s work have stressed that the Memex was a product of the technological environment of the 1930s (Nyce and Kahn, 1991). [↑](#endnote-ref-4)
5. . For a discussion of the augmented interface and human-machine interaction see Hookway, especially section 3 ‘The Augmentation of the Interface’ (2014: 121-48). See also section ‘Technology as Prosthesis’ in Landow (2006: 336-42). [↑](#endnote-ref-5)
6. . Henrot has also used eBay in a number of other works such as *Egyptomania* (2009) and *The Pale Fox* (2014). [↑](#endnote-ref-6)
7. . In an interview, Henrot suggested to me that the reason why nail art appears so frequently in Google Image searches is because of the highly diverse range of names for the colours. Interview with Camille Henrot [unpublished]. Interview by Cadence Kinsey. 18 February 2014. [↑](#endnote-ref-7)
8. . There is much to say about the relationships between these three instantiations of hypermedia, which cannot be fully addressed in this paper. For example, there are overlaps in how hypermedia was conceptualized in both Project Xanadu® and the World Wide Web but also key differences, such as the incorporation of visible links and two-way connections. Both Berners-Lee and Nelson have described meeting sometime in 1989/1990, although from these accounts it would be difficult to infer any direct influences (see Berners Lee, [no date]; Whitehead, 1996). For a discussion of the differences between the two see Lanier (2013: 227). For more on the relationship between the World Wide Web and the work of both Nelson and Bush see Berners-Lee (1996). [↑](#endnote-ref-8)
9. . Berners-Lee first thought only to call it ‘Mesh’ but developed the term World Wide Web in 1990. An important precursor to the Web was a notebook program, ‘Enquire-Within-Upon-Everything’, written while Berners-Lee was consulting for CERN in June-December of 1980. This program allowed links to be made between arbitrary nodes. [↑](#endnote-ref-9)
10. . HyperText Markup Language is the publishing format for the Web, including the ability to format documents and link to other documents and resources; Uniform Resource Identifier is an ‘address’ that is unique to each resource on the Web; Hypertext Transfer Protocol allows for the retrieval of linked resources from across the Web. [↑](#endnote-ref-10)
11. . ‘The Problem with Trees’ is a subheading within Berners-Lee’s proposal. Berners-Lee specifically uses the term ‘hypermedia’, rather than ‘hypertext’, in order to emphasise the possibility of multimedia documents including graphics, speech and video. [↑](#endnote-ref-11)
12. . Some examples of these early browsers and a history of their development can be found in Griffiths (2002). [↑](#endnote-ref-12)
13. . It is notable that Berners-Lee imagined that the Web would resemble structure of the organization itself. He writes, ‘In a complex place like CERN, it's not always obvious how to divide people into groups. Imagine making a large three-dimensional model, with people represented by little spheres, and strings between people who have something in common at work. Now imagine picking up the structure and shaking it, until you make some sense of the tangle: perhaps, you see tightly knit groups in some places, and in some places weak areas of communication spanned by only a few people. Perhaps a linked information system will allow us to see the real structure of the organisation in which we work’ (see Berners-Lee, 1989). [↑](#endnote-ref-13)
14. . Berners-Lee has suggested this relationship in a text that discusses the various different meanings of ‘open’ (see Berners-Lee, 2013). In her important book *Inventing the Internet*, Janet Abbate has also linked this to the wider traditions of decentralisation, open architecture and active user participation with the Internet as a whole (see Abbate, 1999: 217-8). [↑](#endnote-ref-14)
15. . Henrot was concerned that, because of the browser windows, the experience of viewing it would be too much like being at work, so she included the images of the bodies in the shower. Interview with Camille Henrot [unpublished]. Interview by Cadence Kinsey. 18 February 2014. [↑](#endnote-ref-15)
16. . Henrot writes, ‘The question of focusing and eliminating was central to keeping my sanity. I knew that I would go crazy if I did not restrain the scope of the research, and yet I had the intuitive idea that only a sincere, all encompassing strategy would be an interesting project. This was something I then had to accept and give shape to… I was so overwhelmed by images and ideas of connections at night that I thought I was schizophrenic and started looking at the Wikipedia page about schizophrenia. That’s how these pages came to be included in the film’ (Henrot, 2013). [↑](#endnote-ref-16)
17. . The multiple image array has recently been discussed in relation to similar themes by W.J.T. Mitchell in his 2014 lecture ‘Method, Madness, and Montage: Aby Warburg to A Beautiful Mind’. [↑](#endnote-ref-17)
18. . Henrot has described the inclusion of this sequence thus: ‘Knowledge compulsion is also connected to narcissism and loneliness, that’s why I had this idea that the film should have a masturbation scene’ (Henrot, 2013) [↑](#endnote-ref-18)
19. . This is a phrase used by Google in their mission statement: ‘Google’s mission is to organise the world’s information and make it universally accessible and useful’. See http://www.google.co.uk/about/company/ (Accessed: 12 September 2015). [↑](#endnote-ref-19)
20. . Although the politics is inverted, this argument relies on an understanding of hypermedia as a mode of decentering, intertextuality and multivocality that reconstructs the reader as an active agent. This model derives primarily from the work of Landow, who drew analogies between hypermedia and the challenge to traditional modes of reading and writing developed within poststructuralist and postmodernist critical theory, most notably that of Roland Barthes, Mikhail Bakhtin and Jacques Derrida. The gendering of the pronouns here is also crucial, since the ‘young girl’ has been modelled as the ideal subject of neoliberalism (see Tiqqun, 2012[1999]). [↑](#endnote-ref-20)
21. . Although not representative of any change in the technical specification of the World Wide Web, the term ‘Web2.0’ has formalised the increasing prevalence of user-generated content and social networking sites in the last ten to fifteen years. It has been associated with the transformation of the user into an active participant in terms of the democratisation of information sharing, not only on the grounds of user engagement with one another but with brands, business and services more widely. The literature on this is extensive, but for representative examples see Benkler (2006); Bruns (2008); Hartley (2009); Jenkins (2006); Mizuko (2008). [↑](#endnote-ref-21)
22. . For a discussion of Henrot’s work in the context of these colonial traces see Quaintance (2015). For a discussion of postcolonial theories of the archive see Mirzoeff (2011); and Basu and de Jong (2016). [↑](#endnote-ref-22)
23. . For other studies of the interface that also touch upon these themes see Hookway (2014); Johnson (1997); Robins (1999); Virilio (1997). [↑](#endnote-ref-23)
24. . Interview with Camille Henrot [unpublished]. Interview by Cadence Kinsey. 18 February 2014. [↑](#endnote-ref-24)
25. . It is important to note that computers are not inherently visual entities: screen-based interfaces only started to appear from the late 1950s onwards, for example with the SAGE – Semi-Automatic Ground Environment – device, in which an operator directed actions by touching a light gun to a screen. [↑](#endnote-ref-25)
26. . There are relevant connections here with work being done around transparency and opacity in other contexts (see Birchall, 2011). [↑](#endnote-ref-26)
27. . This is an idea expressed by the term ‘filter bubble’, which was coined by the Internet activist Eli Pariser in 2011 but has only recently entered popular usage following the 2016 U.S. presidential election. There is something of this pacifying, inwards-facing aspect to search results contained in the word ‘Backrub’, the original name for ‘Google’. [↑](#endnote-ref-27)
28. . Cloud Computing, describes a shift in thinking about computing as a product to the delivery of a service, using the Web to deliver applications, like word processors, that would previously have been on a PC. In the reports of the European Commission-funded initiatives RESERVOIR and IRMOS, which established the technical infrastructures for Cloud Computing in 2008, Cloud Computing is described as analogous to utilities services such as electricity or telephony (see European Commission, 2010, 2011). [↑](#endnote-ref-28)
29. . Something of this can be identified in the literature around hypertext fiction. For example, N Katherine Hayles has argued that Memmett’s *Lexia to Perplexia* emphasizes the way in which user’s are structured through their interaction with the text, becoming ‘simulations’ which ‘operate according to the dynamics and protocols of the medium through which they are constituted’ (Hayles, 2002: 49). In this respect, Hayles is influenced by Espen Aarseth’s work on the alternative category of ‘cybertext’, which downplayed narratives of freedom and autonomy in favour of a rule-based logic derived from a fundamentally computational perspective (see Aarseth, 1997). The work of Aarseth (as well as that of Michael Heim, who also questioned the extent to which the hypertext reader experiences a sense of active agency) has been extensively critiqued by Landow (Landow, 2006: 46, 126, 250-3, and 325-30).

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