

A Peer-Reviewed Journal About POST-DIGITAL RESEARCH

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EDITORIAL

POSTDIGITAL RESEARCH

**Christian Ulrik Andersen,
Geoff Cox, Georgios Papadopoulos**

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'Post-digital Research' is the outcome of an extensive peer process. In August 2013 a number of researchers responded to an open call to participate in a research/Ph.D workshop organized by Aarhus University and transmediale, Berlin. In advance of meeting, each participant prepared a short text addressing the notion of the post-digital, posted it online and commented upon each others' contributions (postdigital.projects.cavi.dk). The group then met at Kunsthal Aarhus in October, where they — in an ongoing peer-review process — presented, critiqued and further developed their writings. This included the invention of a common working definition of the post-digital:

Post-digital, once understood as a critical reflection of "digital" aesthetic immaterialism, now describes the messy and paradoxical condition of art and media after digital technology revolutions. "Post-digital" neither recognizes the distinction between "old" and "new" media, nor ideological affirmation of the one or the other. It merges "old" and "new", often applying network cultural experimentation to analog technologies which it re-investigates and re-uses. It tends to focus on the experiential rather than the conceptual. It looks for DIY agency outside totalitarian innovation ideology, and for networking off big data capitalism. At the same time, it already has become commercialized.

Following this, the current issue of *A Peer-reviewed Newspaper* (Volume 3 Issue 1), and the current issue of *A Peer-reviewed Journal About Post-digital Research* (Volume 3 issue 1) have been developed. The peer-reviewed newspaper was developed as a 'sprint', where the group decided to rewrite their contributions using a set of constraints.

Building on shared impressions of the post-digital, a common vocabulary was developed that included a list of words considered good to use in their writings (those words that were shared), alongside a list of those that were considered taboo (words that only had a single instance). Over the course of two days, all articles were rewritten and made more concise, and in addition a script was developed to analyse how each text compared to the common working definition of the post-digital (written by Florian Cramer). Another script (written by James Charlton) analysed all submitted images and compared them to the average of all images (displayed overleaf).

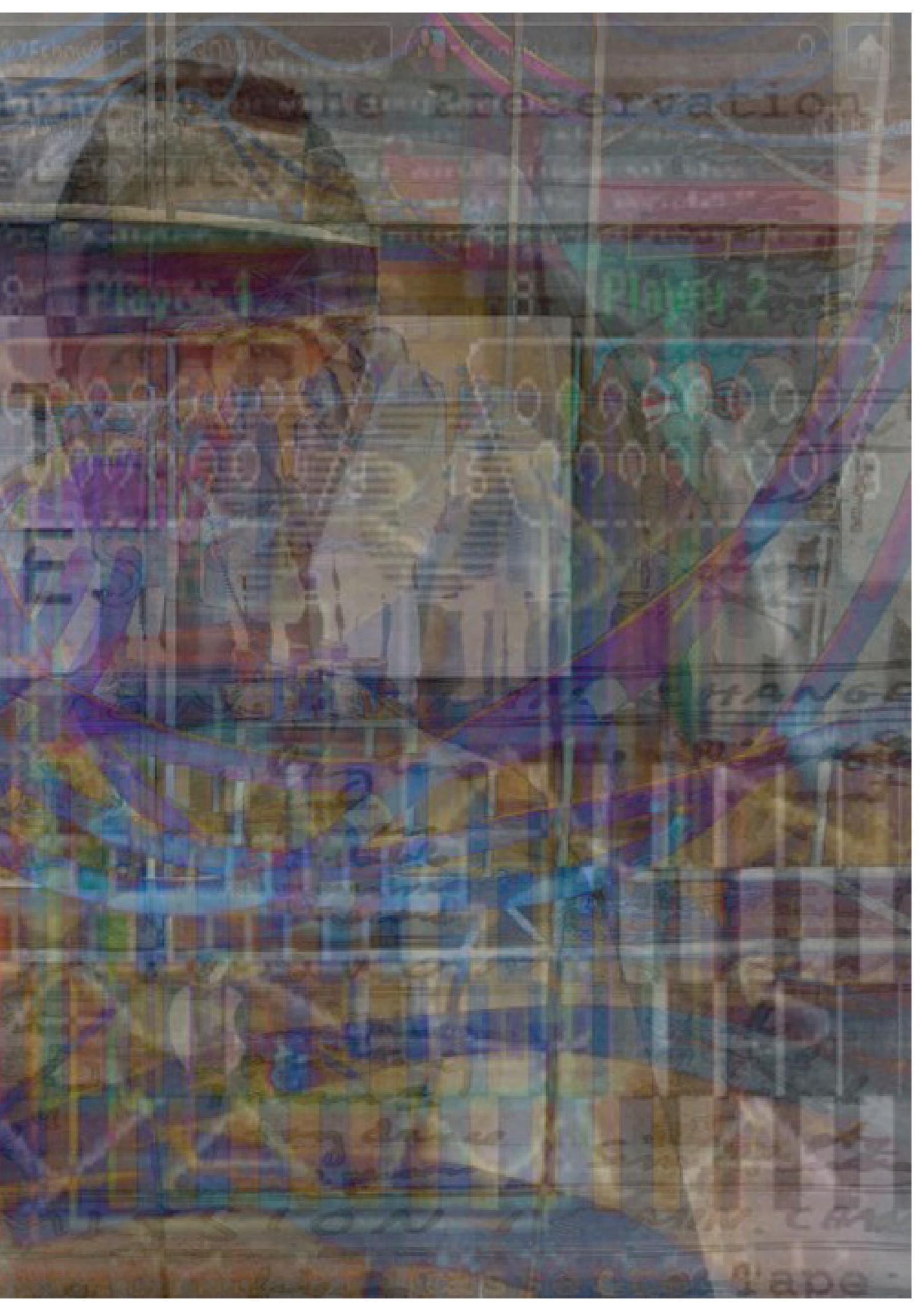
Whereas the newspaper reflects the post-digital in relation to the changing conditions of research in 'the afterglow' of a digital revolution (related to the thematic framework of transmediale 2014, entitled "Afterglow"), the peer-reviewed journal further reflects the developed arguments of the participants' research in a lengthier academic format.

Although in many ways the post-digital "sucks but is useful" as Florian Cramer notes in his article, the journal takes it to be a serious concept that deserves our critical attention. The journal issue is divided into three sections, that address the term itself, its genealogy and wider connotations, as well as its potential usefulness across different fields (including art, acoustics, aesthetic theory, political economy and philosophy). Given that the term comes from practice, it also addresses how the post-digital potentially operates as a framework for practice-based research that relate to material and historical conditions. As part of this, the journal includes a commissioned artwork, *Psychoacademic dérive* by Christophe Bruno, to make comment on the political economy of academic citation.

Aarhus, February 2014

Overleaf: All images combined.





The Reservation

Physical

T
E

CHANGE

Tape

THE POST-DIGITAL CONDITION

Florian Cramer

WHAT IS 'POST-DIGITAL'?

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Typewriters vs. imageboard memes



Figure 1: “You’re not a real hipster – until you take your typewriter to the park.”

In January 2013, a picture of a young man typing on a mechanical typewriter while sitting on a park bench went ‘viral’ on the popular website Reddit. The image was presented in the typical style of an ‘image macro’ or ‘imageboard meme’ (Klok 16-19), with a sarcastic caption in bold white Impact typeface that read: “You’re not a real hipster — until you take your typewriter to the park”.

The meme, which was still making news at the time of writing this paper in late 2013 (Hermlin), nicely illustrates the rift between ‘digital’ and ‘post-digital’ cultures. Imageboard memes are arguably the best example of a contemporary popular mass culture which emerged and developed entirely on the Internet. Unlike earlier popular

forms of visual culture such as comic strips, they are anonymous creations — and as such, even gave birth to the now-famous Anonymous movement, as described by (Klok 16-19). Other important characteristics of imageboard memes are: creation by users, disregard of intellectual property, viral dissemination among users, and potentially infinite repurposing and variation (through collage or by changing the text). As low-resolution images with small file sizes, they can be created and disseminated almost instantly, in contrast with the much slower creation, editing and distribution processes characteristic of traditional publishing media.

The ‘digital’ imageboard meme portrays the ‘analog’ typewriter hipster as its own polar opposite — in a strictly technical sense however, even a mechanical typewriter is a digital writing system, as I will explain later in this text. also, the typewriter’s keyboard makes it a direct precursor of today’s personal computer systems, which were used for typing the text of the imageboard meme in question. Yet in a colloquial sense, the typewriter is definitely an ‘analog’ machine, as it does not contain any computational electronics.

In 2013, using a mechanical typewriter rather than a mobile computing device is, as the imageboard meme suggests, no longer a sign of being old-fashioned. It is instead a deliberate choice of renouncing electronic technology, thereby calling into question the common assumption that computers, as meta-machines, represent obvious technological progress and therefore constitute a logical upgrade from any older media technology — much in the same way as using a bike today calls into question the common assumption, in many Western countries since World War II, that the automobile is by definition a rationally superior means of transportation, regardless of the purpose or context.

Typewriters are not the only media which have recently been resurrected as literally post-digital devices: other examples include vinyl records, and more recently also audio cassettes, as well as analog photography and artists' printmaking. And if one examines the work of contemporary young artists and designers, including art school students, it is obvious that these 'old' media are vastly more popular than, say, making imageboard memes.[1]

Post-digital: a term that sucks but is useful

1. DISENCHANTMENT WITH 'DIGITAL'

I was first introduced to the term 'post-digital' in 2007 by my then-student Marc Chia — now Tara Transitory, also performing under the moniker *One Man Nation*. My first reflex was to dismiss the whole concept as irrelevant in an age of cultural, social and economic upheavals driven to a large extent by computational digital technology. Today, in the age of ubiquitous mobile devices, drone wars and the gargantuan data operations of the NSA, Google and other global players, the term may seem even more questionable than it did in 2007: as either a sign of ignorance of our contemporary reality, or else of some deliberate Thoreauvian-Luddite withdrawal from this reality.

More pragmatically, the term 'post-digital' can be used to describe either a contemporary disenchantment with digital information systems and media gadgets, or a period in which our fascination with these systems and gadgets has become historical — just like the dot-com age ultimately became historical in the 2013 novels of Thomas Pynchon and Dave Eggers. After Edward Snowden's disclosures of the NSA's

all-pervasive digital surveillance systems, this disenchantment has quickly grown from a niche 'hipster' phenomenon to a mainstream position — one which is likely to have a serious impact on all cultural and business practices based on networked electronic devices and Internet services.

2. REVIVAL OF 'OLD' MEDIA

While a Thoreauvian-Luddite digital withdrawal may seem a tempting option for many, it is fundamentally a naïve position, particularly in an age when even the availability of natural resources depends on global computational logistics, and intelligence agencies such as the NSA intercept paper mail as well as digital communications. In the context of the arts, such a withdrawal seems little more than a rerun of the 19th-century Arts and Crafts movement, with its programme of handmade production as a means of resistance to encroaching industrialisation. Such (romanticist) attitudes undeniably play an important role in today's renaissance of artists' printmaking, handmade film labs, limited vinyl editions, the rebirth of the audio cassette, mechanical typewriters, analog cameras and analog synthesisers. An empirical study conducted by our research centre Creating 010 in Rotterdam among Bachelor students from most of the art schools in the Netherlands indicated that contemporary young artists and designers clearly prefer working with non-electronic media: given the choice, some 70% of them "would rather design a poster than a website" (Van Meer, 14). In the Netherlands at least, education programmes for digital communication design have almost completely shifted from art academies to engineering schools, while digital media are often dismissed as commercial and mainstream by art students (Van Meer, 5). Should we in turn dismiss their position as romanticist and neo-Luddite?

Post-what?

POST-DIGITAL = POSTCOLONIAL; POST-DIGITAL ≠ POST-HISTOIRE

On closer inspection however, the dichotomy between digital big data and neo-analog do-it-yourself (DIY) is really not so clear-cut. Accordingly, 'post-digital' is arguably more than just a sloppy descriptor for a contemporary (and possibly nostalgic) cultural trend. It is an objective fact that the age in which we now live is *not* a post-digital age, neither in terms of technological developments — with no end in sight to the trend towards further digitisation and computerisation — nor from a historico-philosophical perspective. Regarding the latter, Cox offers a valid critique of the “periodising logic” embedded in the term 'post-digital', which places it in the dubious company of other historico-philosophical 'post'-isms, from postmodernism to post-histoire.

However, 'post-digital' can be defined more pragmatically and meaningfully within popular cultural and colloquial frames of reference. This applies to the prefix 'post' as well as the notion of 'digital'. The prefix 'post' should not be understood here in the same sense as postmodernism and post-histoire, but rather in the sense of post-punk (a continuation of punk culture in ways which are somehow still punk, yet also beyond punk); post-communism (as the ongoing social-political reality in former Eastern Bloc countries); post-feminism (as a critically revised continuation of feminism, with blurry boundaries with 'traditional', unprefixated feminism); postcolonialism (see next paragraph); and, to a lesser extent, post-apocalyptic (a world in which the apocalypse is not over, but has progressed from a discrete breaking point to an ongoing condition — in Heideggerian terms, from *Ereignis* to *Being* — and with a contemporary popular



Figure 2: Popular take-away restaurant in Rotterdam, echoing an episode from 19th-century Dutch colonial history, when members of the Chinese minority living in Java (Indonesia, then a Dutch colony) were brought as contract workers to a government-run plantation in Suriname, another Dutch colony.

iconography pioneered by the *Mad Max* films in the 1980s).

None of these terms — post-punk, post-communism, post-feminism, post-colonialism, post-apocalyptic — can be understood in a purely Hegelian sense of an inevitable linear progression of cultural and intellectual history. Rather, they describe more subtle cultural shifts and ongoing mutations. Postcolonialism does not in any way mean an end of colonialism (akin to Hegel's and Fukuyama's “end of history”), but rather its mutation into new power structures, less obvious but no less pervasive, which have a profound and lasting impact on languages and cultures, and most significantly continue to govern geopolitics and global production chains. In this sense, the post-digital condition is a post-apocalyptic one: the state of affairs after the initial upheaval caused by the computerisation and global digital networking of communication, technical infrastructures, markets and geopolitics.

'DIGITAL' = STERILE HIGH TECH?

Also, the 'digital' in 'post-digital' should not be understood in any technical-scientific or media-theoretical sense, but rather in the way the term is broadly used in popular culture — the kind of connotation best illustrated by a recent Google Image Search result for the word 'digital':

The first thing we notice is how the term 'digital' is, still in 2013, visually associated with the colour blue. Blue is literally the

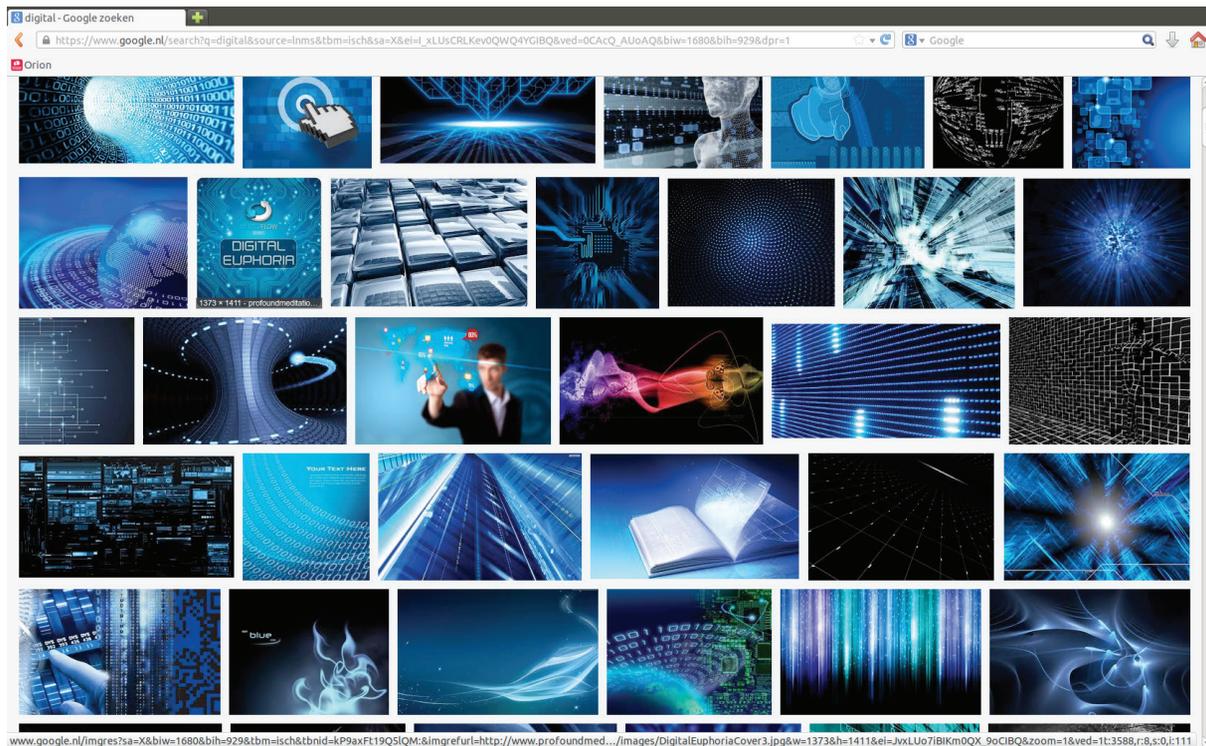


Figure 3: Figure 3. Google.nl image search result for 'digital', October 2013.

coolest colour in the colour spectrum (with a temperature of 15,000 to 27,000 Kelvin), with further suggestions of cultural coolness and cleanness. The simplest definition of 'post-digital' describes a media aesthetics which opposes such digital high-tech and high-fidelity cleanness. The term was coined in 2000 by the musician Kim Cascone, in the context of glitch aesthetics in contemporary electronic music (Cascone, 12). Also in 2000, the Australian sound and media artist Ian Andrews used the term more broadly as part of a concept of "post-digital aesthetics" which rejected the "idea of digital progress" as well as "a teleological movement toward 'perfect' representation" (Andrews).

Cascone and Andrews considered the notion of 'post-digital' primarily as an antidote to techno-Hegelianism. The underlying context for both their papers was a culture of audio-visual production in which 'digital' had long been synonymous with 'progress': the launch of the Fairlight CMI audio sampler in 1979, the digital audio CD and the MIDI standard (both in 1982), software-only digital audio workstations in the early 1990s,

real-time programmable software synthesis with Max/MSP in 1997. Such teleologies are still prevalent in video and TV technology, with the ongoing transitions from SD to HD and 4K, from DVD to BluRay, from 2D to 3D — always marketed with a similar narrative of innovation, improvement, and higher fidelity of reproduction. In rejecting this narrative, Cascone and Andrews opposed the paradigm of technical quality altogether.

Ironically, the use of the term 'post-digital' was somewhat confusing in the context of Cascone's paper, since the glitch music defined and advocated here actually was digital, and even based on specifically digital sound-processing artefacts. On the other hand, and in the same sense as post-punk can be seen as a reaction to punk, Cascone's concept of 'post-digital' may best be understood as a reaction to an age in which even camera tripods are being labelled as 'digital', in an effort to market them as new and superior technology.



Figure 4: 'Digital' camera tripod.

'DIGITAL' = LOW-QUALITY TRASH?

There is a peculiar overlap between on one hand a post-digital rejection of digital high tech, and on the other hand a post-digital rejection of digital low quality. Consider for example the persisting argument that vinyl LPs sound better than CDs (let alone MP3s); that film photography looks better than digital photography (let alone smartphone snapshots); that 35mm film projection looks better than digital cinema projection (let alone BitTorrent video downloads or YouTube); that paper books are a richer medium than websites and e-books; and that something typed on a mechanical typewriter has more value than a throwaway digital text file (let alone e-mail spam). In fact, the glitch aesthetics advocated by Cascone as 'post-digital' are precisely the same kind of digital trash dismissed by 'post-digital' vinyl listeners.

Digression: what is digital, what is analog?

DIGITAL ≠ BINARY; DIGITAL ≠ ELECTRONIC

From a strictly technological or scientific point of view, Cascone's use of the word 'digital' was inaccurate. This also applies to most of what is commonly known as 'digital art', 'digital media' and 'digital humanities'. Something can very well be 'digital' without being electronic, and without involving binary zeroes and ones. It does not even have to be related in any way to electronic computers or any other kind of computational device.

Conversely, 'analog' does not necessarily mean non-computational or pre-computational. There are also analog computers. Using water and two measuring cups to compute additions and subtractions — of quantities that can't be counted exactly — is a simple example of analog computing.

'Digital' simply means that something is divided into discrete, countable units — countable using whatever system one chooses, whether zeroes and ones, decimal numbers, tally marks on a scrap of paper, or the fingers (digits) of one's hand — which is where the word 'digital' comes from in the first place; in French, for example, the word is 'numérique'. Consequently, the Roman alphabet is a digital system; the movable types of Gutenberg's printing press constitute a digital system; the keys of a piano are a digital system; Western musical notation is mostly digital, with the exception of instructions with non-discrete values such as *adagio*, *piano*, *forte*, *legato*, *portamento*, *tremolo* and *glissando*. Floor mosaics made of monochrome tiles are digitally composed images. As all these examples demonstrate, 'digital' information never exists in a perfect form, but is instead an idealised abstraction of physical matter which, by its material nature and the

laws of physics, has chaotic properties and often ambiguous states.[2]

The hipster's mechanical typewriter, with its discrete set of letters, numbers and punctuation marks, is therefore a 'digital' system as defined by information science and analytic philosophy (Goodman, 161). However, it is also 'analog' in the colloquial sense of the word. This is also the underlying connotation in the meme image, with its mocking of 'hipster' retro culture. An art curator, on the other hand, might consider the typewriter a 'post-digital' medium.

Analog = undivided; analog ≠ non-computational

Conversely, 'analog' means that the information has not been chopped up into discrete, countable units, but instead consists of one or more signals which vary on a continuous scale, such as a sound wave, a light wave, a magnetic field (for example on an audio tape, but also on a computer hard disk), the flow of electricity in any circuit including a computer chip, or a gradual transition between colours, for example in blended paint. (Goodman, 160) therefore defines analog as "undifferentiated in the extreme" and "the very antithesis of a notational system".

The fingerboard of a violin is analog: it is fretless, and thus undivided and continuous. The fingerboard of a guitar, on the other hand, is digital: it is divided by frets into discrete notes. What is commonly called 'analog' cinema film is actually a digital-analog hybrid: the film emulsion is analog, since its particles are undifferentiated blobs ordered organically and chaotically, and thus not reliably countable in the way that pixels are. The combined frames of the film strip, however, are digital since they are discrete, chopped up and unambiguously countable.

The structure of an analog signal is determined entirely by its correspondence (analogy) with the original physical phenomenon which it mimics. In the case of the photographic emulsion, the distribution of the otherwise chaotic particles corresponds to the distribution of light rays which make up an image visible to the human eye. On the audio tape, the fluctuations in magnetisation of the otherwise chaotic iron or chrome particles correspond to fluctuations in the sound wave which it reproduces.

However, the concept of 'post-digital' as defined by Cascone ignored such technical-scientific definitions of 'analog' and 'digital' in favour of a purely colloquial understanding of these terms.

Post-digital = against the universal machine

Proponents of 'post-digital' attitudes may reject digital technology as either sterile high tech or low-fidelity trash. In both cases, they dismiss the idea of digital processing as the sole universal all-purpose form of information processing. Consequently, they also dismiss the notion of the computer as the universal machine, and the notion of digital computational devices as all-purpose media.

Prior to its broad application in audio-visual signal processing and as the core engine of mass-media consumer technology, computation had been used primarily as a means of audio-visual composition. For example, Philips ran a studio for contemporary electronic music in the 1950s, before co-developing the audio CD in the early 1980s. By this time, audio-visual computing had shifted from being primarily a means of production, to a means of reproduction. Conversely, Cascone's 'post-digital' resistance to digital high-tech reproduction echoed older forms of

resistance to formalist, mathematically-driven narratives of progress in music production and composition — particularly the opposition to serialist composition in 20th-century contemporary music, which began with John Cage, continued with the early minimal music of La Monte Young and Terry Riley, and was further developed by improvisation/composition collectives such as AMM, Musica Elettronica Viva and Cornelius Cardew's Scratch Orchestra. After all, the serialism of Stockhausen, Boulez and their contemporaries was 'digital' in the most literal sense of the word: it broke down all parameters of musical composition into computable values which could then be processed by means of numerical transformations.

Yet most serialist music was not electronic, but composed with pen and paper and performed by orchestras. This demonstrates once again a crucial issue: unlike the colloquial meaning of the term 'digital' as commonly used in the arts and humanities, the technical-scientific notion of 'digital' can, paradoxically enough, be used to describe devices which would be considered 'analog' or 'post-digital' in the arts and humanities.

What, then, is 'post-digital'?

(The following is an attempt to recapitulate and order some observations which I have formulated in previous publications.[3])

POST-DIGITAL = POST-DIGITISATION

Returning to Cascone and Andrews, but also to post-punk, postcolonialism and Mad Max, the term 'post-digital' in its simplest sense describes the messy state of media, arts and design *after* their digitisation (or at least the digitisation of crucial aspects of the

channels through which they are communicated). Sentiments of disenchantment and scepticism may also be part of the equation, though this need not necessarily be the case — sometimes, 'post-digital' can in fact mean the exact opposite. Contemporary visual art, for example, is only slowly starting to accept practitioners of net art as regular contemporary artists — and then again, preferably those like Cory Arcangel whose work is white cube-compatible. Yet its discourse and networking practices have been profoundly transformed by digital media such as the e-flux mailing list, art blogs and the electronic *e-flux* journal. In terms of circulation, power and influence, these media have largely superseded printed art periodicals, at least as far as the art system's in-crowd of artists and curators is concerned. Likewise, when printed newspapers shift their emphasis from daily news (which can be found quicker and cheaper on the Internet) to investigative journalism and commentary — like *The Guardian's* coverage of the NSA's PRISM programme — they effectively transform themselves into post-digital or post-digitisation media.

POST-DIGITAL = ANTI-'NEW MEDIA'

'Post-digital' thus refers to a state in which the disruption brought upon by digital information technology has already occurred. This can mean, as it did for Cascone, that this technology is no longer perceived as disruptive. Consequently, 'post-digital' stands in direct opposition to the very notion of 'new media'. At the same time, as its negative mirror image, it exposes — arguably even deconstructs — the latter's hidden teleology: when the term 'post-digital' draws critical reactions focusing on the dubious historico-philosophical connotations of the prefix 'post', one cannot help but wonder about a previous lack of such critical thinking regarding the older (yet no less Hegelian) term 'new media'.

POST-DIGITAL = HYBRIDS OF 'OLD' AND 'NEW' MEDIA

'Post-digital' describes a perspective on digital information technology which no longer focuses on technical innovation or improvement, but instead rejects the kind of techno-positivist innovation narratives exemplified by media such as *Wired* magazine, Ray Kurzweil's Google-sponsored 'singularity' movement, and of course Silicon Valley. Consequently, 'post-digital' eradicates the distinction between 'old' and 'new' media, in theory as well as in practice. Kenneth Goldsmith notes that his students "mix oil paint while Photoshopping and scour flea markets for vintage vinyl while listening to their iPods" (Goldsmith, 226). Working at an art school, I observe the same. Young artists and designers choose media for their own particular material aesthetic qualities (including artefacts), regardless of whether these are a result of analog material properties or of digital processing. Lo-fi imperfections are embraced — the digital glitch and jitter of Cascone's music along with the grain, dust, scratches and hiss in analog reproduction — as a form of practical exploration and research that examines materials through their imperfections and malfunctions. It is a post-digital hacker attitude of taking systems apart and using them in ways which subvert the original intention of the design.

POST-DIGITAL = RETRO?

No doubt, there is a great deal of overlap between on one hand post-digital mimeograph printmaking, audio cassette production, mechanical typewriter experimentation and vinyl DJing, and on the other hand various hipster-retro media trends — including digital simulations of analog lo-fi in popular smartphone apps such as Instagram, Hipstamatic and iSupr8. But there is a qualitative difference between simply using superficial and stereotypical ready-made effects, and the



Figure 5: Cassette Store Day: 2013 twist on Record Store Day.

thorough discipline and study required to make true 'vintage' media work, driven by a desire for non-formulaic aesthetics.

Still, such practices can only be meaningfully called 'post-digital' when they do not merely revive older media technologies, but functionally repurpose them in relation to digital media technologies: zines that become anti-blogs or non-blogs, vinyl as anti-CD, cassette tapes as anti-MP3, analog film as anti-video.

Post-digital = 'old' media used like 'new media'

At the same time, new ethical and cultural conventions which became mainstream with Internet communities and Open Source culture are being retroactively applied to the making of non-digital and post-digital media products. A good example of this are collaborative zine conventions, a thriving subculture documented on the blog fanzines.tumblr.com and elsewhere. These events, where people come together to collectively create and exchange zines (i.e. small-circulation, self-published magazines, usually focusing on the maker's cultural and/or political areas of interest), are in fact the exact opposite of the 'golden age' zine cultures of

the post-punk 1980s and 1990s, when most zines were the hyper-individualistic product and personality platforms of one single maker. If we were to describe a contemporary zine fair or mimeography community art space using Lev Manovich's *new media* taxonomy of 'Numerical Representation', 'Modularity', 'Automation', 'Variability' and 'Transcoding' (Manovich, *The Language of New Media*, 27-48), then 'Modularity', 'Variability' and — in a more loosely metaphorical sense — 'Transcoding' would still apply to the contemporary cultures working with these 'old' media. In these cases, the term 'post-digital' usefully describes 'new media'-cultural approaches to working with so-called 'old media'.

DIY vs. corporate media, rather than 'new' vs. 'old' media

When hacker-style and community-centric working methods are no longer specific to 'digital' culture (since they are now just as likely to be found at an 'analog' zine fair as in a 'digital' computer lab), then the established dichotomy of 'old' and 'new' media — as synonymous in practice with 'analog' and 'digital' — becomes obsolete, making way for a new differentiation: one between shrink-wrapped culture and do-it-yourself culture. The best example of this development (at least among mainstream media) is surely the magazine and website *Make*, published by O'Reilly since 2005, and instrumental for the foundation of the contemporary 'maker movement'. *Make* covers 3D printing, Arduino hardware hacking, fab lab technology, as well as classical DIY and crafts, and hybrids between various 'new' and 'old' technologies.

The 1990s / early 2000s assumption that 'old' mass media such as newspapers, movies, television and radio are corporate, while 'new media' such as websites are DIY, is no longer true now that user-generated content has been co-opted into corporate social media and mobile apps. The Internet as a self-run alternative space — central to many online activist and artist projects, from *The Thing* onwards — is no longer taken for granted by anyone born after 1990: for younger generations, the Internet is associated mainly with corporate, registration-only services.[4]

Semiotic shift to the indexical

The 'maker movement' — as manifested in fab labs, but also at zine fairs — represents a shift from the symbolic, as the preferred semiotic mode of digital systems (and of which the login is the perfect example), toward the indexical: from code to traces, and from text to context. 1980s post-punk zines, for example, resembled the art manifestos of the 1920s Berlin Dadaists, while 1980s Super 8 films, made in the context of the *Cinema of Transgression* and other post-punk movements, proposed underground narratives as an alternative to mainstream cinema. The majority of today's zines and experimental Super 8 films, however, tend to focus less on content and more on pure materiality, so that the medium, such as paper or celluloid, is indeed the message — a shift from semantics to pragmatics, and from metaphysics to ontology.[5]

Technically, there is no such thing as ‘digital media’ or ‘digital aesthetics’

Media, in the technical sense of storage, transmission, computation and display devices, are always analog. The electricity in a computer chip is analog, as its voltage can have arbitrary, undifferentiated values within a specific range, just like a fretless violin string. Only through filtering can one make a certain sub-range of high voltages correspond to a ‘zero’ and another sub-range of low voltages to a ‘one’. Hardware defects can cause bits to flip, turning zeroes into ones and vice-versa. Also, the sound waves produced by a sound card and a speaker are analog, etc. This is what (Kittler, 81-90) refers to, somewhat opaquely, when he argues that in computing “there is no software”. An LCD screen is a hybrid digital-analog system: its display is made of discrete, countable, single pixels, but the light emitted by these pixels can be measured on an analog continuum. Consequently, there is no such thing as digital media, only digital or digitised information: chopped-up numbers, letters, symbols and any other abstracted units, as opposed to continuous, wave-like signals such as physical sounds and visible light. Most ‘digital media’ devices are in fact analog-to-digital-to-analog converters: an MP3 player with a touchscreen interface for example, takes analog, non-discrete gesture input and translates it into binary control instructions which in turn trigger the computational information processing of a digital file, ultimately decoding it into an analog electrical signal which another analog device, the electromagnetic mechanism of a speaker or headphone, turns into analog sound waves. The same principle applies to almost any so-called digital media device, from a photo or video

camera to an unmanned military drone. Our senses can only perceive information in the form of non-discrete signals such as sound or light waves. Therefore, anything aesthetic (in the literal sense of *aisthesis*, perception) is, by strict technical definition, analog.

DIGITAL = ANALOG = POST-DIGITAL...?

A ‘digital artwork’ based on the strictly technical definition of ‘digital’ would most likely be considered ‘post-digital’ or even ‘retro analog’ by art curators and humanities scholars: for example, stone mosaic floors made from Internet imageboard memes, mechanical typewriter installations,[6] countdown loops running in Super 8 or 16mm film projection, but also computer installations exposing the indexicality of electrical currents running through circuits. The everyday colloquial definition of ‘digital’ embraces the fiction (or rather: the abstraction) of the disembodied nature of digital information processing. The colloquial use of ‘digital’ also tends to be metonymical, so that anything connected literally or figuratively to computational electronic devices — even a camera tripod — can nowadays be called ‘digital’. This notion, mainly cultivated by product marketing and advertising, has been unquestioningly adopted by the ‘digital humanities’ (as illustrated by the very term ‘digital humanities’). On the other hand, ‘post-digital’ art, design and media — whether or not they should technically be considered post-digital — challenge such uncritical notions of digitality, thus making up for what often amounts to a lack of scrutiny among ‘digital media’ critics and scholars.

Revisiting the typewriter hipster meme

The alleged typewriter hipster later turned out to be a writer who earned his livelihood by selling custom-written stories from a bench in the park. The imageboard meme photo was taken from an angle that left out his sign, taped to his typewriter case: “One-of-a-kind, unique stories while you wait”. In an article for the website *The Awl*, he recollects how the meme made him “An Object Of Internet Ridicule” and even open hatred.[7] Knowing the whole story, one can only conclude that his decision to bring a mechanical typewriter to the park was pragmatically the best option. Electronic equipment (a laptop with a printer) would have been cumbersome to set up, dependent on limited battery power, and prone to weather damage and theft, while handwriting would have been too slow, insufficiently legible, and lacking the appearance of a professional writer’s work.

Had he been an art student, even in a media arts programme, the typewriter would still have been the right choice for this project. This is a perfect example of a post-digital choice: using the technology most suitable to the job, rather than automatically ‘defaulting’ to the latest ‘new media’ device. It also illustrates the post-digital hybridity of ‘old’ and ‘new’ media, since the writer advertises (again, on the sign on his typewriter case) his Twitter account “@rovingtypist”, and conversely uses this account to promote his story-writing service. He has effectively repurposed the typewriter from a prepress tool to a personalised small press, thus giving the ‘old’ technology a new function usually associated with ‘new media’, by exploiting specific qualities of the ‘old’ which make up for the limitations of the ‘new’. Meanwhile, he also applies a ‘new media’ sensibility to his use of ‘old media’: user-customised



Figure 6: C.D. Hermlin, the alleged typewriter hipster.

products, created in a social environment, with a “donate what you can” payment model. Or rather, the dichotomy of community media vs. mass media has been flipped upside-down, so that a typewriter is now a community media device, while participatory websites have turned into the likes of *Reddit*, assuming the role of yellow press mass media — including mob hatred incited by wilful misrepresentation.

The desire for agency

Cascone and Andrews partly contradicted themselves when they defined the concept of ‘post-digital’ in the year 2000. Though they rejected the advocacy of ‘new media’, they also relied heavily on it. Cascone’s paper drew on Nicholas Negroponte’s *Wired* article “Beyond Digital” (Negroponte), while Ian Andrews’ paper referenced Lev Manovich’s “Generation Flash”, an article which promoted the very opposite of the analog/digital, retro/contemporary hybridisations currently associated with the term ‘post-digital’ (Manovich, “Generation Flash”). We could metaphorically describe post-digital cultures as postcolonial practices in a communications world taken over by a military-industrial complex made

up of only a handful of global players. More simply, we could describe these cultures as a rejection of such dystopian techno-utopias as Ray Kurzweil's and Google's Singularity University, the Quantified Self movement, and sensor-controlled 'Smart Cities'.

And yet, post-digital subculture, whether in Detroit, Rotterdam or elsewhere, is on a fundamental level not so different from such mainstream Silicon Valley utopias. For (Van Meer), the main reason why art students prefer designing posters to designing websites is due to a fiction of agency — in this case, an illusion of more control over the medium. Likewise, 'digital' cultures are driven by similar illusions of free will and individual empowerment. The Quantified Self movement, for example, is based on a fiction of agency over one's own body. The entire concept of DIY, whether non-digital, digital or post-digital, is based on the fiction of agency implied by the very notion of the self-made.

Each of these fictions of agency represents one extreme in how individuals relate to the techno-political and economic realities of our time: either over-identification with systems, or rejection of these same systems. Each of these extremes is, in its own way, symptomatic of a *systems crisis* — not a crisis of this or that system, but rather a crisis of the very paradigm of 'system', as defined by General Systems Theory, itself an offshoot of cybernetics. A term such as "post-Snowden" describes only one (important) aspect of a bigger picture:[8] a crisis of the cybernetic notion of 'system' which neither 'digital' nor 'post-digital' — two terms ultimately rooted in systems theory — are able to leave behind, or even adequately describe.

Notes

[1] (Van Meer); also discussed later in this text.

[2] Even the piano (if considered a medium) is digital only to the degree that its keys implement abstractions of its analog-continuous strings.

[3] (Cramer, "Post-Digital Writing"), (Cramer, "Post-Digital Aesthetics").

[4] In a project on Open Source culture organised by Aymeric Mansoux with Bachelor-level students from the Willem de Kooning Academy in Rotterdam, it turned out that many students believed that website user account registration was a general feature and requirement of the Internet.

[5] It's debatable to which degree this reflects the influence of non-Western, particularly Japanese (popular) culture on contemporary Western visual culture, especially in the field of illustration — which accounts for an important share of contemporary zine making. This influence is even more obvious in digital meme and imageboard culture.

[6] For example (and six years prior to the typewriter hipster meme), Linda Hilfling's contribution to the exhibition MAKEDO at V2_, Rotterdam, June 29-30, 2007.

[7] Hermlin writes: "Someone with the user handle 'S2011' summed up the thoughts of the hive mind in 7 words: 'Get the fuck out of my city.' Illmatic707 chimed in: I have never wanted to fist fight someone so badly in my entire life."

[8] A term frequently used at the Chaos Computer Club's 30th Chaos Communication Congress in Hamburg, December 2013, and also very recently by Gurstein.

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Eric Snodgrass

**DUSK TO DAWN:
HORIZONS OF THE
DIGITAL/POST-DIGITAL**

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Blue – the most popular color on the Internet

The equipment-free aspect of reality here has become the height of artifice; the sight of immediate reality has become a blue flower in the land of technology.”

(Walter Benjamin, “The Work of Art in the Age of Mechanical Reproducibility” 35)

Consider the blue flower. Its cold, unnatural luminescence. Its role in the German tradition of Novalis et al as absorptive placeholder for romantic longings, prop and stand-in for a striving towards an ungraspable, infinite beyond. A call to the horizon. Its relative rarity in nature and sense of otherworldliness. How in pure sunlight blue fades and thus the blue flower’s preferred habitat in the threshold moments of dusk and dawn, when it is possible to observe the Purkinje effect, the temporary shifting of the processing of colour perception from the central cones of the fovea to the more sensitive rods of the retina’s periphery, the disappearing sunlight slowly draining warmer, long wavelength colours of their lustre while giving the cooler, shorter bands of the spectrum a heightened luminosity in the moody twilit hues of what is known as “the blue hour.”

And what of a certain strand of colour-informed anthropocentrism? The marked craving within some cultures for more fully saturated colours which the “meagrely endowed” (Finlay 402) natural palette of this planet’s bounty of less vivid browns and greens seemingly fails to satisfy. The way in which such a craving finds expression via an ongoing supplementation of this seeming lack in the form of an ever increasing synthetic range of often strikingly saturated man-made

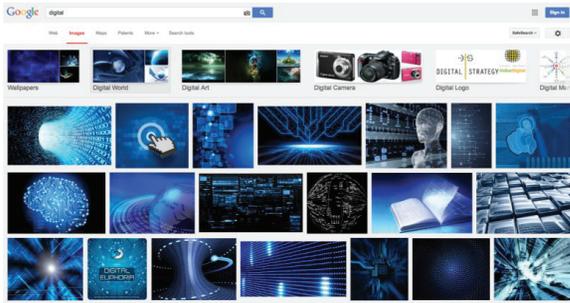
colours, each trying to catch the eye of the second sun that is the human visual cortex in ever more heliotropic stimulation.

How in the age of “digital media” and the internet, it would seem that a certain blue luminosity has never been far from reach. Since the days of the very first hyperlinks, blue as the underlining signifier and promise of further horizons of interaction. Those many synthetic blues of technology. Chroma key blue, signifier of a world predestined for post-production. The post-crash blue screen of death. The default “Bliss” wallpaper of Windows XP, one of the most widely embedded images of the digital age, with its pacifying blue-green pastoral... ah, the supreme flattery of Graphical User Interfaces and this particularly memorable “topography of pure departure” (Harpold 239). A fig leaf of an image.

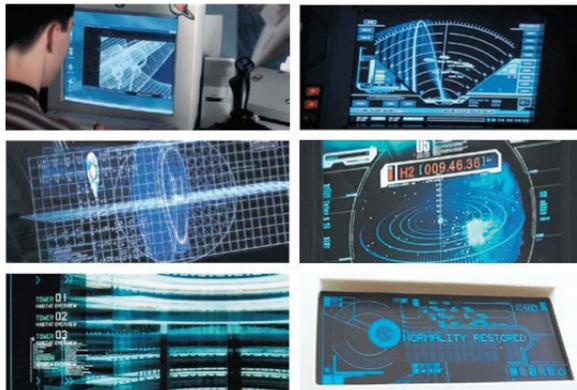
Tech logo blue. Facebook blue. Soothing, corporate IBM deep blue. The chirpy, social pastel of Twitter blue and the vaguely translucent gradients of iOS 7 blue. A showy blue LED. The engineer’s metonymical accentuation, asserting a certain “technology-ness of technology” (Shedroff and Noessel 43). Blue, blinking Bluetooth, blue. Saturated glow of the digital and its attention economy. Ethereal stimulant and banal sedative. Blue pill.

So many blue avatars of the digital, flowering all around, each striving both to stand out and still fit in at the same time. Such is the seeming ubiquity of blue in the land of technology today and this little prelude is intended simply to give a sense of how it can be seen to serve as an “index of the zeitgeist” (Jameson 69), a signifier of the viscous spread of the the digital, its ubiquity and sense of givenness. A blue digital banality to which the post-digital might partly be a reaction towards.

As digitally inflected practices and technology become further diffused and



Google image search for 'digital' (11 Nov 2013).



Future screens are mostly blue' – from Shedroff and Noessel's (41-2) study of computing interfaces in sci-fi films and television. The histograms on the right 'were made by selecting representative images for each screen-based interface in the survey, filtering out noninterface elements in the scene, aggregating them into a single image, and running a Photoshop analysis on the result.'



Shedroff and Noessel (41-2).

hybridised, there is a way in which it does become, in some senses, increasingly difficult to isolate or differentiate between digital and non-digital. Indeed, this paper will posit the contemporary situation as a kind of tipping point moment for the digital as a concept, one that, as a result of its many overlapping, oversaturated and seemingly ubiquitous modes of manifestation in the world, opens up a perceived need for a renewed engagement with the question of what the digital entails and for which a wedge term like post-digital might provide one such contextualising tool. As with the case of descriptions of colour, the question might be said to be in which context or modality does one want to develop a particular take or framework for filtering the very filter that is the digital? Indeed, while it is possible to provide a clear and critically helpful working definition for a potentially nebulous term like “the digital” (Cramer, “What is “Post-digital”?”), as it is also possible to begin to operate upon it in a philosophically rigorous yet expansive manner (Galloway), this paper will purposely embrace a more oblique take on digitality, in the belief that this simultaneously amorphous yet entirely banal, unthinking application of the term digital should be understood as a key part of its easily disseminated operating power and ubiquitous hold within contemporary culture. Given the technical definition of the digital as something that is divided into discrete, countable units, such a treatment of the digital might be seen as particularly egregiously construed. Nevertheless, it will be suggested that this very matter of fact yet elusive nature of the digital, its status as a kind of affective, theoretical “confound” such as Brian Massumi (174-5) speaks of, might be understood as being one of its defining modalities and also possibly a key symptom of any transitioning moves towards a condition or practice of the post-digital.

In this vein, one might already suggest an initial answer to the question of “why blue?” Given that, as Florian Cramer (“What is Post-digital?”) points out, the colloquial meaning of the digital is highly metonymical in nature, perhaps there is a similar metonymical quality to blue — everybody’s favourite colour — that makes it such a ready partner to the digital. The grasping, affective viscosity and fuzziness of each. The horizon that is blue and the promise that has been the digital. Also, their telling, liminal glow. Massumi (239): “It starts with the glow. Or the ‘too-’ of the blue.”

Blue Hours

*at dusk, it is the way the colour sinks
among us, not like dew but settling
dust or poisonous exhaust from all
the life burned up while we were busy
being other than ourselves.
(William Gass, “On Being Blue” 59)*

As a preformative affix that will lay waste to its stem, the prefix of post- can be seen as signifying a recognition (and even premediation) of collapse. Perhaps it is partly intended to mark out another site of “so many ontological cave-ins,” similar to that which Rosalind Krauss (290), in her essay “Reinventing the Medium,” speaks of in relation to photography’s saturation into mainstream, everyday ubiquity. Drawing on Walter Benjamin’s notion of the “outmoded” object, Krauss describes that particular moment of temporal limbo for a medium in which it takes on a status as outdated but not quite fossilised into what Hertz and Parikka call the “archaeological phase” of a product’s lifecycle (429). Krauss (295) christens this in-between phase “the twilight zone of obsolescence.” In such a zone the outmoded object may be seen to

cast what Benjamin (*Selected Writings* 209) describes as the “profane illumination” of its own afterlife, radiating an immanent and potentially critical afterglow, both on its own form and out at the various mythologies it once helped to project. By dint of its quality as impotent, denuded and ultimately discarded, the no longer valuable, outmoded object can for Benjamin (*The Arcades Project*, 466 [B1a, 4]) act as a powerful “anti-aphrodisiac,” a palette cleanser that unsettles the once highly entangled and mediated relationship with the object in question. In the case of a media object, its provisional status as medium — an apparatus with various well- or loosely-defined technical, social, aesthetic, material, economic, institutional, ideological and other factors that inform its everyday uses — the moment of obsolescence can be said to shed a certain light on these relations in the sense of their very disappearing into thin air, and noticeable, felt absence. One is reminded of Marshall McLuhan’s (24) vivid evocation of that transitory moment of visibility that occurs when a previously dominant mode of understanding is made obsolescent by a newly mediated form of understanding: “Just before an airplane breaks the sound barrier, sound waves become visible on the wings of the plane. The sudden visibility of sound just as sound ends is an apt instance of that pattern of being that reveals new and opposite forms just as the earlier forms reach their peak performance.” Death becomes the medium, technology, object.

“Death” here is the obsolescence, the subsidence or outright collapse of the relational vitality and sense of the mediated significance of the item under consideration, and a “blue hour” simply any instance in which a kind of temporal afterglow of this release from mediation is experienced. In their book *Life after New Media – Mediation as a Vital Process*, Sarah Kember and Joanna Zylińska (55) stress the importance of understanding

mediation as “primarily a temporal, multi-generational phenomenon, a process rather than a spatialized and spatializing object.” Thus a particular media form is for Kember and Zylinksa (67) a sustained instance of a temporary “fixing” or “stabilization” of the ordinary, emergent and ongoing “vital process” of mediation itself. In this sense we might understand the process of obsolescence as being a draining of the relational vitalities of a particular medium, a process that might also offer up an illuminating afterglow, in which the still felt absence of this vitality reminds us how, “Every medium thus carries within itself both the memory of mediation and the loss of mediations never to be actualized” (Kember and Zylinksa 21). Or, as Eric and Marshall McLuhan (227) define it, the obsolescence of a medium is characterised by the way in which it mobilises a shift towards an “awareness of ground as all potential.”

One potential in temporarily dwelling on such onsettings of obsolescence is for how they might prove conducive for tracing the contours of any particular condition of post-. Blue hours can be understood as providing a setting of relatively heightened atmospherics, in which mediation itself can be said to subtly flex the curvature of its horizon in a just noticeable fashion. At such moments, in such a zone, one might more readily make out some of the many blended rays that inform a given situation, with any kind of noticeable resistance in the overlapping ecologies involved potentially making certain aspects of such an encounter temporarily distinct and sensate.

As hinted at above, a blue hour of obsolescence might well be compared to the “afterglow” of this year’s Transmediale theme (Transmediale 2014), with its evocation of “the intense red glow of the atmosphere long after sunset (or long before sunrise), when most twilight colours should have disappeared. The *afterglow* is caused by dust in the

high stratosphere, which catches the hues of the twilight arch below the horizon.” One should of course tread carefully in the kind of dramatic theoretical scenes that evocative writers like Benjamin so tantalisingly set, but at the very least, one might be on the lookout for this particular scene of obsolescence, a transition period that might occasionally provide lucid, uncanny or prescient modes for perceiving the previously pervasive or oversaturated qualities of certain mediated entities in question, before these too eventually subside again as residue back into the more generic atmospherics of mediation, inevitably playing a role, large or small, in the various ecologies that designate visibility, mass, time, space, velocity, value.

Anamorphosis, or, the backwards glance

Blue hours such as these suggest an aspect of something that was always there, awaiting its release. A capacity for rebirth that something like obsolescence, in various guises, can act as thanatological ground for. Of particular interest from the perspective of how a notion of post-digital can be of conceptual and/or aesthetic use is how, in the kind of taking in of a blue hour of obsolescence described above, there is the potential for a relational and critical encounter. Just as the second acts of post-modernism or post-colonialism recast that which came before them in a renewed light, so too might an invocation of post-digital restage an encounter with the notion of digital that comes before it. This is the sense of a backwards glance that a blue hour and the first moments of recognition or response thereafter can release, an enactment of a looking-in-the-(rear-view)-mirror moment which the obsolete or post-digitally

renewed entity can set into motion.

In order to give a name to this evasive yet potentially emergent quality, one might draw from various discussions on anamorphosis, the optical technique of transposing a distorted projection within and according to the norms of the visual logic of linear perspective. In its most usual form, the anamorphic image requires that the viewer adopt a particular viewing angle or viewing device in order to reconstitute and better make out the enclosed anamorphic image (the iconic example of this technique being Hans Holbein the Younger's 1533 painting *The Ambassadors*). By virtue of its relatively common application in covertly enclosing memento mori ("remember that you will die") style death-related imagery, and as an embedded signifier of the workings of the media practice in question, anamorphosis can be understood here as a technique and concept that highlights the emergent potentials of obsolescence and post- via the way that it can hint at both the ephemerality and seeming limits of media practice, while also indicating towards other horizons, such as the seemingly innate capacity of images, objects, concepts and mediation itself to escape again one's ability to grasp, let alone unify, their dynamic potentialities.

In its extending of the rules of linear perspective towards seemingly quirky or absurd effects, anamorphosis is "a continual reminder of the astonishing and artificial elements in perspective" (Baltrušaitis 2). By dint of its very excessive yet perfectly reasoned execution, it highlights the general tricks of the trade of Euclidean perspective and that "excess of zeal" on the part of man, whose arts and technologies seem so focused on "supplementing Nature's error" (Chantelou, cited in Baltrušaitis 2). In a similar vein, one might recall those metonymical blues of technology. The excess in supplemental, affective zeal that blue would seem to signify

in today's technological context and which a simple Google image search of "digital" will reveal, in anamorphic fashion, as having always been there.

One site of interest here is the uncomfortable proximity that post- hints at, the lingering, umbilical connection between the progenitor and its late coming prefix, which the embedded quality of the anamorphic also highlights. How anamorphosis is able to act as a potentially unsettling augur embedded within a taken for granted norm, employing the same tools of the media technique in question to create further indexical yet awry scenes which can tease out the very artificial, even absurd nature of the everyday perspective in question. Such signalings of a kind of resistant, "anamorphic remainder" (Boluk and LeMieux), in their very dormant yet persistent fashion, can be experienced as an alternative, potentially alien nature that returns and confronts the mediating and mediated subject with the primacy and weird nature of its own uncanny contortion acts.

Jacques Lacan's (*Four Fundamental Concepts; Ethics*) various writings on anamorphosis are worth turning to in such a context, particularly for the way in which his conception of anamorphosis alerts one to this sense of lingering alienation that is embedded and closer in the mirror than it appears. A potentially disturbing proximity that hints at topological structures of the self which further Lacanian concepts such as the Real similarly addresses. In a Lacanian register, one can turn to the spectre of the profane illumination of the obsolete media object and speak of how this illumination can be partly experienced as a gaze of the temporarily illuminating object, by virtue of the way in which those many scopopic rays of desire are experienced as being reprojected back out from the obsolete object in question. The "pulsatile" (Lacan, *Four Fundamental Concepts* 89) afterglow of these possessive, saturated drives casting

a dark shadow, presenting the “annihilating subject” (*Four Fundamental Concepts* 84) with a jilted reflection of the structures and ideologies which the object has been moving between, is mediated by and yet can be seen to always potentially resist or withdraw from. The way in which these newly presented drives of the subject might be said to be temporarily turned “inside-out” (Lacan 82), before escaping again, accelerating or decelerating towards the vanishing points of yet further investments of this desire.

Can we ever really be post-? Think of Jean-François Lyotard, in his “Note on the Meaning of ‘Post-’”, reflecting back on a term that ended up taking on such a life of its own (*The Postmodern Explained* 80): “You can see that when it is understood in this way, the ‘post-’ of ‘postmodern’ does not signify a movement of comeback, flashback, or feedback — that is, not a movement of repetition but a procedure in ‘ana-’: a procedure of analysis, anamnesis, anagogy, and anamorphosis that elaborates an ‘initial forgetting.’” Is it a surprise that many link the rise of the post-digital with a return of the ana- of analogue? Sealed within the black box, gift wrapped in the sales pitch, enclosed in every discovery is the embedded promise of forgetting.

If the descriptions of blue hours and a flexing of the curvature of mediation in the previous section seemed rather crypto-mystical turns of phrase, one might further recall Lyotard’s description of what is happening at the origin moment of the Renaissance’s rediscovery of linear perspective, the mother of all demos that was Filippo Brunelleschi’s early 15th century linear perspective experiment carried out, in its most famous iteration, in front of the octagonal structure of Florence’s Baptistery of St. John. As Lyotard (*Discourse, Figure* 180) points out, the seductive success of linear perspective, as so vividly presented by Brunelleschi in his

painted wood panel, peephole and mirror demonstration, is achieved by “the effect of blocking out the peripheral field, thus of ‘de-curving’ perceptual space and rendering it as consistent as possible with the central focal area where the curvature (the anamorphosis) is negligible.” Anamorphosis, by virtue of its introduction of a shifted, diverging point of view that nevertheless simultaneously plays within the rules of linear perspective, can be understood as enacting a kind of liminal re-curving of the scene of linear perspective’s particular form of mediation. Similarly, in its reengaging with elements of a perceived “pre-“ or “non-“ digital nature, the post-digital might partly be understood as an attempt to dislodge or at least curve what can be thought of as more irrepressibly linear, homogenising natures — which the digital and the many related factors that help to manifest it continue to so readily latch onto. By virtue of its introduction of an alternative to the singularity of a given vanishing point, the anamorphic, like obsolescence, indicates towards a potential for “poetic reversal” (Lyotard, *Discourse, Figure* 377). In the case of post-digital, there is the simple reversal that even just the term itself enacts via its initiating of a renewed focus which it casts on the slippery, pervasive qualities of the digital. Similarly, some post-digital practices might partly act as mirrors or transduction devices for remembering, rethinking or repurposing current notions and manifestations of the digital.

#banality

No one really dreams any longer of the Blue Flower. Whoever awakes as Heinrich von Ofterdingen today must have overslept. [...] No longer does the dream reveal a blue horizon. The dream has grown gray. The gray

*coating of dust on this is its best part.
Dreams are now a shortcut to banality.
(Walter Benjamin, "Dream Kitsch –
Gloss on Surrealism" 236)*

In his writing on surrealism and kitsch, Benjamin (*Writings on Media* 236-38) highlights how the Surrealists, in their cross-hatching of the dream world with the objects, furnishings and "cheap maxims" of the everyday, "are less on the trail of the psyche than on the trade of things." At the pinnacle of such a practice, "the topmost face on the totem pole is that of kitsch. It is the last mask of the banal, the one with which we adorn ourselves, in dream and conversation, so as to take in the energies of an outlived world of things." In the face of its own unsettling anamorphic alterity and obsolescing drive, the digitally inflected subject has shown an impulsive readiness to latch onto the banal. Online meme ecologies, with their compressed, easily circulated qualities, readily co-evolve with technological provisions such as network bandwidth constraints, instantly replicable digital formats, the highly-greased and quickly churning gears of social media platforms and so on. They partake of a naturalised "trade of things" in the digital, providing a replicable, utilitarian vernacular of rough and ready image macros that can serve as express circuits to banality.

Now almost a decade on since Tim O'Reilly's formulating of the rise of "Web 2.0," in the mainstreaming of things like user-generated 4chan memes into daily morning news shows and Facebook wall posts, there has for some time been detectable a sense of popular, collective self-awareness — "Oh Internet" — in regards to this saturation of the digital. It would seem that we are all producers of "internet-aware art" (Guthrie Lonergan, in McHugh 10) now, and everything is now potentially possessed with a degree of understanding from the digital, to

the point where saying so carries little value. Is any kind of "blue spill" of the digital even noticed anymore? Each discrete part, each ecology, readily overlaps on the other. And overlaps, and overlaps. In such a condition, the emphasis seems no longer to be on startling juxtapositions of everyday objects such as the Surrealists were after, but rather in the increasingly natural, i.e. banal, overlap of what might previously have been experienced as unnatural.

Nevertheless, in something like the popular surge towards the accessible photo filters of Instagram, one might delineate a kind of, part defence mechanism, part tactical countering at play in its employment of the masking device of the filter. At the beginning of such a potential shift towards the post-digital, there is the much commented upon way in which the applying of a photo filter casts an artificial aesthetic of age and materiality upon these digital images, a visual shorthand of saturation and pinhole effects that hints back to pre-digital photographic practices that involved lengthy exposure times and hands-on engagement with the analogue prints and chemicals of the darkroom. This applying of a kind of layer of "fauxstalgia," such as media scholar and practitioner Talan Memmott is outlining in his writing on "banality based banality," helps to mask something like the selfie in sufficiently profane, analogue-esque illumination. In its purposely streamlined interface for post-production, Instagram can be seen to readily service what Lacan (*Four Fundamental Concepts* 104) characterises as a taming of the gaze (*dompte-regard*), in this case, the gaze of the subject as it is reflected back in the typically hypermediated modality of the digital, lending a more palatable slant via this mask of the Instagram filter, its reintroduction of an obsolescent aesthetic and its slight but mandatory temporal pause for a moment post-production reflection.

At the same time though, while the digital filter may add aesthetic value and meaning for the user, it is also infused with a degree of banality as a result of the difficult to ignore sense of artificiality that becomes almost immediately visible when a user returns to their photo stream and is likely (particularly in the early use of Instagram) to be confronted with example after example of this filtered aesthetic, any analogue aura quickly being drowned out in the return to the *mise en abyme* like hall of mirrors of easily replicable and painlessly disseminated digitality. As one sees in this anamorphic-style return, the reoccurrent drive finds yet another ready partner in the digital. Lacan again (Ethics, p.136): “At issue, in an analogical or anamorphic form, is the effort to point once again to the fact that what we seek in the illusion is something in which the illusion as such in some way transcends itself, destroys itself, by demonstrating that it is only there as a signifier.” In the subsequent rise in the practice of tagging non-filtered pictures on Instagram with a #nofilter tag one starts to see a suggestive edging towards a post-digital tipping point, an indication of a heightened sense of awareness on the part of Instagram’s users in regards to this subsuming banality of the digital, acknowledged here via the backwards glance of this knowing hashtag.

With so-called invasive technification looking more and more like a ubiquitous banal given (whose terms of reference were apparently signed off on long ago), little wonder then the appeal of an apotropaic mask of the banal that can attempt to at least partly assuage and apply some taming filters, quotation marks or hashtags upon such potentially alienating qualities, which at times may for its users feel like undergirding, emanating forces of the “always-on” technologies of today. The iconic black mirrors of moment: the drone, the anamorphic gaze of machine vision, Google Glass, the soon to be ubiquitous

3D printed “blobject,” internet-aware soldiers and their streams of Instagram selfies and endlessly looping Vines — an oscillating and/or, this intimate/mundane portraiture of the war machine. Likewise, it is always worth recalling the way in which institutions of power, digitally born and otherwise, often adopt a certain strategically cosmeticised veneer of the banal, with their cheery doodles and seemingly plain vanilla shopfront windows, the wolf in sheep’s clothing tactic. If anything, in the contemporary landscape even the anamorphic itself might serve as yet another potential mask of the banal with which to adorn one’s personal or institutional brand. Thus, perhaps, the trendings of H.P. Lovecraft referencing memes, weird Twitter and “that exciting new Google creepiness that’s just creepy enough for 2014” (Sterling).

In response to the viscous spread of the digital, its seeming horror vacui (“fear of empty space”) and kitsch-like lack of restraint and drive to cover every niche and corner with its own internet of things, why not adopt the recycling tactic of a banal ecology (or garbology) of memes in which one can make oneself at home in, or indeed tactically mask other manoeuvres within? As a result of its own strong levelling power, in which all things are fair game (“ask me anything”), banality can also be said to establish a certain democratic plateau for the internet “junk” that it gleefully recycles. Similar to anamorphosis, it too retains a power to cut through, to interpenetrate such layers of existence and extinction. The still paroxysmal primacy of laughter that a meme can unearth. The silent, unstoppable force of animated GIFs. Boredom and its unexpected, emergent capacities.

One might posit the banal and anamorphic as a kind of dual, interconnected pairing, in a similar vein to Bolter and Grusin’s (355-6) formulation of the psychology of remediation, with its “double logic” and twinned desires for

immediacy and hypermediacy (the elusive quality of immediacy being not dissimilar to that of the evasive, horizon dwelling blue flower in the land of technology and the anamorphic as a compulsive, hypermediate return). Similarly, something like the #nofilter meme on Instagram might quickly be tagged as representative of just another example of the vernacular, reflexive style play of post-modernism. Yet the filter and the #nofilter might also be seen as enacting a critical reflection of sorts on mediation and digital practice, and in so doing, potentially opening the gates towards post-digital practice. Indeed, by virtue of their ready participation in the everyday trade and vernacular of the digital, such seemingly banal practices have a certain knack for plucking out the cultural markers of the contemporary moment that are felt to be of particular communicative power, and in which one can often sense an embedded, self-aware and even implied or charged critical commentary within. A criticality or sense of awareness that might, on occasion, be able to gather certain kinds of counter-publics or movements around their resonant momentum.[1] In this very active exchange of the banal in the digitally informed ecologies of the moment there seems to be a lingering theme of resistance and even resilience on the part of the digitally informed media objects and their users. That ongoing potential for resistance embedded in the stubborn medium or object that, when viewed from a particular angle or caught in a particular relational juncture, can act as, not so much the longed for blue flower, but rather “anti-aphrodisiac” or antidote for reencountering the dominant, obsolete and/or everyday ecologies in which various entities are able to extend across or reposition against.

Bewersdorf blue

In 2008, Kevin Bewersdorf initiated his digital performance piece PUREKev, a work that might serve as a brief example of a transitional blue hour of obsolescence that touches on some of the themes of this paper. The plan of execution for the work was noticeably barebones. Over the course of three-years (2008-11) an automated performance would play out, in which a looping animated GIF of over-exposed home video footage depicting a flickering firecracker would very gradually diminish over time, extinguishing at a provisionally imperceptible but steady rate for its visitors, gradually becoming a field of “pure” blue. PUREKev was initiated in tandem with Bewersdorf’s decision to delete as much of the existing archive of his work as he could from the Internet. In fact, as far as one can tell, Bewersdorf was largely successful in this endeavour and his online archive is today notably difficult to unearth, despite the best efforts of interested admirers and archivists. Thus the auto-destructive nature of the piece was not simply a one off, relatively old hat conceptual gesture, but rather a committed embrace on the part of this net-based artist to fully extract his artistic output from the digital – particularly coming as it did at a time when Bewersdorf’s star looked to be on the rise. As Gene McHugh (40) writes of PUREKev in his book *Post-Internet*, “The website goes in the exact opposite direction of most Internet production, focusing on slow, imperceptible change over the course of years. By doing so, it allows one to see (as if for the first time) what it opposes.” In the piece, it is the blue void rather than the flame that acts as the main performer, surrounding its increasingly pitiable flame, pushing it down and with each passing day forcing us to scroll, and scroll, and scroll, hunting for a figure, no matter how fleeting, that might release us from

this amorphous ground, the “MAXIMUM SORROW” that is Bewersdorf blue.

“MAXIMUM SORROW” is the logo with which Bewersdorf brands many of the images and characters of his melodrama, an anamorphic, memento mori style reminder and imprint of the dot-com crash of an earlier moment in the digital imaginary and the Totentanz, post-crash condition of “2.0.” It shows up in several of the pieces in his Monuments to the INFOspirit series, suggesting a bubble burst, a feeling of the blues or burnout that emanates in a vaguely atmospheric fashion throughout much of Bewersdorf’s works. One is reminded of Krauss (291-2) speaking of photography’s transition from an exciting new medium to yet another commodity that was “swallowed by kitsch,” a transition that partly “betrays a social class under siege.” Expanding on Benjamin’s classic reading of photographer Eugène Atget in “The Work of Art...” essay, Krauss (292) points out how Atget’s photographs can be read as a kind of antidote to the “fraudulent mask of art” in the photography of the time: “Atget’s response to this artiness is to pull the plug on the portrait altogether and to produce the urban setting voided of human presence, thereby substituting, for the turn-of-the-century portrait’s unconscious mise-en-scène of class murder, an eerily emptied ‘scene of a crime.’”

In these pieces by Bewersdorf one witnesses a somewhat similar aesthetic manoeuvre in their pulling of the plug of the digital (and perhaps even an outlining of a crime scene of sorts). Within this vacuum of the outmoded there is also the sense of a lingering afterglow of the pervasive, corporate INFOspirit that clearly once inflated the drama of its digitally inflected subjects while also seeming to drain them of a certain sense of vitality. In his “The Four Sacred Logos” text, produced as a series of brochures for reading at the Monuments to the INFOspirit exhibit, Bewersdorf (88) is able to channel

a certain banal pulse and undercurrent of the digital age: “Maximum Sorrow is a way of perceiving and accepting this sense of drowning we all feel as we spiral with the whirlpool of info towards mediocrity. It is sorrowful to accept that mediocrity resides in each of us. It is sorrowful to realise that mediocrity is at the limits of our awareness.” The text includes “Mediocrity Awareness Exercises,” short marketing style mantras of text, sound and image for rehearsing as one browses through Bewersdorf’s denuded, pathetic, entirely mediocre physical objects, hollowed-out yet still emotive materialisations of a life online. Mediocrity is presented here not so much as a placebo but rather as remedy or even ritualistic, anagogical transitional vehicle for attempting to tune in to the full force of that anamorphic other of the works, the unreachable, uncontainable INFOspirit.

It is also hard to miss the reoccurring use of blue throughout these works, which here seems turned inside out in a poetic reversal that acts in its own way as a kind of binding call to the horizon or vanishing point — “a sensitive spot, a lesion, a locus of pain, a point of reversal of the whole of history” (Lacan, *Ethics* 140) – an abstract but resonant signifier of the digital against which Bewersdorf can offset and perform a world of banal, overlapping, almost sacrificial obsolescence.[2]



Kevin Bewersdorf, *Still Life with Blue Flame*, 2008.

Blue Flower?

Is the internet dead? This is not a metaphorical question. It does not suggest that the internet is dysfunctional, useless or out of fashion. It asks what happened to the internet after it stopped being a possibility.”
(Hito Steyerl, “Too Much World: Is the Internet Dead?”)



Kevin Bewersdorf, Maximum Sorrow throw rug, 2007.



Kevin Bewersdorf, Monuments to the INFOspirit, 2008.



Kevin Bewersdorf, Google Image Search Result for ‘Exhausted’ Printed onto Blanket, Tie, Dog Leash and Golf Towel by Walgreens.com, 2009.

Why blue? Why post-digital? This paper began with a riffing on blue and its status as a meme-like signifier of the digital, a ready-made scaffolding and prevalent filter of the digital imaginary. Having initially indicated towards the romantic conceit of the blue flower, the question returns now as to whether the post-digital is itself a conceptual blue flower? Indeed, can something as nebulous as “the digital” even be treated in a remotely similar manner to an object or a medium? Can it really become obsolete or post-? Ins Blaue hinein... At each turn, this very emulsive, ever-proliferating nature of the digital seems to both cling to and yet elude one’s grasp.

Undoubtedly this is in part an issue relating to the particularly burdensome imposition that a prefix like post- puts on an already sufficiently problematic stem, reminding one of Frederic Jameson’s grapplings with the confounding “total flow” of postmodernism and “how the thing blocks its own theorisation, becoming a theory in its own right” (Jameson 71). One would also do well to keep in mind the reactive, self-propagating nature that such theoretical manoeuvres can readily get carried away by. At least the simple sounding of a speculative death knell of post- in relation to the digital, rather than positing it as any kind of definitive term, might act in a similar way to the onset of obsolescence, the suspending quality of its hyphen creating a temporary tension, a zone of uncertainty

or wobble that might somewhat unsettle the stem that it still implicitly admits it cannot necessarily escape from, nor even wants to. The title of Cramer's recent talk on the matter, "Post-digital: a term that sucks but might be useful," gives some indication of these kinds of strands that come into play.

In exploring themes of onsetting obsolescence, anamorphic alterity and quotidian banality, a central point here has been to emphasise the way in which, in this post-PRISM revelations present, there seems to arise a renewed or heightened sense of awareness and reflexivity in relation to many of the digitally informed practices of today. A kind of sobering moment in which one is reminded, yet again, of how so many blue horizons and promises of the digital end in yet more false dawns. And furthermore, how in such a transitional instance the potential arises for a shifting in approach or a cleansing of a misguided or overused palette. One that might turn our attention to other significant shadings in the media spectrum, such as a much needed interrogation of the more indiscernible, uniform and unremitting "gray immanence" of "evil media" that Fuller & Goffey highlight (13-4). Or likewise, in considering the temporal and immanent qualities of media that obsolescence highlights, one might, as the likes of Hertz and Parikka have outlined, excavate post-digital blueprints for an ethico-aesthetic DIY practice that is able to respond to the embedded post- of planned obsolescence, with its environmental saturation of obsolete technologies whose relative material permanence endows them with an extended afterlife in which they may be re-discovered, recycled, remixed, reinterpreted. Enacting a shift in focus from the illuminating qualities of immanent or recently occurred death, to that of the never-really-dead "untimeliness" of "media undead" (Wolfgang Ernst, cited in Hertz and Parikka 429). From dusk to dawn. The sun also rises. To trace out

and get hands on with the kinds of horizons of speculation and everyday encounters that the post-digital proposal, in an interventionalist modality, might nudge into relational or resistive being.

Notes

[1] An obvious example to point to in this context would be the spread in usage of the so-called “Guy Fawkes” mask: from its initial adoption by children in the late 18th century, who would display masked effigies of Fawkes while begging for money on Bonfire Night, to its later resurfacing in the cult 1982-89 comic series *V for Vendetta*, and subsequent crossover into popular culture with the 2006 film adaptation of the comic and its \$6.99 Halloween costume replica of the mask sold as a merchandising tie-in to the film. In the same year, use of the mask spread further via the /b/ message board of 4chan (and other imageboards) in the guise of the popular “Epic Fail Guy” meme, whose hapless eponymous stick figure was often depicted wearing the mask. Around 2008, the use of the mask migrated into association with protest movements, beginning with the Anonymous movement’s donning of the mask during a series of protests against the Church of Scientology and then spreading internationally and into mainstream consciousness with the outbreak of the 2011 Occupy protests and its regular use at these and other rallies since then. The Guy Fawkes mask as meme oscillates back and forth in a dance with the multiform qualities of the banal, vaguely menacing yet entirely familiar, demonstrating its potential as provider of a mask of anonymity, a break from more singular forms of identity, and/or a compositing and reformation of identity, whether this be in the realms of counter-culture, marketing and/or the proto-political.

[2] An aside, while it appears that Bewersdorf has continued to remain off the grid of the net art scene since PUREKev, he has gone on to stake out a promising career as both actor and soundtrack

composer in the mumblecore film circuit. His most recent appearance, in the acclaimed *Computer Chess* (2013), has him in the role of “cameraman,” a character whose role it is to amble about within the film’s homage to the early days of artificial intelligence, awkwardly recording the events of the fictional computer chess tournament with a Sony AVC-3260, black-and-white analogue tube camera (originally manufactured in 1969). The film itself was shot on the same camera, with the help of a retrofitted analogue to digital video signal converter and hard drive, and is full of the kind of celebration of anamorphic banality that one finds in Bewersdorf’s earlier net art pieces. Is there a more fitting existing example of a post-digital career trajectory?

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**TRASH VERSIONALITY FOR
POST-DIGITAL CULTURE**

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Media Trash

RHETORIC

Following a 14-day visit to parts of the UK, the United Nations' special rapporteur on adequate housing Raquel Rolnik, issued an end-of mission press statement.[1] She recommended immediate suspension of controversial reforms affecting social housing tenants.[2] Researched according to UN protocol (Gentleman), the advice was however vehemently rejected by the UK government; the rapporteur's personal and professional credibility were then attacked in the media and elsewhere.[3]

These changing dynamics, between public and political spheres are especially visible online, where social media is influencing many areas. In one instance a court trial was abandoned after new evidence, obtained from a disused Twitter account, came to light. Details of the accused were nevertheless reported in print and on the Web.[4] Elsewhere, legal proceedings have been derailed because of jurors' activity online (Davis). Incautious tweets have resulted in prosecutions for libel (BBC News).

This article attempts an overview of phenomena, which exemplify informational and conceptual instances (or 'versions') characteristic of current 'post-digital' conditions. By counter-posing a variety of material, I aim to explore the role and position of different kinds of images (foremost social and visual) as they constitute post-digital relations. These are relations in which the primacy of computerized digital objects is moot. The versions presented in this text are the social, cultural and organizational confluences which find expression in differing data formats — originals and copies subject to fluctuating, moment-to-moment alteration. Together with the growth in communication and exchange, these versions imply a

continual re-writing of the standards affecting social and network-based encounter. The processes renew shared conceptions and pictures, prompt self-reflection and pose the questions, "whose truth?" and, "whose value(s)?"

INDISPENSABILITY

As quickly as attention has switched away from the aforementioned episodes, they offer us a snapshot of a media landscape in which trash, as dispensable news and information, is merging with public opinion and political rhetoric. The combination of booming mass culture and creativity produces a variety of images — including data images — which are not easily locatable within the apparatus' of political, social and economic assemblages. Consequently, these images (whether personal or institutional) are open to conjecture. Their position on the continuum between media, platform and network transport renders them equivocal — ambiguous entities, where identity, trust and authenticity come under review.

These are issues which are problematized in an artwork by Kripe, Schraffenberger and Terpstra; *The Formamat* (2010) investigates the value individuals place on data they have stored on their mobile devices. The work is a vending machine, "which returns candy in exchange for the deletion of [an individual's] digital data". The authors, "invite people to experience the joy of deletion in a public space and encourage them to think about the value and (in-)dispensability of their files while also researching the subject in a broader sense by storing and analysing their deletion-behavior." (*Formamat*)

REVISION

With the hindsight of just a few years, *The Formamat* can also be seen to capture uncertainties — of ownership and identification — in our relationship with data.

Our understanding of the work encounters an unexpected revision, reformulating the question, not of which, but of whose files are going to be deleted. Taken together with the Internet's long memory — from the Internet Archive's *Way Back Machine*[5] to playfully macabre, assisted Facebook-identity suicides[6] — this observation underlines the attention now being given to choice and control of data. Here, Nissenbaum's 'contextual integrity' is relevant. It advocates the individual's right to manage the flow of their personal information, rather than exert absolute control (Nissenbaum). The emphasis seems to be on the subjective way we value information, where one person's waste can become another's livelihood.

Such perspectives might be welcomed by the Sunlight Foundation, known for co-ordinating crowd sourced analysis of US government records. Transparency initiatives like this commonly use Wikis to manage document revisions made by multiple authors (Sifry). In the case of Wikipedia, software for 'version control' becomes the image of a community and its knowledge, a reflection of that community in code:

People can and do trust works produced by people they don't know. The real world is still trying to figure out how Wikipedia works...Open source is produced by people that you can't track down, but you can trust it in very deep ways. People can trust works by people they don't know in this low cost communication environment. (Cunningham qtd in many2many)

VERSION CONTROL

Other types of version control system (VCS) are useful, especially in co-ordinating software development groups. The Linux kernel project is one example. For this, a very specific VCS was conceived: Git [7]

was created to manage all the code for the Linux kernel. It solves problems of ownership and responsibility with its own purpose built command: `git-blame`. [8] The command finds the author of an edit or addition and reports when changes were made. This is one way in which Git addresses the techno-social problems of making and releasing new versions of the kernel image (the core of the GNU/Linux operating system; a large-scale project with more than nine million lines of code).

The Git software was created with security, authentication and traceability as paramount concerns. Contributors to any Git-maintained project are encouraged to advance development by regularly committing smaller changes into a main line of development. Additions and revisions can be written and tested in isolation before being introduced to the main line or 'branch'. Copies of this branch become distributed as changes are written back to the computers of other developers as they also submit their work. Files 'checked out' from the main development tree can be added to newly created branches. Typically, these development threads are later merged into the project's main branch or abandoned. In some instances, new branches diverge substantially from the main development effort. This is basically the concept of project forking. It might be apparent from this summary that talk about governance in Git is necessarily also a discussion about technical operation.

Issues of governance are also dealt with in creative projects which utilize and discuss version control. Simon Yuill's *Social Versioning System* [9] and Matthew Fuller and Usman Haque's *Urban Versioning System 1.0* [10] concern the relevance of Free Software principles to consensus and co-operation in design practice:

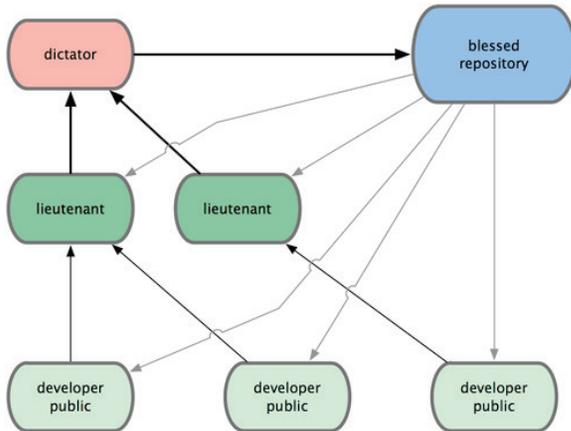


Figure 1: “Benevolent dictator workflow”. Illustration. n.d. Distributed-workflows, git-scm.com. Web. 29 Sep. 2013.

one of the most interesting aspects of open source software is the continuous interleaving of production, implementation, usage and repurposing processes, all of which can and sometimes must be open — not just an “open design” that then gets implemented in a closed manner. (Fuller and Haque 17)

Soon after Git was released, GitHub [11] appeared. Using the apparatus (the ‘plumbing and porcelain’) which comprises the Git software, GitHub establishes a web-based repository for software projects whose source code is released in the public domain. GitHub has been adopted by a huge and rapidly expanding user community, as a platform for developing and publishing software and a range of other creative works. GitHub provides a large-scale, distributed means to recognize and pin point different stages in the production of these works. It has also become home to a mass of never changing, user-generated software configuration files. In GitHub these can be Git configuration files, stored in a Git repository, on a platform built using Git.



Figure 2: Marcosleal. “Matryoshka dolls in street fair – Budapest”. Photograph. 2008. Matryoshka dolls in Budapest.jpg. Wikimedia Commons. Web. 29 Sep. 2013.

Social overload

ETHICS AND ETIQUETTE

Besides the sense of community that data sharing in this way inspires, proliferating codes also produce tensions. Where levels of interest from the public increase, the scale and relative value of contributions can in turn challenge a project’s direction. WikiLeaks’ release in 2010 of hundreds of thousands of classified US Army field reports (the so-called Iraq War Logs) is an example where the relevance and reliability of material have been key considerations (Domscheit-Berg). In other guises, this problem of managing contributions has been encountered in projects from Community Memory (an electronic bulletin board), through to contemporary hacker spaces and Open Source tech communities. In all these instances, it seems that mutual agreement — whether or not this has been explicitly defined — is a central issue. Arguments often focus on leadership, personal style and the possibility of ‘benevolent dictatorship’ (Lovink). Though positive feedback generated by self-enhancing ‘recursive geek publics’ is not without drawbacks (Kelty), neither is it clear how this energy can work best — in the case of the Debian

Software Project there is the Debian Social Contract,[12] enshrining free speech and enough hierarchy to manage the flow of contributions. Free speech has been central to the development of Free-Libre Open Source Software (Turner), as it has to the protocols and conduct written into projects such as Wikipedia.

Away from hacker-styled communities, in observing public sector adoption of open source software, Maha Shaikh explains that, “information technology and users are not defined outside their relationship but in their relational networks”. Hence the focus moves away from actors, “towards a more complex, and less defined phenomenon... the interaction”. This perspective, emphasizing mutability and becoming is advantageous to understanding materializing of public sector adoption of open source software: “performativity leaves open the possibility of events that might refute, or even happen independently of what humans believe or think”. We are presented with a different means to envision interaction, “drawing on ideas of becoming, tracing versus mapping and multiplicity alongside the shared ontology of Actor Network Theory”. Shaikh concludes that,

the becoming of adoption can be both constrained and precipitated by various forms of materiality (of the assemblage of the open source ecosystem)... open source software — a much touted transparent and open phenomenon — is by its nuanced mutability able to make the process and practices surrounding it less visible. (Shaikh 123-140)

BENEATH THE STREET, THE NETWORK

Conversely, since the release of NSA files by Edward Snowden, meshing and co-dependent network assemblages and

apparatus’ (as well as the methods by which they constitute one another) have gained visibility. Journalistic reporting of this data at first underlined governments’ ability to track and target individuals at will (for example, by following calls and data from mobile phones). Subsequently, attention has moved somewhat away from wireless networks and ‘eyes in the sky’ to the image of massive submerged and underground data pipes, connecting (really big) data centres routinely serving information to government secret services. Documents detailing these practices provoked strong objections from businesses who insisted on the ‘right to reveal’. [13] This twist on the ‘right to know’ placed mutability and truth centre stage.

Besides this totalizing image of state control and vested corporate interests, is the changing interplay between humans, machines and geography. The activities of Anonymous, and organizations such as WikiLeaks and The Pirate Bay continue to demonstrate the actually fragmented, disorganized and dis-regulated condition of government and businesses, which are not always pulling in the same direction. Meanwhile, activist groups find identities outside of pre-existing ones (of public friend or foe) as their operations compose new and revised networks, in street action, engagement with news media, and in online provocations.

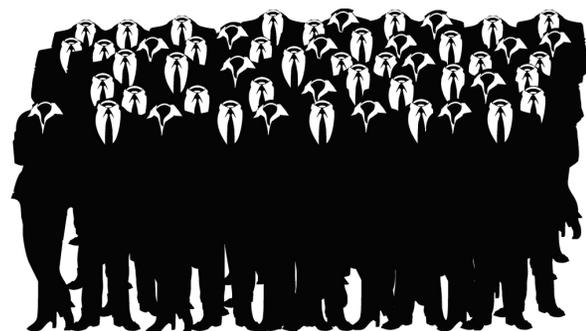


Figure 3: Anon617. “Anonymous Crowd”. Illustration. 2008. Anonymous Crowd, flickr.com. Web. 10 Jan. 2014.

In the encounter between Anonymous and their targets, a firmament of politics and identity shows the interconnectedness of free speech and anonymity. Alternatively, the evidence in revelations about state surveillance precisely demonstrates that anonymity is not an essential aspect of digital networks, but rather is a set of standards which in many places is already compromised. Cloud computing, Software as a Service and skeuomorphic interfaces readily belie the real sense in which data is exposed. With the changed connotations of 'access', Ted Nelson's invocation, 'you must understand computers now' (Nelson) is renewed by under-reporting in the media (Jarvis).

ABUNDANCE AND MODIFICATION

Anonymous is one contemporary expression of this will to understand computers (as well as other network forms). In a moment of self-reflexive wonder, in February 2008, members of Anonymous turning up for street protests were themselves surprised — in numerous ways — by the people converging on that day, and by the network image this manifestation bodily performed. In one documentary, protesters describe their feelings of being a part of Anonymous and how, as it entered the world, it came to exist in a significantly new way, for them and others. Information activist Barrett Brown explains:

Anonymous is a series of relationships. Hundreds and hundreds of people who are very active in it — who have varying skill sets, and who have varying issues they want to advance — these people are collaborating in different ways each day. (Brown in BBC)

Emerging platforms allow recursive representations of existing creative forms, whilst re-versioned political slogans and insider nods — to Surrealist and Situationist

imagery — issue from anonymous channels and deviant locations.[14] These creations, designed for modification, are then absorbed into the melee engaging internet memes and personalities. One notable example of this recursion and modification concerns a prominent UK politician, Ed Balls. In April 2011 he inadvertently tweeted an empty message along with his name. This spawned a long chain of varyingly humorous and teasing responses, facebook likes, as well as many retweets. The action entered meatspace at the time of the original tweet's two year anniversary, when Ed Balls acknowledged the joke by retweeting the following image:

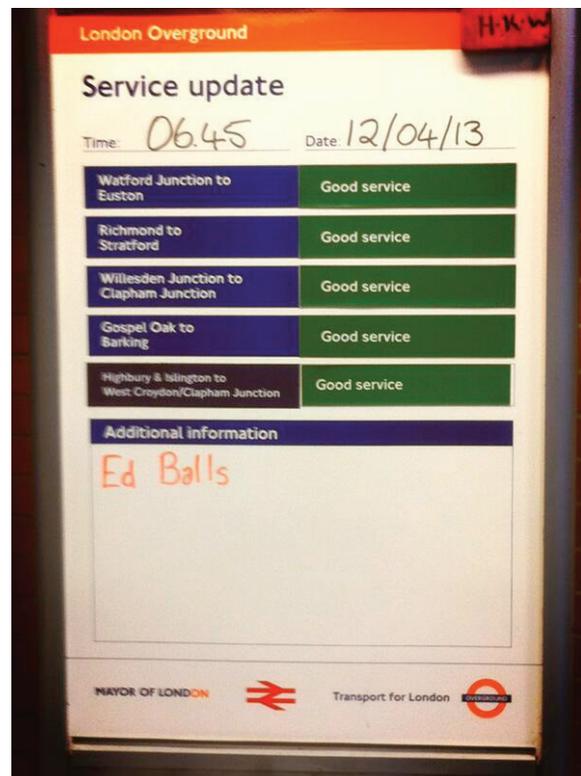


Figure 4: Balls, Ed (edballsmp). "Sorry... But this is getting really weird.. RT @FelicityMorse: Ed Balls makes it onto a train sign." 10:01 PM – 12 Apr 2013. Tweet.

REDUCTION AND OVERLOADING

The impact of flourishing social media (and its reflective potential) receives additional validation through public acquisition of artworks such as *The Cybraphon*,[15] through

Wikimedia outreach projects[16] and in metric analysis of the public mood via twitter and the blogosphere.[17] Reflecting this change, networks of users now create, “fast, fluid and innovative projects that outperform those of the largest and best-financed enterprises” (Tapscott and Williams qtd in Heath Cull 78).

The value of such observations was not lost on Julian Assange and Daniel Domscheit-Berg as they went about building WikiLeaks. Starting with only minimal funds and relying on their own technical expertise, the two activists would typically exaggerate the scale of WikiLeaks (for example by using fictional identities of people working in purely notional departments). During this time Domscheit-Berg used the pseudonym Daniel Schmitt. Assange used his own name, but was occasionally still identified by his old hacker handle of MENDAX (Domscheit-Berg). Alongside this overloading, re-purposing and extension of identity within WikiLeaks, there has been the task of gathering, sifting and reproducing large quantities of data. This was achieved through various means, partnerships and collaborations. However, Domscheit-Berg’s subsequent criticism was that WikiLeaks has fundamentally always been a network of one (Domscheit-Berg).

By contrast, Anonymous forms (including memes, reddit and 4chan forums) lend themselves rather less to analysis — their direction being to continually circumvent and override. However, what these forms do present us with, are collaboratively made *creative network entities*. In the changing dynamic by which these appear, new conventions are being worked out; overloading standards of taste and acceptability are stimulating alternatives to the ordinary narratives of conflict and resolution.

Trash versionality

DISRUPTIVE CONVERGENCE

In these forms of representation which we see entering mainstream narratives, a kind of collective and competitive vandalism is esteemed. The multiplicity of voices — for which the expanding net has become more lightning conductor than conduit — increasingly provides its own self-fulfilling cycle of news, serving 24-hour comment and analysis for comment and analysis. A re-writing is under way, in which messages combining text and visual images, produce networks within networks. These communications become the mutable containers of doubt and disinformation, of intent and ignorance:

since images are two-dimensional the representations in them form a circle, that is, one draws its meaning from the other, which in turn lends its meaning to the next. Such a relationship of exchangeable meanings is magical.
(Flusser 9)

DISEASEFUL MEDIA

From miniature artefacts to large network entities, whether as discrete objects or grand-scale public conceptions, the representations and mental images can seem diffuse, untraceable, and in contradictory states. Nodes, which constitute networks, are themselves potentially networks and networks are collapsible forms, in which processes, “are recurrent [processes]... which typically involve entirely different mechanisms... larger scale assemblages of which some of the members of the original population become component parts.” (De Landa 19). Little wonder if the scale and definition of networks should induce feelings of disorientation, even anxiety.

However, overload also gives rise to easeful interactions. These go against any supposed separation of relations on the Internet and those In Real Life (IRL); In *The Pirate Bay: Away From Keyboard (TPB:AFK)*, Pirate Bay founder Peter Sund explains assuredly to a Swedish courtroom, “We prefer not to use IRL. We believe the internet is for real”.[18] Whilst the motivation and affiliations of the the Pirate Bay trio have remained opaque to state and private prosecutors, in this film the question which achieves over-arching significance is, “Who do you trust?”. This may be a point around which easeful interactions revolve. As trojan links to the Internet meme *Goatse.cx* [19] showed, the merriment of a practical joke can be a hair’s breadth away from the abuse of trust.

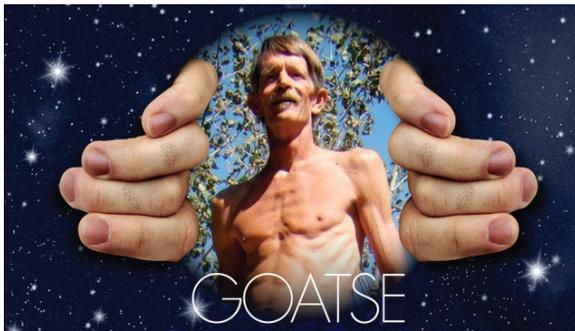


Figure 5: Montage inspired by the Goatse Internet meme. Digital montage. n.d. *Finding Goatse: The Mystery Man Behind the Most Disturbing Internet Meme in History*. gawker.com. Web. 29 Sep. 2013.

FETISH

As social media has refreshed the status of the Internet troll, the nuanced subterfuge of social engineering, of spreading Fear, Uncertainty and Doubt, appears diminished. Flames, defamation and libel have become the norm. The specialized rules of email etiquette have evaporated. In the merging of media, products and social interaction, trolling itself has gone viral; self-validating intercourse has been upstaged by

social-media-sanctioning broadcast-media discourse. In legal proceedings (as with subterfuge against enemy combatants, and leaders of states), a game of cat and mouse is being played; in litigation, plaintiffs become complicit in a mystifying data hide-and-seek, where bytes are transferred, as if seamlessly across frontiers, until reaching new data housing facilities (fortresses of this age).

Other means of outwitting covetous censorial desires have been conceived. Perhaps none has scored higher than the self-mutilation of computers enacted by *The Guardian* newspaper in response to a threatened injunction on reporting leaked NSA data:

in a deserted basement of The Guardian’s King’s Cross offices, a senior editor and a Guardian computer expert used angle grinders and other tools to pulverise the hard drives and memory chips on which the encrypted files had been stored. As they worked they were watched by technicians from Government Communications Headquarters (GCHQ) who took notes and photographs... (Borger)



Figure 6: Shockblast underground data centre. Photograph. n.d. *TPB:AFK watch.tpbafk.tv*. Web. 29 Sep. 2013.

OBJECTIFICATION

The fixation on data and hardware objects; the advance of our litigious cultures; these elements may contribute to conditions in which bullying can be blended into human interactions. As much as hardware and new platforms may enable discourse, they also become the sites for abuse, where differences between trolling and harassment easily merge: In the UK, during 2013, a number of women in the public eye (among them MPs, campaigners and journalists) became the target of insults and threats intended to silence their contribution to public debates. Often these communications were sent through Twitter. In what was possibly the most high profile case, the abuse followed a successful campaign to have the Bank of England print a female historical figure on its banknotes. [20] Online, the equivocal status of networks is further evident where derogatory, self-aggrandising 'trash-talk' between computer game players[21] turns to harassment and 'the gamification of misogyny' (Lewis). In the competition for kudos, questions about the liberating potential of the Internet abound.

DISAPPEARANCE

Such identity fetishism promises certainty in a moment of profound uncertainty, and harks back to a time in which physical media trash appeared more present than today; it is a moment where, in many ways, absence may be more desirable than presence. The contradiction in interfaces is that in the moment they renounce claims on materiality, they may still expose us to physical threat (whether actual or perceived). Accordingly, Internet trolls revel in their ability to circumvent blocks, hide or adopt new identities and to label messages in ways that reach targets indirectly.[22] The collision between anonymity and free speech makes clear why for some, disappearance is preferable to the advice, 'do not feed the trolls'. In examples

of this, activist Caroline Criado-Perez was driven to delete her twitter account after she received a series of rape threats online (Topping); in 2012, as a consequence of bullying which began online and followed her during several years and different schools, the Canadian teenager Amanda Todd committed suicide (Amanda Todd's Death).

Afterglow

VERSIONING AS METHOD

In a broad sense, and in different domains, we are now seeing truth and responsibility increasingly under review; In the widening push to deliver up to the minute news, the sources and verifiability of content are an ever more present consideration (think of the Yes Men's Bhopal anniversary action [23]). Concern for information ethics, in public and private domains, means questions of accountability and trust (the veracity of versions) gain significant attention: The extended reach of media is changing the act of reflection; propagating images, collectivizing values. In the networked era, reduction is going global.

Away from the context of news and entertainment media, images also circulate in obscure ways. In the apparatus' of political, social and economic assemblages, images now appear as agents. They are the subjects of viral exchange on social networks and potentially convey malicious executable computer code — this is no longer speculation (Tung). Intrinsic to this agency, in the dissemination of images, is the creation of copies. These copies are the multiplying trash by-products of networks' movements, "diverse objects brought together in particular relations, such as the detritus of everyday life unearthed in an archaeological dig" (Wise 78). Whilst networked computer assemblages

generate data in ever greater volume, other assemblages constitute networks in a similar vein: in digital cameras images are made in multiple versions, modelling 'pipeline' work flows and invoking the trope of 'relation'; Images constitute networks where value, exchange, and mutability are implicit. They are pixel-assemblages to be seen as networks in and of themselves.

Relating Michael Callon's work on the 'performativity of networks', Iain Hardie and Donald Mackenzie write,

For Callon, an actor 'is made up of human bodies but also of prostheses, tools, equipment, technical devices, algorithms etc'. – in other words is made up of an agencement. The notion... involves a deliberate word-play. Agencer is to arrange or to fit together: in one sense, an agencement is thus an assemblage... The other side of the word-play... is agence, agency. (Hardie and Mackenzie 58)

We can envisage networks as aggregated versions, sites of recursion and reflexivity, in which circular relations establish the inter-relation of medium and method.

Post-irony for a post-digital age

The activities of comment trolls and websites such as ask.fm demonstrate other ways in which the Internet has become a machine for reflectivity: Interactions dominated by glib and clever epithets invariably promote self-image over self-knowledge (though with notable exceptions[24]). Rhetoric turns the joke upon those who have missed the joke. These episodes thrive on lack of understanding and the connoisseur's appreciation of the

unspoken: The joke is ruined if you spell it out (Harman).

However, the targets of abuse are standing up against such misrepresentation. Their narratives are the alternative versions filling gaps in communication. In this way identities are re-presented; self-images are recomposed. Projects such as *unslut* [25] have this same end, of allowing individuals to positively re-enact negative stories.[26] Intimate reflections like these are in contrast to celebrity relationships lived through media and social media, where the open-ended repetition of text and image insinuates another kind of performance.[27] In a quieter way, self-representation is also self-creation:

my proliferation of selfies is a small way of fighting back. The more I look at myself (in a mirror or in pictures), the easier it becomes to accept that this is really me, and this is my skin... I feel that the more pictures I post of me, sure I'm putting myself out there to be judged, but I am also adding to images out there (in the minds of friends and strangers alike) of who I am. (Stufionado)



Figure 7: Mekhitarian, Vahram. "Recursive Cell." Photograph. 2013. File:Recursive Cell.jpg Wikimedia Commons. Web. 10 Jan. 2014.

As images and self-images re-instate a sense of place, absent themselves from rhetoric and generate their own associations, they obtain a peculiar sense of agency. They are re-entering the world as prosaic reminders of the real — hermetic emblems of an already present, post-ironic post-digital age:



Figure 8: Advertisement posters for a dry cleaner's shop, apparently inspired by Internet memes. Edinburgh, 2013. Photograph by author.

Notes

- [1] <http://www.ohchr.org/en/NewsEvents/Pages/DisplayNews.aspx?NewsID=13706&LangID=E>.
- [2] For an explanation see <http://www.housing.org.uk/policy/welfare-reform/bedroom-tax>.
- [3] <http://www.dailymail.co.uk/news/article-2418194/Outrage-loopy-UN-inspector-lectures-Britain-Shes-violent-slum-ridden-Brazil-attacks-housing-human-rights.html>.
- [4] <http://www.dailymail.co.uk/news/article-2418993/Trial-collapses-men-accused-rape-police-discover-new-evidence-old-Twitter-account-14.html>.
- [5] <http://www.archive.org/web/web.php>.
- [6] <http://www.seppukoo.com>.
- [7] <http://www.git-scm.com>.
- [8] <http://www.git-scm.com/docs/git-blame>.
- [9] <http://www.spring-alpha.org/svs/>.
- [10] <http://www.situatedtechnologies.net/?q=node/85>.
- [11] <https://www.github.com/explore>.
- [12] http://www.debian.org/social_contract.
- [13] http://www.blogs.technet.com/b/microsoft_on_the_issues/archive/2013/08/30/standing-together-for-greater-transparency.aspx.
- [14] <http://www.opgraffiti.deviantart.com/gallery/>.

[15] http://www.nms.ac.uk/highlights/objects_in_focus/cybraphon.aspx.

[16] <http://www.en.wikipedia.org/wiki/Wikipedia:GLAM/NLS>.

[17] <http://www.bbc.co.uk/news/technology-24001692>.

[18] <http://www.watch.tpbfk.tv/>.

[19] <http://www.gawker.com/5899787/finding-goatse-the-mystery-man-behind-the-most-disturbing-internet-meme-in-history>.

[20] <http://www.thewomensroom.org.uk/banknotes>.

[21] For examples of trash-talk in online gaming see: <http://www.kotaku.com/the-problem-with-trash-talk-707113214>.

[22] “online abusers continued to find “new and imaginative ways” to contact her, through her blog”. See <http://www.theguardian.com/uk-news/2013/sep/03/caroline-criado-perez-rape-threats-continue>.

[23] http://www.museumof-hoaxes.com/hoax/archive/permalink/the_yes_mens_bhopal_hoax.

[24] <http://www.theguardian.com/technology/2013/sep/09/jake-davis-topiary-lulzsec-answers>.

[25] <http://www.unslutproject.com/>

[26] “I felt like the chat box could see me through the computer screen.” See: <http://www.theguardian.com/society/2013/sep/21/unslut-project-against-sexual-bullying>.

[27] See remarks about Kayne West and Kim Kardashian’s relationship: <http://www.theguardian.com/lifeandstyle/2013/oct/27/instagram-selfie-reveal-kim-kardashian-tweet>.

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**FOUR NOTES TOWARDS
PROPAGANDA AND THE
POST-DIGITAL SYMPTOM**

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This statement is still somewhat lacking in definiteness, and will remain so [...] The statement is moreover one which one does not attempt to prove. Propaganda is more appropriate to it than proof, for its status is something between a theorem and a definition. In so far as we know a priori what is a puzzle and what is not, the statement is a theorem. In so far as we do not know what puzzles are, the statement is a definition which tells us something about what they are. (Turing, "Solvable and Unsolvable Problems", 588)

This unassuming quote appears in, (what would be) Turing's final published article "Solvable and Unsolvable Problems" (1954). Out of context Turing's argument doesn't mean much, yet it is that word with stands out: propaganda. It is completely unrelated to any of Turing's other descriptions. What is it about propaganda that Turing deemed sufficient in describing a statement about puzzles, problems and solutions?

Despite not being an overtly political writer, Turing's relevancy is undoubtedly important for the politics of digital culture today: particularly concerning relationships between culture, computation, mathematics, digital transmission and even the purported recognition of the "post-digital". What on earth provoked him to describe a mathematical idea as propaganda? Might it not be understood as a retroactive sign of a post-digital affect, or, perhaps an expected symptom of embedded life within a politics of mathematical propagation? The purpose of these notes is to outline what such a description might provoke.

1. The efficacy of the digital

An obvious problem comes from the discourse of 'the digital' itself: a moniker which points towards units of Base-2 arbitrary configuration, impersonal architectures of code, massive extensions of modern communication and ruptures in post-modern identity. Terms are messy, and it has never been easy to establish a 'post' from something, when pre-discourse definitions continue to hang in the air. As Florian Cramer articulates so well, 'post-digital' is something of a loose, 'hedge your bets' term, denoting the general tendency of accounting for the digital revolution whilst acknowledging its innovations and political effects (Cramer).

Perhaps it might be aligned with what some have dubbed "solutionism" (Morozov) or "computationalism" (Berry 129; Golumbia 8): the former critiquing a Silicon Valley-led ideology oriented towards solving liberalised problems through efficient computerised means. The latter establishing the notion (and critique thereof) that the mind is inherently computable, and everything associated with it. In both cases, digital technology is no longer just a business for privatising information, but the business of extending efficient, innovative logic to all corners of society and human knowledge. Here then, the 'post-digital' logic might condemn every action through a cultural logic of efficiency and proprietary.

In fact, there is a good reason why 'digital' might as well be an synonym for 'efficiency'. Before any consideration is assigned to digital media objects (i.e. platforms, operating systems, networks), consider the inception of 'the digital' as such: that is *information theory*. If information was a loose, shabby, inefficient method of vagueness specific to various mediums of communication, Claude Shannon compressed all forms of

communication into a universal system with absolute mathematical precision (Shannon). Once transmission became digital, the conceptual leap of determined symbolic logic was set into motion, and with it, the 'digital' became synonymous with an ideology of effectivity. No longer would miscommunication be subject to human finitude, distance and time, but only the limits of entropy and the matter of automating messages through the support of alternating 'true' or 'false' relay systems.

However, it would be quite difficult to envisage any 'post-computational' break from such discourses — and with good reason: Shannon's breakthrough was only systematically effective through the logic of computation. So the old missed encounter goes: Shannon presupposed Turing's mathematical idea of computation to transmit digital information, and Turing presupposed Shannon's information theory to understand what his Universal Turing Machines were actually transmitting.

The basic theories of both have not changed. Instead, the necessary materials have provided greater processing power, extensive server infrastructure and larger storage, propagating Turing and Shannon's ideas beyond what they thought or expected. Some historians even speculate that Turing may have made the link between information and entropy two years before Bell Labs did (Good).

Thus this 'post-digital' logic of efficiency might historically acknowledge Shannon's digital efficiency, and Turing's logic. But by the same measure, any critical reflection on it must document how the logic of efficiency has transformed work, life, culture as well as artistic praxis and aesthetics. This is not to say that everything is reducibly predicated on efforts made in computer science. Instead one must fully acknowledge these dominant structures and account for how

ideological principles operate within them, whilst restricting other alternatives which do not fit such a 'vision'. Hence, the 'post-digital' interpretation is as much a symptom of acknowledging this infrastructure, as it is, its own failure to address such implications. Perhaps the 'task' set for us nowadays might consist in critiquing digital efficiency and how it has come to work against commonality, despite transforming the majority of Western infrastructure in its wake.

Propaganda has some historical context here, and it exists in cryptography and concealment. It is well known that in 1943, Shannon and Turing had many lunches together, holding conversations and exchanging ideas, yet they never revealed detailed methods of cryptanalysis so integral to their lives (Price & Shannon). This provides us with a succinct allegorical image not only of their missed encounter, but also of their influential ideas: neither of which ever affords an ability to be transparent. Computational and digital transmission is never neutral, nor open, nor clear about what it does. Its automated decisions always conceal inherent principles of ideal forms that benefit those who construct them.

But in saying this, I do not just mean that the capitalist means of production *only* uses digital networks for propagative means (although that happens), but that the *very means of computing a real concrete function is constitutively propagative*. No system is ever 'neutral'. In this sense, propaganda resembles an understanding of what it means to be integrated into an ecology of efficiency, symptomatic of living 'post-digitally' or pretending to. Digital information often deceives us into accepting its objective, mathematical transparency, and of holding it to that account: yet in reality it does the complete opposite, with no given range of judgements available to detect manipulation from didactic lesson, nor persuasion from smear.

Thus the role of computation in digital networks affords a similar proposition. We all know that the 'web' is lying to us: it keeps telling us we are involved, or rather we have confused involvement with the 'fear of missing out'. Propaganda might be the practice of being always-already implicated with someone else's conceptual principles. Such principles embed pre-determined decisions which not only *generate* but *decide* on user choices and implicitly engage with them in the effort of solving a problem.

Propaganda obfuscates the means of transforming itself by its own use, such is the efficacy of propagating. It establishes itself by eschewing any systemic implication, thus becoming concealed behind other user attitudes. It denotes the verb to *propagate*: that is, to *reproduce ideas*, such is the inherent logic of ideology. Propagative logic is at its most potent in digital culture when machines operate silently, spreading and transforming ideas and decisions across global networks and functional systems.

Propagation operates in the logic of transmission: that of communication and control existing as one system, as Wiener's cybernetics knew so well. As Siegfried Zielinski recently noted in *[After the Media]: News from the Slow-Fading Twentieth Century* (2013), the discipline of cybernetics, so intimately related to Turing's work, is comparable to the study of propaganda. Quoting Zielinski, both disciplines share, "the intention of using applied mathematics to describe what is difficult to calculate or predict, and to monitor it in tests, which at the same extend the promise of controlling it". (Zielinski 25). The concrete practice of propagation is operative as soon as any transformed motion of binary signal is transmitted in a favourable direction through a medium, any medium. But more than the above, propaganda might be the inherent operation of solving all problems: most notably mathematical ones.

2. A decision problem

Two years before Shannon's famous Masters thesis, Turing published what would be his famous theoretical basis for computation in the 1936 paper "On Computable Numbers, with an Application to the Entscheidungsproblem." The focus of the paper was to establish the idea of computation within a formal system of logic, which when automated would solve particular mathematical problems put into function (Turing, *An Application*). What is not necessarily taken into account is the mathematical context to that idea: for the foundations of mathematics were already precarious, way before Turing outlined anything in 1936. Contra, the efficiency of the digital, there is a precariousness built-in to computation from its very inception: the precariousness of solving all problems in mathematics.

The key word of that paper, its key focus, was on the *Entscheidungsproblem*, or decision problem. Originating from David Hilbert's mathematical school of formalism, 'decision' means something more rigorous than the sorts of decisions in daily life. It really means a 'proof theory', or how analytic problems in number theory and geometry could be formalised, and thus efficiently solved by provable theorems (Hilbert 3). Solving a problem is simply finding a provable 'winning position' in a game. Similar to Shannon, 'decision' is what happens when an automated system of function is constructed in such a sufficiently complex way, that an algorithm can *always* 'decide' a binary, yes or no answer to a mathematical problem, in a sufficient amount of time given an arbitrary input. It does not require ingenuity, intuition or heuristic gambles, just a combination of simple consistent formal rules and a careful avoidance of contradiction.

The two key words there are ‘always’ and ‘decide’. The progressive end-game of twentieth century mathematicians who, like Hilbert, sought after one simple totalising conceptual system to decide every mathematical problem and work towards absolute knowledge. All Turing had to do was make explicit Hilbert’s implicit computational treatment of formal rules, manipulate symbol strings and automate them using an ‘effective’ or ‘systematic method’ (Turing, *Solvable and Unsolvable Problems* 584) encoded into a machine. This is what Turing’s thesis meant (discovered independently to Alonzo Church’s equivalent thesis (Church)): any systematic algorithm solved by a mathematical theorem in a proof, can be computed by a Turing machine (Turing, *An Application*), or in Robin Gandy’s words, “[e]very effectively calculable function is a computable function” (Gandy).

Thus *effective procedures decide problems*, and they resolve puzzles providing winning positions (like theorems) in the game of functional rules and formal symbols. In Turing’s words, “a systematic procedure is just a puzzle in which there is never more than one possible move in any of the positions which arise and in which some significance is attached to the final result” (Turing, *Solvable and Unsolvable Problems* 590). The significance, or the winning position, becomes the crux of the matter for that problem: *what puzzles or problems are to be decided and what solutions are afforded?* This is what formalism attempted to do: encode everything through the regime of formalised efficiency, so that all of mathematically inefficient problems are, in principle, ready to be solved. Programs are simply proofs: if it can be proved in discrete mathematics, it could be computed and automated.

In 1936, Turing showed how some complex mathematical concepts (or effective procedures) could simulate the functional

decisions of all the other ones (such as the Universal Turing Machine). Ten years later, Turing and John von Neumann would independently show how physical general purpose computers, offered the same thing. From that moment on (broadly speaking), efficient digital decisions began to embed themselves in the cultural application of physical materials. Before Shannon’s information theory offered the precision of transmitting information, Hilbert and Turing developed the structure of that transmission in the mathematical regime of formal decision.

Yet, there was also a non-computational importance here, for Turing was also fascinated by what decisions couldn’t compute. His thesis was quite precise, so as to elucidate that if no mathematical problem could be proved, a computer was not of any use. In fact, the entire focus of his 1936 paper, often neglected by Silicon Valley cohorts, showed that Hilbert’s particular decision problem *could not be solved*. Unlike Hilbert, Turing was not interested in using computation to solve every problem, but as a curious endeavour for surprising intuitive behaviour. The most important of all, Turing’s halting, or printing problem was influential, precisely as it was *undecidable*; a decision problem which couldn’t be decided, as no ‘higher’ algorithm existed to replicate the proof (what is commonly known as the halting problem).

Undecidable problems might be looked at as a dystopian counterpart against the utopian efficient solutions constitutive of Shannon’s ‘digital information’ theory. A base 2 binary system of information transmission only works via the computational work of deciding on one of two possible states. Thereby a system can communicate with another via processing one digit, by virtue of the fact that there is only one other alternative digit to it. Yet any efficient transmission of that information, is only subject to a system which can ‘*decide*’ on the digits in question,

and establish a formalised proof to calculate and modify the success of the transmission's direction. If there is no mathematical proof to decide a problem, then transmitting information becomes problematic for establishing a solution. Proofs, decisions and computation go hand in hand.

3. Decisional ecologies

What has become clear is that the post-digital world is no longer simply accountable to human decision alone. Decisions are no longer limited to the borders of human decisions and 'culture' is no longer simply guided by a collective whole of social human decisions. Nor is it reducible to one harmonious 'natural' collective decision which prompts and pre-empts everything else. Instead we seem to exist in an *ecology of decisions*: or better yet *decisional ecologies*. Before there was ever the networked protocol (Galloway), there was the computational decision. Decision ecologies are already set up before we enter the world, implicitly coterminous with our lives: explicitly determining a quantified or bureaucratic landscape upon which an individual has limited manoeuvrability.

Decisions are not just digital, they are continuous as computers can be: yet decisions are at their most efficient and effective when digitally transmitted. Decisional efficiency seeps into every neo-liberal treatment of engaging with a problem: forms, bureaucracy, quantification and administration. We are constantly told by governments and states that are they making 'tough' decisions in the face of austerity. CEOs and Directors make tough decisions for the future of their companies and 'great' leaders are revered for being 'great decisive leaders': not just making decisions quickly and effectively, but also settling issues and producing definite results.

Even the word 'decide', comes from the Latin origin of '*decidere*', which means to determine something and 'to cut off.' Algorithms in financial trading know not of value, but of decision: whether something is marked by profit or loss. Drones know not of human ambiguity, but can only decide between kill and ignore, cutting off anything in-between. Constructing a system which decides between one of two digital values, even repeatedly, means cutting off and excluding all other possible variables, leaving a final result at the end of the encoded message. Making a decision, or building a system to decide a particular ideal or judgement *must force other alternatives outside of it*. Decisions are always-already embedded into the framework of digital action, always already deciding what is to be done, how it can be done or what is threatening to be done. It would make little sense to suggest that these entities 'make decisions' or 'have decisions', it would be better to say that they *are decisions* and *ecologies are constitutively constructed by them*. Digital efficiency is simply about the expansion of automating decisions and what sort of formalised significances must be propagated in order to solve social and economic problems, which creates new problems in a vicious circle.

The question can no longer simply be 'who decides', but now, 'what decides?' Is it the cafe menu board, the dinner party etiquette, the NASDAQ share price, Google Pagerank, railway network delays, unmanned combat drones, the newspaper crossword, the javascript regular expression or the differential calculus?

One pertinent example: consider George Dantzig's *simplex algorithm*: this effective procedure (whose origins began in multidimensional geometry) can always decide solutions for large scale optimisation problems which continually affect multi-national corporations. The simplex algorithm's

proliferation and effectiveness has been critical since its first commercial application in 1952, when Abraham Charnes and William Cooper used it to decide how best to optimally blend four different petroleum products at the Gulf Oil Company (Elwes 35; Gass & Assad 79). Since then the simplex algorithm has had years of successful commercial use, deciding almost everything from bus timetables and work shift patterns to trade shares and Amazon warehouse configurations. According to the optimisation specialist Jacek Gondzio, the simplex algorithm runs at “tens, probably hundreds of thousands of calls every minute” (35), always deciding the most efficient method of extracting optimisation. The technique of decision might be a *propagative* method for embedding knowledge, optimisation and standardisation techniques in order to solve problems combined with the greater urge to solve the most unsolvable ones, including us.

Elsewhere Google do not build into their services an option to pay for the privilege of protecting one’s privacy: the entire point of providing a free service which purports to improve the problems of daily life, is that it primarily benefits the interests of shareholders and extends commercial agendas. James Grimmelmann gave a heavily detailed exposition on Google’s own ‘net neutrality’ algorithms and how biased they happen to be. In short, PageRank does not simply decide relevant results, it *decides visitor numbers* and he concluded on this note: “With disturbing frequency, though, websites are not users’ friends. Sometimes they are, but often, the websites want visitors, and will be willing to do what it takes to grab them.” (Grimmelmann 458)

Propaganda might not simply exist as biased representable information, but the very ecology of functional processes that effectively construct such a bias. Net neutrality assumes that technologies are never

inherently propagative, but forgets that regimes of standardisation and formalisation, were already ‘built in’ to the theories which developed digital methods and means, irrespective of what computers can or cannot compute or prove.

The issue is what sort of significant result arises from these proofs, and what sort of principles are established in a given decision ecology: thus *mathematical algorithms are hard-wired ideological automatons*. As Plato knew, *an idea is an idea*, just as a decision only decides, regardless of its material basis.

4. Encryption and propaganda

But what of propaganda itself? What about the very idea of it? The familiarity of propaganda is manifestly evident in religious and political acts of ideological persuasion: brainwashing, war activity, political spin, mind control techniques, subliminal messages, political campaigns, cartoons, belief indoctrination, media bias, advertising or news reports. A definition of propaganda might follow from all of these examples: namely, the systematic social indoctrination of biased information that persuades the masses to take action on something which is neither beneficial to them, nor in their best interests. As Peter Kenez argues, propaganda is “the attempt to transmit social and political values in the hope of affecting people’s thinking, emotions, and thereby behaviour” (Kenez 4) Following Stanley B. Cunningham’s watered down definition, propaganda might also denote a helpful and pragmatic “shorthand statement about the *quality of information transmitted and received* in the twentieth century” (Cunningham 3), insofar as the twentieth century is sometimes referred to as the ‘century of propaganda’.

But propaganda isn't as clear as this general definition makes out: in fact what makes propaganda studies such a provoking topic is that nearly all literature notes from the start, that no stable definition exists. Propaganda's definition is in itself deceptive. It moves beyond simple 'manipulation' and 'lies', unsubtle derogatory, jingoistic representations, and the irrational spread of emotional pleas, and extends to the ambiguity of constructing truth. As the master propagandist William J. Daugherty wrote:

It is a complete delusion to think of the brilliant propagandist as being a professional liar. The brilliant propagandist [...] tells the truth, or that selection of the truth which is requisite for his purpose, and tells it in such a way that the recipient does not think that he is receiving any propaganda. (Daugherty 39).

Propaganda, like ideology, works by being inherently implicit and social. In the same way that post-ideology apologists ignore their symptom, propaganda is keenly ignored in digital culture. It isn't to be taken as a shadowy fringe activity, blown apart by the democratising fairy-dust of 'the Internet'. As many others have noted, the purported 'decentralising' power of online networks, simply offers new methods for propagative techniques, or 'spinternet' strategies, evident in China amongst other regimes (Brady). Iran's recent investment into video game technology only makes sense, only when you discover that 70% of Iran's population are under 30 years of age, underscoring a suitable contemporary method of dissemination. Similarly in 2011, the New York City video game developer Kuma Games was mired in controversy when it was discovered that an alleged CIA agent, Amir Mirza Hekmati, had been recruited to make an episodic

video game series intending to "change the public opinion's mindset in the Middle East." (Tehran Times). The game in question, *KumaWar* (2006 – 2011) was a free-to-play First-Person Shooter series, delivered in episodic chunks, the format of which attempted to simulate biased re-enactments of real-life conflicts.

But propaganda is not just social, it is also tied up with understanding technical procedures and technique in general. Despite his unremarkable leanings towards Christian realism, Jacques Ellul famously updated propaganda's definition as the end product of what he previously lamented as 'technique'. Instead of viewing propaganda as a highly organised systematic strategy for extending the ideologues of peaceful warfare, he understood it as a general social phenomenon in contemporary society.

Ellul outlined two general types amongst other distinctions: *political* and *sociological* propaganda: Political propaganda involves governmental administrative techniques which intend to directly change the political beliefs of an intended audience. By contrast, sociological propaganda is the implicit unification of involuntary public behaviour which creates images, aesthetics, problems, stereotypes, the purpose of which aren't explicitly direct, nor overtly militaristic. Ellul argues that sociological propaganda exists; "in advertising, in the movies (commercial and non-political films), in technology in general, in education, in the *Reader's Digest*; and in social service, case work, and settlement houses" (Ellul 64). It is linked to what Ellul called "pre" or "sub-propaganda": that is, an imperceptible persuasion, silently operating within ones "style of life" or permissible attitude (63).

Faintly echoing Louis Althusser's Ideological State Apparatuses (Althusser 182) nearly ten years prior, Ellul defines pre-propaganda as "the penetration of an

ideology by means of its sociological context.” (63) Sociological propaganda is inadequate for decisive action often meaning that the more repressive strategies of political propaganda are required. In the post-digital world, such implicitness no longer gathers wartime spirits, but instead propagates the social with proprietary principles: a neo-liberal way of life that is individualistic, wealth driven, cynical, proprietary and self-opinionated.

Ellul’s most powerful assertion is that ‘facts’ and ‘education’ are part and parcel of the sociological propagative effect: nearly everyone faces a compelling need to be opinionated and we are all capable of judging for ourselves what decisions should be made, without at first considering the implicit landscape from which these judgements take place. One can only think of the implicit digital landscape of Twitter: the archetype for self-promotion, quip-formations and overly self-important methods of propagation — all taking place within Ellul’s sub-propaganda of data collection and concealment. Such methods, he warns, will have “solved the problem of man” (xviii).

But the technique of information is of relevance here, and propaganda is only effective within a social community when it offers the means to solve problems by actively transmitting ideas in a particular direction: quoting Ellul:

Thus, information not only provides the basis for propaganda but gives propaganda the means to operate; for information actually generates the problems that propaganda exploits and for which it pretends to offer solutions. In fact, no propaganda can work until the moment when a set of facts has become a problem in the eyes of those who constitute public opinion (114).

Looking at Ellul’s quote sideways, the issue isn’t that strategies have simply adopted contemporary technology to propagate an impressionable demographic, but that information is simply *always-already efficient, effective and propagative in its automation*. Thus for Ellul, “propaganda is called upon to solve problems created by technology, to play on maladjustments and to integrate the individual into a technological world” (Ellul xvii).

Let’s return to Turing’s quote, given from the outset. The statement he refers to as propaganda, is not immediately obvious to the reader, yet on closer inspection it actually refers to the Church-Turing thesis already mentioned. Might it not allude to this predetermined structures for how something can be effectively calculable? (Rosser): that Turing’s own statement is not just capable of automating propaganda, *but just simply is propaganda?*

But why would Turing define a mathematical idea as *propaganda rather than proof?* He was well aware that his statement was *not an effective procedure in itself, which is to say the thesis itself cannot be proved* — it is certainly about proofs, or how one can prove certain things in a formal system (hence it might be a theorem) and what formal methods can automate them, but it *doesn’t give us knowledge about what computational or systematic procedures are*. The statement only tells us that automated machines can decide the same winning conditions through equivalent algorithmic methods (its definition). The statement or thesis does not prove why computation might be able to solve problems at all — moreover it can’t even tell us whether a problem can be solved, before one even attempts to find a solution (there is no effective procedure to ‘decide’ every effective procedure, as the halting problem suggests). Thus following Turing, there is no ‘correct’ use of applying

the thesis in practice: it resembles a theorem which seems to *propagate proofs*, yet, mathematically it only stands as a definition.

Formal systems certainly seem to offer effective procedures to problems, but unless a winning position is proved outright, it can never fully justify itself in offering solutions in all cases. *There is no effective procedure to guarantee a proof about what effective procedures are*, and this is what Turing might have meant: *there is no guaranteed calculation which calculates all other calculations*. There is only concrete instances of propagative functions that give us second-hand truths.

Turing's propaganda works much like Hilbert's progressive project of formalism, operating as *if* it can always decide solutions to problems, yet in its operation, must hide uncomfortable paradoxes which allow its communication to occur in the first place. In other words, there are only concrete methods of effective procedure which unavoidably *propagate* the view that *all* problems can be totally solved in advance.

Then again, perhaps Turing wasn't exactly prophetic in calling it propaganda considering his contributions to cryptography and the mathematical work of decoding encrypted messages. There is a lot more going on in Turing's definition of propaganda than passing it off as an anachronism. For instance the historical relationship between Turing's contribution to decoding the enigma code for the Government Code and Cypher School (the forerunner of GCHQ) continues to play itself out in the ongoing NSA mass surveillance revelations (Hopkins). This seventy year history does not just capture the secret relationship between two regimes of state surveillance, *but how the propagation of mathematical proofs decide ideological effects*. Indeed, a detailed account of how the NSA actually managed to enact such surveillance, is implicated in the ecologies of problem solving and formalising proofs, just

as it was for Bletchey Park. Both ecologies establish similar propagative strategies but with different historical principles.

In September 2013 Edward Snowden's leaked a number of NSA memos, which showed exactly how the NSA managed to hack into personal accounts, emails and messages. They were completely reliant on the demonstration of one single mathematical proof which relied on solving an equation. The proof in question lay in a public key encryption algorithm, entitled a *Dual Elliptic Curve Deterministic Random Bit Generator* (Dual_EC_DRBG) introduced by the National Institute of Standards and Technology (NIST) in 2005 as the national standard for web encryption (Barker and Kelsey).

Elliptic Curve Cryptography (ECC) is an entire industry in mathematics specialising in encrypting messages using modular arithmetic and large number factorisation formulae. Sending messages are easy to encrypt, but mathematically improbable to decrypt, unless you have the necessary private key. Along with other public key encryption methods (such as RSA), ECC's use has almost single handedly contributed to the relative stability of internet security infrastructure: securely transmitting digital messages, emails, tweets, data, bit coin and bank transactions all through a public infrastructure. ECC and RSA have *constructed a decision ecology of a supposedly secure web*.

It is the reliance of mathematical proofs which matter here. ECC affords the sender to encrypt a message using public and private integers, or keys, which are created by multiplying huge prime numbers. The receiver can decode the message on the same basis.

In order to illegally hack and decrypt such encryptions without having access to the decoding private number, it is necessary to factorise the public number into its original primes. Because such factorisations are hard or intractable (i.e. infinitely possible,

but finitely impossible using current computational means), the hardness of the mathematical problem establishes the security of the transmission. Here we can see that moderately unsolvable mathematical problems are actually responsible for encrypting secure messages.

ECC works by plotting a curve where two solutions (y and x) exist to satisfy a simple equation. Dual_EC_DRBG uses the following equation (where b is an integer and \pmod{p} is the prime number used):

$$y^2 = x^3 - 3x + b \pmod{p}$$

Thus, the plot lines on the elliptical plane curve correspond to the private and public solutions which generate large numbers for encryption. The Dual_EC_DRBG algorithm, creates pseudo random numbers which look publicly random next to the curve, but can be securely decrypted.

However, Snowden's leaked memo showed that NIST propagated Dual_EC_DRBG with the full knowledge that NSA developed a back door within the algorithm itself (speculation suggests that the NSA explicitly paid RSA £10 million to support the insecure algorithm). Essentially, NSA propagated a mathematical proof inherent to Dual_EC_DRBG which allowed them to decrypt any encryption produced, so long as the Dual_EC_DRBG was used as a general standard: which it was, as in the case of Microsoft (Windows Vista and Windows 7/8), Cisco systems, IBM, Blackberry, Symantec, to name just a few (DRBG Validation List). Before Snowden leaked anything, there was already some suspicion of Dual_EC_DRBG back in 2007 (Schneier), where it was shown the numbers defining the elliptic curve had never been disclosed. Two Microsoft researchers (Shumow and Ferguson), showed that these numbers correlated to a second

hidden set of numbers, which if known would solve Dual_EC_DRBG's intractability thus having, quoting Schneier, "the keys to the kingdom."

Indeed, Dual_EC_DRBG appears to be have been propagated as an infrastructure which supports only one direction of encryption, because NIST produced *the* public document recommending it as *the* standard. Such calculable mathematical proofs *operationalise* devious exercises of propagation, which in this case, constructs an entire security infrastructure concealing back doors for surveillance. What is important to note is that this propagated back-door is a bona-fide mathematical proof: inherently effective.

Thus, what is computation if it isn't the technical means of enacting effective, efficient, propagated pre-determined results through societal means? What if the machine was the propagandist? Propaganda largely avoids intractability: it can't stand it. Difficult questions cannot be decided. Frederic Charles Bartlett argued that propaganda was primarily a *decisive* method of suggestion, not simply designed to control psychological behaviour, but to acquire specific, *effective* results through purposeful action (Bartlett). Perhaps we could add to this, the deeper realisation that propaganda is no longer limited to the limits of psychological behaviour, or the limits of societal communities, but extends to the mathematical limits of decisional machines which decide results in a real infrastructure. Ideology no longer operates at the borders of human knowledge, but of automated systems.

Propaganda is part and parcel of computational culture and of technical infrastructure: not just posters, pamphlets, zines and broadcasts, but now, gamification, platform devices, spy-ware, pseudorandom encryption algorithms, services and subscriptions. Each one only allows certain pre-determined outcomes to be realised and exploited. Each

one already deciding (or propagating), a limited number of routes, which users mistake for their own 'openness'. If there is one thing Silicon Valley or the NSA would love to solve, in their self-congratulatory wallowing, it is detecting whether a certain problem always has a provable solution: and whenever they come up with one, it usually has a market to satisfy and a propagative strategy to make it seem beneficial.

In this post-digital realisation, information doesn't seem to want to be free (Polk): or at the very least, it wants to convince you it might be. Digital information simply wants to propagate itself as a watchdog for any problems that are always-already resolved, refusing its own transparency in turn. The best we can hope for is to understand information's propagative effect, and ask not of its truth, but of what it propagates. Following Orwell, we should admit that as far as the post-digital is concerned, "[a]ll propaganda is lies, even when one is telling the truth. I don't think this matters so long as one knows what one is doing, and why" (Orwell, Davidson & Angus 229).

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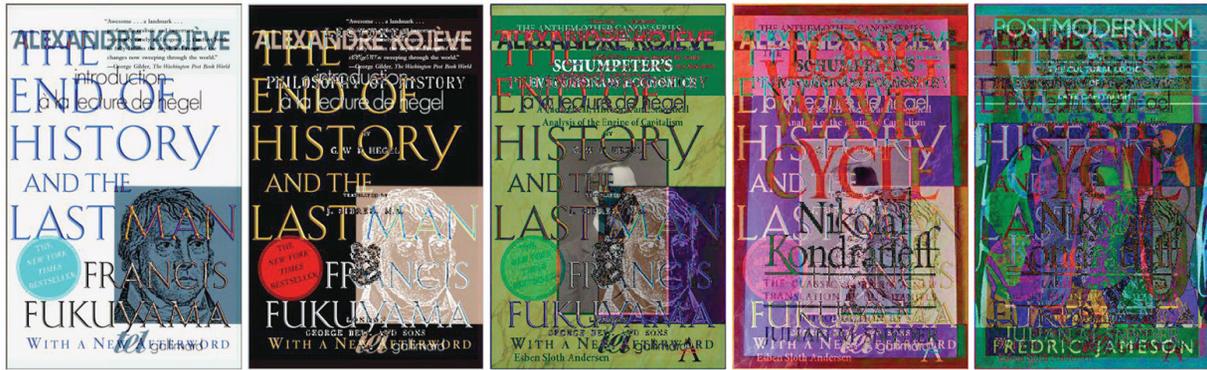
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Geoff Cox

**PREHISTORIES OF THE
POST-DIGITAL: OR, SOME
OLD PROBLEMS WITH
POST-ANYTHING**

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According to Florian Cramer, the “post-digital” describes an approach to digital media that no longer seeks technical innovation or improvement, but considers digitization something that already happened and thus might be further reconfigured (Cramer). He explains how the term is characteristic of our time in that shifts of information technology can no longer be understood to occur synchronously — and gives examples across electronic music, book and newspaper publishing, electronic poetry, contemporary visual arts and so on. These examples demonstrate that the ruptures produced are neither absolute nor synchronous, but instead operate as asynchronous processes, occurring at different speeds and over different periods and are culturally diverse in each affected context. As such, the distinction between “old” and “new” media is no longer useful.

Yet despite the qualifications and examples, there seems to be something strangely nostalgic about the term — bound to older ‘posts’ that have announced the end of this and that. I am further (somewhat nostalgically too perhaps) reminded of Frederic Jameson’s critique of postmodernity, in which he identified the dangers of conceptualising the present historically in an age that seems to have forgotten about history (in *The Cultural Logic of Late Capitalism*, 1991). His

claim was that the present has been colonised by ‘pastness’ displacing ‘real’ history (20), or what we might otherwise describe as neoliberalism’s effective domestication of the transformative potential of historical materialism.

In this short essay I want to try to explore the connection of this line of thinking to the notion of the post-digital to speculate on what is being displaced and why this might be the case. It is not so much a critique of the post-digital but more an attempt to understand some of the conditions in which such a term arises. Is contemporary cultural production resigned to make empty reference to the past in ‘post-history’: thereby perpetuating both a form of cultural amnesia and uncritical nostalgia for existing ideas and mere surface images? As Cramer also acknowledges, one of the initial sources of the concept occurs in Kim Cascone’s essay “The Aesthetics of Failure: Post-Digital Tendencies in Contemporary Computer Music” (2000), and it is significant that in his later “The Failures of Aesthetics” (2010) he further reflects on the processes by which aesthetics are effectively repackaged for commodification and indiscriminate use. The past is thereby reduced to the image of a vast database of images without referents that can endlessly reassigned to open up new markets and establish new value networks.

Posthistory

The Hegelian assertion of the end of history — a notion of history that culminates in the present — is what Francis Fukuyama famously adopted for his thesis *The End of History and the Last Man* (1992) to insist on the triumph of neoliberalism over Marxist materialist economism. In Fukuyama's understanding of history, neoliberalism has become the actual lived reality. This is both a reference to Hegel's *Phenomenology of Spirit* but also Alexandre Kojève's *Introduction à la lecture de Hegel: Leçons sur "La Phénoménologie de l'Esprit"* (1947), and his "postscript on post-history and post-historical animals," in which he argues that certain aesthetic attitudes have replaced the more traditional 'historic' commitment to the truth.

These aesthetic changes correspond somewhat to the way that Jameson contrasts conceptions of cultural change within Modernism expressed as an interest in all things 'new', in contrast to Postmodernism's emphasis on ruptures, and what he calls 'the tell-tale instant' (like the 'digital' perhaps), to the point where culture and aesthetic production have become effectively commodified. He takes video to be emblematic of postmodernism's claim to be a new cultural form but also reflects centrally on architecture because of its close links with the economy. For critical purposes now, digital technology, more so than video even, seems to encapsulate the kinds of aesthetic mutability as well as economic determinacy he described in even more concentrated forms. To Jameson, the process of commodification demonstrated the contradictory nature of the claims of postmodernism: for instance, how Lyotard's notion of the end of grand (totalizing) narratives became understood to be a totalizing form in itself. Furthermore, it seems rather obvious that what might be considered

to be a distinct break from what went before clearly contains residual traces of it ("shreds of older avatars" as he puts it), not least acknowledged in the very use of the prefix that both breaks from and keeps connection to the term in use.

So rather than a distinct paradigm shift from modernism, he concludes that postmodernism is "only a reflex and a concomitant of yet another systemic modification of capitalism itself" (Jameson xii). Referring to Daniel Bell's popular phrase 'postindustrial society', Jameson instead argues for 'late-capitalism' (a term allegedly taken from Adorno). This preferred choice of prefix helps to reject the view that new social formations no longer obey the laws of industrial production and so reiterates the importance of class relations. Here he is also drawing upon the work of the Marxist economist Ernest Mandel in *Late Capitalism* (1978) who argued that in fact this third stage of capital was in fact capitalism in a purer form — with its relentlessly expanding markets and guarantee of the cheapest work-force. If we follow this line of logic, can we argue something similar with the post-digital? What are its residual traces and what is being suppressed? How are new markets and social relations are being reconfigured under these conditions?

Determining logic

To begin to think about these questions it should be understood that Jameson adopts Mandel's 'periodising hypothesis' or 'long wave theory' of expanding and stagnating economic cycles to explain developmental forces of production. In this unashamedly dialectical model, growth is explained in parallel to the previous period's stagnation. Three general revolutions in technology are described, in close relation to the capitalist

mode of production since the 'original' industrial revolution of the later 18th century: Machine production of steam-driven motors since 1848; machine production of electric and combustion motors since the 90s of the 19th century; machine production of electronic and nuclear-powered apparatuses since the 40s of the 20th century (Mandel 119). Correspondingly Jameson characterises these as: market capitalism; monopoly capitalism, or the stage of imperialism; multinational capitalism (35), each expanding capital's reach and effects. He then relates these economic stages directly to cultural production, as follows: realism — worldview of realist art; modernism — abstraction of high modernist art; and postmodernism — pastiche.

Although this model may seem rather teleological and over-determined on first encounter, he explains that these developments are uneven and layered, without clean breaks as such, as "all isolated or discrete cultural analysis always involves a buried or repressed theory of historical periodization" (Jameson 3). The acknowledgement of what lies historically repressed provides a further link to Hal Foster's *The Anti-Aesthetic*, and his defence of Jameson's adoption of the long wave theory as a "palimpsest of emergent and residual forms" (Foster 207). However he does consider it not sensitive enough to different speeds nor to the idea of 'deferred action' (that he takes from Freud's the return of the repressed). This aspect is important to any psychoanalytic conception of time and implies a complex and reciprocal relationship between an event and its later reinvestment with meaning.

This feedback loop (or dialectic) of anticipation and reconstruction is perhaps especially important to understand the complex symptoms of psycho-social crisis. For instance, and to understand the present financial crisis, Brian Holmes traces cycles

of capitalist growth and the depressions that punctuate them by also referring to long wave theory. Rather than Mandel, he refers directly to the Russian economist Nikolai Kondratiev, who identified three long waves of growth underpinned by techno-economic paradigms: "rising from 1789 to a peak around 1814, then declining until 1848; rising again to a peak around 1873, then declining until 1896; and rising once more to a peak around 1920 (followed by a sharp fall, as we know, in 1929)." (Holmes 204) He explains that what Kondratiev discovers is that large numbers of technological inventions are made during the slumps, but only applied during the upsurges (205). This pattern in turn informs Joseph Schumpeter's influential idea of how innovations revolutionize business practices — what he later calls "creative destruction" and later "disruptive innovation" by others (1995) — to demonstrate how profit can be generated from stagnated markets. Holmes traces the contemporary importance of these concepts to establish how capitalism follows a long wave of industrial development that presents opportunities for social transformation from a complex interplay of forces, and innovation is applied: "Investment in technology is suspended during the crisis, while new inventions accumulate. Then, when conditions are right, available capital is sunk into the most promising innovations, and a new long wave can be launched." (206)

Is something similar taking place with digital technology at this point in time following the dotcom hype and its collapse? Is the pastiche-driven retrograde style of much cultural production a symptom of these complex interplay of forces, and an indication of business logic that seeks to capitalize on the present crisis (given the paucity of other options) before launching new innovations on the market? Yet before making such a bold assertion we should also be wary of other determinisms as the relays of technological

innovation alone do not reveal the inner mechanisms of the broken economy, but broader analyses that reach beyond technology: “Technology has as much to do with labour repression as it does with wealth and progress. This is our reality today: there is too much production, but it is unaffordable, inaccessible, and useless for those who need it most.” (Holmes 209)

This position seems to concur with the overall problem of endless growth and collapse — the reification of class divisions — where old technologies are repackaged but in ways that serve to repress historical conditions. In a similar vein Jameson would have us conceive of the contemporary phase of capitalism in terms of both catastrophe and progress (Jameson 47). This means to inscribe the possibility of change into the very model of change offered up as unchangeable — or something similarly paradoxical (and dialectical). Other kinds of innovations outside of the capitalist market might be imagined in this way but there also seems to be a problem here in that the very processes have been absorbed back into further stages of social repression.

Postscript

Are these periodisations simply too mechanical, too economically determining? Probably. Indeed, are Marxist theories of capitalist crisis bound to outmoded notions of the development of the forces of production, in order to conceptualise decisive (class) action? That may not be such a bad thing if our memories are fading about what is being displaced and how. Having said this let us perhaps better conclude that economic crises are increasingly subject to the conditions of what Peter Osborne refers to as ‘global contemporaneity’. The suggestion is that neither modern

nor postmodern discourses are sufficient to grasp the characteristic features of the historical present. In this view, the contemporary is not simply a historical period per se, but rather a moment in which shared issues that hold a certain currency are negotiated and expanded.

As a historical concept, the contemporary thus involves a projection of unity onto the differential totality of the times of lives that are in principle, or potentially, present to each other in some way, at some particular time — and in particular, ‘now’, since it is the living present that provides the model of contemporaneity. That is to say, the concept of the contemporary projects a single historical time of the present, as a living present — a common, albeit internally disjunctive, historical time of human lives. ‘The contemporary’, in other words, is shorthand for ‘the historical present’. Such a notion is inherently problematic but increasingly irresistible. (Osborne)

The term contemporaneity has become useful to deal with the complexities of time and history, if not politics, in ways that neither modernism nor postmodernism seemed able to capture. Beyond simply suggesting something is new or sufficiently different, the idea of the contemporary poses the vital question of when the present of a particular work begins and ends. In getting to grips with what constitutes contemporary art, Osborne’s point is that the convergence and mutual conditioning of periodisations of art and the social relations of art have their roots in more general economic and socio-technological processes.

Thus contemporaneity begins to describe the more complex and layered problem of different kinds of time existing

simultaneously across different geo-political contexts. Doesn't this point to the poverty of simply declaring something as post something else? When it comes to the condition of the post-digital, the analogy to historical process and temporality seems underdeveloped to say the least. The post-digital can perhaps be considered "badly known," as Osborne would put it.

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APPLICATIONS OF THE POST-DIGITAL

Alessandro Ludovico

**POST-DIGITAL PUBLISHING,
HYBRID AND PROCESSUAL
OBJECTS IN PRINT**

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Introduction

This paper analyses the evolution of printed publishing under the crucial influence of digital technologies. After discussing how a medium becomes digital, it examines the 'processual' print, in other words, the print which embeds digital technologies in the printed page. The paper then investigates contemporary artist's books and publications made with software collecting content from the web and conceptually rendering it in print. Finally, it explores the early steps taken towards true 'hybrids', or printed products that incorporate content obtained through specific software strategies, products which seamlessly integrate the medium specific characteristics with digital processes.

How a medium becomes digital (and how publishing did)

For every major medium (vinyl and CDs in music, and VHS and DVD in video, for example) we can recognise at least three stages in the transition from analogue to digital, in both the production and consumption of content.

The first stage concerns the digitalisation of production. It is characterised by software beginning to replace analogue and chemical or mechanical processes. These processes are first abstracted, then simulated, and then restructured to work using purely digital coordinates and means of production. They become sublimated into the new digital landscape. This started to happen with print at the end of seventies with the first experiments with computers and networks, and continued into the eighties with so-called 'Desktop Publishing', which used hardware

and software to digitalise the print production (the 'prepress'), a system perfected in the early nineties.

The second stage involves the establishment of standards for the digital version of a medium and the creation of purely digital products. Code becomes standardised, encapsulating content in autonomous structures, which are universally interpreted across operating systems, devices and platforms. This is a definitive evolution of the standards meant for production purposes (consider Postscript, for example) into standalone standards (here the PDF is an appropriate example, enabling digital 'print-like' products), that can be defined as a sub-medium, intended to deliver content within specific digital constraints.

The third stage is the creation of an economy around the newly created standards, including digital devices and digital stores. One of the very first attempts to do this came from Sony in 1991, who tried to market the Sony Data Discman as an 'Electronic Book Player' — unfortunately using closed coding which failed to become broadly accepted. Nowadays the mass production of devices like the Amazon Kindle, the Nook, the Kobo, and the iPad — and the flourishing of their respective online stores — has clearly accomplished the task (of 'Data Discman'). These online stores are selling thousands of e-book titles, confirming that we have already entered this stage.

Post-digital print starts here, with the alchemic intertwining of the traditional print with the digital (finally taken for granted) that generates new type of publications and genres.

The processual print as the industry perceives it (entertainment)

Not only have digitalisation processes failed to kill off traditional print, they have also initiated a redefinition of its role in the mediascape. If print increasingly becomes a valuable or collectable commodity and digital publishing also continues to grow as expected, the two may more frequently find themselves crossing paths, with the potential for the generation of new hybrid forms. Currently, one of the main constraints on the mass-scale development of hybrids is the publishing industry's focus on entertainment.

Let's take a look at what is happening specifically in the newspaper industry: on the one hand we see up-to-date printable PDF files to be carried and read while commuting back home in the evening, and on the other we have online news aggregators (such as Flipboard and Pulse) which gather various sources within one application with a slick unified interface and layout. These are not really hybrids of print and digital, but merely the products of 'industrial' customisation — the consumer 'choice' of combining existing features and extras, where the actual customising is almost irrelevant. The way the aggregators are assembling the selected sources (and so 'customising' the selection) is limited by available screen space, or technological compatibility, missing the whole point of the real multiplicity of sources on the Internet, especially if graphically experienced in their own context.

Even worse, the industry's best effort at coming to terms with post-digital print (print embedding some active digital qualities) is currently the QR code — those black-and-white pixelated square images which, when read with the proper mobile phone app, allow

the reader access to content (usually a video or web page). This kind of technology could be used much more creatively, as a means of enriching the process of content generation. For example, since they use networks to retrieve the displayed content, printed books and magazines could include QR codes as a means of providing new updates each time they are scanned — and these updates could in turn be made printable or otherwise preservable. Digital publications might then send customised updates to personal printers, using information from different sources closely related to the publication's content. This could potentially open up new cultural pathways and create unexpected juxtapositions (Ludovico 155).

On a different side, the Electronic Literature field of studies is also slowly starting to reflect about these new relationships between language and its representation on the screen. In *Between Page and Screen* by Amaranth Borsuk and Brad Bouse (Borsuk), poetry can be read in its own animated form, after a QR code printed on their book is exposed to the laptop camera and interpreted by a specific software. What we can read is in a three-dimension perception of the screen, in a classic augmented reality, which becomes our 'reading space', eventually even animated, and expanding print directly into the screen. But beyond the spectacular visuality of the poetry, and the great potential of those technologies to be used for designing a different space, this work is a relatively static process, all planned by the author and only reproducible in an exact way. The enormous potentialities of software and networks to be integrated creating new significant paths at every step is here stopped to stick with the product.

Printing out the web

Many possibilities emerge from the combination of digital and print, especially when networks become involved (and therefore infinite supplies of content that can be reprogrammed or recontextualized at will). A number of different strategies have been employed to assemble information harvested online in an acceptable form for use in a plausible print publication.

One of the most popular of these renders large quantities of Twitter posts (usually spanning a few years) into fictitious diaries. *My Life in Tweets* by James Bridle is an early example realised in 2009 (Bridle). The book compiled all of the author's posts over a two-year period, forming a sort of intimate travelogue. The immediacy of tweeting is recorded in a very classic graphical layout, as if the events were annotated in a diary. Furthermore, various online services have started to sell services appealing to the vanity of Twitter micro-bloggers, for example Bookapp's Tweetbook (book-printing your tweets) or Tweetghetto (a poster version).

Another very popular 'web sampling' strategy focuses on collecting amateur photographs with or without curatorial criteria. Here we have an arbitrary narrative, employing a specific aesthetic in order to create a visual unity that is universally recognisable due to the ubiquitousness of online life in general, and especially the continuous and unstoppable uploading of personal pictures to Facebook.

A specific sub-genre makes use of pictures from Google Street View, reinforcing the feeling that the picture is real and has been reproduced with no retouches, while also reflecting on the accidental nature of the picture itself. Michael Wolf's book *a series of unfortunate events*, points to our very evident and irresistible fascination with 'objets

trouvé', a desire that can be instantly and repeatedly gratified online (Wolf).

Finally, there's also the illusion of instant-curation of a subject, which climaxes in the realisation of a printed object. Looking at seemingly endless pictures in quick succession online can completely mislead us about their real value. Once a picture is fixed in the space and time of a printed page, our judgments can often be very different.

Such forms of 'accidental art' obtained from a 'big data' paradigm, can lead to instant artist publications such as Sean Raspet's *2GFR24SMEZZ2XMCVI5... A Novel*, which is a long sequence of insignificant captcha texts, crowd-sourced and presented as an inexplicable novel in an alien language (Raspet).

There are traces of all the above examples in Kenneth Goldsmith's performance *Printing Out The Internet* (Goldsmith). Goldsmith invited people to print out whatever part of the web they desired and bring it to the gallery LABOR art space in Mexico City, where it was exhibited for a month (which incidentally also generated a number of naive responses from environmentally concerned people). The work was inspired by Aaron Swartz and his brave and dangerous liberation of copyrighted scientific content from the JSTOR online archive (Kirschbaum). It is what artist Paul Soulellis calls "publishing performing the Internet" (Soulellis).

Having said all this, the examples mentioned above are yet to challenge the paradigm of publishing — maybe the opposite. What they are enabling is a 'transduction' between two media. They take a sequential, or reductive part of the web and mould it into traditional publishing guidelines. They tend to compensate for the feeling of being powerless over the elusive and monstrous amount of information available online (at our fingertips), which we cannot comprehensively visualise in our mind.

Print can be considered as the quintessence of the web: it is distributing a smaller quantity of information available on the web, usually in a longer and much better edited form. So the above mentioned practices sometimes indulge in something like a 'miscalculation' of the web itself — the negotiation of this transduction is reducing the web to a finite printable dimension, denaturalising it. According to Publishers Launch Conferences' cofounder Mike Shatzkin, in the next stage "publishing will become a function... not a capability reserved to an industry" (Shatzkin).

Hybrids, the calculated content is shaped and printed out

This 'functional' aspect of publishing, at its highest level, implies the production of content that is not merely transferred from one source to another, but is instead produced through a calculated process in which content is manipulated before being delivered. A few good examples can be found in pre-web avant-garde movements and experimental literature in which content was unpredictably 'generated' by software-like processes. Dada poems, for example, as described by Tristan Tzara, are based on the generation of text, arbitrarily created out of cut-up text from other works (Cramer). One of the members of the avant-garde literature movement Oulipo created a similar 'generative' concept later: Raymond Queneau's *Cent Mille Millions de Poèmes* is a book in which each page is cut into horizontal strips that can be turned independently, allowing the reader to assemble an almost infinite quantity of poems, with an estimated 200 million years needed to read all the possible combinations

(*Hundred Thousand Billion Poems*). Here a natural gesture (moving strips as if they were sub-pages) becomes a process in the hands and eyes of the reader who can endlessly create not just a combinatory type of content, but truly unexpected poetry. That an Oulipo member created this was no accident — the movement often played with the imaginary of a machinic generation of literature in powerful and unpredictable ways.

Contemporary experiments are moving things a bit further, exploiting the combination of hardware and software to produce printed content that also embeds results from networked processes and thus getting closer to a true 'form'. This 'form' should define at the technical and aesthetic levels the hybrid as a new type of publication, seamlessly integrating the two worlds (print and digital) up to the point that despite its appearance and interface, they would be inextricably tied together through the content. So it's not just about 'automatically generating a text' and printing it, or randomly assembling bits and pieces of (eventually printed) content in digital form. A hybrid product should have a strategy composed by its software part, which would provide some content through a process, and an analogue part which would frame and contextualise it. The level that this hybridisation can reach is only limited by the conceptualisation and the sophistication of the act and the process.

If we take the traditional book as a starting point there are few cases of early hybrids. Martin Fuchs and Peter Bichsel's book *Written Images* is an example of the first 'baby steps' of such a hybrid post-digital print publishing strategy (Fuchs). Though it is still a traditional book, each copy is individually computer-generated, thus disrupting the fixed 'serial' nature of print. Furthermore, the project was financed through a networked model (using Kickstarter, the very successful 'crowdfunding' platform), speculating on the

enthusiasm of its future customers (and in this case, collectors). The book is a comprehensive example of post-digital print, through the combination of several elements: print as a limited-edition object; networked crowd-funding; computer-processed information; hybridisation of print and digital forms — all residing in a single object — a traditional book. This hybrid is still limited in several respects, however: its process is complete as soon as it is acquired by the reader; there is no further community process or networked activity involved; once purchased, it will forever remain a traditional book on a shelf.

A related experiment has been undertaken by Gregory Chatonsky with the artwork *Capture* (Chatonsky). *Capture* is a prolific rock band, generating new songs based on lyrics retrieved from the net and performing live concerts of its own generated music lasting an average of eight hours each. Furthermore the band is very active on social media, often posting new content and comments. But we are talking here about a completely invented band. Several books have been written about them, including a biography, compiled by retrieving pictures and texts from the Internet and carefully (automatically) assembling them and printing them out. These printed biographies are simultaneously ordinary and artistic books, becoming a component of a more complex artwork. They plausibly describe a band and all its activities, while playing with the plausibility of skilful automatic assembly of content. In *Capture* the software process is able to create a narrative that can be almost universally read, potentially 'updated' for every print (or anytime), and eventually infiltrating some of the alternative music histories, resulting as a future fake reference, accepted and historicised.

Another example of an early hybrid is *American Psycho* by Mimi Cabell and Jason Huff (Cabell). It was created by sending the

entirety of Bret Easton Ellis' violent, masochistic and gratuitous novel *American Psycho* through Gmail, one page at a time. They collected the ads that appeared next to each email and used them to annotate the original text, page by page. In printing it as a perfect bound book, they erased the body of Ellis' text and left only chapter titles and constellations of their added footnotes. What remains is *American Psycho*, told through its chapter titles and annotated relational Google ads only. Luc Gross, the publisher, goes even further in predicting a more pervasive future: "Until now, books were the last advertisement-free refuge. We will see how it turns out, but one could think about inline ads, like product placements in movies etc. Those mechanisms could change literary content itself and not only their containers. So that's just one turnover."

In *American Psycho* the potential of the 'accidental' information, generated by the massive online advertisement mechanism is turned into a whole work. It tells a story through the generated advertisement parasites exploiting a unstoppable commercial mechanism, transducing a literature work into the language of advertisement through the 'quoting email' which then become active agents in the process.

Finally, why can't a hybrid art book be a proper catalogue of artworks? Les Liens Invisibles, an Italian collective of net artists have assembled their own, called *Unhappening, not here not now* (Les Liens Invisibles). It contains pictures and essential descriptions of 100 artworks completely invented but consistently assembled through images, generated titles and short descriptions, including years and techniques for every 'artwork'. Here a whole genre (the art catalogue or artist monograph) is brought into question, showing how a working machine, properly instructed, can potentially confuse what we consider to be 'reality'. The

catalogue, indeed, looks and feels plausible enough, and only those who read it very carefully can have doubts about its authenticity.

Conclusions

Categorising these publications under a single conceptual umbrella is quite difficult and even if they are not yet as dynamic as the processes they incorporate, it's not trivial to define any of them as either a 'print publication' or a 'digital publication' (or a print publication with some digital enhancements). They are the result of guided processes and are printed as a very original (if not unique) static repository, more akin to an archive of calculated elements (produced in limited or even single copies) than to a classic book, and so confirming their particular status. The dynamic nature of publishing can be less and less extensively defined in terms of the classically produced static printed page. And this computational characteristic may well lead to new types of publications, embedded at the proper level. It can help hybrid publications function as both: able to maintain their own role as publications as well as eventually being able to be the most updated static picture of a phenomenon in a single or a few copies, like a tangible limited edition. And since there is still plenty of room for exploration in developing these kind of processes, it's quite likely that computational elements will extensively produce new typologies of printed artefact, and in turn, new attitudes and publishing structures. Under those terms it will be possible for the final definitive digitalisation of print to produce very original and still partially unpredictable results.

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**A CRITICAL ENGAGEMENT
WITH MONETARY
INTERFACES**

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Introduction

The current economic condition of digital participation is described by the proponents of the neoliberal model of economic efficiency as a new economic revolution. The simulated existence of the market in computer networks and graphic interfaces presents itself as the ultimate reality of value at the same time as it tries to make other forms of social valuation subordinate and even unreal. Reflecting on the mystification of the effect of digital interfaces on social participation, the paper raises a series of questions for the analysis of the cultural effects of the mediating function of monetary interfaces by reflecting on their economic, technological and aesthetic implications. The critique focuses on the new digital architecture of the monetary system by investigating how money intervenes in information exchanges and signals the creation and transfer of economic value. The ability of payment interfaces to impose, both overtly and covertly new relations of ownership as well as new forms of surveillance, suggests their capacities as technologies of political control of the individual. The aim is a theoretical framework for the analysis of the re-organization of the economic system and its dependence on money.

Digital money rising

The revolution in information and communication technologies facilitated the emergence of electronic payment systems and the organization of new types of payment instruments. Communication has become faster, safer and considerably cheaper, leading to a more efficient system for the circulation of funds, the expansion of credit cards and of electronic money. Monetary interfaces

have been developing and providing added value services to consumers, limiting the use of cash and of other paper based payment methods, effectively laying the foundations for a cashless society.

The competition from new payment networks confined the use of cash only to a fraction of the total value of monetary transactions as the data on the relative popularity of payment methods issued by the European Central Bank indicate: only in 2011 the total of non-cash payments increased by 4.4% to 24.9 billion (ECB press release). The importance of paper-based transactions continued to decrease, with the ratio of paper-based transactions to non-paper-based transactions standing at around one to five. The number of cards with a payment function in the EU remained stable at approximately 727 million, a figure that amounts to 1.44 payment cards per EU inhabitant (ECB SEPA). Chart 1 below shows the use of the main payment instruments from 2000 to 2011.

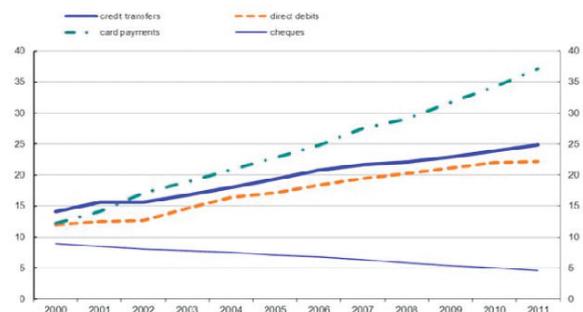


Chart 1: Use of the main payment instruments in the EU 2000 – 2011 (ECB press release)
(estimates of number of transactions in billions).

The phasing out of cash and of other paper based payment instruments raises important questions both about the nature of money and the economic relationships in the new network economy. The immaterialization of money and the progressive disappearance of cash opens new forms of political control as well as new possibilities of resistance. Interfaces, protocols and networks influence

the structure of the market, the degrees of participation of different social groups and also the distribution of social wealth.

Digital economy and the control of participation

The digital revolution has not exhausted all its potential, and the application of information technologies in the market seems to be still expanding, but at the same time ICT has reached a certain degree of maturity and relative stability. The new phase of network society has been described as post-digital referring to the 'post-modern' idea of the end of the Enlightenment project, but also to the post-revolutionary banalization of digital culture (Cascone, Cramer). The pervasiveness of digital technologies dispels some of the fascination and the novelty that characterized the early stage of participation in electronic networks but also is a precondition of the commercialization of the network culture. The normalization of ICT encourages also the use of uniform standards, the expansion of surveillance, and the concentration of the control of electronic network in the hands of a limited number of agents following an ingrained tendency of hierarchical networks towards ever more concentration.

One of the most visible consequence of the normalization of ICT and a cause of its further establishment is the gradual replacement of the networked computer, which is the general purpose technology that carried more of the weight of the socio-economic transformation, by other information processing-devices which have a more restricted domain of application (Andersen & Pold Interface Criticism). Smart-phones, e-readers, tablets, media players, and game consoles allow restricted access to content and regulate interaction around graphic

interfaces that allow limited if any access to their supporting protocol. IT companies, which are simultaneously the producers of the devices, their software, and the retailers of the content, have a vested interest to prevent sharing and cooperation among users. Controlled consumption, a term used by Henri Lefebvre, to describe the bureaucratic control of supply and demand in the affluent society, has assumed a new meaning where it becomes a model of restricted and temporary access to information, conditioned by the architecture of the interface (Andersen & Pold "Controlled Consumption Culture"; Striphas).

In the post-digital age, it is the interface, rather than the personal computer, that emerges as the medium of social participation and consequently as the object of analysis and critique. If information becomes the main resource and the most valuable commodity, if the "new economy" is digital, the interface is the most authentic concatenation of technological, social and economic principles. The transformation of individual property rights in the digital paradigm, and the new technologies of their surveillance and their enforcement, have far reaching consequences over the individual and the economic freedom, reaching even to the fundamental right of economic as well as of political freedom. One important conclusion that should be drawn from the NSA surveillance program "Prism" is the complete failure of the rule of law to protect the privacy of citizens from the new technological capabilities of surveillance, control, and (potentially) suppression, independently of their location or the particular legal safeguards in their jurisdiction.

The emergence of the cashless society and the proliferation of payment interfaces is a vivid example of the realities of the new model of control consumption and of the surveillance mechanism that

support its enforcement. Electronic banking and electronic payments in general have been instrumental in the commercialization of digital culture, both as a precondition of this development and as one of the areas of the most advanced technological innovation. Finance is an example of early adoption of information technologies as a way to ensure a comparative advantage that can be translated into profits; financial engineering and automated trading are the two most prominent examples of financial innovation that employs the most recent technologies provided by ICT. Commercial banking is also relatively progressed, developing global networks for the transfer of funds, coupled with the credit card systems that also have their own purpose-built system for the processing of payments across markets and jurisdictions. Such technologies use some of the most advanced systems of security and information processing that set the standards for electronic economic transactions.

The proliferation of networks of electronic payments and the consequent increase of the information processing capabilities, have a further, unintended consequence for the implementation of the model of controlled consumption. The information flows about economic transactions processed by banks and credit card companies do not enjoy the same degree of legal protection as private communications, because their property is shared by the transacting parties and the organization(s) that processes the transaction. The value of such information is already acknowledged and in many cases used for marketing, for the prediction of price movements, and for the screening of transaction for potential dangers of fraud or default. Economic profiling is becoming widespread both for the creation of added value and the exclusion of the economically disadvantaged. The proprietary status of the records of digital economic transactions

legally allows their use for reasons other than facilitating the completion of the transaction themselves, like profiling, market research, risk assessment, targeted marketing and advertising. Banks and credit card companies share and often sell such information in third parties without the prior consent or even the knowledge of their clients. Such practices of economic information sharing and the consequent economic profiling may raise new barriers to participation in the official banking and monetary system, excluding first the illegal, then the migrant and potentially the poor and the precarious from accessing the financial system.

The payment interface and the constitution of the subject

Money is a media technology in the sense that it represents reality by reducing all phenomena to the absolute quantity of value. The informatization of money has increased the control of the principles of rationality and efficiency over the subject by adding more layers of mediation between the subject and the society, and new mechanisms of control, intensifying surveillance and normalization. The investigation of the contribution of transaction interfaces in the support of a model of controlled consumption in electronic networks may explain how the circulation of money is enacted in electronic networks. Furthermore, they can illuminate how the ideological operation of money as the master signifier of economic value is supported by its new visual identity in payment networks.

The imposition of the economic logic on social reality passes through the re-constitution of society as a market. Prices communicate the content of social constitution,

organizing an order of meaning where all commodities are inserted as signifiers of economic value in accordance to their prices. Signification is regulated by money, the master signifier of economic value, which supports and quilts the signifying chain of commodities, effectively constituting the system of prices. Economic value, the ultimate signified of all commodities, remains nonetheless elusive and ambiguous, an ambiguity that is never eliminated but always remains obscured by money. The forced participation in the market, the alienation of desire by commodification, the inconsistency of the system of prices, the unjust distribution of wealth and resources, and the vacuity of the notion of economic value find their way in the simulated economic systems, in the interfaces of social media and the aesthetics of the commercialized digital culture.

Subjects relate to money on a practical level; theoretical understanding of the meaning and the functions of money comes only later, if at all (Papadopoulos, Notes). The unreflective relation to the monetary system is not limited to the quasi-automatic rule-following of the norms that regulate money, but extends to the acceptance of the dominant discourse about money and its relation to value. The subject may be agnostic about the role of money, the mysteries of economic value or the constitution of the system of prices, but the use of money is a continuous ritual of acceptance the ideological discourse. Money develops from a mere carrier of its social function, as standard of value and a means of payment, to the dominant organizing force of social interaction. Social relations are mediated and reconfigured through the intermediation of money. The signifying omnipotence of the master signifier is combined with the omnipresence of everyday use, effectively quilting the signifying chain of the system of prices both at the level of meaning and at the level of practice.

The reliance of the economy on iconography and representation has only rarely been addressed directly, but there is extensive literature on the social function of representation that spans from social ontology, to post-structuralism, and to media theory. The new socio-technological paradigm challenges the cultural foundations of the economy encouraging new representations of value that fit the format of the new media of circulation and the symbolic universe of digital culture. The social significance of monetary interfaces is to condition participation and interaction. The relationship of interfaces to social discourse is one of figuration in which the complexities and the contradictions of ideology, are modeled and simulated out of the formal structure of protocol itself (Galloway, "Language Wants To Be Overlooked"). The functionality of the interface exacerbates and challenges the tension between the utopian and the repressive tendencies of ideology within itself; interfaces are ideology-in-code. The aesthetic analysis of monetary interfaces can uncover the ideological foundations of economic value. Flusser claims that technical images open a window to the functioning and the logic of the apparatuses that produce them; the aesthetics of payment interfaces present some impressions of the monetary apparatus from looking through this window. We could assume, as a working hypothesis, that the monetary system is indeed an apparatus in the Flusserian sense of the word.

The interfaces that support the circulation of economic value in the internet are imbued with a complex machinery for hiding things, be it the emptiness of the value form, the self-referentiality of money and its ability to mask its own history of production and the social division of labor that it generates. The success of the interface is the ability to regulate information through inscription and execution, which is no doubt both an abstraction or a re-territorialization of the circulation

of value. The structure of electronic payment facilitates the global system of unequal exchange. The relationships between centre and periphery, between producers and consumers, between labor and market, between finance and society are all neutralized by the algorithms of money and networks. The ability of money to reduce all qualities in an absolute quantity is being intensified by the functionality of protocols to domesticate social relations. Protocols reproduce the same fetishistic logic of money. “Users know very well that their folders and desktops are not really folders and desktops, but they treat them as if they were — by referring to them as folders and desktops” (Galloway “Language Wants To Be Overlooked”, 329); in the same fashion the semiotic flow of monetary value, be it through PayPal, through MasterCard or through Bitcoin, acquires its reliability through enforcement and representation as money via the providers of monetary interfaces.

The new graphic interfaces impose a new aesthetic, addressing the subject both at the rational and the affective level. As Anne Friedberg argues “this remade visual vernacular requires new descriptors for its fractured, multiple, simultaneous, time-shiftable sense of space and time. Philosophies and critical theories that address the subject as a nodal point in the communicational matrix have failed to consider this important paradigm shift in visual address.” (Friedberg 3) Money interfaces can and should also be studied in terms of the psychological appeal to the subject, as knots affective tension, and as screens for the projection of desire and subjectivity. Representation is central for the psychological investment in money, and so is the illustration of the idea of value in the iconographic and symbolic elements of monetary interfaces. Such representations legitimize and enforce to an extent the dominant ideologies of state, market, and culture.

Monetary interfaces and post-digital challenges; a set of questions

The model of controlled consumption is challenged by alternative economies, of sharing, gifting, and exchanging based on different standards of value. The critique of monetary interfaces and controlled consumption should start by studying the collective representations of value in money, the technologies of their dissemination, and investigate their contribution in the constitution of subjectivity in the digital realm. The shared representations of economic value support consumption and commodification by illustrating the cultural significance of the system of prices. A post-digital critique of money can be developed following a series of questions, the most important of which is how the new visual vernacular of digital monetary interfaces informs and shapes the representations of economic value and how such representations are challenged and informed by post-digital practices? The answer to this question comes from critical theory and philosophy rather than from economics, building on the literature on the reliance of the economy on representation and signification, and on an extensive literature on the social function of representation that spans from social ontology, and psychoanalysis, to media theory and interface criticism. The new socio-technological paradigm transforms the cultural foundations of the economy encouraging new representations of value that fit the format of the new media of circulation and the symbolic universe they inhabit. A post-digital critique of electronic money should try to assemble, organize and interpret the emergent aesthetics in an attempt to construct a theoretical framework for the analysis of the new ‘digital’ identity of economic value

investigating both its authoritative expression in the official monetary system and its alternative post-digital configurations.

The analysis of 'digital value' should be supported by the study of three interconnected themes of research combining the methodological framework of interface criticism and aesthetic analysis of monetary interfaces with a critical perspective on economic discourse. The analysis may start by looking back to the growth of the informational sector of the economy, revisiting the most important episodes, integrating them to the overall trajectory of social development tracing the relation of value and money with equivalent transformations in language and image. Such a historiography is important to contextualize the role of information in the socioeconomic system and to describe its input in social production. In this context the notion of economic value as well as its transfigurations in the networks and interfaces would be central. Equally important would be the relation between money, language and code, which will inform the analysis of the immaterialization of economy and value.

The second theme would be the issue of uncertainty and its relation to economic growth. In the recent decades the financial markets have thrived on computational models that try to reduce uncertainty to risk, making it manageable. Uncertainty could be considered in two different capacities. It denotes both the unpredictability of future outcomes given the availability of information and the resources of processing it in the present, but also points to a gap between reality and representation, where uncertainty is the part of the undomesticated real that disrupts the relations of our theories to the world.

The third part of the analysis will address the dialectic relation between interface criticism and the further development of interfaces with a specific attention to artistic practice and political projects that aim at

actual alternatives to the monetary system of valuation and exchange, both within and outside digital networks of participation. Ideally the outcome would be an archeology of digital payment media that is informed by the process of social antagonism. To that effect a critique should try to compile a typology of the aesthetic and the operational principles of monetary interfaces including both their mainstream version and the critical attempts from the edges of the economic system. The conclusion of the analysis would be a critical history of money and its current reconfigurations in the digital condition.

Interface criticism emerges as a necessary methodology in order to understand the conditions of participation in the new social paradigm. It addresses the conditioning of human behavior by new technological media with a specific emphasis on the sensible and persuasive qualities of the interface. Obviously aesthetics and its relation to economics and technology is an important part in the methodological framework that is used in interface criticism and is a necessary supplement to socioeconomic analysis. Here aesthetics is used in three interconnected meanings. Aesthetics denotes sensory perception; an interface has a sensible component in order to create meaning and allow for the interaction between the user and the system that are connected through the interface. A second dimension of the aesthetics of the interface has to do with beauty; interfaces are often designed to be appealing, pleasing, and even seductive in an attempt to address the subject and its desire and to invite interaction. The key here is that the interface is within the aesthetic (Genette), not a window or doorway separating the space that spans from here to there. It is a type of aesthetic that implicitly brings together the edge and the center, or the protocol and the node, but one that is now entirely subsumed and contained within the visual architecture of the interface.

This tension brings us to the last, and most subversive possibility in the aesthetic quality of the interface, the notion of aesthetics as artistic production. Art can operate as a force of consolidation of the power of the interface as it can function disruptively, unmasking the limitation and the normativities of the system, and acting as the real form of transparency and in that sense it provides a practical solution to the challenges of commercialization and controlled consumption of digital culture. The analysis offered in the paper could be read as set of arguments that clear the ground and allow for such artistic practices to realize their full critical potential.

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**AN ETHOLOGY OF
URBAN FABRIC(S)**

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... no one knows ahead of time the affects one is capable of; it is a long affair of experimentation...
(Deleuze 1988, 125)

With this piece, we wish to open up a patchwork of relational thinking of the ethology of urban fabric(s) from a post-digital perspective. The semantic of the urban fabric normally denotes the “physical aspect of urbanism, emphasizing building types, thoroughfares, open space, frontages, and streetscapes but excluding (the) environmental, functional, economic and sociocultural [...]” (Wikipedia), from an ideal top-down perspective (see e.g. Bricoleur Urbanism). Here, however, we would like to explore a non-metaphorical understanding of urban fabric(s), shifting the attention from a bird’s eye perspective to the actual, textural manifestations of a variety of urban fabric(s) to be studied in their real, processual, ecological and ethological complexity within urban life. We effectuate this move by bringing into resonance a range of intersecting fields that all deal with urban fabric(s) in complementary ways (interaction design and urban design activism, fashion, cultural theory, philosophy, urban computing).

We wish to underline that this is a conceptually explorative piece written in the first year of the 7-year grant *IMMEDIATIONS: Art, Media, Event*. Rather than presenting defining arguments, we wish to sketch out a field of questioning that can inform future interventionist or practice-based experimentation — or research-creation — within an academic context. At this moment, we are using the notion of urban fabric(s) to produce conceptual and relational trajectories we want to investigate further during the project. To us, this means following and unfolding the conceptual richness in a number of directions, drawing on the ambiguity of the notion of fabric(s), from textures to textiles, but always in relation to the urban, and within the

frame of the post-digital, meaning the thinking and organizing procedures (networking, relational procedures, rhizomes) that we have culturally approached through the novelty value of the recent digital phase.

In this article, rather than attempting to pin down the notion of urban fabric(s) to any absolute definition, we want to open up lines of thought and experimentation around the concept by sketching out possible ethological dimensions to be considered. We take the term ethology from Deleuze’s book, *Spinoza: Practical Philosophy*, where he states the following:

Ethology is first of all the study of the relations of speed and slowness, of the capacities for affecting and being affected that characterize each thing. For each thing these relations and capacities have an amplitude, thresholds (maximum and minimum), and variations or transformations that are peculiar to them. And they select, in the world or in Nature, that which corresponds to the thing; that is, they select what affects or is affected by the thing, that moves it or is moved by it. For example, given an animal, what is this animal unaffected by in the infinite world? What does it react to positively or negatively? What are its nutriments and its poisons? What does it “take” in its world? Every point has its counterpoints: the plant and the rain, the spider and the fly. So an animal, a thing, is never separable from its relations with the world. The interior is only a selected exterior, and the exterior, a projected interior. The speed or slowness of metabolisms, perceptions, actions, and reactions link together to constitute a particular individual in the world. (Deleuze, Spinoza 125)

Looking into the ethological workings of urban fabrics directs our attention towards a range of possible areas of investigation and propositions, among other things:

- *What is the velocity of urban fabric(s)?*
- *What characterizes urban fabric in terms of amplitude, thresholds, variations, transformations; what affects or is affected by urban fabric(s)?*
- *What relations and capacities emerge through the processes concerned with the creation and distribution of urban fabric(s)?*
- *What interfaces between (what kinds of) exterior and interior are produced by urban fabric(s) (animal-organic, skin-textile/skin-city, language-fabric, habit-character)?*
- *How does this relate to the intensity in the formation/transformation of habits, perceptions, actions, movements in urban environments?*

In the following we will sketch out some lines of thought relating to in particular the first two of these four questions, moving towards propositions for possible forms of experimentation and expositions with the relational aspects of urban fabric(s).

Velocity of urban fabric(s)

When asking what the velocity of urban fabrics might be, two main themes occur; the speed vs. slowness of fashion in the past and the present and the temporary nature of the built environment in a post-digital perspective.

In fashion, novelty and modernity have been aligned with the shifts and modi of

fashion (la mode) since 1850, and considering that the development of capitalism had its take-off from the industrial production of linen by the meter (the Jacquard loom/weave), novelty in fashion has been a very visible force for the understanding of 'time as progress'. The aesthetic novelty in the form of a folding, a lace trimming, a color shade or a cut in its always renewed relational connectivity with bodies and urban surroundings has been an essential part of the aesthetic attraction of fashion. In Charles Baudelaire's essay on modernity from 1859 this passion for the transitory, fugitive element is an important indicator of the painter of modern life's ability to be on par with his time:

In texture and weave [...] [modern manufacture; our note] are quite different from the fabrics of ancient Venice or those worn at the court of Catherine. Furthermore the cut of skirt and bodice is by no means similar; the pleats are arranged according to a new system. Finally the gesture and the bearing of the woman of today give to her dress a life and a special character which are not those of the woman of the past. In short, for any 'modernity' to be worthy of one day taking its place as 'antiquity', it is necessary for the mysterious beauty which human life accidentally puts into it to be distilled from it. (Baudelaire 13)

To distill beauty from the fugitive moment became the task of Baudelaire himself as Walter Benjamin has noted in his essays on the relationship between the city of Paris and the modern poet, assembled in *The Writer of Modern Life: Essays on Charles Baudelaire* (Benjamin 2006). Baudelaire was aware that poetry was just as transitory as fashion and that clothings as well as books were goods at the marketplace, and that he

like the designer of fashion had to know life as it is lived by the crowd in the streets in order to illuminate these impressions of the transitory moment to modern art. The new metropolis of Paris became a second skin for the reader of modern life. Baudelaire became a forerunner of the material analysis of the culture of modernity, later carried out by Benjamin and Michel Foucault. They both wanted to read modernity by its traces on the skin by digging into the structures and technologies applied in everyday life. In his essay, "What is Enlightenment?", Michel Foucault comments on Baudelaire's text in length underlining that his method of unravelling the meaning of modernity is not just being sensitive to 'the fleeting present'. It is far more a question of having a 'will to "heroize" the present', by performing as the so called 'dandy' who must 'invent himself' in order to produce art that could still affect the masses in the urban environment of the metropolis (Foucault 1984). This brings to Foucault's method the necessity to step back from universal values in art and transcendental ideas in philosophy to propose instead his well-known archaeological method and its genealogical research design described as 'experimental': 'it will separate out, from the contingency that has made us what we are, the possibility of no longer being, doing, or thinking what we are, do, or think' (Foucault 1984).

What connects the methods of Baudelaire, Benjamin and Foucault is a search for new beginnings on par and in touch with the textures of the social formation of their own time. This entails a reconsideration of the formative technologies and organizational patterns of society and culture – in order to analytically grasp the *material* formations of lives lived and performed within systems of fashion, architecture, archival systems etc. But whereas Baudelaire wanted to extract the poetics of modernity from his

experiences with (amongst other things) the novelty of fashion, Benjamin wanted to keep open an awareness of the social body involved in the aesthetic experiences of modernity, and Foucault wanted to question the disciplinary, driving forces of power. Foucault's main question in "What is Enlightenment?" is phrased: 'How can the growth of capabilities be disconnected from the intensification of power relations?' (Foucault 1984).

This question must in a contemporary context be posed differently, since disconnection in revolutionary terms has declined in favour of an awareness of the relational and affective connections and forces involved in networks that are rapidly becoming the weaved fabric of almost all connectivity in society. Foucault's society of control and surveillance indeed plays an important part of this fabric, but the relationship between individual and dividual, between speed and slowness has indeed changed with the overlapping networks. This entails that we can no longer inhabit the position of dandyism nor extract allegorical connectivities between past and present and furthermore envisage what the *dispositif* of our time would look like. The challenge as well as the potential of our time is to acknowledge that each event holds a virtual openness involving past or futurity in the actual change taking place. So, just as each modulation of digital sound or image data changes the whole, each modulation, vibration or stretching of the forces of the velocity of urban fabric(s) affects the whole.

In line of the above arguments, the contemporary recycling of former fashion clothings can be seen as a digging into (imaginary) spaces belonging to older or disappeared spaces and places in the city, forming our experiences of the urban fabric(s) anew. The culture of recycling, reusing and the compilation of fabrics belonging to different clothings and body-sizes have developed into a new ecological model of business in

which the relational capacities of body and fabric are re-thought and re-worn. This 'slowing down of fashion' in order to focus on affect and appreciate the relational production of spaces and places in connectivity with the ethology of the fabric-becoming-body is further touched upon in the section Relational Capacities.

Focusing on the temporary nature of the built environment, we want to move from a top-down understanding of urban fabric(s) to the actual configurations and compositions of texture and their relation to experience in and of the urban sphere. Here, we are interested in the use of different forms of duration relating to the materiality of the cityscape, as well as in the changes in velocity and perception with the advent of digital activations of the city in the light of urban computing (see e.g. Greenfield & Shepard 2007) through mobile phones, media facades, urban screens and the like. The velocity of the built environment can be sped up or slowed down – disrupted – through the use of digital layers, changing our perception of the built city, as seen in the artistic practices of Rafael Lozano-Hemmer (<http://www.lozano-hemmer.com>), United Visual Artists (<http://www.uva.co.uk/work>) and the Graffiti Research Lab (<http://www.graffitiresearchlab.com/blog/>).

In addition, a range of practices have arisen around the creation of temporary urban spaces, among others the Danish-based Institut for (X) who are working actively with emerging spaces in the city as part of their artistic and investigative practice, as seen in the project 'Platform 4' (<http://www.detours.biz/projects/platform-4/>). For a large part, Institut for (X) use wood to built structures that can easily be dismantled again. Looking at interventionist strategies such as Urban/Guerilla Gardening and Urban/Guerilla Knitting (<http://knitthecity.com>), it might be argued, from an ethological point of view, that we are witnessing the complexity of the

'speeding up' of the built infrastructure somehow merging with a 'slowing down' through the agency of more or less analog — post-digital? — materials, textures, fabric(s) and data.

The two trajectories presented in this section — concerning the speed vs. slowness of fashion and the temporary nature of the built environment in a post-digital perspective — in particular direct our attention towards the entanglement of human ideas, technologies, market mechanisms, power relations and individual and collective actions continuously shaping — and taking shape from — the urban fabric(s). The next section will further elaborate on this relation drawing in particular on the philosophy of Jacques Rancière and the work of Hito Steyerl to more closely unfold the characterizations of urban fabric(s).

Characterizations of urban fabric(s)

When attempting to analyze what affects or is affected by urban fabric(s) through looking into what characterizes urban fabric(s) in terms of amplitude, thresholds, variations, transformations, we must explore how the urban fabric(s) we want to sketch out two (admittedly rather general) points of entry; how does the urban fabric affect our ability to act in the city and secondly, how does it act upon us and how is this manifested in the fabric?

Considering the first point of entry, we want an ethological understanding of urban fabric(s) to take into account the ways in which it distributes the sensible, the aesthetics of the urban fabric(s) (Rancière 2004). The urban fabric(s) conditions our (common) everyday perception of the city, the actions we

undertake (or not), on what Brian Massumi terms a microperceptual level — with, what might be termed, macropolitical implications (Massumi 2009). Massumi links the notion of microperception to that of micropolitics, resonating with Rancières notions of the aesthetics of politics and politics of aesthetics, where the latter lies “[...] in the practices and modes of visibility of art that re-configure the fabrics of sensory experience’ (Rancière 2010, 140). To Rancière, these artistic practices of re-configuration can establish a ‘[...] dissensual re-configuration of the distribution of the common through political processes of subjectivation.’ (Rancière 140).

Thomas Markussen has explored how this might be investigated through designerly practices of urban activism using the ‘[...] sensuous material of the city while exploring the particular elements of urban experience’ (Markussen 41). According to Markussen, who also builds on the work of Rancière, urban design activism ‘uses the sensuous material of the city while exploring the particular elements of urban experience’ (41). He mentions a range of examples, e.g. Institute for Applied Autonomy’s iSee-project allowing people to choose the least surveilled routes through urban spaces (<http://www.appliedautonomy.com/isee.html>) and Santiago Cirugedas Recatas Urbanas (Urban Prescriptions), exploring the relation between the regulations of the city municipality and the need for extra room through the construction of scaffolds which are then turned into places of dwelling (<http://www.recetasurbanas.net/index1.php?idioma=ENG&REF=1&ID=0003>). These projects can be said to experiment with the way in which urban fabric(s) can be renegotiated through artistic and designerly experimentation, highlighting existing distributions of the sensible on a microperceptual and political level, offering ways for people to engage with the urban fabric(s) to act upon this.

The entry into the second point — how urban fabric acts upon us and how it is manifested in the fabric — can be opened by Hito Steyerl’s video installation for Documenta XII, 2007, *Lovely Andrea* (http://www.ubu.com/film/steyerl_andrea.html). In Steyerl’s search for an image of Japanese bondage, that was taken of her in 1987, she documents on the one hand that power relations within a contemporary visual dominance does create an endless appetite for images of ‘truth’ and ‘freedom’, and on the other hand that images can create facts and can produce realities to unravel the interconnectedness of bondage and webs. Her examples that she weaves together are bondage girls, Spiderman and prisoners at Guantánamo Bay. Like the cobweb serves the purpose of attracting and capture, weaved fabrics, web-designs and the Internet all leave marks in the skin and connects us to buildings, archives and urban distribution and traffic (cf. trafficking). In Steyerl’s case the unraveling of the web actually generates an idea about the scale and amplitude of trades and transactions of bonding. The thresholds that determine Steyerl’s access to her own image are spelled out as ‘the cameraman’ and ‘the studio’.

The discursive ownerships belonging to the 1980s are still controlling the entry points to the material archives, but the search machines of the internet archives have for a long time attracted our appetite for ‘new material’. If this material is thought of as all the archives and databases of the Internet the thresholds are easily identified as Google, Facebook etc. — and the code is the password, that includes and excludes. In 1990 Deleuze wrote in “Postscript on the Societies of Control” on the (then future) web control that the code — “one’s (dividual) electronic card” — would grant or deny access to “one’s apartment, one’s street, one’s neighborhood” creating a universal modulation. Deleuze compared his modulation, i.e.

the processes by which we connect or are denied access to the weave of the Internet archive, to the coils of the serpent — whereas societies based upon disciplinary systems of control described by Foucault are compared to the ethology of mole and molehill. This line of thought makes it possible to think of the serpent in its relation to its coil as a rubbing between two surfaces — the skin and the ground. The friction created is becoming the new fiction, the affective field of creation. The fabric (of the ground) is just as much affected by the skin as the other way around. The skin leaves traces and form patterns in the fabric (of urbanity, the Internet, the brain) just as the fabric determines the possible coiled movements (of the snake).

Actively experimenting with the distributions of the sensible that characterize urban fabric(s), reconfiguring our possibilities for sensory experience through activist, design-erly interventions into, amongst other things, the archives and databases that are increasingly in-forming the patterns of these fabric(s) and our experience of them, is at the core of the general project initiated by this article. Tapping into new frictional and fictional affective fields of creation focuses on uncovering existing amplitudes, thresholds, variations, transformations in the ethological workings of urban fabric(s), which will be developed in relational terms in the next section.

Relational capacities of urban fabric(s) (distribution and creation)

Talking about the relational capacities of urban fabric, we want to investigate the creation and distribution of fabric and textiles on a local and global scale. On a global scale, it is possible to look into and critically account for

the complex networks of production of fabric — clothes, books, archival material on the Internet, economic transactions — to suggest a starting point. We have not yet developed a vocabulary to address this but are looking for ways to move into these explorations. An example of a recent project that deals with some of these issues is in fact entitled the Urban Fabric Project (www.urbanfabricproject.com). The project focuses on American textile cities, and how they have been shaped when the industries have departed from these cities, leaving them disenfranchised and struggling. Here, the aim is to show how it is possible to revitalize these cities — but it would also be important to trace and diagram the new globalized systems of distribution and creation emerging from the decline of these American textile cities.

Locally, we are interested in the above-mentioned business models of recycled clothes appearing around flea markets and re-sewing businesses (<http://www.melangedeluxe.dk/conditions/>). Also, we see examples of shops appearing where you have to donate a piece of clothes to buy a new one, suggesting new forms of distribution and altering power relations. In addition, bringing it back to a global scale, we want to pursue what happens to the recycled clothes and how this can be inserted into other-than-urban loops and what that might entail. Whereas this might seem rather 'down to earth' or even simplistic following from the previous section, we do see a potential for these investigations to enter more complex conceptual infrastructures through the analysis and experiments with different kinds of creation, distribution and circulation of urban fabric(s). In addition, we wish to explore how this might relate to textures and not only textiles.

Although this might be argued to be the least developed part of the ethology of urban fabric(s), we believe there is great potential

in tying these explorations together with the previous sections to allow for a diagrammatic conceptualization of the relational complexity at stake here.

Exterior/interior of urban fabric(s) (interfaces)

One way of exemplifying what generates the surface for contemporary interfaces between art and technology is definitely the software as a weave of algorithmic codings. In the case of interactive architecture or media facades, where buildings become interfaces, and the relation between the interior/exterior is broken up, we can argue, with Rancière, that these algorithmic codings are in fact re-distributing the sensible through an (inter) activation of the urban fabric(s):

This is not a simple matter of an 'institution', but of the framework of the distributions of space and the weaving of fabrics of perception. Within any given framework, artists are those whose strategies aim to change the frames, speed and scales according to which we perceive the visible, and combine it with a specific invisible element and a specific meaning.
(Rancière 2010, 141)

In continuation of this line of thought we might ask: What interfaces between (what kinds of) exterior and interior are produced by urban fabric(s) (animal-organic, skin-textile/skin-city, language-fabric, habit-character)? The animal-organic-artificial relations concern the raw material of the production of fabric (e.g. wool-bamboo-polyester) and its relation to the distribution of the sensible through affective fields. The skin-textile

activates a thinking of the skin and textile as surfaces that co-constitute complex inter-weavings of texture and fabric, as developed in the previous section through the story of the serpent. The language-fabric relation is etymological and can be used to develop the relation between text and textile, where text has etymological roots to both 'weaving' and 'tissue'. An interesting example here concerns the Minoan script of 'Linear B' (approximately 1250 B.C.) in which the content of the communication relates directly to the production of textiles (e.g. how many sheep are needed to produce a garment). This relation between the number of sheep and a garment has long since been lost, but today's fabric of networks have nevertheless opened the possibility to dig into the material relationality involved in interfaces of many kinds. In this project, it is our ambition to generate material fabrics that invite to experiment with the velocities, characterizations and the relational capacities of interfaces between animal-organic, skin-textile/skin-city, language-fabric, habit-character.

Experiments and expositions

As outlined in this article, we believe urban fabric(s) can be questioned through critical conceptual, artistic and designerly experimentation, bringing forth existing ideological, sometimes totalitarian, distributions of the sensible on a microperceptual and political level, offering ways for people to act upon the normalized distribution of urban fabric(s) through infra-ordinary micro-revolutions. Concurrently with the conceptual investigations of a possible ethology of urban fabric(s), we are contemplating how to go about this kind of experimentation, which

we want to aim at different distributions of the sensible — dissensus — through new interweavings, interactions and interfaces that rupture relations and invent new relationships. Re-thinking the notion of ‘fiction’, Rancière argues that it is possible to change ‘[...] existing modes of sensory presentations and forms of enunciation; of varying frames, scales and rhythms; and of building new relationships between reality and appearance, the individual and the collective’ (Rancière 2010, 141). In future projects, we want to situate this kind of interventionist or practice-based experimentation within an academic context as a kind of diagrammatic practices of research-creation.

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**POST-DIGITAL IS POST-
SCREEN: ARNHEIM'S VISUAL
THINKING APPLIED TO ART
IN THE EXPANDED DIGITAL
MEDIA FIELD**

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1. Introduction

If the interest in the post-digital seems to point at anything, it is that the usefulness of the digital as a discursive element in analyzing the impact of technology in society and culture is waning. Digital technologies on the other hand only grow and proliferate. This raises the question: why do we need or want to discuss matters in terms of a post-digital condition if digital media do not seem to lose ground but rather expand? I suggest we use the term post-digital to establish new points of perspective to refine the analysis of digital media and digital technologies. I look at this issue in the context of art. Here, the digital realm tends to be perceived as screen-based. This tendency is validated by popular approaches in media art, most notably in Lev Manovich's *The Language of New Media*. To examine and understand art practices in which screens are not at the center of a work a screen-based analysis does not seem to make much sense. I try to show the limitations of the screen-based approach of the digital through Alexander Galloway's analysis of this problem in his book *The Interface Effect*.

What is not directly visible is also less likely to be seen. Additional issues for art in the context of digital media seem to be the visual impermeability or the spatial dispersion of specific works and practices. What I mean with visual impermeability is the presence of somehow 'hidden' structures, like network technologies, code and software processes, and even indirect influences of the Internet or of computer technology, in specific works of art. The perception of such works is mostly limited to traces and elements of the work our vision, hearing, and touch *can* detect. The interpretation of physical objects or 'artifacts' is part of the appreciation and perception of a work of art (Dickie 431). Works of art whose

structures or processes mostly escape the line of sight present a challenge for interpretation that has been explored from different perspectives.

Earlier approaches for example suggest using Jack Burnham's 'Systems Aesthetics' (Shanken, *Art and Electronic Media*) or Callon and Latour's 'Actor Network Theory' (ANT) (Lichty) as a basis for analysis of complex works of art in a technological environment. What these approaches lack however is a strategy to develop new visual models. The prevalence of the visual arts in contemporary art seems to suggest developing a view beyond the screen may ask for an alternative visual approach, rather than a predominantly conceptual or actor network approach. Rudolph Arnheim offers a possible basis for such visualization in his book *Visual Thinking* (274). He explains how visualizations are an intrinsic part of thought and understanding (257). He uses examples from science, where the awareness of processes, structures, and objects often precedes or even constitutes their visibility. This inner mind visualization is created through the observation and analysis of physical objects or effects, which Arnheim calls "patterns of forces", which the observer inevitably interprets based on prior knowledge of the world (276). For art this means that perception of an individual work will still depend on an audience member's experience and knowledge of art, but this time in a post-digital context, a context whose possibilities and limitations are still largely unknown to the general audience. Such an experience and knowledge will therefore take time to develop.

The development of experience and knowledge largely depends on existing research, criticism, and theory in the field. Despite a widespread tendency to approach digital technologies as screen-based, practices and works that exist beyond the screen have been documented and analyzed,

mainly from within the media cultural field (Blais and Ippolito 17; Cramer 8; Popper 89; Bazzichelli 26; Holmes 14; Galloway 96). Their examples and mine show a diversity in practice and form in art in the context of digital technologies that remains largely obscured in the many screen-based approaches. To round up my proposal to take Arnheim's notion of models of theory as a basis for a new visual approach to art, I attempt to describe a few possible uses of Arnheim's theory in this particular context. Since the visualizations he proposes all depart from specific areas of research, I combine his notion of models of thought with approaches of critics and theorists from the field of media art and media culture. The new perspectives on the effects of digital technologies on art developed this way could, through their radical break away from the screen and their move into the darkness of the unseen, serve the critical potential of the post-digital.

2. The bright and blinding screen

In her book *Where Art Belongs* the art writer Chris Kraus puts what she calls "digital forms" in the same realm as video (119). She is but one of many critics and theorists that describe art in the digital realm in terms of the image and the screen (Bourriaud 69; Foster 105; Jameson 110; Krauss 87; Virilio 14; Rancière 9). The manner in which it is described is almost always negative. Computers are described as the present day epitome of Guy Debord's *The Society of the Spectacle*, or as problematic because prolific image copy machines. Virilio, in all his poetic paranoia, expresses this feeling by equalizing all screens, from the screen of the networked computer to the surveillance

monitor: "What was still only on the drawing board with the industrial reproduction of images analysed by Walter Benjamin, literally explodes with the 'Large-Scale Optics' on the Internet, since telesurveillance extends to telesurveillance of art." (14)

This superficial view of the computer and digital media in general is supported or at least barely countered by influential writers from the media art field. Lev Manovich's bestseller *The Language of New Media* describes the computer almost entirely in terms of cinema. Even the chapter called "The Operations," after a chapter on screens, solely focuses on image editing and image sequencing (117). In his book *The Interface Effect* Alexander Galloway starts off with a respectful yet also critical analysis of Manovich's cinematic approach of new media. Galloway takes his criticism of this approach further by continuing his criticism to a related approach, that of remediation (20). The theory of remediation draws a straight line from medieval illustrated manuscripts to linear perspective painting to cinema to television and lastly to digital media (Bolter and Grusin 34). The radical transformations brought on by digital technology are explained only by stating it "can be more aggressive in its remediation" (Bolter and Grusin 46). Galloway however puts a radical new twist on remediation in digital media. He observes that, far from remediating a visual language like that of cinema, the computer "remediates the very conditions of being itself" (21). In terms of art practice this means that digital media remediate art as is, with all its complexities and contradictions. Digital media however do so from their own form of 'Dasein', which comes to be through their design and application.

The focus on the screen therefore is not a problem produced by digital technologies per se. To find a possible cause and solution for this problem it seems more appropriate to

approach it as a continuation of issues in art criticism and cultural theory at large. Though a variety of approaches to discuss art involving digital technologies exists (Blais and Ippolito 17; Cramer 8; Popper 89; Bazzichelli 26; Holmes 14), “no clearly defined method exists for analyzing the role of science and technology in the history of art” as a whole (Shanken, “Historizing Art and Technology” 44). Edward Shanken notes how after the heydays of modern art historians stopped describing technological developments in art (45). In this time period especially digital technologies have prospered exponentially. This change in art historical method seems to have created a lack of analytical tools to grasp the realities of art in the age of digital media. What the ongoing screen-based analysis of digital media shows is that this causes the variability and techno-political issues of the digital in art and culture to go largely unnoticed.

3. What is visual thinking?

To bridge the gap in knowledge about art and technology it seems first of all necessary to look at the role of technology in art in another way. The term post-digital seems to suggest we take a certain distance from the digital, or that we at least question what the term has come to stand for. This distance and questioning may provoke a necessary re-assessment of the effects of the rise of digital technologies, also in art practice. Galloway and others (Castells 355; Fuller 21; Campanelli 144) point to how the content and events of digital media do not exist on-screen primarily by far, and thus largely happen beyond a straightforward, retinal view. Developing ways to see beyond the screen therefore seems one of the main goals of a post-digital analysis of art. The merging of

machine spaces and art practices asks for a visualization method that is at the same time applicable to both science and art.

In his book *Visual Thinking* the psychologist and art theorist Rudolf Arnheim describes various forms of visualization, one of which happens largely in the mind. It boils down to ‘seeing’ things you know are there but which cannot or can barely be seen by the naked eye. It is not a form of imaginative construction of unreal events or phenomena. Arnheim speaks of “models for theory” (274). He describes examples of how such models appear in nature sciences and geometry, especially in their early days. Even if he uses examples from the hard sciences, his approach of scientific visualizations is largely psychological (275). He explains how every scientific model of an unseeable event or object is never static or stable, as it is based on a mixture of theory, observation, experience, and psychology. In other words, these visualizations are as much subjective as they are objective views of events, phenomena, or objects that exist beyond the reach of the human eye.

Arnheim gives an example of how psychological or cultural influences can affect visual thinking: Gallileo not only had to battle church dogmas. He also had to constantly challenge his own, learned modes of perception, and in the end he did not completely succeed. Gallileo refused to accept planets rotated around the sun in ellipses rather than in circles. His refusal was based on cultural notions of his day in which religious beliefs suggested an underlying perfection existing in all of God’s creation. Ellipses were considered imperfect. Arnheim quotes Erwin Panofsky pointing out that the ellipse, the distorted circle, “was as emphatically rejected by High renaissance art as it was cherished in mannerism” (278). Yet, even if Gallileo’s vision of how the earth moves through the universe was not entirely correct, his model

of the universe did change our view of our planet radically, and gave the work of other scientists an important new direction. A shift of perspective can apparently enrich the way we approach things, even if not every detail of this new view is in line with the reality it reveals.

A visualization such as meant in Arnheim's theory is flexible, and is not meant to prescribe how works of art should be interpreted or valued. Works of art can still be explored from different perspectives, for the development of which intuition, theory, and physical experience are combined. What a development of this form of visualization may add is an experience of seemingly scattered or elusive works as relatively concrete, graspable objects or processes. In other words, rather than depending on a few visible markers the view of a work could entail shapes ungraspable by the eye alone, but deductible or knowable to the mind, to serve as the basis for a possible interpretation. According to Arnheim, "all shapes are experienced as patterns of forces and are relevant only as patterns of forces" (276). In this sense an art object in a gallery and a networked installation are not that different. Pictures, models, or visualizations developed from interpreting these patterns of forces however depend on former experiences and intellectual, cultural, or emotional preconceptions of the beholder.

To illustrate how this can play out: whereas Jacques Rancière describes the future of the image and representation in terms of "machines of reproduction" (9), Galloway looks at the same surface and sees what he calls 'The Interface Effect', which is an effect "of other things, and thus tells the story of the larger forces that engender them" (preface). One sees a copy and editing tool, the other a change of the forces beyond the screen that the images represent. Rancière's example reveals a limited perception of the digital as screen-based, while Galloway puts forward

a view of the digital as a complex structure of forces obscured by a focus on the screen. These two divergent approaches of the digital each offer a radically different view. The first limits a view of the digital to what is directly visible, while the second firmly places the construction of the screen within larger systems and barely or non-visible practices. By breaking away from the screen Galloway seems closest to a post-digital approach.

4. Applying visual thinking

Arnheim's notion of models of theory describes a general way in which the mind's eye can see things, and how this way of seeing can help us make sense of things or situations. Contemporary art contains a highly varied field of practices, ranging from visual to performance to conceptual, and the interdisciplinary practices and works produced between them. Not one model for theory will fit to grasp the shape of all individual works of art. In the context of digital technologies art shows the same variety of practices and forms (Popper 23; Weiß 89-90). Individual works and practices need an approach that enables a view of their specific form and/or process, a specificity Arnheim's concept of models for theory does not offer on its own. Arnheim himself uses examples from cosmogony, geometry, and physics to illustrate how these models work (274-293). The notion of models of theory therefore describes a way of seeing that arises from various disciplines or practices in which direct, retinal views of specific forms or processes cannot occur, can only be established partially, or are not available yet. Research on post-screen works and practices therefore needs to be a departure point from which to develop visualizations for these works and practices.

Arnheim also describes boundaries to visual thinking. A mental image is not a photographic image of reality, but an approximate, subjective view of a form or event. The creation of models of thought is influenced by “the psychological tendency towards simplest structure” (282), or a combination of an intuition or deduction of the shape we envision and the shapes we are already familiar with. Models of thought can make the shape of objects, processes, and events beyond the line of sight easier to grasp, but they also tend to be simplified versions of these objects, processes, and events. A model for theory is nothing more than an attempt to see structure beyond the line of sight. Applying this type of visualization to works of art therefore means balancing an attempt to be accurate with the reality of inherent failure.

Still, an additional, visual layer to the way post-screen works and practices are approached already cannot harm us, but it can possibly help and enrich the way we see. A poetic use of code (Baumgärtel 11; Goriunova, Shulgin 4; Arns 194; Cramer, “Words Made Flesh” 8), a sculptural use of networks (Popper 181; Weiß 175; Shanken 140), and conceptualist practices (Greene 9; Holmes 20; Hand 10) are examples that show the heterogeneity of art beyond the screen. I treat these for the moment as separate categories, but am aware of the interdisciplinary character of each work in these areas, and of the physical and conceptual overlaps between them. In the next three sub chapters I briefly describe each category, and I try to apply visual thinking to an example in each.

4.1. Code art

Various authors have described the deep entrenchment of code in culture and society, and its defining role in new systems of power (Galloway and Thacker 30; Galloway 54;

Wark [029]). Others have emphasized the generative aspect of code and its application in various art practices, and how code art at least partly escapes institutional realms (Arns 201; Goriunova, Shulgin 6). These views from the media art and media theoretical field seem to conflict with the tendency among influential art critics and cultural theorists to see and discuss the main issues of the digital in terms of the screen. The intervention of the post-digital may help here.

What is clear from all descriptions of code art is that it cannot be represented on a retinal plane in its entirety, or in its full capacity. Code as a written text, deep within a computer or presented on screen or paper, encompasses a potential activity that cannot be grasped from a literal reading or retinal observation of code as text or effect alone. To create a visualization of a work of code art we could attempt to include the potential activity inherent to code. Visualizing the work in full force would have to include movement through time and space, however minimal in the machine it runs on, as well as its relation to cultural, social, and political realms.

Let us take a work like Jaromil’s *Forkbomb* for example, a highly poetic and minimal string of code designed to replicate itself endlessly. When seeing it displayed as text, like it was painted on a wall at Transmediale 2012, we could admire the simple beauty of the string of signs. Awareness of it being a piece of executable code of a very specific kind, a fork bomb virus, however could lead us beyond this relatively simple visible dimension. We could imagine a proliferation of that string of code in the shape of maybe a family tree, much like the poetic experiments Florian Cramer describes (“Words Made Flesh” 94), but constantly splitting, moving, growing. We could at the same time see the hard disc working away and filling up, its design standardized so as to allow indeterminate applications and

thus also viruses, along the observations in Matthew Fuller's *Media Ecologies* (93). We could wait to see how much time it takes for the computer it runs on to crash, placing it in the media archeological domain described by Jussi Parikka (97). We could also see a computer failing at being a productive machine in terms of expectations of what its economical, cultural, or political purpose is in ways Galloway describes (22). A visualization of *Forkbomb* in action could in this way give body to what first may have appeared as a predominantly conceptual work, by revealing its profound embedding and movement in the very physical structure that is a computer, and in the socio-technological landscape that stretches out around it.

4.2. Sculpture and performance in digital networks

The visualization of how technological networks are made part of specific works of art requires an explicit visualization of hardware as well as of the role of hardware in information flows. In network art installations hardware is essential, and most of it is far beyond sight. Any Internet connection for example quite easily runs halfway around the world (Terranova 44). The myriad of specific operations to realize an Internet connection happens almost entirely automated (Weiß 36). It runs across different national borders in ways largely beyond our control. Internet connections therefore are not neutral, straightforward couplings of machines. Yet Internet connections in works of art are mostly discussed in terms of technology, virtual spaces, and telepresence, and seldom in terms of the mixed physical and technological essence of the network, let alone in terms of a visualization of it (Goldberg 3;

Popper 363; Shanken, *Art and Electronic Media* 32; Paul 93).

By making the Internet part of a decentralized installation or performance, happening at different places at once, a composition is created that involves the implementation of a shared, semi-public infrastructure. This implementation of the Net is time-based, because the network involvement only exists when the installation runs or a live performance takes place (Weiß 342). Though some works in this category involve smaller or private networks that are not online and have no significant political dimension, in my opinion the use of the semi-public space of the Internet as a key factor in a work deserves special attention due to its political and cultural sensitivity. A post-digital view of art could and should include a sobering view of the Internet as bringer of alleged freedom and progress by disclosing the reality of and behind its construction. The political dimension to the Internet also affects the art world. The possibilities for artists to represent themselves and have a direct connection to their audience online creates a challenge to the authority of critics, curators, gallerists, and art institutions (Stallabrass 90; Greene 11). In this sense the interests of artists and media activists seem to overlap. It must maybe be emphasized though that an inclusion of a view of the way the Internet is constructed, and how it functions within a work of art, need not be political per se. It could also be aesthetic or poetic, or a combination of all these.

Several authors have described the role of the Internet as a continuation of struggles over media access and the development of free media or of tactical media (Rifkin 232; Lovink 258; Kluitenberg 305; Holmes 61). The vulnerability of the Internet as a space for free speech and collaboration across borders has led some artists to develop alternative networks. These sometimes unpractical

and sometimes highly inventive alternative networks are works of art in themselves, and, though they are not connected to the larger Internet, through their sheer separation and rejection of the Internet they can be seen as political, activist art statements. Several works from artists that are part of Weise 7, a studio and artist collective from Berlin, could be described this way.

Netless for example, a work by Danja Vasiliev, establishes an independent network through the attachment of wirelessly communicating data storage devices to public transport vehicles such as trams. Information exchange in this network happens through manual upload to one of the devices, and an automatic exchange between two devices when the trams they are attached to pass each other. The work's shape is defined through physical, semi-physical, and conceptual elements: the trams, wireless storage devices, and the computers and phones of the users; the wifi-signals moving separately and overlapping occasionally; and the explicit separation of the Internet. Though the work is dispersed, it is still delineated by the public transport infrastructure's reach, the capacity of the wireless devices, and the network of users and their individual computers. One could maybe say it has a tentacle-like shape, whereby the ends of each tentacle dissolves in the personal network and interests of each user. By envisioning the patterns of forces involved conceptually, spatially, and physically, a relatively comprehensive and less abstract view of this installation could possibly emerge than from a description and an abstract presentation model alone.

4.3. Conceptualism and the digital sphere

In the last few years a growing awareness of the influence of the Internet in art beyond the computer has evolved through the development of so-called Post-Internet art (Olson 60; Vierkant 5). The Post-Internet art 'movement' and the post-digital have in common that they both re-examine the faulty premises common views of digital culture are based on. They also seem to share a questioning of boundaries between technological and socio-cultural domains, in particular the penetration of life and culture by concepts and practices originating in the technological domain. The reason I call certain art practices conceptualist is that they largely manifest themselves in some form outside of digital media, yet these media do inform their shape. The technology seemingly disappears in them. Maybe more than in other art practices digital media here "remediate the very conditions of being itself" (Galloway 21).

Works range from performance and activist art to sculpture, painting, video, and prints (Holmes 47; Olson 63). Works in this highly diverse group of practices seem to have three things in common: they use the Internet as an information or material resource; they use the Internet as a community space; and they use digital media for publication purposes (Bazzichelli 28; Goriunova 29; Holmes 66; Hand 47). The works in themselves largely take shape outside the computer. Some works, such as the activist art performances of the Yes Men/ rtmak, are described in books about net art and digital art (Baumgärtel 106; Stallabrass 8; Greene 92; Paul 209). More object-based work, like that associated with the 'Post-Internet' label, still largely needs to find its way into literature. Marisa Olson describes the extensive use of

found photography in Post-Internet practices in terms of a reevaluation of “portraits of the Web.” “Taken out of circulation and repurposed, they are ascribed with new value, like the shiny bars locked up in Fort Knox” (60).

To develop a model for theory or visualization of the indirect effects of technology at play in conceptualist works of art could be difficult. Following Arnheim’s view that these visualizations always take the simplest form, the elusive and near intangible echoes of technology in these particular conceptualist practices seem to ask for a highly abstract yet familiar model. One such model for an all-pervading yet invisible machine comes from the world of popular fiction. Borrowing from the Hollywood blockbuster *The Matrix* Vito Campanelli speaks of an “aesthetic matrix” when describing the influence of the design and content of the web. He sees our current cultural situation as “a time characterized by a diffuse aesthetics and by memetic transmission”, especially pertaining to “cultural elements” such as images (148). Next to media content one could however also include the subtle but defining role of tools and technologies in the development of practices in this aesthetic. The work of the Yes Men may serve as an example.

The art activism of the Yes Men consists largely of infiltration and subversion strategies. They copy the logo and communication design of a certain corporation or institution and use it as a façade for their intervention in the media presence of this corporation or institution (Greene 95; Holmes 169). The Yes Men’s work is a juggling with the different dimensions of reality: the reality of physical space; the reality of media representations; and the specific historical and cultural perceptions relating to their target. They use the space between the reality of physical space and that of media representations as a theatre in which to perform alternative histories. This in-between space is a physical space, a

technological space, and a conceptual space at once (Campanelli 13). We could maybe see the shapes of individual works of art in this space as explicitly virtual, even if they appear as objects, like in Post-Internet art. The virtual, in the sense of representing the potential of an event or object, here exists in ghost-like shapes and processes that consist of the ectoplasm, the leakage, or the extra-digital results of digital technologies. An analysis of this leakage seems to belong in the techno-critical exploration the post-digital approach may offer.

5. Finally

In the twenty years, I worked as a critic and observer of art in the context of digital technologies I have been confronted with a partial, but rather substantial blindness to the shapes of works and practices in this area in audiences, critics, educators, and curators. The relative inexperience with computers and related technologies seems to make it easy either to be sucked into, or to be turned away by, the movements and the glitter on the screen. Furthermore a reluctance to see the screen in a different light seems informed by pre-digital cultural theory, in which cinema and television were the main focus of analysis (Galloway 8). I have tried to show how this surface view of the digital media is distracting and misleading.

New technologies have enabled artists to make structures and processes that are too large, too small, or too elusive for us to perceive with our eyes alone. The computer and its networks seem to especially influence this tendency. A screen-based view of art in this context will not make the works in question visible. Different descriptions and analyses of these works exist, but these are mostly based on a conceptual approach. A

comprehensive visual approach to these works does not exist yet. In my search for a way to pass on my own experiences, in particular with art in networks, I stumbled upon Arnheim's *Visual Thinking*. In the chapter "Models for Theory" Arnheim describes a way of seeing in which the inner mind creates visualizations of complex or large phenomena (274). These visualizations are part of the formation of a grasp of the shape and processes of these phenomena.

Though Arnheim ascribes this visualization technique for science, I think it can just as easily be applied to the arts. Here too we have complex and large structures the shape and processes of which almost completely escape the eye. By trying to develop a visualization of a work from patterns of forces, or from those elements and effects of a work we can experience directly, it may be possible to get a more profound or full experience of a work as it expands beyond the line of sight. This visualization technique is not to replace interpretation, but I offer it as a possible additional strategy to approach and experience specific works of art. Rather than approaching complex, unstable, and/ or very large or small works as limited or, on the contrary, as dissolving into an undefined public sphere or some mysterious machinic universe, it may be possible to discern shapes, trajectories, and spheres of influence or interaction. Arnheim's "models for theory" approach comes closest to my own view and experience of art in the context of digital technologies. To hopefully clarify, but also to inspire possible new visualizations in the reader, I have added examples of possible implementations of this particular form of visualization, which no doubt should be refined.

"Post-digital is post-screen", the title of my paper, refers to the need to develop new approaches to art and culture in the context of digital technologies. Getting stuck

in an endless loop of images and copied images is not how the arts of today need to be perceived. A post-digital perspective can see deeper, and further.

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Lotte Philipsen

**WHO'S AFRAID OF THE
AUDIENCE? DIGITAL AND
POST-DIGITAL PERSPECTIVES
ON AESTHETICS**

x

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This article analyses how works of art that make use of or refer to digital technology can be approached, analysed, and understood aesthetically from two different perspectives. One perspective, which I shall term a 'digital' perspective, mainly focuses on poetics (or production) and technology when approaching the works, whereas the other, which I shall term a 'post-digital' perspective, focuses on aesthetic experience (or reception) when approaching the works. What I tentatively and for the purpose of practical analysis term the 'digital' and the 'post-digital' perspectives do not designate two different sets of concrete works of art or artistic practice and neither do they describe different periods.[1] Instead, the two perspectives co-exist as different discursive positions that are concretely expressed in the way we talk about aesthetics in relation to art that makes use of and/or refers to digital technology. In short: When I choose here to talk about a digital and a post-digital perspective, I talk about two fundamentally different ways of ascribing aesthetic meaning to (the same) concrete works of art. By drawing on the ideas of especially Immanuel Kant and Dominic McIver Lopes, it is the overall purposes of this article to analyse and compare how the two perspectives understand the concept of aesthetics and to discuss some of the implications following from these understandings. As it turns out, one of the most significant implications is the role of the audience.

Why aesthetics?

Why focus on aesthetics in the first place? Why not just investigate and interpret the concrete works of art? The radical answer to that question is: Because a work of art does not exist in itself. By this I mean that whenever we assume that we talk about a specific

work of art, we really talk about a number of different, culturally constructed phenomena depending on who 'we' are. Whether we take as an example a piece of net art or a marble sculpture it can be considered, for instance, as pure conceptualization on the side of the artist (Kosuth), as significant form (Bell), as good or poor social/cultural critique (Adorno), as that which is accepted by the art institution (Bourdieu) etc.

Therefore, it is impossible to essentially pin down a specific work of art as something that exists as one clear-cut object/phenomenon/process/action/relation ready for 'pure' interpretation and analyses. In other words, all discussions on concrete works of art are based (sometimes unknowingly) on certain theoretical points of departure – even if the focus of the discussions themselves are down to earth and do not seemingly involve theory. Hence, I insist on focusing on aesthetics in the following comparative analysis of the digital and the post-digital perspective, not because it is the right way to consider works of art, but because it is — as the article shall demonstrate — a relevant issue that the digital and the post-digital perspectives approach fundamentally differently.

A brief note of clarification: The article distinguishes between 'aesthetics' (aesthetic theory in general) and its subcategories 'poetics' (relates to the practice of creating works of art and, hence, an aesthetics of production) and 'aesthetic experience' (relates to a concrete experience governed by judgement of taste, and, hence an aesthetics of reception).

A digital perspective on aesthetics

Three aspects characterize the digital perspective's notion of aesthetics: cross-disciplinarity, technological essentialism, and artistic creation.

Cross-disciplinarity

A digital perspective challenges the borders between traditional institutions and disciplines, and, hence, does not seem to distinguish between, for instance, 'art' in a strictly institutional sense, 'aesthetic artefacts' in a broader sense, and 'cultural artefacts' insofar as, overall, these terms are used more or less synonymously to describe new experiments or practices that make use of digital technology. As an example of this characteristic Stephen Wilson's book *Information Arts* carries the subtitle: Intersections of art, science, and technology. Wilson states that 'Information Arts can be seen as an investigation of these moving boundaries [between art and techno-scientific inquiry] and the cultural significance of including techno-scientific research in a definition of art' (18).

A significant advantage of a digital perspective's ability to transgress disciplinary borders is that the perspective looks beyond the narrow institutional confinements of Art with a capital A when focusing on aesthetics — thus, it is possible to consider themes like, for instance, 'surveillance', 'gaming' or 'artificial life' in manners that cut across different disciplines (like social science, engineering, art etc.)

Technological essentialism

Perhaps as a result of the refreshingly unorthodox cross-disciplinarity, the second characteristic of the digital perspective is that

digital technology in itself is placed at the centre of attention. This means that digital technology and media are the elements that fixate the meaning of a digital perspective — or constitute it — whereas art and aesthetics do not play central roles. Therefore, when art or aesthetics are considered from a digital perspective these concepts are subsumed — along with other cultural/social/political modes of expression — under the primacy of digital technology and not as governing concepts in themselves. For example, the majority of survey books on new media art or digital art are organised either as descriptions/analysis of individual artists or works or according to technological subgenres like 'video art', 'network art', 'interactive art', 'telepresence' etc. (see, for instance Rush; Giannetti; Tribe and Jana; Paul; Shanken; Wilson, *Art + Science Now*). Consequentially, considered from a digital perspective, analyses and debates on the role of new technology in art have an overall techno-essentialist character in the sense that questions asked basically centre around: What is "interactive", or "networked", or "digital" (etc.) art?

Though the above questions are good and relevant, they lack one important component that it is highly appropriate to investigate, that is: According to whom? Or in other words: From which specific subject position are such questions asked? From the position of the artist, the curator/critic, the user, the implied audience or the actual audience? By not explicating which subject positions are addressed when carrying out analyses of new art forms, the results of those analyses are staged as virgin born truths radiating from the works of art. As a result, attempts to critically investigate tendencies across different works of art do not distinguish between the specific technical features applied in a work of art and what is actually encountered by the average member of the audience.

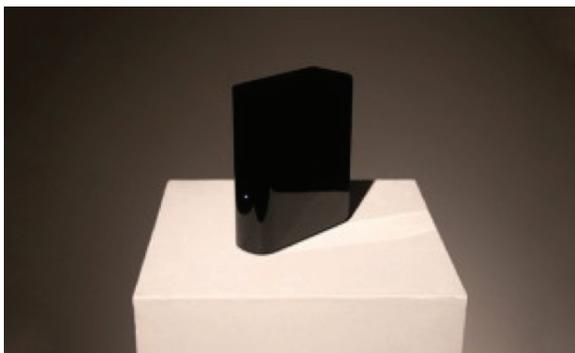


Figure 1: Art404, *5 Million Dollars, 1 Terabyte*.

Consider, for instance, the work *5 Million Dollars, 1 Terabyte* by Art404, which consists of a black terabyte hard drive exhibited in a vitrine. No matter how hard we look, smell, taste, listen or touch the hard drive, we will never be able to extract the most important feature about this work of art — the decisive factor that transforms the terabyte from a dull object of everyday life and that potentially gives rise to aesthetic experience for the audience: The fact that this particular hard drive contains illegally downloaded material worth five million dollars. The only way of becoming aware of this crucial piece of information is by reading the catalogue text or visiting Art404's website. Thus, in reality there is a gap between the experience gained from actually encountering the work in the gallery and from reading about it. This gap is not really addressed when applying a digital perspective on aesthetic research, since such a perspective interprets the works of art according to technological features and does not pay attention to the different subject positions of the artist (who knows what the technical properties of the work) and the audience (whose knowledge about the technical properties sometimes — like in the case of *5 Million Dollars, 1 Terabyte* — stems from para-texts rather than from first-hand encounters with the work).

Especially the subject position of the audience seems to be neglected in the digital research discourse insofar as audience

experiences are assumed in aesthetic analyses to be identical to the artist's intention, curatorial/critical framing, or theoretical accounts of technical characteristics and potentials of new art types. Considered from the digital perspective, if the use of a specific technology in a work of art is considered to have interactive, or critical, or alienating potentials it is more or less automatically assumed that the audience/users' experiences correspond to those potentials without paying much attention to the fact that different contexts and subject positions invite different aesthetic considerations.

Artistic creation

Whereas a digital perspective does not focus on the audience when considering the aesthetics dimensions of a work, it pays significant attentions to the subject position of the creator (and this is the third characteristic of the digital discourse). Thus, the focus of attention is the very important work done by artists who explore new media and technology in line with an avant-garde tradition. As Morten Breinbjerg states in relation to the practice of live-coding artists using ixi software: '[They see] new technology as a way of subverting, or at least getting around, the historical understanding of music, as well as the constraining practices of music composition and production present in commercial music software' (164). As such the process of artistic experiment and creation can be said to serve an aesthetic and/or cultural purpose instead of a functional one. A similar focus on the process of artistic creation is detectable in Ian Bogost's notion of 'carpentry', which describes craftsmanship as a way of alternative thinking or a philosophical practice (see Andersen, Pold, and Riis in this volume).

The focus on poetics — what the artists actually do, what programmes are written, what hacks are carried out, which

components are combined in a specific design? — is of importance because this is what physically creates the work. Without the craftsmanship of the artist there would be no work. But this applies to all works and not exclusively to works that make use of and/or refer to new media or technology. The question is if what the artists do in a process of creation automatically equals aesthetic experience of an audience? This is where a digital perspective on aesthetics lacks an important dimension. The tendency to consider poetics as synonymous to aesthetic experience means that if an audience is to gain any aesthetic experience by encountering the work this is automatically assumed to happen only insofar as the audience is able to place him- or herself in the subject position of the creator and to understand what the creator actually does, or did, during the creation of the work.

As insightfully accounted for by Florian Cramer, two overall practices of aesthetics are at work in relation to new media art: One is in accordance with aesthetic theory as formulated by Burke and Lyotard (and Kant one may add) and includes “hacks” and intentional crudeness of software and hardware design’ whereas the other is governed by ‘neo-pythagorean beauty ideals, [...] white-hat hacker culture, [and] human/computer interface designs of mainstream, high-tech media lab arts’ (Cramer, 122). A digital perspective, as well as a post-digital one, both relate to the former understanding of aesthetics. But as suggested, a digital perspective does so from the point of view of a poetics of technology more than from a point of view of aesthetic experience in a Kantian sense.

Cramer (with reference to Burke) mentions as cases of sublime aesthetic ‘pleasure and pain of hardware and software interfaces, terror of the desktop, obscurity of the API, and suddenness of operating system

crashes’ (122), which, in my opinion, are all excellent examples of possible aesthetic experiences because they can be related to an act of reception, and as such represent what I term a post-digital perspective. But when Cramer continues by describing the practices involved in such effects as ‘technological and media aesthetics’ (123), the perspective changes. By talking of ‘technological and media aesthetics’ — admittedly, the devil lies in the detail — Cramer implicitly draws the contours of an aesthetics that is defined by technology and media. I would argue that Cramer is here dealing with poetics (if specific kinds of artistic creation are considered crucial) or art forms/genres (if specific characteristics defining for instance ‘hacker art’ are considered to be crucial), but not with aesthetic experience.

The tendency to understand aesthetics in a technologically pre-fixed manner is commented on by Carsten Strathausen:

The nascent aesthetics of new media is variously named “rational aesthetics”, (Claudia Gianetti) or “info-aesthetics” as well as “post-media aesthetics” (Lev Manovich) or “techno-aesthetics” (Peter Weibel) [...] “Rational,” “info-,” or “techno-“ aesthetics is thus informed by the history of science and engineering rather than that of philosophy and politics. Its heroes are Boscovich, Boole, Turing, and Bense instead of Aristotle, Kant, Hegel, or Adorno. (Strathausen, 59)

In his article, Strathausen points to and criticizes a tendency to replace one discourse of aesthetics (the classic) with another, new discourse which is closely tied to the subject matter of digital technology. The problem with this replacement is that aesthetics, then, becomes certain properties of a work instead of being a philosophical perspective applied

to a work (and its technical properties). In this sense, aesthetic research within a digital perspective is governed by techno-essentialist focus, which is both unavoidable and important when exploring the poetics of new digital technologies or media in their emergence. It is, however, important to acknowledge that this is a matter of poetics, which limits aesthetics experience to the subject position of the creator and leaves out an audience.

A post-digital perspective on aesthetics

If a digital perspective on aesthetics takes as its point of departure technological poetics, a post-digital perspective takes a post-technological and post-media point of departure. The post-digital perspective is not anti-technological or pre-digital, since it does not seek a romantic return to a stage before new technologies and media entered the realm of art. On the contrary, a post-digital perspective on art can be considered a sub-category of a more general post-media discourse (see Quaranta) in the sense that it fully acknowledges the ubiquitous presence of digital technology in art and the fact that new media and technology may facilitate or prompt aesthetics experience.

A significant potential of applying a post-digital perspective on works of art, as well as on other objects or phenomena, is that it considers the aesthetic potentials of works that make use of new media and technology without automatically subjecting aesthetic experience to technology or equating it with poetics. Hence, within a post-digital perspective we may ask the 'naïve' questions to the field of contemporary art, such as: Are new media or technologies of aesthetic relevance in a work if they go unnoticed by

the audience? And vice versa: What are the aesthetic potentials of para-textually fictional stories about the presence of digital media/technology in a work? In short: Does it make any difference in terms of aesthetic experience (not poetics) whether the terabyte in *5 Million Dollars, 1 Terabyte* actually includes the illegal files or not (as long as we believe the story)? And how do we elaborate on the fact that the same work of art potentially gives rise to different kinds of aesthetic experiences depending on which subject positions (artist, curator/critic, user, audience) engage with the work and in what manners (as intended by someone else or not)?

Kantian distinctions

In order to investigate such aesthetic questions thoroughly it is necessary to insist on upholding Immanuel Kant's significant distinction between the subject positions of the creator and that of an audience (Kant §48): First, Kant describes how aesthetic taste is at work on the side of the creator when the artist creates his work insofar as he 'checks his work [against manifold examples from art or nature]; and after many, often toilsome, attempts to content taste he finds the form which satisfies him.' Kant then crucially states: 'But taste is merely a judging and not a productive faculty'. In other words: Even when the artist judges his own work during its production, he does so by stepping back from the work, 'after he has exercised and corrected it', in order to create the distance necessary for passing an aesthetic judgement of taste, before stepping towards the work to once again correct it. Kant, thus, distinguishes between two different subject positions, between which the artist oscillates: That of the immediate creator and that of the contemplative judge, of which only the latter, according to Kant, is able to pass an aesthetic judgement of taste on the work. Hence,

in Kant, aesthetic experience is always implicitly an act of reception – even when it is part of an overall production process.

Now, the fact that Kant defined aesthetic experience as a matter of reception in 1790 does not automatically render it relevant today. After all, why should we still insist on a separation between the creating artist and the audience when, for instance, the fields of new media art and relational aesthetics in many cases are characterised by participation and interactivity that result in extensive co-creation? For instance, the Ars Electronica Prix category of ‘Digital Communities’ consists of works in which such a distinction between artist and audience may seem absurd, since the digital communities function collectively in the participants’ everyday life.

One example could be the 2013 Golden Nica winner El Campo de Cebada, the name of an enclosed city square in Madrid, where residents and the council work together — in the physical place and via online social media — to define the use of the square (Leopoldseder et al. 200-203). No artist or artist group is credited for this genuinely collective project. Now, participating in El Campo de Cebada may (or may not) result in aesthetic reflective judgements among the individuals who engage in the project on an everyday basis in Madrid, as accounted for above with reference to Kant, but the moment the project is framed by Ars Electronica as an outstanding work a non-creating audience is created for the project and it becomes an object for potential aesthetic experience to that audience too.

In fact, the very act of presenting or exhibiting the project within an art (or at least cultural) institutional framework, like Ars Electronica, renders the prime purpose of El Campo de Cebada one of prompting aesthetic experience rather than immediate function — even if it is the functional dimensions that,

contemplated from the point of view of an audience subject position, prompt aesthetic experience. Whereas in Madrid the square is inhabited, in the context of Ars Electronica it is ‘exhibited’, and this sole act of exhibiting automatically installs El Campo de Cebada as an object for potential reflective aesthetic judgement of taste by subject positions that differ from the work’s immediate producers. Hence, at least three different subject positions are at work in the case of El Campo de Cebada: The active participants that create the phenomenon, the active participants that step back to contemplate the phenomenon (who in flesh and blood are identical to the first position), and the audience at Ars Electronica who contemplates the project that is presented to them. The ability to distinguish between these subject positions, and between poetics and aesthetic judgement of taste, when analysing the aesthetic potentials of phenomena like El Campo de Cebada is one important reason why Kantian aesthetics is highly relevant today.

The split of the audience: user and audience

Another reason is that, especially in the realm of so-called interactive art, the overall audience subject position is often divided in two, since — as lucidly accounted for by Dominic Lopes — in interactive art we may distinguish between the ‘user’ (who explores a work by generating displays in a prescribed manner) and the ‘audience’ (who explore a work by watching users generate displays by interacting with a work). Similar distinctions have been made between ‘visitors’ and ‘shy visitors’ to exhibitions of interactive art (Scott et al.), and audience members acting as ‘object signs’ and ‘meta signs’ respectively when experiencing digital art (Qvortrup). Thus, in many cases we may add yet another subject position to the three detected above in relation to El Campo de Cebada, because



Figure 2: *OCTO P7C-1* at Transmediale 2013.

the overall category of audience is often split into (at least) two different subject positions.

The difference between Lopes' two different subject positions of user and audience can be illustrated with reference to the work *OCTO P7C-1* (exhibited at Transmediale 2013). The work (produced by the Telekommunisten group) consisted of a spectacular, seemingly chaotic, network of yellow plastic tubes that criss-crossed the entire main venue of the Transmediale Festival, and worked as an 'Intertubular Pneumatic Packet Distribution System', that enabled visitors to communicate between different locations on the festival by way of sending written notes or small objects through the tube system.

In the exhibition, Lopes' term 'users' describes those visitors who engaged actively with *OCTO P7C-1* by, for instance, writing/drawing/crafting messages for the postal tubes or sending/receiving such messages by communicating commands to the OCTO-staff working the distribution centre. The distinctive sound accompanying each packet's travel through the tube system, the messages, the conversations between users and OCTO-workers etc. are all different kinds of audible, visual and sensual displays generated by the user and enabling him/her to gradually explore physical and semiotic dimensions of the work (and potentially gain aesthetic experience from it).

In addition to the user who acts in accordance with a prescribed manner staged by the creators of the work, the subject position of what Lopes terms 'audience' is of relevance when investigating aesthetic implications of a work like *OCTO P7C-1*. The audience do not engage directly with the work like the users do, but they watch how users interact with *OCTO P7C-1* and they observe how users' interaction with the work generates displays. As such, the audience explores the work, too, albeit in a different manner than users (and may gain aesthetic experience from the work). Exploring a work, one physical person may (at different times) hold the different subject positions of both user and audience.

One reason that a digital perspective leaves out the equation the subject position that Lopes calls 'audience', is that the potential aesthetic reflective judgement with this subject position does not fit a techno-essentialist view on new media art. Another reason could be that the subject position of the audience is sometimes (falsely) considered to be passive and uncritical (Philipsen). The fact remains, however, that an audience may experience what might be intended by the artist or described by a curator as an 'interactive, networked installation' in a very non-interactive, non-networked manner. And even 'users', who do interact actively with a work, may have aesthetic experiences that differ from the technologically defined ones at work in the poetics of a digital perspective. While we may think that such misinterpretations present a problem, in the sense that something has gone wrong in the course of communicating fully the essence of the work to the audience, this article will conclude by pointing out why such 'glitches' in aesthetics experience are valuable and why a digital perspective on art to a large extent ought to support it.

Conclusion: two paradoxes

First of all, to challenge the close interpretative connection between creator, technical properties of the work, and audience that governs a digitally oriented discourse is in perfect accordance with Roland Barthes' account of the birth of the reader and "The Death of the Author" and with Michel Foucault's subsequent distinction between author — in flesh and blood — and author function — as an important, yet virtual, character. When Barthes and Foucault articulated the radical break between artist and audience, the work was simultaneously transformed to text. This transformation — from work to text — actually fits very well with a digital perspective, since it is the very same kind of transformation strategy that the digital perspective focus on when it pays attention to the poetics of creative hacks on phenomena and artefacts that, according to a more traditional point of view, belong to established domains of — for instance — engineering, art, politics, science, etc. And this is why it is a strange paradox that the digital perspective does not seem to allow the same post-structural practice of active reading to unfold with regard to the works of art that it, so to speak, adopts (or monopolizes) as the digital perspective's own by incorporating them in books and exhibitions on 'digital art' or 'new media art'.

Apart from the theoretical critique of a digital perspective or digital discourse on art — that it does not do justice to the post-structural ideas of separating and acknowledging the functions of different subject positions — another paradox related to the concrete artistic practices is at work in the digital discourse. Namely that especially when it comes to works of art that make use of new media and technologies, it seems obvious that the cultural and institutional uncertainties surrounding the works may in fact boost

the potentials of 'readers' gaining aesthetic experiences from encountering such works, due to the lack of an overall concept by which the works might be comprehended rationally. A comparison will elaborate on the matter: Oil paintings are conventionally framed and pinned down as 'works of art' that we are meant to appreciate as such. Due to traditional institutional framings of those concrete works of art, they have been categorized as an established art form, 'fine art painting', which makes it harder to read them freely as texts. Kantian aesthetics insists that the subject's aesthetic judgement of taste is governed by reflective rather than determined relation to the object encountered (Kant §4), but this principle may be compromised when the object is fixed by one specific institutional framing established over a long period.

In contrast to paintings or sculptures, many of the objects, designs, events, phenomena, hacks, etc. considered in a digital perspective have tremendous potential for prompting aesthetic experience due to the institutional and cultural ambiguity they (still) possess. It seems, therefore, paradoxical when survey books, analyses, critics or curators account for the aesthetic characteristics of such works by subsuming them under determined technological categories and reducing them to a specific poetic matter.

Thus, one significant advantage of applying a post-digital perspective on works — including works that happen to make use of or refer to digital technology — is that it enables us to approach works as texts; that is, in a more open and critical manner 'from the outside' than if approached from a digital perspective, whose strength lies in analysing matters of poetics and technology 'from the inside'. Specifically, a post-digital perspective allows us to acknowledge the subject positions of an audience when we conduct aesthetic research and analysis.

Notes

[1] Hence, my notion of a post-digital perspective bears no resemblance with Kim Cascone's use of the term 'post-digital' as synonymously to glitch in computer music. In fact, Cascone's approach belongs to what this article terms a digital perspective insofar as Cascone considers contemporary music practice from the point of view of artistic creation in which digital computer technology plays a crucial role.

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**OBJECT-DISORIENTED
SOUND: LISTENING IN THE
POST-DIGITAL CONDITION**

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Prelude: the sonic explosion

For some time, I have been deeply concerned with the mindful potential of listening as the subjective ramification of auditory perception. The thoughts that envelop these concerns essentially stem from questions of perpetual mobility, flow, fluidity, flexibility, and nomadism that are perhaps symptomatic of the contemporary post-digital culture. A nomadic listener is affected by a fleeting sound, which appears and diminishes as it triggers an amorphous stream of subjective contemplation and thoughts bordering on the immediate known-ness of the sonic phenomenon yet simultaneously moving toward the realm of the unknown.

What is the “unknown” embedded in a sonic phenomenon? Does it operate outside of the reality of the sonic object-hood and epistemic structure of the sonic phenomenon? Even object-oriented philosophers like Graham Harman have argued that the reality of anything outside of the correlation between thought and being remains unknowable. Harman has further criticized early phenomenologists’ approaches to sonic phenomena as reductive, such as:

If I hear a door slam, then I hear a door slam, and this experience must be described in all its subtlety; to explain this experience with a scientific theory of sound waves and eardrum vibrations is derivative, since all we encounter directly is the experience of the door slamming (Harman quotes Husserl, in Kimbell 103-117).

If we explore such a sonic phenomenon, we may find that a specific sound leads to a specific listening state inside the listener, who may, in a nomadic condition, indulge in taking the phenomenon as a premise or

entryway into a world that he or she did not previously know. The listener may address the sound relating it to the imagining and remembrance of a number of amorphous moods triggered by the temporality of listening, instead of deciphering its objective meaning, location-specific identity, or other spatial information embedded in the characteristic texture and tonality of the sound. Today’s wind may not sound like mere wind, and the lonely screeching of the windowpane may not sound like mere friction between glass and wood—the wind and the windowpane may sound like something more abstract in the sense that they are generating memories and imagination of other realities that deviate and refract in response to the immediate materiality of the sonic event. These sounds, as impermanent as they might seem to the ears of a wandering listener, may open hidden doors and obscure entrances that invite further perceptual meanderings in the spiritual realm of contemplation and a myriad of thoughts transcending the merely epistemic knowledge-based identity that the sounds would otherwise embody. The epistemological problems and ontological questions posed by such object-disoriented sonic explosions are the primary areas of interrogation and praxis in this paper. Ancient Indian philosophers would define these sonic explosions in terms of *dhvani* (sound heard by the ear) and *sphōṭa* (sound grasped by the intellect) suggesting that: “A sound changes into language and acquires meaning only after a certain explosion of sounds” (Barlingay 27), emphasizing the subjective and perspectival resonances through which a sonic entity is perceived by the listener. These are the conceptual bases on which I posit my questions and hypothesis. Addressing a practice-based approach, I explore the basic tenets of my ongoing project *Doors of Nothingness* (2012–ongoing) and sound installation/interventions *Mind Your*

Own Dizziness (2014 –ongoing) — the first of a series of works emerging from the project — which incorporate the concept of “hyper-listening” emphasizing the “mindful” aspects of listening and the resultant perceptual unfolding of sound into the sonic explosion. Let me elaborate on these concepts in the light of the post-digital condition. But firstly, what does “post-digital” suggest?

Fugue: the post-digital milieu

In order to create the premise of interpreting the provocative term “post-digital,” I wish first to underscore the extensive and ever-growing nomadism of agents attuned to the psychogeographic evocation of physical locations and corporeal places in the post-globalized universe of intense mobility. In this universe, we encounter an immediate place and situate ourselves within it in ways that are intertwined; they are not only discreet physical experiences but sometimes appear as hybrid and syncretic environments. For example, my smartphone records sound from a place and sends it elsewhere to someone else via applications like *whatsapp*; one place becomes merged with another as I overhear it on a Skype chat from someone far away, thus I move, migrate and navigate from one place to another more mentally than I do physically. The sonic interactions with these multiple places through which I move and the superimposed locations upon which I trespass tend to be unfixed and evolving rather than having a concrete structure (Chattopadhyay).

Due to extensive mobility as an active listener within constantly changing places, locale and landscapes transcending the boundaries between global, local and discreet digital environments, my perception

and cognition of sounds cannot be posited within a specific place-based source, nor can a locative identity be extracted from the sound because of its transient nature. As my nomadic movements intensify, I cannot relate myself to one place at one time; my sense of “rootedness” dissolves into a perpetual nomadism by itinerant sonic interaction with semi-known and/or unknown places and pseudo-locales perceived in the mind. In this nebulous cosmos of rapid flow, the interpretation of sound contents contributes to the formation of speculative notions like “post-global,” “post-local,” or “post-digital” via the extensions of social networks, greater interactivity and/or interpenetration, and psychic personalization of (sound) media. These features result in an increase in flexibility and disembedding of sound contents from their sources as social acts beyond mere geographical limits and identities. But these phenomena are intensely engaged with economic and cultural shifts, as well. As early as 1995, David Morley was writing about this future in his work *Spaces of Identity*:

We emphasize two keys [...] on the one hand, technological and market shifts are leading to the emergence of global image industries and world markets; we are witnessing the ‘deterritorialisation’ of audiovisual productions and the elaboration of trans-national systems of delivery. On the other hand, however, there have been significant developments towards local production and local distribution networks. (Morley 1-2)

Within the merging local-global boundaries, one culture develops constant awareness of the existence of other. Cultural components like sound recordings travel through this dispersed space in mutual interaction, influencing and infusing each other,

although the aspects of travel prevail over these implied interactions. These “deterritorialized” wanderings substantially contribute to an emergent condition of primarily mobile and itinerant beings engaged in the liberated ebb and flow of events, phenomena, and ephemera, which operate arguably beyond digital essentialism. This essentialism in the digital revolution, which was the predominant theme of the late 1990s and early part of this millennium, starts to dissolve into an ever-growing field of intangible data and immoderate information, with Nicholas Negroponte aptly proclaiming: “Like air and drinking water, being digital will be noticed only in its absence, not by its presence. Face it—the digital revolution is over” (12). Alongside this comes a sense of saturation across the prevailing digital divide between rapidly digitized and already digital contents like samples, glitches, and digital-acoustic artifacts. During this process, digital media were turning our world into an augmented one. In this rapidly emerging environment, we found that different forms of older media, such as recorded sound, were constantly moving, being relocated, reinterpreted, and engaged in conflict with these already digital contents within an imminent convergent culture. The older sound contents could be as varied as archival sound recordings, clips of music and songs, spoken words, environmental field recordings, and older film soundtracks. We could observe a certain movement of these sound contents from a localized state (creative/productive end) to a globalized state (consumptive end) and vice versa. For example, a piece of field recording was digitally mediated so as to be considered a work of sound art, or a “traditional” song from one part of the world was transmitted via the internet to another part of the world as a “folk” song. The question was whether a “fluid-local” sound element was losing its characteristics or retaining its identity over

the course of a “hyper-global” shift. We could also ask how such location-specific sound elements were received and interpreted at the widest end of a rather volatile audience reception within the dissemination of digital media technology and the establishment of e-commerce. In this very context, Robert Pepperell and Michael Punt aptly decode the term “post-digital”:

The term ‘Postdigital’ is intended to acknowledge the current state of technology whilst rejecting the implied conceptual shift of the ‘digital revolution’ — a shift apparently as abrupt as the ‘on/off’, ‘zero/one’ logic of the machines now pervading our daily lives. New conceptual models are required to describe the continuity between art, computing, philosophy and science that avoid binarism, determinism or reductionism. (Pepperell and Punt 2)

The central question arising from interest in the sonic was the ongoing dialogue between older sound contents from primarily locative analogue sources and digitally generated ephemeral travelling sounds, while rapid digitization was rendering the interpretation of older/analogue sound contents as digitalized sonic artifacts beyond the mere binarism, determinism, or reductionism of the old vs. new or digital vs. non-digital or global vs. local discourse. These phenomena contributed to the formulation of the speculative concepts of the “post-digital” by regarding digitalized artifacts as displaced, relocated, and transformed, thereby dissolving the digital divide between already digital artifacts and rapidly digitized contents bringing them into interaction on the one hand, and their reinterpretation as an elusive field of data on the other.

Once this saturation is reached, Kim Cascone argues that, in the domain of sound

art and experimental music, “the medium of digital technology holds less fascination for composers in and of itself” (Cascone). In deciphering the term “post-digital aesthetics” in relation to experimental music, he speaks of the “failure” of digital technology and the way in which it triggers subversive practices with glitches, clippings, aliasing, distortion, etc. His formulation of the “post-digital” thus accommodates the breaking down of “digital essentialism” into fragments of digital sonic artifacts that can be reused and repurposed in new sound-works in a fluid, flexible, and inclusive manner.

I further expand this conceived “failure” into the inability of digital media technology to identify, structure, and archive the transient and elusive sounds from the nameless, placeless, and faceless background world of data as the derivative of the ebb and flow of digital artifacts. In this world of “big data” (Rasmus Helles and Klaus Bruhn Jensen), “data abundance,” and “data flood” (Steve Lohr), itinerant sound content (the digitized file or artifact) essentially eludes its locative character, spatial identity, normative structure (such as digital, analogue, or hybrid), ontological source identity, and epistemic knowledge-based objecthood. But how do I link this to the post-digital?

Coda: Sounding the post-digital

Such behaviors of sound are accentuated in the post-digital universe of “big data,” contributing to the elusive identity of the “digital (sound) object” (compared to “non-digital” objects, devices, and systems) and posing problems of authentication and/or preservation, thereby proliferating a sense

of “absence” in a digital sound object’s recognition, identification, and negotiation of the corresponding knowledge-structure upon a network of listening. In their work *A Theory of Digital Objects*, Jannis Kallinikos, Aleksi Aaltonen, and Attila Marton claim that “digital objects are marked by a limited set of variable yet generic attributes such as editability, interactivity, openness and distributedness that confer them a distinct functional profile”. This leads to a profound sense of “instability” as evasive and fleeting artifacts that contrast with the solid and self-evident nature of already-old sound media, such as sound recordings on tape, CD, file systems, or other types of storage. The fluid and mutating nature of that universe of digital objects and their diffusion across the social fabric makes them difficult to authenticate, preserve, or archive in the social memory and knowledge base. The elusive flow of digital objects, carrying a multitude of sound contents, problematize their (sound’s) objecthood, rendering them more as ephemera than even discreet artifacts.

On the other hand, sound does indeed seem “less esoteric” in this post-digital milieu because of our “newfound comfort with the immaterial world of pure data and information flowing through the cyberspace” (Gopnik qtd. in Dayal). The contemporary media environment allows the separation of sounds from their locations and facilitates their travel across hyper-dispersed networks as “background” of data flow. A sound that is disembodied from its locational specificity causes multiple layers of mediation across its multiple receptions and interpretations outside of place, time, and context — but in the mind of the listener — whether in an audio streaming network on the internet, a digital sound composition published on a net label, or exhibited within the augmented space of an interactive installation work. In an interactive art piece, identification of a

sound event can be understood through its subjective interpretation as an augmented auditory situation. The post-digital discourse essentially relates to the perpetual transience of these amorphous but fertile auditory situations (Chattopadhyay) spatially as well as temporally. It is evident that, in this milieu of sound's explosion of substance into subjective interpretations, the production and reception of sounds over greater mobility and interactivity leads to the transformation of the epistemic structure of the sounds beyond their objecthood in the post-digital condition. Admittedly, at this stage, my motivation lies in delving into the question of sound's object-disoriented behavior upon the mindful listening.

Variation I: Object Disorientation of Sound

Let me elaborate on what I mean by the "object-disoriented behavior" of sound. To do this, we need to go back in time and excavate the term "sound object." Pierre Schaeffer, arguably the founder of *musique concrète*, coined the term "sound object" (*objet sonore*), which paved the way for a new kind of perception — "acousmatic listening." To Schaeffer, the "sound object" was an intentional representation of sound (Demers) to its listener. With the rise of new audio technologies, the "sound objects" recorded on magnetic tape or other media were no longer referred to a sound source, hence the musical exploration of the "acousmatic experience" of sounds that one hears without seeing the causality behind them. The emphasis here was on the reduced listening state instead of causal listening, if we borrow Michel Chion's terminology. The problem here is the imposition of the word "object"

over "sound." The intrinsic flaw in reduced listening as Schaeffer conceptualized it in *The Theory of Sound* Object is that it assumes that sound has an "a priori ontological foundation" (Kane qtd. in Demers 43) that is separate and distinct from any cultural or historical (or even personal) associations it might have subsequently acquired. According to scholars such as Joanna Demers, this assertion is problematic on both practical and theoretical counts. Listeners have difficulty hearing sounds divorced from their associations; at the same time, it is nearly impossible for the human listening faculty not to ascribe a multiplicity of causes to a sonic phenomenon. Furthermore, in practice, the listener is almost certain to simultaneously create imagined gestures or link a sound to its illusory myriad of sources, evoking some kind of contemplative and thoughtful imagery in this process of mental resonance and mindful personalization of sounds into various listening states.

In his seminal writings, for instance in the article "Aural Object," film-sound scholar and early phenomenologist Christian Metz expresses serious doubts about the object specificity of sonic phenomena in scholarly thinking following Schaeffer. Metz instead focuses on the "characteristics" of sound and emphasizes the problematic aspects of locating sound's object-oriented or location-specific source. He states that "Spatial anchoring of aural events is much more vague and uncertain than that of visual events" (Metz 29). In classical sound studies (Rick Altman et al.), scholars have already underpinned the issue of sound's problematic relation to its object or source and emphasized its interpretative nature following its production: "Sound is not actualized until it reaches the ear of the hearer, which translates molecular movement into the sensation of sound" (Altman 19). Altman speaks here of a sound event as defining the trajectory

of the essential production and subsequent reception of sound content. Its narrative, as Altman terms it, is hypothetically bound to the source that produces it. These spatial sources of sound, or the sounding object when producing sound, are spatially defined or connected to a place, but are not rendered until and unless they are carried by a medium (such as a tape recording) to reach the point of reception and subsequent interpretation. By the same token, a sound is remediated whenever it is digitally converted from its analogue recording source into the digital format. Digitization further dislocates sounds from their sources, turning them into discreet data in the nebulous post-digital environment as discussed above. Sound contents enter the domain of constant travel, flexibility, and flow at different stages of digitalization toward reaching a saturation state of an assumed “post-digital” economy/ecology, in the process they are freed from the object or source. Sounds thus, in the post-digital condition, imply mobility and subsequent object disorientation. However, the process of interpretation is more complex than it appears at its perceptual level. Contributing to this discourse, New Media scholar and theorist Frances Dyson argues concerning the “sound object” that “first — find a way of discussing and representing sound unhinged from the visual object, second, find a device (the tape recorder) that will somehow enable such a representation, and finally, mask the mediation of that device by arguing for an ontological equivalence between the reproduced sound and the original sonic source” (Dyson 54). This ontological equivalence might be difficult for a listener to establish in a nomadic condition in which a specific sound presents a multitude of amorphous listening states inside the listener’s mind, leading to a sonic explosion of object-disoriented but mood-based streams of thoughts within the nomadic listener’s consciousness.

Variation II: The nomadic listener

At this juncture, a nomadic listener floating across the post-digital milieu may interact with the background noise or the unknowable sounds of nameless, placeless, and faceless flow of sound data, which inculcates a sort of “semantic fatigue” so that, eventually, they seem cut adrift from the sources or origins (Demers 42) in the mind of the listener. Listeners in this process may sensitize their ears to the pseudo-object of the sounds and are thus able to deconstruct them into their listening selves through an evocative capacity toward a sonic explosion as streams of timeless sonic states of interconnected reveries, ruminations, and musings. The “unknown” embedded in the wandering shadows of sounds is explored and given a context by the nomadic listeners’ intervention into their appearing and diminishing, leaving object-disoriented states of feelings or moods.

Variation III: Hyper-listening

Let us indulge in further philosophical musings triggered by listening in the post-digital milieu and attend to what John Cage claims: “Silence is not acoustic. It is a change of mind” (Cage qtd. in Popova). This indulgence will require us to set aside “epistemic” issues of recognizing the source or “object” of sound and instead focus on the subjective and inward perception of sound within the “self” or the “mindfulness” of the nomadic listener. Following this methodology, we can examine the way in which the memory, imagination, and personal experience of the itinerant listener alter the character of

sound. Taking my point of departure in the epistemological basis of the sound object, I now introduce an alternative methodology of listening in the post-digital condition, which I term “hyper-listening,” meaning that I intend to relate to the higher-level/psychic pre/post-cognitive processes triggered by listening to the object-disoriented sounds in terms of creating thought-provoking auditory situations. This method perhaps operates on the fringe of what artist Yolande Harris explains in her doctoral thesis as creating “situations where sound can affect and activate people’s experiences in a personal way” (Harris 4-7) but at the same time expands the idea of “experience” to include conscious contemplation. Much of this argument resonates with Roy Ascott’s recent writings in which he speaks of “interconnectedness, nonlocality and the inclusion of consciousness” (Ascott) embedded in new media art that includes process-based artistic practices with sound and listening. According to Ascott, “Process-based art implies field awareness, in contrast to the object dependency of much art practice.” This leads to what he claims to be “the shamanic path to immersion in the spiritual domain, where interaction with psychic entities is the means, transformation of consciousness is the goal and the emergence of new knowledge the outcome” (Ascott). Much of this line of thinking may be arguable, but what is essential is the potential of inclusivity in listening. In his seminal work *Listening*, Jean-Luc Nancy argues that a philosopher is one who hears but cannot listen “or who, more precisely, neutralizes listening within himself, so that he can philosophize.” (Nancy 1). Operating on the premise of philosophizing the sound, the methodology of “hyper-listening” challenges sound’s epistemic discourse that equates “listening” with “understanding,” “audibility” with “intelligibility,” and the “sonic” with the “logical.” “Hyper-listening” explores the contemplative

and mindful potential of sonic phenomenon at the nomadic listener’s end, emphasizing the indolent mood of elevated thoughtfulness ingrained in sound and listening.

Finale: Doors of nothingness

Once we get past the structurally and technologically over-deterministic realm of the digital into a more flexible and fluid world of flow and inclusivity, sound’s spatial source or temporal object lose their corporeal identities by means of increased interaction and interpenetration. Sound transcends its object-hood to dissolve into the mindful potential of listening at the mental and personal realm of interpretation, contemplation and thoughts at the listener’s end. The increased nomadism of agents attuned to listening contributes to these expanded sonic exercises beyond the epistemic object-hood. This is the condition that I relate to the “post-digital.” Instead of defining the post-digital, I speculate on the contours of the term and try to locate and measure its relation to the sonic in my own artistic practice and its articulation.

Taking my point of departure in the phenomenological premises of sound, I make the subjective interpretation and personal contemplation as the basis of my sound artworks, such as the ongoing project *Doors of Nothingness*, which frame spatial sound phenomena in their entirety, including the mental, contemplative, and spiritual contexts of the listener’s auditory situation. In these works, the thought processes activated by the sonic phenomena transcend the epistemic comprehension of the source identity of sound toward outlining the auditory situation in a context that delineates the sound events beyond immediately accessible meanings,

expanding on and transcending the object or source-specific knowledge structure. *Listening and its Discontents* (2013) and *The Room within a View* (2013) — two of the previously shown works from the project—frame and (con)textualize a myriad of thoughts within the mindfulness of a nomadic listener, triggered by pervasive interaction with various immersive but evanescent auditory situations. The virtual prototype of *The Room within a View* has been exhibited on The Widget Art Gallery on iPhone, iPod touch, iPad and other MAC OS platforms, while the sited sound installation *Listening and its Discontents* has been exhibited at a group show during *Dirty Ear Forum* (sound, multiplicity and radical listening) at *Errant Bodies*, as part of reSource 003, P2P Vorspiel presented by transmediale 2013. Essentially experiential, subject-oriented and contemplative in its development, both the works explore the itinerant sonic interactions occurring between the listener and the emerging environment as associative processes of hyper-listening and thinking. The forthcoming work *Mind Your Own Dizziness* (2014–ongoing), expected to be realized during *Art Hack Day* in transmediale 2014, will work as a set of fertile auditory situations or settings for active audience intervention/ participation/ involvement. In its projection of sound and text, the work will investigate the cognitive processes of thinking within the mindfulness of a potential exhibition viewer/ audience/ participant as a wandering listener interacting with the specific site's various immersive but evanescent auditory situations such as inside a bathroom, in the basement, behind the cloakroom, in the café, or around the auditorium. The work will locate and contemplate how these situations trigger streams of thoughts within the mind of the audience. These works rely on intuitiveness of the listener rather than the reasoning involved in deciphering the

meaning of sound in listening. The strong belief in inward contemplation, subjectivity, and enhanced 'selfhood' available to a nomadic listener (because of his or her ability to free the ears of object specificity, whether spatial, temporal, or locative) mean that the project on one hand explores the personal or private nature of listening while on the other hand engaging with the emergent sonic practices in the implicit post-digital condition.

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POST-DIGITAL PRACTICE-BASED RESEARCH

James Charlton

**ON REMEMBERING A POST-
DIGITAL FUTURE**

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We have always been post-digital or at least I cannot recall a time when art wasn't?

To claim this is surely ridiculous, as the post condition demands the prior instantiation of a digital state that purportedly did not begin until the mid 1970s.[1] Yet if, for a moment, we entertain the idea that art *has* always been post-digital, in what way might this make sense? How might this enable a re-reading of *pre-digital* practices and inform our understanding of future *post-digital*[2] practice?

1. The case of a post-digital anthrax

In pursuing this question we should of course take note of the precedent of Latour's *We Have Never Been Modern* (Latour, *Reassembling the Social* 17). In its function as antecedent to the Post-Modern, Latour's claim appears not to be susceptible to the same redundancy as that made in regard to the post-digital. The modern does not after all explicitly refer to its precedents in the way the terms post-modern or post-digital might. However, in Latour's attempt to reconnect the social and the natural worlds by denying the distinction between nature and culture, *We Have Never Been Modern* operates from a similar retroactive position — a position in which the Modern assumes distinction from that which came before it. In this sense the Modern, too, was always *post* conditional. This is not simply a case of semantic positioning but reflects fundamental aspects of Latour's work on irreductions in regard to discovery and prior events.

We always state retrospectively the previous existence of something, which is then said to have been discovered (Latour, The Pasteurization of France 84).

In as much as naming something might be considered a discovery of sorts, the post-digital has always existed just as anthrax bacillus existed before Pasteur named it. (Latour, 1988) Discovery is not creation. More than this then, naming, like discovery, works backward in time, creating that which existed before its existence was known.[3] "Once again time does not move in one direction" (Latour, *The Pasteurization of France* 145).

In arguing as he has that time is a configurable control mechanism pursuant to a force of labour beyond subjective or objective perception (Latour, *Aramis* 88), Latour challenges an anthropocentric world-view that promotes humans as the arbitrator of existence. The post-digital, like anthrax, may always have existed. It is not a state created by our observance of it or something metaphysically conjured up exclusively for our amusement. It may previously quite happily have gone about its business un-disturbed by human interest.

While the logic of a mind-independent existence is clearly viable in regard to extant entities such as anthrax, we must go one step further to accept phenomena such as the post-digital in this way. For surely a human idea cannot exist before it was thought of?

Extending Latour's assertion that the world is comprised of relational networks formed by independent actants, Graham Harman's Object Oriented Ontology (OOO) allows for thoughts to operate as active agents that are on an equal footing with objects (Harman). For Harman, ideas are simply objects and thus capable of existing independently of our recognition of them. Here there is a subtle but significant difference with Latour's notion of "irreduction" as it affects our reading of the post-digital. Harman's light-hearted aside that "I am a genius in something that doesn't exist yet" (Harman) should be read not as a claiming

that all ideas have been thought and are simply waiting for humans to discover them — this would suggest some universalizing apeiron that Harman clearly rejects. Rather Harman's statement should be seen as talking about the phenomena of *being* a genius rather than the subject of his genius. Thus it can only be in hindsight of brilliance that we declare someone to be a genius as the knowledge they have *created* becomes recognized. The idea of genius, like the idea of the post-digital, is like a programming variable waiting for instantiation in that it must be declared before it can be defined.

We must consider then the possibility that the post-digital as a recognition-independent phenomenon existed not simply before Nicholas Negroponte claimed the digital revolution to be over in 1998 (Negroponte) or Kim Cascone coined the term in 2000 (Cascone), but before the digital itself. Indeed Cascone, in coining the term, grounds the post-digital in pre-digital practices of the early twentieth century.[4] It is, according to Cascone, this shift in focus from foreground to background — from notes to noise — which leads to the *glitch* in digital sound processing (Cascone 13). While Cascone tends to draw on historical practices as precursors to the emergence of the post-digital glitch, I want to suggest that practices such as those of John Cage and Futurists are not simple groundwork for an emergent genre but are in fact recognition of an existing post-digital practice. If you like — the post-digital before the *discovery* of the post-digital.

In this sense the post-digital might be far closer to Latour's anthrax bacillus than first acknowledged. It too may have been quite happily going about its business oblivious to the accolade of critical recognition. Furthermore if Cascone can find examples of the post-digital before even the digital era, the very nature of the digital must also be called into question.

2. Grounding the rabbit-hole

Before we chase our own post-digital rabbit-tail down a futile, rhetorical rabbit-hole, it would be sensible to ground this argument within a digital ontology in the hope that it may provide some terra firma in which to burrow.

If the digital is grounded in the material world as John Wheeler would have us believe, it should help solidify the position of the post-digital as a state of practice (Wheeler 311).

At the bottom of Wheeler's ontological rabbit hole is the '*it* from the *bit*' (Wheeler 309) — the notion that every aspect of the physical world stems from a yes/no immaterial source. *It from bit* brings an abrupt dead-end to the rabbit hole and levels the ground by reducing the apeiron that is so scorned by Harman and other Speculative Realists, to a simple binary decision at the lowest level. There is no master plan or grand scheme; simply a 0 and 1 — a digital response in which nothingness cedes to physics through the act of observation.

This binary function is the fundamental nature of the digital that operates as a set of discrete packets of information as opposed to the analogue that adopts a smooth and continuous state. The oppositional relationship between the digital and the analogue that is the basis for Digital Philosophy's claim that the world is ultimately finite (Miller) stems from Lewis's mathematically grounded definitions of the digital as discrete, and the analogue as continuous forms of representation (Lewis 321).

Indeed the seduction of the digital era was the distinction that it drew in regards to the analogue by offering an enlightenment in which each unit was perfect and

infallible — infinitely lossless re/production at all levels. The analogue, by contrast, with its lax attitude to the world was degenerate and impure.

If anything, the post-digital is a rejection of this either/or dichotomy and an acknowledgment that an epistemic agent cannot establish whether nature is analogue or digital in nature (Floridi, *Against Digital Ontology* 160). It simply does not follow that the world is ontologically either digital or analogue simply because it appears so.

Instead we are left with the alternative position that the perception of a discrete or continuous mode is dependent on the level of abstraction assumed by an epistemic agent. As Luciano Floridi's level of abstraction argument succinctly puts it, "reality can be observed as being either digital or analogue, depending on the epistemic position of the observer... and the level of abstraction adopted" (Floridi 161). Drawing both on Kant's antinomies and Young's interference experiment, Floridi[5] suggests that the oppositional digital / analogue framework that Wheeler's "its from bits" relies on, is untenable. (Floridi 168-172)

In refuting the distinction between the analogue and the digital, it is as if Floridi has stripped non-human agents of agency and reduced matter to an indeterminate grey mush in which the digital and the analogue are only distinguished in our perception of them. Although verging on an anthropocentric model, how, within such a framework, can we understand the nature of digital materiality that is central to our positioning of post-digital art practice?

As the digital loses its allure in the afterglow, as Transmediale's 2014 thematic statement proposes (Transmediale 2014), we have seen the proliferation of practices that are distinctly or inherently disinterested in the distinction between digital and analogue materiality. The digital has become

simply another studio material that no longer assumes a privileged position as it vies for studio space alongside paint and plaster. Indeed the fusion of digital and analogue functions — as typified by 3D printing, robotics and sensor inclusive practices — exemplifies the untenable position of an "its from bits" argument that promotes a universal materiality.

Instead we see an engagement with materiality from the perspective of the work — a sort of conceptual-materialism that brings both analogue and digital materiality into play with each other. But how do either analogue or digital states possess materiality as non-corporeal concepts, neither being bound to a substance?

While affirming material agency, binding materiality to substance denies objects the potential of a primary role in a Latourian network and denies the idea of equity between physical and metaphysical objects that is proposed by Speculative Realism. Instead, materiality might be treated as a non-corporeal state that is distinguished from material substance not just by a parallel etymology[6] but, as Kant suggests in his treatment of material as differentiated from substance (Kant 24-27),[7] and Heidegger in his assertion of "thingness" that "does not lie at all in the material of which it consists, but in the void that holds it" (Heidegger 167). While both Kant and Heidegger support in different ways the reading of substance-independent materiality, they maintain an anthropocentric position[8] that conflicts with the flat ontology of Speculative Realism.

It is Graham Harman again who reconciles this anthropocentric conflict in his critique of Heidegger's *Zuhandenheit* — readiness-to-hand (Harman, *Tool-being* 19). In Harman's theory of objects,[9] objects are not ontologically exhausted by human perception. They remain independent and able to enter into a non-human Latourian network.

If materiality is neither a default state of substance nor an attribute of human perception, the very idea of materiality seems doubtful unless we allow for a form of co-constitution that is formed by the relata between objects.

It is precisely this co-dependent dynamic between human and non-human actants that Leonardi clarifies in regard to digital-media (Leonardi 13). Arguing for a definition of materiality that is inclusive of instantiations of non-corporeal agents, Leonardi stresses the affordance of materials rather than their physical properties, stating that it is in the interaction between artefacts and humans that the materiality is constituted.

This alternative, relational definition moves materiality 'out of the artefact' and into the space of the interactions between people and artefacts. No matter whether those artefacts are physical or digital, their materiality is determined to a substantial degree by when, how and why they are used. These definitions imply that materiality is not a property of artefacts but a product of the relationships between artefacts and the people who produce and consume them (Leonardi 13).

At risk of falling into another anthropocentric stance, Leonardi fails to extend the argument to allow for a materiality constituted solely between non-human actants. Drawing again on Heidegger we can see how – in the example of the jug (Heidegger, 20), materiality is defined by a co-constitutional relation with the water that fills it.

Co-constituted materiality then might be thought about as an Object Orientated Philosophy form of Merleau-Ponty's '*intentional-arc*' in which the object extends beyond itself while remaining within itself. To reinterpret Young's reading of Merleau-Ponty: Co-constituted objects such as materiality thus loop through objects, loop through objects and the world and loop through the objects and the virtual world (Young 65).

It is the ability of the co-constituted object to overreach itself while remaining embodied, to transcend subjectivity by entering into a relational schema, that emerges as a method by which materiality is actualised. Materiality is both an independent object — in an OOO sense — and an object that is dependent on the structural method of the actant network that realises it. Of course this definition of materiality as a structural method applies equally to both analogue and digital modes. In fact, it is these continuous and discrete states that constitute the underlying structural methods, which ultimately underpin materiality.

The term *structural method* is perhaps confusing given that it tends to suggest alliance with Structuralism that through its anthropocentric stance appears to conflict with OOO's flat ontology. Indeed this is the problem that Jane Bennett addresses as she attempts to navigate around "the throbbing whole of relations" with her formulation of *vital matter* (Harman, *Materialism Is Not the Solution*). While Bennett's vibrant materialism seems to dabble a little too much in the occult of the Latourian plasma,[10] her development of Deleuze and Guattari's *assemblage* grounds materiality in method (Bennett 23). Like a structural method Bennett's assemblages are emergent properties that are distinct from each actant. In a state of becoming, an assemblage emphasises the dynamic method through which parts are related and from which the underlying materiality of practice is derived. Digital materiality, then, is a method of practice that promotes discrete structures regardless of the ontological affiliation of its constituted parts.

3. The life of Zoog – a post-proposition

The central role of structural method in materiality is played out in the more than confusing linguistic parallels between Object Oriented Programming (OOP)[11] and Object Oriented Ontology (OOO). As a core feature of the OOP, the nature of the object as an abstract concept has clear parallels to the nature of physical objects, to the extent that in many introductory OOP texts the first object class named is a Person, Car or, as is the case with Daniel Shiffman, a Zoog – a ‘Processing-born being’ (Shiffman 16). Shiffman’s Zoog, like a person, has a childhood, must learn to walk and eventually reproduce through the programmed Variables, Conditionals and Functions that define it.

Object Oriented Programming’s use of concepts like object, inheritance and encapsulation are more than metaphorical aids. They are indicative of the interconnectedness of physical and technological digital materiality that grounds the digital in a material structural method well before Kim Cascone’s work on *The Aesthetics of Failure* recognised post-digital disillusionment. (Cascone)

Object oriented methodology with a promise “[...] everything in life is an object” seemed more like common-sense even before it was proven to be meaningful. (Mehta)

It is no surprise then that OOP terminology emerged at MIT in the early 1960s[12] at precisely the time when Lucy Lippard’s ‘ultra-conceptual’ artists were dematerialising the art object and rethinking materiality. As Jacob Lillemose explains, Lippard’s dematerialisation of art as an object is not an argument for the disappearance of materiality

but a rethinking of materiality in conceptual terms (Lillemose). When Lippard describes conceptual art as having emerged from two directions – “art as idea and art as action” (Lippard, ix) — she failed to recognise that an action can be an idea, and thus the misnomer that conceptual art is not concerned with materiality doesn’t hold.[13]

[I]nstead of understanding dematerialization as a negation or dismissal of materiality as such, it can be comprehended as an extensive and fundamental rethinking of the multiplicity of materiality beyond its connection to the entity of the object. (Lillemose)

Meanwhile around the same time in MIT computer labs OOP was attempting to make sense of dematerialised objects by establishing a programming structure grounded in material objects. While I accept the argument that, like most metaphorical terms, OOP’s object analogy now wears thin through over use (Ewert), I also assert that OOP’s ability to model the world is less significant than its ability to inform the world about its own material state. In developing a programming language grounded in object metaphor, OOP reflected back to us something new about the state of the material world – the structural methods that underpin objects.

While we can thus see both the development of OOP and the dematerialisation of art as symptomatic of a broader desire to re-engage with materiality,[14] seminal conceptual art works such as Alan Kaprow’s *18 Happenings in Six Parts* (1959),[15] deepen the connection by engaging systems that are clearly aligned to digital structural methods. [16]

Kaprow’s Happenings generated an environment that immersed the viewer inside the work, not just by putting them inside the performative space but by making them

active agents in the work through tightly prescribed instructions, that — in the case of *18 Happenings in Six Parts*, fragmented narrative by breaking the audience up, moving them around and creating ambiguous ‘free’ time within the work (Rodenbeck).

Kaprow can be seen as effectively treating both human (performers and audience) and non-human objects as programmable units that execute simple ‘non-matrixed’ actions that embody and make the idea concrete (Kirby 35). Their function as programmable objects within the work is discrete and autonomous. Each actant is performing a task that is self-contained and digital in a way that parallels methods of encapsulation and instantiation in OOP.

What I propose is occurring in *18 Happenings in Six Parts* (Kaprow), then, is an instance of a digital structural method that is a function of both a shared agency and a fragmented isolation that relocates the individual at the spatio-temporal centre of the materiality that is the work. What we have is not one continuous material but multiple co-constituted materialities all of which are inter-connected in the relational network of the piece.

In illustrating the ability of non-technological practices to realise a digital materiality by operating through a digital structural method, the work liberates the digital from technology and from the specific delineators of the digital era. The digital is no longer the exclusive domain of the computer. It is a material state defined by a structural method. The potential for the digital to exist prior to the advent of digital technology re-positions not only the digital but also the post-digital that might now be considered as more than simply a refutation of digital technologies.

The idea that art has always been post-digital now seems less ludicrous not simply because the digital has been shown as an enduring material state but because of the

parallels between post-digital disillusionment and an unbounded digital materiality.

The post-digital’s disinterest in the distinction between digital and analogue materiality is a levelling of the material playing field so that any distinction between them is no longer the definitive factor. Both are objects not as form but as method. In an ironic twist, the promises of a digital immateriality made by technology have instead found reality in the co-constituted interactions of human and non-human agents as material methods.

As a structural method *the digital* is not dependent on the technological constructs of the digital era that it is commonly associated with. The body — perhaps the most analogue of all objects — has been shown, through the example of Kaprow’s work, as capable of constructing a co-constituted digital structure, thus chronologically freeing *the digital* from specific media histories. In this sense *the digital* predates the development of digital-technologies, rather than being a condition determined by it.

4. After the coup?

If a new materiality in the guise of the post-digital has risen up and overthrown the governance of technologies that have for so long appeared to dictate its condition, what comes next? Is the new regime as susceptible to corruption as the old, or are we witnessing some new world order?

If the digital afterglow attempts to find anything, it is not a new pathway in the wasteland of the digital aftermath (Transmediale, 2014), but the retracing of a pathway that appeared long buried in the plethora of digital gadgetry that litters the material landscape.

There is nothing new about the post-digital, at least not in the sense of it being chronologically tethered to the digital era.

Rather, the post-digital is a renewed interest in the materiality of the world that includes digital materiality. It is the epiphany that the digital as a structural method was a material long before the first 8-bit string.

The rethinking of digital practices as proposed by the post-digital is not really that radical after all, then. While it may be that the so-called post-digital is a symptom of resistance to the commodification of digital culture, it is not simply a nostalgic yearning for the Jurassic technologies as postulated by Andersen and Pold (Andersen). The post-digital might instead be considered as a *neo-material* state in which the materiality of “objects” is better understood not as a physical condition but in non-corporeal terms as a relational structural method.

Although *neo-materialism* in its Marxist positioning of human subjects as objects of labour (Simon 5) shares much in common with the post-digital’s rejection of the technological object, my use of the term here is in regard to the materiality of the digital and the post-digital. In this way, *the post-digital* is an affirmation of the significance of method rather than form in materiality in a way that is not only compatible with a *neo-material* positioning of labour relations but a further affirmation of the relevance of Speculative Realism’s non-anthropocentric positioning of objects in regard to materiality.

Whatever we call this *rediscovered* state of materiality that is emerging as post-digital, it is not a cybernetic post-human fusion of the co-constituted technological flesh in which the digital is grafted onto the body to realise a new materiality. (Mitchell 221).

Even if the *neo-material* body turns out to be digital after all, as it might conceivably do once we accept materiality as structural method, this is not a wetware art dream in which we find out that the body has always been digital. Far from being a dream, though, the so-called post-digital has simply woken

us up to what other non-human objects knew all along.

Art has always been post-digital; we are only now remembering that it is.

Notes

[1] Although there is no definitive starting point I take the release of the Apple-1 in 1976 as marking the proliferation of digital technologies typified by the *digital age* and marking a point at which *the digital* became analogous with the technological rather than to its function as a structural method as I have previously argued. (Charlton).

[2] Although this paper hopefully makes some contribution to ongoing debates about the post-digital I am not interested in define it as such here. Rather accepting Cramer's position on the post-digital regarding the redundancy of differentiating between digital and analogue states, I seek to understand how this might play out in regards to notions of materiality (Cramer, 162-166).

[3] Georgios Papadopoulos has suggested that it is important to distinguish between natural facts and human constructs such as the post-digital (Papadopoulos). While this question requires fuller elaboration, that is outside the scope of this paper, the terms in which I reframe a co-constituted post-digital materiality here leave open the possibility that a socially constructed structural method can pre-date the awareness of its human agents. To think otherwise would seem to support an anthropocentric model that works against a flat ontology. It is also possible if not probable that humans engage in social structures without having a global awareness of their actions. Certainly there seem to be ample examples from male chauvinism to post-structuralism that support this contention. Post-structuralism and for that matter the post-digital did not exist simply because two words were conjugated! It existed as a condition of *practice* in order for it to be named as such.

[4] Cascone identifies both the Futurists and Cageian attention to noise from the 1950s as key identifiers of post-digital music.

[5] Florridi's papers against a digital ontology lay the groundwork for Informational Structural Realism.

[6] As explained by JeeHee Hong, material and materiality are ambivalent terms that refer both to physical and non-physical matter (Hong).

[7] That the philosophical concept of substance is an *a priori* condition for our experience.

[8] For Heidegger, "humans are both a kind of entity and the clearing in which entities can be manifest" (Dombrowski 27).

[9] First laid out in *Tool-Being* 2002 and later developed by Levi Bryant into Object Oriented Ontology in 2009.

[10] In *Resembling the Social*, Latour defines plasma as an epistemic agent. "I call this background *plasma*, namely that which is not yet formatted" (Latour 244).

[11] OOP is a programming language organized around objects rather than actions.

[12] Although Simula 1965 is the first recognized OOP language its origins can found in MIT's artificial intelligence group work in the late 1950's and Ivan Sutherland's Sketchpad (1963), <http://www.computerhistory.org/timeline/?category=sl>.

[13] Lippard acknowledges the deficiencies off the term in regard to materiality of objects in the preface to *Six Years: The dematerialization of the art object [...]* (Lippard, 1973).

[14] The counterculture movement of the 1960s is taken as a rethinking of materiality as an idea and in action.

[15] Kaprow's Happenings are seen as 'a touchstone for nearly every discussion of new media as it relates to interactivity in art' (Wardrip-Fruin 2003: 1). More than simply providing a precedent for current approaches to interactivity, early works such as Kaprow's *18 Happenings in Six Parts* also highlight *inter*-action as an exchange in which the materiality of the work is co-constituted by independent agents.

[16] A fuller analysis of materiality in Kaprow's Happenings will be included in the upcoming publication *Digital Movement: Essays in Motion Technology and Performance* (Popat & Salazar).

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**A DIALOGUE ON CASSETTE
TAPES AND THEIR MEMORIES**

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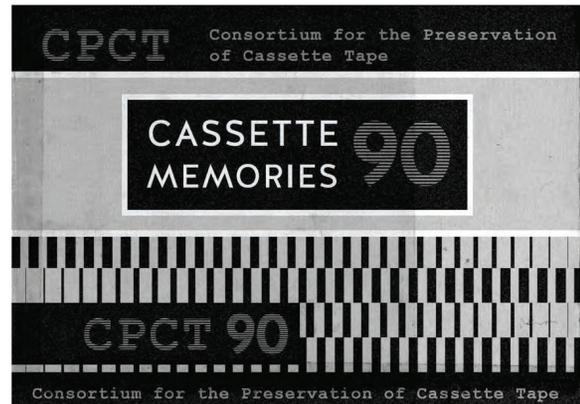
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Tape-in

The interest for lost media practices and materials appears intrinsic to contemporary popular and maker culture — a post-digital culture that through vinyl, cassette tapes, print, chemical photography, etc. revisits a time before the digital revolution. How are we to perceive this re-investment in history and old technologies? It is obvious to regard this as nostalgia and a trendy taste for lo-fi. However, the aim of this article is to develop an understanding of how these practices also express a critique of contemporary digital culture. This critique feeds on two competing perspectives on the materiality of media technologies: historical materialism and speculative realism, and hence also two perspectives on artistic media practice as a form of research.

In the summer of 2013, The Consortium for the Preservation of Cassette Tape presented *CASSETTE MEMORIES*, ‘a media archaeological excavation of the cassette tape and its use — from a human and tape perspective’ (a workshop at Roskilde Festival, initiated by Andrew Prior, Morten Riis and Søren Pold in collaboration with Roskilde Libraries). The workshop explored the overlooked sound archives of cassette tapes residing in closets, second hand shops and flea markets, and invited participants to disassemble, cut-up, loop, remix old cassette tapes, and through practices that we often associate with new media this discover the materiality of an obsolete medium.

First of all, following the perspective of a historical materialist, we ask how to perceive history? Cassette tapes are deeply associated with our childhood memories of recording voices, listening to music and creating mixtapes. As such, they express our past memories, as well as recollections of poor signals and incompatible noise reduction.



However, the desire for the old is not merely nostalgia for a lost aesthetics; rather, it implies an alternative view on history – the memory of the past itself. In this perspective, excavating the past is an attempt to challenge the techno-social constructions of contemporary interface culture. In short, interface culture has been subsumed under a strictly monopolizing business model that is characterised by a shrink-wrapped agency and tight control of consumption (Striphas; Andersen and Pold, “Controlled Consumption”). Inquiring lost media technologies establishes imaginary correspondences with past practices and production modes that only exist in our memory.

Secondly, following the perspective of the speculative realist, we ask whose memory? On the one hand, vinyl records, cassette tapes, floppy disks and so forth are media that contain human memories as texts, sounds and images. However, on the other hand, following an inquiry into the poetics of materials and how our memories

are stored through for instance phonography and magnetism, the technologies also seem to remember the humans. In other words, a reinvestment in old media is also an excavation of the materials' own reality.

Both the perspective of the historical materialist and that of the speculative realist seem to provide an explanation of a post-digital and critical investment in Jurassic technologies. But, to what extent are the two perspectives compatible? Can the historical materialist understand the perspective of the material? Can the perspective of the material reveal a critique of history? We do not seek a clear answer to these questions in this article, and it can also be argued that any attempt to create a written argument will challenge the attempt to understand practice as a an ontological endeavour, and a way of understanding a material level of things (what is referred to as 'carpentry' below). Following this, we are interested in establishing a dialogue between two cassette tapes, between material and culture, and explore when and how the two communicate. "Cassette A" represents how the cassette tape as a material remembers us (speculative realism). "Cassette B" represents how we remember cassette tapes, and how our memories of material practices reflect the subsumption of interface culture by controlled consumption (historical materialism). The dialogue between the two cassette tapes is based on fragile timing mechanisms — not linear, nor compatible with digital clock frequencies — and as such, they may get out of sync.

CASSETTE A – Against cassette tapes as representations of the past

By posing the question of how the tape recorder represents and understands the world, we have the possibility to get closer to the actual physical operational technology itself, as an exposition of length, time and magnetism and its way of representing reality. For the scientist, the tape recorder was traditionally used to document and record the sounds of the world, which then could be brought back to the lab for further analysis. These analyses focused on the spoken or auditory content of the tape — as opposed to how the sound of the tape itself understands its surroundings. Later, digital technology made the tape recorder obsolete, but the analysis still focuses solely on the content, making the medium somewhat unimportant. However, there is a different approach, in which the cassette tape recorder is transformed into an object of "carpentry"; a term inspired by the work of Graham Harman and developed further within the object-oriented ontology of Ian Bogost.

CASSETTE B – Against historicism

What is it that the tape records? What does it show us when brought to the workshop? In his essay "Theses on the Philosophy of History" Walter Benjamin writes: "To articulate the past historically does not mean to recognize it 'the way it really was (Ranke)'. It means to seize hold of a memory as it flashes up at a moment of danger" (Thesis VI). It seems clear that Benjamin criticizes historicism. We

cannot seize hold of the past merely by describing a level that pre-determines a logical course of events. History as ‘the way it really was’ is more ambiguous (as Benjamin’s criticism of the founder of modern, source-based history, Leopold Ranke also indicates). In his theses, Benjamin explicitly addresses historical materialism, and in continuation of this, we propose to explore the revival of cassette tapes as a material history pointing beyond a simple revelation of material and technological determination. This implies that it is not merely the productive forces (our tools, instruments, technology, knowledge, etc.) that define our history as a changing mode of production (tribal, feudal, capitalist, etc.) in a simple one-way — techno-deterministic — direction. In other words, cassette memories are not just revelations of how social relations are most fundamentally production relations; they do not disclose cassette tapes’ historical role in the making of a prosumer capitalist system (or whatever one chooses to call it). Technology, and the processing of magnetic signals did not make history and did not define our language and social relations in new ways, nor did any other technology. The technology and material production levels are always met with specific cultural interpretations and practices. Likewise, cassette tapes are used through a myriad of practices that still carry potentials.

CASSETTE A – The carpentry of cassettes

A central term for Bogost, as it is explained in his book *Alien Phenomenology* from 2012, is the notion of “carpentry”, which is described as the philosophical practice of making things. As a philosophical lab equipment carpentry becomes a perspective on creative work that

poses philosophical questions (100). In other words, matter is being used especially for philosophical purposes, or, an applied ontology (see also Bogost “Carpentry vs. Art”). This happens because writing is dangerous for philosophy. Writing is only one form of being that exemplifies the assumption that we relate to the world only through language (Bogost 90). At the core of carpentry lies an understanding of philosophy as a practice just as much as a theory: the philosophical practice of constructing artefacts (92). The term extends the ordinary sense of woodcraft, to include any material. Additionally, it lies within Graham Harman’s philosophical sense of “the carpentry of things,’ a term that refers to ‘how things fashion one another and the world at large’ (93). However, in Bogost’s terminology, carpentry ‘entails making things that explain how things make their world’ (93). This enables not only theory in practice, but moreover; practice as theory (111).

The term carpentry is unfolded within a larger context of object-oriented ontology or philosophy, which originates from the speculative realism of Graham Harman, Ray Brassier, Quentin Meillassoux and Iain Hamilton Grant. A speculative realist is opposed to “correlationism” — a term used to describe how being exists only as a correlate between mind and world, placing humans at the centre (Bogost 4; Harman). As an example, Bogost refers to Heidegger who claims that objects can exist outside human consciousness, but only become meaningful in human understanding (4). Thus, to be a speculative realist ‘one must abandon the belief that human access sits at the center of being, organizing and regulating it like an ontological watchmaker’, and instead shift focus to include all possible objects (a flat or tiny ontology): all things exist equally (Bogost 5).

Ultimately, this means that when removing humans from the centre of the

equation, more focus is directed towards the various objects that the world consists of (for instance, Bogost investigates what it is like to be a pixel within a computer game).

CASSETTE B – Cassette tape interfaces

Rather than beginning by discussing whether to prioritize the auditory signs of the recorded voices (what the sounds on the magnetic tape mean), or the signals embedded in the materiality of tapes (what it means to be a magnetic tape), we suggest enlightening the relation between the sign and the signal (see Andersen and Pold, *Interface Criticism*). What is a magnetic cassette tape from this perspective? Along with other productive forces and technologies, cassette tapes must be seen as part of the same realm as language, in the sense that also language is material (as on a cassette tape), and this material is in itself a speech act (at the workshop people talked about sending their voices to their loved ones across the Atlantic and about the investment and gesture of recording and giving away a mixtape). A qualitative separation of material signal processing and the media representation is therefore futile. In every way, the material of the cassette tape (the playback head, the noise reduction system, etc.) is as much a social and linguistic construct (including DIN and IEC defined standards and protocols for equalization), as it is the physical manifestation of a representation (of a memory, a voice, a recording). This ambiguous double-nature allows for a critique of the social and political reality of the technology.

CASSETTE A – Magnetic operations

Material that is capable of being magnetised is referred to as ferrous, and the molecules of such a material are linked together in the form of a “crystal structure” (Earl 21). Each complete crystal element contains a certain number of molecules, depending on the material. For instance, ferric oxide (which forms the basis of the coating of Fe tape) has eight molecules per element. The crystal elements can be regarded as domains of randomly oriented magnetic fields. When the material gets magnetised, the domains are swung from their random distributed positions, and then line up. The strength of the resulting magnet is determined by the number of domains in alignment. When all the domains are in alignment, the material is “magnetically saturated”. In other words, it is incapable of accepting further magnetism or producing a greater magnetic field (Earl 22). To capture and record auditory content, the tape recorder is installed with three tape heads: erase, record and playback. Each head contains an electromagnet that can convert an electrical signal into a magnetic force. This force can be stored on the passing magnetic tape, and subsequently convert the magnetic content of the tape into electrical current.

CASSETTE B – The danger of techno-cultural discourse

Techno-cultural discourse leads to the belief that technology represents a history of increased efficiency, and that the conditions of present digital technologies (producing, sharing, mixing, etc.) can maximize individual freedom and social production. *CASSETTE*

MEMORIES challenge these myths. The return to old media holds no essence but expresses awareness of how our material technologies are also signs, and our signs technological, and of how the coupling of signs and material by digital technology leads to a form of control. Following this, techno-cultural constructs cannot be understood as a pure material condition (signals), but nor can they be understood as pure discursive constructs (signs): they are both related to the technologies, but also to the cultures around their use. The post-digital material turn (as seen in *CASSETTE MEMORIES* as well as other practices) exemplifies — not how materials are more real than signs — but how also our technologies are signs, and our signs technological, and how the coupling of signs and material in technology also incorporates a form of control. In other words, the material turn is a response that seeks to reconfigure the relations between signals and signs — of the material processes of computation, and their social and political realm; of material and social procedures and protocols.

CASSETTE A – The danger of erasure

Each new recording involves a process of erasing old magnetic matter. To erase the content of the tape, a high frequency (approximately 80 to 100 kHz), high amplitude audio signal is sent from the erase head. This signal randomises the magnetic particles on the tape. Music varies in frequency and amplitude, and so does the magnetic field from the record head that imprints the magnetic picture of the audio signal on the tape. When recorded, tape scrolls under the playback head, and the moving magnetic fields induce a varying current in the head. This voltage

produces an electrical representation of the magnetic signal on the tape. Subsequently, the signal is passed through an equalisation and amplification circuit that makes recorded music audible in the connected speakers.

CASSETTE B – Cassette tape allegories

CASSETTE MEMORIES does not hold an essence or a truth but is seen as an allegory. As an allegory, the cassette tape and *CASSETTE MEMORIES* seize ‘hold of a memory as it flashes up at a moment of danger,’ to quote Benjamin. It establishes an imaginary correspondence to another historical moment. This is partly a yearning for the bygone, and there is no radical power in looping and cutting up tapes today. However, the imaginary construction also represents another way of experiencing producing, sharing, mixing, etc. than we usually experience in today’s interface culture.

CASSETTE A – The “sound on sound button” (or, “the switch of carpentry”)

“The switch of carpentry” enables a recording method that does not erase previous content, but superimposes layers of sound upon each other. This “sound on sound button” — which in *CASSETTE MEMORIES* was built into a modified cassette recorder — disables the erase head of the tape recorder and reconfigures the cassette machine into an object of carpentry. The button provides the possibility to display and monitor the cassette tape’s state of magnetic saturation,

a state where all possible resources of the ferrous coating on the tape are used. This shows the true personality of the recording medium and its attempt to capture the complex pulsating sound waves of humans talking, walking, playing music, etc. onto the tape. The recorded sounds gradually gets more and more saturated, forcing the magnetic domains in the same direction, but still leaves room to listen to the contours of the previously recorded material, while new recordings get layered up.

CASSETTE B – The cassette tape as a document of barbarism

Benjamin's thinking is an encouragement to think of the renewed interest in the cassette tape as something that flashes up in a moment of danger. The historical materialist must therefore address history differently, as Benjamin puts it: 'There is no document of civilization, which is not at the same time a document of barbarism. [...] A historical materialist therefore dissociates himself from it as far as possible. He regards it as his task to brush history against the grain.' (Thesis VII) With no attempt to recreate a media history, *CASSETTE MEMORIES* recalls the lost potentials of cassette tapes in relation to a contemporary digital culture. In the words of Benjamin, the cassette tapes are explored as a 'configuration pregnant with tensions' in order to recognize a 'revolutionary chance' and 'blast a specific era out of the homogeneous course of history' (Thesis XVII).

CASSETTE A – Compact cassette time

Time is a crucial factor. When recording on a compact cassette, time is measured in the length of tape played by the tape recorder with an average speed of 4,76 cm/sec. The specific cassette recorder used in *CASSETTE MEMORIES* is the Philips D6260. According to the service manual, the tape speed can vary up to 3%, making the notion of accurate time questionable.

If time is length — or, more accurately, the execution of length — then the precision of the tape recorder and the idea of an "operative tape recorder" becomes extremely important (which to a great extent references Wolfgang Ernst's notion of micro-temporality). However, things gets even more complex when using a 1 minute continuous loop cassette that superimposes layers upon layers of sound (as it was the case in *CASSETTE MEMORIES*). This method challenges the notion of documented time (seconds, hours, days, years). Time gets transferred into complex states of recorded time, real time, machine time, past time, tape time (which is the execution of tape length), and creates a compound of different conceptualisations of time that exists as layers on top of each other.

CASSETTE B – Interface culture in the eighties

What does it mean to 'blast a specific era out of the homogeneous course of history', as Benjamin writes? Our own childhood memories of cassette tapes date back to the seventies and eighties. Those were the heydays of compact cassettes, but also a time when

cassette culture was gradually supplemented by digital technologies. Cassettes were the material for recording and sharing audio, and with early home computing this was extended to software (e.g., the Commodore 64 (released in 1982), and the Amstrad CPC 464 (released in 1984) both came with cassette decks). In many ways, the cassette tape and the promise of a digital revolution express similar desires, but also tensions.

To advertise the Macintosh in 1984, Apple released a famous commercial video directed by Ridley Scott. In a dystopian future, the Macintosh will save civilization from a totalitarian state with obvious references to both George Orwell's *Big Brother* and allegedly also the IBM mainframe systems that were controlling the market at the time. The future will not be like Orwell's *1984* because Apple's computer interface will redefine what computing means. It will no longer be an interface for conformity that absorbs the worker, but an interface for individual expression and cultural taste. No doubt, the Macintosh played a central role in a history where computers redefined cultural consumption, communication and the arts. The computer, and not least the smart phone and tablet, has grown to become a primary medium for cultural consumption. In this sense the digital revolution has out-conquered the cassette. However, the conditions for this success are based on metaphorical interface design, and the control of access to the materiality of the computer. With this, the relations between signal and signs (technology and language) become displaced: What-You-See-Is-What-You-Get, but you never realize the conditions and consequences.

However, cassette tapes may also be seen in line with another digital revolution at the time. It was not only Apple that believed in a digital revolution. Also in 1984, Steven Levy published a seminal book on hackers as 'heroes of a computer revolution'. Levy's

hacker ethics included free access to all computers and all information, mistrust to authorities as well as an insistence on beauty and art. In many ways, this ethics has always been in opposition to Apple's ethics. When Apple believed that the digital revolution would happen through user-friendly design and aesthetical and perceptually pleasing hardware and software, hackers turned to the poetics of hardware and software, foregrounding the constructing elements. This involved both an inquiry into programming and circuit bending, and an inquiry into the social institutions that follow technologies. As an example of this, "hacking" developed criminal connotations, which stands in contrast to the "good" digital revolution carried out through user-involvement in interface design (but with an ignorance to the hacker ethic of respecting people's data). Following this, the re-investment in cassettes is not just an inquiry into the perceptually pleasing experience of the lo-fi from our childhood. The aesthetics of cassettes, in relation to both audio and digital culture, has always also been associated with the poetics of materials and a critical reflection on the social constructions that follow media technologies (the relations between signs and signals). Audio culture is also about the changing materialities of recording, producing and sharing, and as such, *CASSETTE MEMORIES* is not only a yearning for the past, but also a reflection on the contemporary.

CASSETTE A – OOO, OOP, OOMT <=> micro temporal media archaeology

The self-made “sound on sound button” and the use of looped cassette tapes change the tape recorder’s status from a technological object into an object of carpentry, a philosophical lab equipment used to practice philosophy. Layers of sound becomes superimposed upon each other; and furthermore, various notions of recorded time gets superimposed upon each other, making the sound on sound loop tape difficult to analyse in a traditional textual manner, forcing us to shift our analytical perspective towards the actual recording technology itself.

These philosophical questions posed by carpentry reveal an alternative reality of the operational tape recorder. This reality is — following the thoughts of Wolfgang Ernst — somewhat a-historical, meaning that the specific function of the machine is outside history and human discourse. However, it is not outside the discourse of cassette tape itself. The perspective is thus shifted towards the medium itself as an operating entity (Ernst, “Towards a Media Archaeology”). Thus, a merger of object-oriented ontology and media archaeology presents itself, bringing an awareness to the moment when media themselves become active “archaeologists of knowledge” (Ernst, *Media Archaeography* 239). From a media archaeological point of view, it is only technical media that are able to register physical real signals. The cassette tape not only preserves the memory of human cultural language, but also the knowledge of how the cassette recorder stores and operates the magnetic domains of the running tape and its ferrous coating. The

“carpentry” of an artistic performative context exposes the knowledge that is embodied in the operational technology and reconfigures it into a philosophical practice; meaning that it exposes the saturation of the physical material and uncovers questions regarding our understanding of documented time. In addition, such perspectives reflect the use of our current digital technologies for documenting our sounding reality, by stressing the importance of paying attention to the media archaeological moment of the operational machine.

CASSETTE B – Is the digital revolution over?

Three decades after the introduction of the Mac computer in 1984, the table is turning. According to a leaked NSA presentation it is now Apple who is Big Brother, and enthusiastic iPhone customers who are the zombies living in a surveillance state (Rosenbach et al). In other words, the promise of a digital revolution also implies a reaction where dominant actors remain faithful to the institutions of intellectual property, as Stuart Moulthrop predicted already in 1991. The computer, which was originally developed as a military technology but redefined as emancipatory and revolutionary by Apple and others, is now back again where it began: as a military intelligence technology.

Following Florian Cramer, post-digital critique can be seen as “a form of social networking that is not controlled or data-mined by those companies [Google, Apple, Amazon, and Facebook].” (“Post-digital Writing” 237) Paradoxically, these critical practices relate to a contemporary digital paradigm of controlled consumption by inquiring the poetics social constructions of lost technologies. Products

such as Portastudio for iPad (Tascam), Tape (Focusrite) and Virtual Tape Machines (Slate Digital) all promise a shrink-wrapped sound and feel of classic tape machines within the convenience of favourite digital workstation. However, the fascination of the obsolete can also be of a different kind than the pure perceptual and digitally simulated aesthetics of the analogue. Contrary to Portastudio for iPad and similar products (which arguably fascinate), the material engagement with old technologies themselves originates in a different poetics and different ethics. The distinction between digital and analogue can also be understood as a distinction between shrink-wrapped and Do-It-Yourself, as Cramer further notes in his article in this journal volume (Cramer “What is ‘Post-digital’?”). The fascination of vinyl records, floppy disks, and other historical and lost materials and platforms is in this sense a reaction to the ways cultural use is packaged within hardware and software interfaces, and an exploration of alternatives.

CASSETTE A – Cassette types

Type I Ferric oxide. HF-ES90
Type II Chromium dioxide (CrO₂). CR-E II
Type III Ferro-chrome. FeCr90
Type IV Metal-formulated. Metal-ES60

CASSETTE B – A post-digital interface criticism

In a post-digital era of reaction (rather than revolution), the digital no longer seems to induce any disruption (Cramer “What is ‘Post-digital’?”). When present digital technologies

no longer afford the spaces ‘in-between’ that do not have clear ownership and are devoid of meaning (but are full of potential significance), past technologies appear as alternatives. However, if current materialist practices with bygone media aim to be more than a parenthesis in the reconfiguration of our interface culture (more than a trendy, hipster purely perceptual revival of the old which could just as well be subsumed in trendy new apps for the iPhone), they need to question their notion of material and materialism in a way that embraces a potential for criticism. Tampering with cassette tapes may not provide redemption of current interfaces and their culture, but may in the words of Benjamin present a ‘weak Messianic power’ (Thesis II).

Tape-out

From the perspective of the historical materialist, speculative realism appears as an all-encompassing metaphysics whose engagement with objects and materiality risks displacing their discursive, cultural and political contexts: how compact cassettes are embedded in linguistic and social constructs. From the perspective of the speculative realist, historical materialism risks not seeing the ontology and perspectives of objects – the essence in them. But how do the two theories relate to one another? There does not seem to be an easy answer to this, and no possibility to assemble a meta-theory. Following speculative realism: to capture their relations as objects, one can only access their appearance, and through practice (carpentry) explore the relations. Following historical materialism: such explorations reveal allegories on the relations between culture and the materiality of media.

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**POST-DIGITAL APPROACH:
RETHINKING DIGITAL
LIVENESS IN ‘THE LIKES OF
BROTHER CREAM CAT’**

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The animal celebrity – Brother Cream Cat

This essay discusses ‘post-digital liveness’ via the artwork *The likes of Brother Cream Cat*, made in 2013 in collaboration with Helen Pritchard. The work is about a popular figure and celebrity cat, Brother Cream, who lives in a convenience store everyday with the shop owner in Tsim Shai Tsui, Hong Kong. He became popular in Hong Kong in 2011 after he disappeared and was later found through the help of his Facebook fans who alerted local residents to his disappearance. Brother Cream Cat’s attraction permeates in both the physical and digital live network. He has over 1000 first time and recurring fan visits per day at his store and has accumulated with more than 150,000 “likes” on his Facebook fan page 尖東忌廉哥. The number of “likes” becomes an instrument, as well as a starting point, to sustain his well being by attracting more visitors (both online and offline), to sell merchandised products, cat food and sponsorship opportunities for this animal celebrity, Brother Cream.



Figure 1: Brother Cream Cat at the 24-hour convenience store in Hong Kong.

The likes of Brother Cream Cat

The likes of Brother Cream Cat is a custom-made browser add-on, a piece of networked software, which intervenes with the users’ browsing experience through the concept of the exaggerated ‘likes’ phenomena of this ‘Facebook famous’ cat. The notion of liveness that is explored in the artwork includes both human and nonhuman participants (both animal and computation). After installing the add-on, users can no longer view their usual Facebook pages as most images are replaced with Brother Cream’s latest online trace, producing a lively and entertaining experience as the life of Brother Cream permeates the network everywhere. The image data on Facebook is constantly mutating and the live trace is participating actively in human-machine, human-human and machine-machine interaction through real time technology, including the network and software. The peculiar visual and audio effects which come about through ‘liking’/‘unliking’ Brother Cream Cat’s posts add another whimsical layer to the piece, allowing a virtual interactivity between human and non-human animal to occur. All these augmented browsing experiences are enabled through the nonhuman, the networked and computational communication between the add-on and the Facebook software. Therefore, the artwork “explores the network as a co-joined experience of humans and [nonhumans] with this popular Facebook cat” (Pritchard and Soon, *The Likes of Brother Cream Cat* par. 1).

Whether Brother Cream Cat can invade the network requires the attention of computational ecologies. Though this essay only addresses the issue of social forces between the add-on and Facebook, his

entanglements also include other possible ecological matters such as fan culture, gift economy, entertainment commerce, social media, copyright, data laws and his affective aspect (Pritchard, “Animal Hackers – The Affective Ecologies of Cream Cat”).

The Likes of Brother Cream Cat is produced collaboratively with Helen Pritchard. Our work and research engages with ‘more-than-human’ computing (Pritchard and Soon, *Performativity of jsut code*) and network happenings. In 2013, Geoff Cox invited us to produce a piece for project. arnolfini, an online experimental production and research platform, commissioned by Arnolfini. In *The Likes of Brother Cream Cat*, we developed our interest of liveness in the context of computational ecologies. While Pritchard is focusing more on the nonhuman animal as a creative force in the production of code, as co-writers in computational ecologies (Pritchard, “Thinking with the Animal Hacker, Articulation in Ecologies of Earth Observation”). I am addressing the issues related to how social forces impact the life span and health conditions of a piece of networked software through the rethinking of the notion of liveness. Digital liveness is about the software’s capacity to maintain a networked live connection and is subject to social forces including both socio-technical and socio-political dynamism. With this addition, digital liveness exists in a ‘black box’ behind the screen; the success or failure of running the artwork is a co-participation between the software code that makes *The Likes of Brother Cream Cat* and Facebook. It is not simply a technical implementation.

In *The Likes of Brother Cream Cat*, we take the approach of Mark Marino’s ‘critical code studies’ (2006), a method to study code itself rather than focusing on the representation, the usability or interface design of software. Studying how the algorithm is implemented might not be necessary as

“code itself [is already] a cultural text worthy of analysis and rich with possibilities for interpretation” (Marino par. 10). The available Facebook code, including but not limited to source code, web API, the Facebook developers site and its documentation, and the terms and conditions, provide a useful way to understand the architecture of the Facebook infrastructure in both technical and political dimensions.

This essay tries to open up the discussion of digital liveness through artistic research and practice, examining the socio-technical and socio-political digital processes of Facebook through its constant negotiation with my software. To run *The likes of Brother Cream Cat* under good conditions, Facebook needs to keep using the same data schematics in their source code.



Figure 2: Screen shot of *The likes of Brother Cream Cat* on Facebook.



Image 3: Screen shot of the overlaid text and the ‘like’/‘unlike’ responses on the Brother Cream fan page

Post-digital approach

In 2011, Transmediale Festival held a conference entitled *BODY:RESPONSE – Biomedical Politics in the Age of Digital Liveness*. It suggested that networked environments and technology have been shifting the understanding of the living body from the biological to the “social and political” body, which is extended from online society. Technology governs the social body and social relations through online platforms, communication devices and application gadgets. The ways a body connects to society have dramatically expanded through social practices in online environments. The use of biopolitics is also evident in various scholars’ writings (Pasquinelli 153; Liu 57-77; Parikka, *Digital Contagions* 124; Karppi; Munster 72), opening up critical perspectives between politics and the networked body. In the context of digital liveness, biopolitics, with reference to Foucauldian discourse analysis, is about digital life (related to life span and health conditions of a network/artifact/software), regulatory controls, social relations, production, reproduction and population.

Ian Andrew’s notion of post-digitality, in his article *Post-digital Aesthetics and the return to Modernism* (2000), places emphasis on the “flaws” of an artifact, and examines how the technologically related and unattended noises are generated during the digital production process. If we consider that “the flaws inherent in digital processes” (Ian par. 2) are part of the artwork examination, then I would push further Ian’s notion of “flaws” to argue that they are not a mere interruption, but the possible causes of an artwork’s malfunction that go beyond “technological failure” (Cascone par. 6). The post-digital approach involves investigating the digital life process that leads to software flaws. The question then would be: Why does

the artwork, the networked software, end its life? And how can its life be prolonged?

Ian suggests the post-digital approach is not about examining functions and “mundane tasks” (par. 28) of a software application, but thinking about “material processes” (par. 24) that are transmitted through every part of the hardware, software, network and environmental conditions. *The Likes of Brother Cream Cat* is a piece of software that connects to a network platform, in this case, Facebook. To focus on the digital processes of the add-on, I am emphasising the material-communication processes between my software and Facebook through web scraping and the standard web application programming interface (API) communication technique.

The add-on addresses the notion of liveness through continuously scraping Facebook data and intervening in the user experience of browsing Facebook in real time. However, like any other software production, the add-on could potentially malfunction, ending its life when it no longer functions, and this would lead to a newer version release. In this post-digital era, one tends to think beyond the polished screen and well-functioned software, departing from the critical reflection of software disruption. A newer software version is not simply regarded as a new fix or a new update, but it encompasses social forces, which shape the digital liveness of *The likes of Brother Cream Cat*.

Beyond the technical: The governing of web APIs

Using a web API was one of the possible options in developing *The Likes of Brother Cream Cat*. Web API (Application Programming

Interface) is a standard interface offered by Web 2.0 service providers to communicate between software in the application layer. Developers, designers, artists and anyone can register a platform account and are then able to retrieve services and online data via the use of web API in their developed software. Arguably, there is a growing trend for artists (such as JODI, Jonathan Harris & Sep Kamvar, Jer Thorp and Shu Lea Cheang) to employ available web APIs in their works. This public interface, the API, has become an “art-making enabler” (Soon 1).

Facebook is not only a web platform and application for end users to socialize and communicate, it also provides web API services to developers. The release of the web API in Facebook provides much broader opportunities to enhance its popularity on the Internet and sustain its business inasmuch as more third-party applications are being offered in the market. Online and social data could pass through the web API from Facebook databases, reproducing and appearing in other interfaces, and this has become known as ‘Facebook apps’. However, the web API should not only be considered as a tool, but has to be understood from a socio-political perspective related to how providers manage or govern their data usage, encompassing a highly complex socio-technical-political relation.

Although most data, ranging from user-generation to system tracking data, is contributed in the public domain freely, Facebook basically has the full control on granting the access and deciding what data should be opened from databases and made available to the public through algorithms. In this regard, it controls the technical execution of data inclusion and exclusion. All the users’ data fundamentally “is the sole and exclusive property of Facebook” (Lodi 242). Since all Facebook apps have to go through a registration process and are under constant

monitoring, this in effect means Facebook is controlling what should be made available in the market, cultivating a desire and favorable apps through the labour market, and governing the constitution of the developers’ community.

Facebook has made their web API available since 2006 and developers have to comply with their rules, including both concrete and ambiguous instructions. An example of this is the limit of query requests per day via the developers’ programs. One of the conditions presents in a Facebook developer page called “Facebook Platform Policies” states: “Quality of content: you are responsible for providing users with a quality experience and must not confused, defraud, mislead, spam or surprise users.” Clearly, the rules are set to be mostly beneficial to Facebook. In this regard, I am wondering if *The likes of Brother Cream Cat* surprises users, through its messy interface and bizarre interaction? Undoubtedly, Facebook has the right to withdraw and block the application’s access for data retrieval, and even reserves the right to pursue any legal actions that they might consider necessary. This has been seen previously in other artistic websites such as *Seppukoo* (2009), developed by Les Liens Invisibles, which promotes ‘Facebook suicide’. Facebook blocked *Seppukoo*’s web API access in 2010 through the Facebook account deactivation service. In contrast, to be a well-behaved developer, in both technical and political terms, a stable delivery of data is expected (Bucher par. 40).

The politics of the Facebook web API

Though Facebook tries to maintain their platform stability by giving advanced notice of

API code changes and offering more comprehensive documentation and guidelines, still many developers suffer from their frequent code updates. According to an online web service company called “API Changelog”, the related documentation and services of the Facebook API accumulated a total of 64 changes in just 30 days. Chunk, an engineer who works at Facebook, announces that they update their code (not only for API but Facebook as an entire platform) at least on a daily basis for different enhancement purposes in order to sustain its entire economic activities in the page called “Ship early and ship twice as often” (2012).

Nevertheless, third party applications have to keep up to date in order to cope with Facebook changes and to keep up with the latest technology. In 2010, Facebook announced significant changes towards the web API with the introduction of Open Graph, a way to structure web data that allows data to be easily distributed. But this also implies the deprecating of the former format of REST API on Facebook (REST format was originally defined by a scientist, Roy Fielding, in 2010). In fact, backwards compatibility or legacy support has been seen as highly time-consuming and expensive for maintenance (Bisbal et al. 103), and therefore, companies tend not to take the approach of supporting both new and old systems. Facebook, as one of the listed companies, also has to be cost effective in growing its revenue and business. Despite new features no longer being supported in the old API format, according to a Facebook developer announcement page called “Platform Updates: Operation Developer Love” (2013) which is posted by Lei Lei, REST API is completely removed and is no longer available for apps created after April 10, 2013. One of the developers responded and criticized Facebook on the same page as follows:

“The argument that ‘existing apps will continue to work’ doesn’t work because our software is not a single application — it is a platform for Facebook applications. Software like ours is therefore instantly broken for anyone who uses it with a new application – no grace period for us to make sure that we have removed all traces of the old REST API.” (Fowler)

As such, it is very difficult to ensure the life expectancy of a third-party application as developers are forced to change their software to avoid potential and instant malfunction, and it would be the same if *The likes of Brother Cream Cat* used the web APIs. How could one “escape” (Berardi ix) from all these conformities? I have employed an alternative and conventional method, yet not properly verified and approved, called web scraping.

What about web scraping?

Before the wide availability of web APIs in the late 90s released by Web 2.0 providers, developers or artists could only use web scraping to harvest web data. Web scraping is an automatic process of web data extraction, written by a computer scripting language, in which “specific fields or data elements [are extracted directly] from pages on the Web and other Internet sources” (Marres and Weltevrede 316). Authorization is not required, one can easily program a script and start fetching the web data, however, Marres and Weltevrede call our attention to possible issues related to the legality of web scraping as it may go against a website’s “terms of use” (320).

Indeed, both the use of API and web scraping techniques could achieve the same results as an add-on, allowing Brother Cream

cat to invade the network and permeate the Facebook browsing experience massively. However, the use of different code crafting methods and languages goes beyond the mere issue of technical implementation. Indeed, code has a ‘voice’ (Cox and McLean 3) in this artistic context to maintain the digital liveness of the software and escape from Facebook’s regulatory control. Geoff Cox argues that machine code should not only be regarded as an instrument for executing creative instructions, but also “subjectivity and sociality” that “connects with political expression and allows for a wider understanding of power relations” (3). A ‘voice’ is therefore embodied in the add-on’s source code by using the web scraping technique, somewhat ‘escaping’ the way that the web API is governed by Facebook. This voice is subtle and hidden as a black box from audiences. We have tried to make this explicit by including a warning notice in our landing page of *The likes of Brother Cream Cat*, as well as disclosing the source code entirely on userscripts.org. Indeed, using web scraping might violate Facebook’s existing policies, such as copyright and ownership.

Marres and Weltevrede further discuss the extracted dirty web data (322) in using the Web scraping technique. The source is hardly understood without proper revealing of data schematics, and the web data collection process is “unstructured” (316) and “messy” (322). In addition, web scraping is considered an unstable method because there are substantial changes of web interfaces and data elements from the source (Tseng 2), which impact the app’s development.

In fact, none of these approaches, web scraping or standard web API, are stable in a technical sense. In general, *The likes of Brother Cream Cat*’s add-on is expected to cope with all the changes in the Facebook platform by continuously updating the add-on software with different versions — just



Figure 4: Screen shot of *The likes of Brother Cream Cat*’s landing page <<http://thelikesofbrothercreamcat.net>>

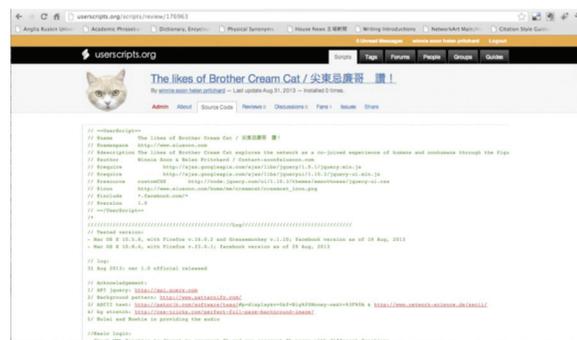


Figure 5: Screen shot of the source code of *The likes of Brother Cream Cat* <userscripts.org/scripts/show/176963>

like any other software practice — in order to maintain the liveness and functioning of the artwork.

Fostering life: The production of new updated releases

A new version of a piece of software means there is a new update. There are different reasons for this and so what makes a provider introduce a newer software release? Chunk, the Facebook engineer mentioned earlier, responds that the Facebook software updates provide “great things” in their “Ship early and ship twice as often” policy (2012). Perhaps, it can be understood as “greater” interfaces, “greater” functions and “greater”

stability to drive Facebook's business model, keeping users and expanding possible online connections. Mark Zuckerberg, the CEO of Facebook, mentions in his announcement "Facebook Reports Third Quarter 2013 Results" (2013): "we work to bring the next five billion people online and into the knowledge economy". Therefore, Facebook's number of users is predicted to expand continuously with the 'great things' that are offered to them. Given that advertising revenue had a 66% increment from 2012 to 2013, it is understood the direct and inter-related forces that exist between end users, business relations and monitoring systems in the Facebook empire. Every new update of the software can be seen as an event in the world of capitalism. It is an economic process and yet it exists through the technical practice of code release, controlling the network population in relation to the machinery of production. In other words, the software signifies "a power to foster life" (Foucault 138) and is entangled with the optimization of efficiency and effectiveness that directs the engaging forces from macro interactions among advertisers, technology and users to micro individual behaviors.

In fact, these software changes are commonly seen in "media software" (Manovich 24) nowadays including things as hotfixes or security updates from operating systems, and software updates from other kinds of applications. The reasons behind these range from protecting security and privacy of users, to offering better experiences, features and functions. Arguably, one of the hidden agendas for software companies is to implement a range of mechanisms to reinforce their controlling, monitoring and optimizing via data tracking. Facebook is one of the companies that actively analyzes user behaviors, such as tracking users' cursors on screen as was reported in the *The Wall Street Journal* by Steve Rosenbush

in 2013. Perhaps, software should also be considered as a control apparatus, with power that is exercised on individual live connections – as a form of life – through the black box of algorithms in order to track and analyze users' online behavior. These micro tracking techniques are implemented down to the individual level in order to trace potential consumption patterns. All these controls are hidden but integrated in the normal release of software, which is offered to users as an uncompleted and distorted picture since it is presented as 'great things'. According to Foucault, the notion of life is biopolitical and consists of disciplinary power that is "centered on the body as a machine". It can be argued that this notion is integrated into existing systems to optimize software efficiency. Foucault explains power as:

its disciplining, the optimization of its capabilities, the extortion of its forces, the parallel increase of its usefulness and its docility, its integration into systems of efficient and economic controls, all this was ensured by the procedures of power that characterized the disciplines (139).

Extension of life: Social reproduction via APIs

As a production platform, Facebook's population includes not only end users who frequently and actively engage with Facebook for socialization and communication, but also those external parties who participate in developing Facebook apps. The Web API is one of the ways through which Facebook extends its user population through third-party applications. Facebook offers comprehensive guidelines and interfaces for their web

APIs, facilitating the reproduction of user data and the production of 'Facebook apps' in a creative way.

Other than data reproduction, the social life of Facebook is being extended and enriched through third-party apps as there are an increasing number of apps that post requests/scores/notifications on users' Facebook walls through the web API. For example, a mobile app called *Candy Crush Saga* has implemented a system that allows users to request further 'lives'. When players have used up all the lives available to them in the game, they are able to obtain more lives by asking Facebook friends for help. This enables them to keep playing the game. This social interaction that allows them to obtain extra lives has been implemented via the Facebook API by posting a request message on a friends' wall from within the app, as well as accepting the help message from them. Facebook will then inform the app that the player has been given extra lives and this will allow them to continue playing. As a result, social reproduction is made possible via web APIs.

Being able to access Facebook's databases with the API is highly motivating for developers, since it immediately creates a network of relations through individual behavior. For instance, a users' 'likes', 'posts' or 'shares' are exposed to a massive network where a ripple effect is created. Gerlitz and Helmond would describe this as an "interconnected" (7) network relation, whereby Facebook data keeps circulating among a network of networks exponentially. They point out that Facebook is intentionally implementing their business as part of Zuckerberg's agenda, which is "to build a more comprehensive map of connections and create better, more social experiences for everyone", as stated in his Facebook post "Building the Social Web Together" (2010). Thus, this social connection, extension and

reproduction are, in conjunction with wealth and desire, producing "subjectivities" like "needs, social relations, bodies, and minds" (Hardt and Hegri 32). This demonstrates 'biopower', that Hardt and Negri describe as "the production and reproduction of life itself" (24).

When it comes to creating a socio-technical and socio-political context, the Facebook web API is contributing to the liveness of both *The likes of Brother Cream Cat* and the Facebook platform. As far as Facebook is concerned, these new relations are enriching their entire business. New apps will recruit and attract new users as well as intensify the social activities through third-party software, and hence affect the dynamics of the Facebook population and extend the life of the software in biopolitical terms.

Conclusion

In summary, a newer version of software does not only mean advancing the software's functions and features, but also refers to the disappearance of old interfaces, old functions, old regulations and policies in both the case of Facebook and *The likes of Brother Cream Cat*. It essentially documents and embodies the changes, history and a particular moment of technological media development, including but not limited to the capitalist, mainstream and commercial demands, conformity, political decisions, regulatory controls and ideological practices.

In *The likes of Brother Cream Cat*, a possible malfunction in the add-on would mean the death of live connections to Facebook in a quite literal sense. The social forces around the add-on, on the one hand, have the capacity to prolong its life as a piece of well-functioning software, connecting healthily with Facebook as a live connection.

On the other hand, the social forces can also lead to malfunction and to failure, ending the life of a piece of software. Using web scraping might lengthen the add-on's life and help it escape from the disciplinary practices of Facebook, but still it will hardly escape the frequent code changes and releases of the Facebook Empire. The fragility of the add-on, *The likes of Brother Cream Cat*, thus expresses the notion of post-digital liveness through rethinking the matter of digital life, its material-communication inter-relation with Facebook and the possible software failure on an artistic, conceptual and practical level of production.

Post-digital liveness in *The likes of Brother Cream Cat* exists in the material-communication software process. The capacity to maintain a live connection is not only subject to pure technological consideration, but is also related to socio-technical and socio-political relations within the digital process that allows Brother Cream Cat to invade the network. These aspects, though, are hidden to users behind the screen. Post-digital liveness implies both being technologically connected live to the network, as well as the digital life of software bodies.

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CRITICAL INFRASTRUCTURE

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Environments are invisible. Their groundrules, pervasive structure, and overall patterns elude easy perception.

(McLuhan, *The Medium Is the Massage* 68)

If a work of art is to explore new environments, it is not to be regarded as a blueprint but rather as a form of action-painting.

(McLuhan, *Letters of Marshall McLuhan* 325)

Infraduction

The essay and ideas included here is a discussion of the topics raised through *CRITICAL INFRASTRUCTURE*, an artistic research and production residency that took place as part of the lead up to the transmediale festival, *afterglow*, 2014. The project's initiation was about uncovering the resources and reserves of physical and material energies, signals and data that scaffold the very possibility of post-digital art-and-technology practices. Through a series of public workshops, and an installation project situated within the transmediale 2014 festival, *CRITICAL INFRASTRUCTURE*'s 'post-digitality' is not only historical-temporal, but immediate, and dredged up from below, in the present. The artistic project stemming from research and public events through the project creates a media-archaeological site-survey, revealing data and depth of the present moment of an art and technology festival, in the Haus der Kulture der Welt, in Berlin, on Earth. As such, the project intends a kind of post-digital institutional critique, as well as reflecting something of the "geological-turn" in media and media theory through the landscape survey form. When "data mining" and circuit-bent

archeologies (Parikka and Hertz 424), are powerful metaphors and methods for artistic knowledge practices, we perform a survey of the media-technical landscape.

The project spanned the Autumn of 2013, and received the gracious support of the Canada Council of the Arts and the Danish Arts Council, and hosted by transmediale 2014 and the Zentrum für Kunst und Urbanistik (ZKU), Berlin.

Post-digitality and infrastructure

[...] a new poetics giving flesh to a 'voice from below', an eloquent voice of the mute. It purported to decipher the signs written on faces, walls, clothes — to travel under the visible stage and disclose the secrets hidden underground. (Rancière 15)

If there is something of value in seeking out what "post-digital" might mean for, artists, technologists, and researchers, we first and foremost think it temporally. That is, what we grasp at is 'afters' and 'befores'—placing developments and destinies along imagined timelines. Going "post-" presupposes a hopeful and helpful epochal exit-strategy of lateral reasoning and longitudinal conclusions. Post-digitality smudges across the many real and re-imagined tendencies and nostalgias, regularities and inconsistencies that lie in the wake of a dampened digital euphoria. The result, in our current moment, seems to favour a very tight cybernetic loop, as we re-visit, re-wire, re-create, re-resource, re-new, and re-surface the dreams and nightmares of 20 years of somehow anticlimactic technological emissions. The overly enthusiastic 20-something ages into a seasoned,

skeptical 30-something, embarrassingly sweeping the dusts of digital idealism from the 1990s and 2000s under an IKEA rug. But this dust sifts its way back up through the weft and weave—and we, as with other techno-utopic waves and generations before us, are called to wonder, “What happened?”

With *CRITICAL INFRASTRUCTURE*, alongside time-based concepts, we speculate another “way of seeing” the post-digital: to look down, into and through the sediments of a technological present we re-main a re-action to. If “post-” usually refers to that which comes after, let’s look here at what lies below — charting a course not in terms of eras, generations and epochs, but through layers, vertical gradients, veneers and strata — driving our “post-” into the ground. The afterglow, the hangover, of the digital booms and busts we have been experiencing since the late 80s evidence a very real layering of matter: the dirt and dusts of the digital systems, interconnects and protocols that now wrap the Earth. What matters (that is, presents itself with all its material agency) is technical-trash, overfilled (an)archives, dendritic digital distensions — the bursting at the seams of attentional and intentional gutters.

These gutters of dirt and dust are passageways to geological thinking, pointing to the “anthropocene”, our current geological age (during which humans and our activities have dominant influence over climate, environment). Our contributions to the geological record over the course of this era will primarily show the effects of technical media: the electrification, then wiring, then wirelessness, of the globe. For material reminders, consider how the modern engineering concepts of backward-compatibility and innovation, respectively, resonate with proto-geoscientist Steno’s 17th Century stratigraphic laws of superposition and cross-cutting: “At the time when the lower stratum was being formed, none of the upper

strata existed,” and “If a body or discontinuity cuts across a stratum, it must have formed after that stratum.” (Brookfield 143) *CRITICAL INFRASTRUCTURE*, a project of methodological and conceptual misappropriations, extends the work of geological and archeological media thinking. How might we perform a core-drill of media and its technical systems?

Critical infrastructure?

[...] infrastructure is not a substrate which carries information on it, or in it, in a kind of mind-body dichotomy. The discontinuities are not between system and person, or technology and organisation, but rather between contexts.

(Star and Ruhleder 114)

The mercurial character of technical infrastructure is what renders it critical in two ways. These constellations of technologies are by definition ceaseless and foundational, in the way that the U.S. Department of Homeland Security describes them:

Critical infrastructure are the assets, systems, and networks, whether physical or virtual, so vital to the United States that their incapacitation or destruction would have a debilitating effect on security, national economic security, national public health or safety, or any combination thereof.
(Homeland Security Website)

But they are also, in a sense critical of themselves, unstable and doomed ultimately to breakdown and failure. Paul Virilio puts frames the broad, pharmacological relation of infrastructures this way:

When you invent the ship, you also invent the shipwreck; when you invent the plane you also invent the plane crash; and when you invent electricity, you invent electrocution [...] Every technology carries its own negativity, which is invented at the same time as technical progress.
(Virilio 89)

Looking at the post-digital as infra-digital (below-digital, sub-digital), outlines a superorganism. It is an image of the technical that intends to take account of specific contexts and micro-relations of both creation and use. A post-digital minerality, or elementally shows the desire, the need, to bring the digital euphoria that erupted twenty years ago down to size, down to protocol, down to implementation, down to its gritty, grimy details. The depth of the problems created and solved with technical media might require an engagement with them that is unsexy, respectful, humble — even boring. Contemporary creative practices give account of the resurgence of these purportedly boring things, having renewed resonance and interest. Online culture and art making that we identify as post-digital overflow with concern for the mundane object, the muted image, simple interactions. For examples, load up a few Tumblrs: “Things Fitting Perfectly Into Other Things” (<http://thingsfittingperfectlyintothings.tumblr.com>) or “The Jogging” (<http://thejogging.tumblr.com>), with its particular brand of Duchampian manoeuvring. Jack Strange’s 2008 exhibition work ‘g’ — an exhibition piece where a lead ball is placed on the ‘g’ key of a Macbook laptop — places technological dullness on a pedestal. Gone is the art-and-technology of “New Media Artist,” aiming at some terrifically preposterous future of art, or of the media. Technical media is composed of embarrassingly simple and commonplace, repeated



Figure 1: ‘g’ (2008), by Jack Strange. A “g” key of a laptop is held down by a lead ball, repeating the letter into a Microsoft Word document.

elements (the micro-switching of a WiFi router, the ordinary hand-to-mouse gestures of a film editor, etc.). The exciting exhilaration of “Where do you want to go today!?” digitality is set against its monstrous monotony: The repetition of keystrokes, clicks, logic gates, ethernet routers and seemingly never-ending lists. (“Where do you want to go today?” was Microsoft Corporation’s global campaign slogan for most of the mid-90s.)

There is a thing that exists in the world, a half-serious post-digital counter-strike, known as “The Society for People Interested in the Study of Boring Things.” One of The Society’s charter members, Susan Leigh Star, has described their activities, characteristically, as a list of things: “Among the boring topics presenters brought to the table were: the inscription of gender in unemployment forms used by the city government in Hamburg, Germany; the difficulties of measuring urine output in a post-surgical ward in the Netherlands, and how to design better cups for metrication; the company mascot and the slogans used by a large Midwestern insurance firm in its attempts to build corporate cultures; and how nematologists use computers to keep track of their worm specimens.” Star continues that, “what they have in common is a concern with infrastructure, the invisible glue that binds disciplines together, within and across their boundaries.”

(Star, *Got Infrastructure?*) Relying on, and extending Star's discussions of infrastructure elsewhere (Star, *The Ethnography of Infrastructure*), we can sketch an outline of a concept of infrastructure that is full of contradictions. Infrastructures are:

- *embedded, but give themselves to experience as secreted access points;*
- *transparent in terms of how we use them, but opaque in terms of how they work;*
- *articulated at human scale but operational only at much larger and smaller scales;*
- *material and systemic, as well as learned and practiced;*
- *locally articulated, but rely on a globally "installed base";*
- *designed to be reliable and established, but existentially insecure, unpredictable and precarious.*

The infrastructures of media-technics, is a lively area for cultural and artistic activities, and realist, non-idealized approaches to creative work. What we provide with art-and-technology are "punctualized building blocks," (Hertz and Parikka 427) and condensation points for the misty haze of technology as it ascends into "the cloud." We can no longer study or use a thing called technology: "Think of technology as a verb, not a noun." (Red Burns) Likewise, we can never claim to step outside of the technological: "I don't see an outside, but see technology everywhere, even where it purportedly is not [...] Is it never not on?" (Ronnel, *The Fable of Media Technology*) Using Heidegger's terminology to discuss the experience of use, and the design of informational systems, Star writes:

Within a given cultural context, the cook considers the water system a piece of working infrastructure integral

to making dinner; for the city planner, it becomes a variable in a complex equation. Thus we [should] ask, when — not what — is an infrastructure [...] infrastructure occurs when local practices are afforded by a larger-scale technology, which can then be used in a natural, ready-to-hand fashion.
(Star, *Steps Toward an Ecology of Infrastructure*)

A fascination for infrastructure in art making can serve to point out the links between institutional, economic and political structures, and commonplace and material systems. These "always-on" systems allow for, and (to a lesser degree) are allowed by, art-and-technology practices. These banal systems are what we are not supposed to care about, not supposed to notice, while awestruck and immersed, blown-away by the spectacle, the narrative, the classically aesthetic. What lies beneath? "You wouldn't be interested," anyway. And if we do notice these underlying systems, then something has gone, often terribly, wrong. Infrastructural technologies are like DJs — you only really notice them when they suck. *CRITICAL INFRASTRUCTURE* is a characterisation of the technological that shares much in common with the *Critical Engineering Manifesto*, prescriptive instead of the technologist :

The Critical Engineer looks beyond the 'awe of implementation' to determine methods of influence and their specific effects.
(Oliver, Savicic and Vasiliev, *The Critical Engineering Manifesto*)

When something works — really works — it becomes infrastructure. We give this name to something we are not enough aware enough normally to name at all. As Douglas Adams has put it, "Technology is a word that

describes something that doesn't work yet." (Adams, *How to Stop Worrying and Learn to Love the Internet*) So, infrastructures are at once easily detected and indiscernible — they are everywhere and nowhere, at once. These dynamics of appearance and disappearance, of visibility and invisibility are perhaps somewhat fundamental to what is to be technological. But there are other ways and reasons that technologies disappear, and some of are motivated by the worrying realpolitik of knowledge and access, as well as social relations incumbent of late capitalism.

The infrastructure of institutions/institution of infrastructure

There are significant impediments to understanding large and complex technologies, and one mode of invisibility is here brought about through a purposeful projection of tedium. For example, "one of bureaucracies' most effective, least appreciated weapons is its tedious technical reports. Like frigid February elections in Chicago, these fat volumes dissuade all but the most faithful." (Espeland 109) There is a particular colour of grey used in the telecommunications industry that, at least in industry folklore, has been psychologically proven to be the world's most boring colour. This cognitive camouflage marks everything technological that is intended to be uniformly dull and uninteresting. The seemingly colorless cross-connection boxes that stand aloft in the urban landscape are like tombstones of a bygone digital era, an invasive species we aren't supposed to notice the presence of. Fuller and Goffey define "grey media" as those,

databases, group-work software, project-planning methods, media forms, and technologies that are operative far from the more visible churn of messages about consumers, empowerment, or the questionable wisdom of the information economy. (Fuller 9)



Figure 2: The Sichert family of cross connection and KVz — Kabelverzweiger, or "Cable fan out" — cabinets, for outdoor use. These grey boxes are used to connect trans-regional and trans-national telecommunications infrastructure to individual subscribers and households, known in the industry as "the last mile." (Image with the explicit permission of Julian von Hardenburg, Berthold Sichert GmbH management — <http://sichert.com>).

Networks can no longer be conceived of as intrinsically utopian. On the contrary, they are now the third terrain (alongside nations and markets) on which the bitter competition for wealth and power are undertaken [...] they retain, in layers, older formations — network security, network discipline, and network sovereign power over life and death. (Cubitt 312)

Infrastructures and institutions are related: they are conjoined twins — the former generally thought to be the latter's more obstinate, material counterpart. The practices of institutions create and sustain infrastructures, and, reciprocally, institutions require the channels and stratifications scaffolded by them. If infrastructures order

and delimit a kind of imperceptibly-opaque, fragile, material-technological hyperobject (Morton 130), institutions do the same kind of work for social, political and even personal life. Infrastructures and institutions may not be so different, beneath their commonplace surfaces:

an idea or something that has been learned can also be considered as having material-objective force in its consequences and mediations, the understanding of the material nature of ideas, and their relation to medial activity such as reading, navigation, and calculating, has become commonplace.
(Fuller 214)

And this is where a tension between impressions and realities, a politics of knowledge, at individual and community scales, becomes highly pronounced. Bureaucracies and institutions express a set of techniques that are also present in the design and development of technical infrastructure: abstraction, compartmentalisation, classification, oblivious interiorities — the list of tententious strategies spins round and round, centrifuging imbalances of both knowledge and power.

Histories and studies of science and technology in the industrial age are witness to multifarious accounts of dangerous and productive complicities like this (Eisenhower famously terming the U.S.'s initial version of such an infrastructure the "military industrial complex" as early as 1961 (Eisenhower, *Farewell to the Nation*)). A more personal, illustrative account comes from Colleen Black, one of 75,000 residents of Oak Ridge, Tennessee, who's war-time period in America was spent unwittingly processing uranium for the bombs dropped on Hiroshima and Nagasaki in 1945. When asked how almost

the entire population of the town could have worked in the processing facility, without knowing its incendiary purpose:

You'd be climbing all over these pipes, and testing the welds in them. Then they had a mass spectrometer there, and you had to watch the dials go off, and you weren't supposed to say that word, either. And the crazy thing is, I didn't ask. I mean, I didn't know where those pipes were going, I didn't know what was going through them [...] I just knew that I had to find the leak and mark it."

Ms. Black is here speaking of a fearsome impedance matching sometimes achieved by institutions and infrastructures. When capitalism, its institutions, and comprehensive technologies collude, no one needs to know anything: "If somebody was to ask you, 'What are you making out there in Oak Ridge,' you'd say, 79 cents an hour." (National Public Radio, *Secretly Working To Win The War In 'Atomic City'*)

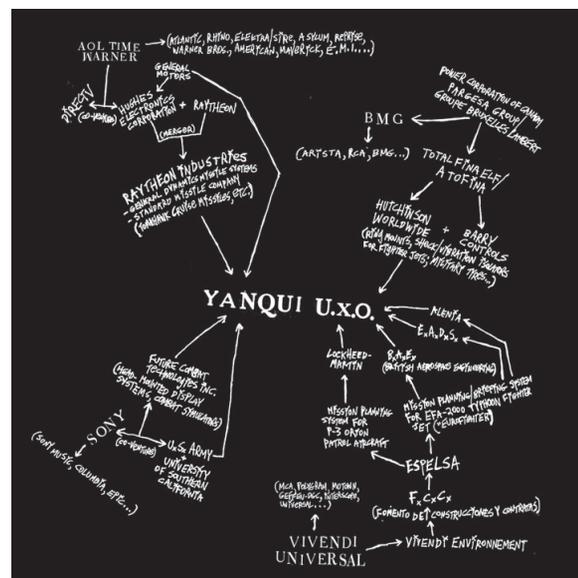


Figure 3: Godspeed You Black Emperor!'s Yanqui U.X.O. back cover, showing relationships between music publishing and recording industries and the military-industrial complex. (Used with the permission of Don Wilkie, Constellation Records, Montreal, Canada).

So, nobody gets to know everything. Technologies, when they become infrastructural, are never fully understood by any one. Try asking a car mechanic to fix household plumbing, a supercomputer programmer to reconfigure a Microsoft Windows network, or a WordPress php coder to build a robot. There are vectors of re-integration, signs of domain hopping, but by and large and more and more we just have to “find the leak and mark it,” and wait for the cable repair man to show up. And these contradictorily interdependent-autonomies manifest themselves all the way down. The telecommuting MacBook Pro graphic designer and the resident of a developing-world megacity are different in every way, save this: each is subject to the imposed vulnerability and inflicted impotence of institutional, technical infrastructures. The result is a devolving chain of irresponsibility (where responsibility is “the ability to respond,” as well as its more common meaning). As these infrastructural systems ascend from our physical, then from perceptual, then our conscious realities, we are called upon to think about them less and less, and the consequences get more and more gnarly. It get to the point that even when we would like to find out where the pipes are going, and what is going through them. When confronted with highly complex technological systems, “individuals [are] simply incapable of bearing full responsibility for their effects,” as Jane Bennett discusses in attempting to trace causal logic (blame) to the North American power blackout of 2003. (Bennett 24)

Globally, the scaffolding of institutional and governmental power through technological artefacts, often taking the form of territorialisation through instrumental measurement, has long been part of the infrastructural bargain. Techniques include, “dependence on imported equipment rather than self-sustaining networks, and an absence of R&D in the colonized territory.” For electrical

power, for example, these are “techniques which keep the regional power companies in thrall to larger global corporate networks of goods and services.” (Cubitt 314) Information and network archivic infrastructures work in the much the same way — cartographic mapping and scientific investigation (as “quantification” movements of the 18th and 19th centuries) were serviceable preludes to Western European powers’ dominion over the new world, the Indian subcontinent and Africa, among others. German and British geographers, map makers and natural scientists certainly thought themselves to be doing a great, inherent service to the world. And the preplanning of today’s contemporary superpowers seems no less an irreproachably admirable bargain: Google just wants to know, and we just want free email.

Measuring Infrastructure

Whenever things were frightening, it was a good idea to measure them.
(Kehlmann 16)

The promise that base metals supposed for the alchemist, and the capacities that scryers gave to globes of rock crystal, is the promise that “data” brings to our present moment. Richard Wright’s essay for *Software Studies, A Lexicon* (2007), points to the archive fever and historical anxiety from which contemporary techniques of data visualisation arose: “In 1987 the US National Science Foundation published their ‘Visualisation in Scientific Computing’ report (ViSC) that warned about the “firehose of data” that was resulting from computational experiments and electronic sensing.” (Fuller 78) Artists, “creative technologists,” designers, programmers are, right this moment, developing an enormity of alternate perspectives on comma delimited lists,

spreadsheets and other seemingly humdrum data formats and sources. The tools they employ often involve a surprisingly potent mix of simple statistical techniques, aesthetic schemes, and data massaging.

But the whole endeavour reveals a quintessential epistemic irony of our data-age: Data is collected in order to characterise the truth of an object or event. But, having collected too much data, of a kind that is impossible to comprehend directly, we elaborate a whole literature of symbols, infographics, explanations and visualisations. As Vilem Flusser puts it,

every mediation between man and the world, [is] subjected to an internal dialectic. They represent the world to man but simultaneously interpose themselves between man and the world ("vorstellen"). As far as they represent the world, they are like maps; instruments for orientation in the world. As far as they interpose themselves between man and the world, they are like screens, like coverings of the world.
(Flusser, "Our Images")

We drill-down, slice and sieve the database — digital dowsing, attempting to "strike oil," or to "sift gold" from these stratifying datasets. And here again is why geological thinking is more than an inter-disciplinary conceit. We find ourselves inventing a new tectonics of the database, an elaborate succession of measurements and multiple-working-hypotheses, that we hope will bring us closer to the realities we seek to characterise. But, there is much to be said for the insights wrought by perspectively looking at the data. Perhaps "a landscape is best viewed with a single source of light — the sun, one light bulb, a lone candle, a lone writer — so that all the shadows and highlights are true to each

other." (Coupland, *Extraordinary Canadians*) In order to study something highly non-linear, perhaps we must first arrange it, slice through it, in or with a line.

Infrastructures, networks of materials and people, piping and protocols, seem a favorable source for ever more data, to be distilled and visualised. Operating at the dashboard — via interfaces that try to convey new understandings via illustration — we can decide to engineer awareness in almost innumerable ways. Can we imagine an "infrastructural proprioception" of a kind similar to the "social proprioception" that the social media allows for? (Thompson, *Clive Thompson on How Twitter Creates a Social Sixth Sense*) There will exist a data-space for infrastructure, all the way up, and all the way down. It would seem that withdrawn technological entities call us toward them, inevitably in this way:

Thus what is a mere procedure of mind in the translation of sense-awareness into discursive knowledge has been transmuted into a fundamental character of nature. In this way matter has emerged as being the metaphysical substratum of its properties, and the course of nature is interpreted as the history of matter.
(Whitehead 16; qtd. in Latour 43)

Performing infrastructure

Technology slips from the invisible to the visible in a number of ways, some already outlined, and some more intentional and performative than others. The most obvious is perhaps through internal or external failure. This breakdown, as self-critique by and of infrastructure itself, is a reading that Sean Cubitt gives of McLuhan's influential

description of electric light: “The electric light is pure information. It is a medium without a message.” (McLuhan, *The Medium Is the Massage* 15) Infrastructural breakdown, here the example and existentialism of electricity and light, can be “an assertion of the criticality of the medium to our innately communicative species.” (Cubitt 15) When a large power blackout happens, it increasingly means a complete severing of all cultural communicative ties—arenas for public and private interactions are artificially lit, and social spheres (in the West, at least) are nearing complete metastasis from situated to networked, analog to digital, neighbourhood to online.

More interesting than breakdowns are instances where infrastructural performers and human actors do a more explicit double-act. A favourite story regarding such a vaudevillian ploy involves one Harvey Schultz of New York City. During a press conference in advance of the 1987 National Football League Super Bowl game, Schultz hinted to the public at large that it might be a good idea for football fans to “stagger their bathroom visits” during the game — so as to avoid a potentially hydraulically catastrophic “Super Flush.” The exacting news outlets of the moment took the story and ran with it. Hearsay about the Super Flush is an important mechanism for rendering of infrastructure in the minds of we who would use it unwittingly. The important thing about Schultz’s peculiarly artful institutional critique that day at the press conference is not whether or not what he said was true (it was not), but that it made present, perhaps for the first time: New Yorkers have toilets, they are each part of an massively interconnected system, all connected to an otherwise unnoticeable aqueduct. Schultz did no less than to render the infrastructure of plumbing and sewage visible, in the consciousness of millions of people.

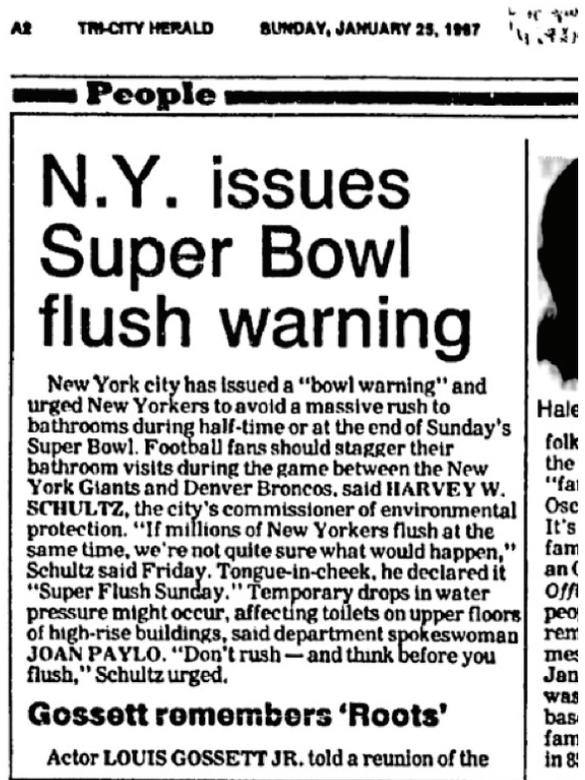


Figure 4: The Tri-City Herald article from January 25th, 1987, reporting on the possibility of a “Super Flush” occurring due to toilet activity during the Super Bowl football game. Harvey Schultz, then New York City’s Commissioner of Environmental Protection, urged “Don’t rush—and think before you flush.”

Along with breakdowns (hoaxed or otherwise), we could add a further mode to the ways in which infrastructures move from the mysterious to the manifest. Correlation, a process known to statisticians and scientists that serves to establish links between data derived from individual processes, can further serve to elucidate infrastructures. Marshall McLuhan expressed correlation in a more felt manner, emphasizing an underlying inclination of systems and people toward patterns and connectivity:

When information is brushed against information [...] the results are startling and effective. The perennial quest for involvement, fill-in, takes many forms.” (McLuhan, The Medium Is The Massage 103)

Consider a phenomenon known to exist in the United Kingdom power industry known as “Television Pickup.” By quite a large majority, the English like to make tea, and watch television drama. Whenever a particularly popular drama or sport programme on the BBC ends, the entire viewing public gets up from their television and makes tea. During these mass-brew events, millions of electric kettles are turned on all at once, just prior to which the national electrical grid system goes into mini-emergency mode. The largest pickup recorded for the TV drama *East Enders* happened on April 5th, 2001, when an estimated 22 million viewers watched to find out ‘Who shot Phil Mitchell’. (BBC 2007) The post-episode power load by 2290 megawatts and the population of the UK at this time was 58.7 million. (Wikipedia United Kingdom Census 2001). Television Pickup is a correlation between media, behaviour and electrical supply — and it is this correlation, revealing unexpected infrastructural causalities, that allows for an awareness of subsystems, and how they interrelate. (British Broadcasting Corporation, Britain From Above) Through unexpected correlation and causal relationships, technologies are drawn out from their transparent fog, their immanent and pervasive haziness.

The performance of infrastructures, as the rendering present of unwitting, unwanted or unthought of systems, has its place and prelude in artist practice. The methods developed by artists and activist associated with forms of “Institutional Critique,” treat institutional infrastructures of art as fodder for artworks that expose and elaborate them. Institutional Critique, serves as perforative and performative interrogation into the value and support structures of the museum, gallery, catalogue and official welcome. Amongst artist Andrea Fraser’s well-known works is *Museum Highlights: A Gallery Talk* (1989). The scripted dialogue in these

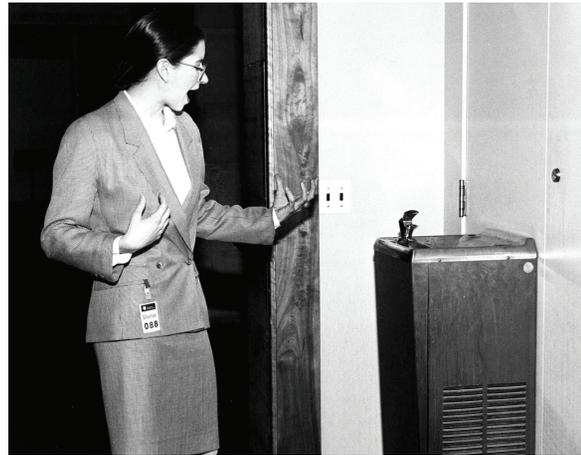


Figure 5: Andrea Fraser, as Jane Castleton, highlight the water fountain as part of the *Museum Highlights: A Gallery Tour*, at the Museum of Philadelphia, 1989.

interventions includes not only an exposition of art historical and aesthetic concerns, but also discussions of material infrastructure (water, electrical lighting), museum sponsorship, and cultural-economic and political agendas more widely:

Jane walks into the Coat Room, gesturing toward the drinking fountain at the far end. Addressing the drinking fountain: Hmm, ‘a work of astonishing economy and monumentality [...] it boldly contrasts with the severe and highly stylised productions of this form.’ (Fraser 120)

One thing that makes the work interesting is that it may not matter if what Fraser is saying is wholly accurate or factual. A narrated dataset of factoids and excerpts, the work presents an appropriately incoherent and unlocatable constellation of information and messaging (some lifted from official museum publications), that the audience is left to interpolate between and within. This is infrastructural theatre of the superorganism of the art museum, and the art world, all strings attached. But what in the post-digital landscape could be thought potent for enlivening and reinvigorating this kind of theater,

that could serve as a further “new departure point for what used to be called institutional critique”? (Holmes, “Extradisciplinary Investigations”)

Interminable terminals

CRITICAL INFRASTRUCTURE — that is, technological materials that are at once constitutive of social and political meaning, while reflexively analytic and self-destructive — allow art and technology practices to move “Towards a New Critique of Institutions,” as Brian Holmes suggests, through extradisciplinary, or perhaps anti-disciplinary, approaches. (Holmes, “Extradisciplinary Investigations”) A critically infrastructural study (as artwork, as whatever) might appropriate from the grey media of engineering, instrumentation, and technical disciplines, creating less of an artistic gesture and more of an articulation of live research. How “raw” can the “data” of an “art world” be, and how might it be performed for its artists and audiences? How might such infrastructural data be presented in public, such that we are prompted or called to draw an appropriate panoply of individual, evolving conclusions? There are no truths to be evoked, but relationships and resonances can be modelled and estimated, meanings evoked, tendencies charted: further attempts at living in a world we seek to understand. These are extradisciplinary methods and strategies, as a reassessment of the post-digital technological landscape seems necessary: An infrastructural account of the heaving, bristling detritus the digital has left in its wake.

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**PSYCHO-ACADEMIC
DÉRIVE – A PROPOSAL**

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Psycho-Academic *Dérive* (P.A.D.) is a post-digital humanities project about the interrelations between art, academy and the corporate world.

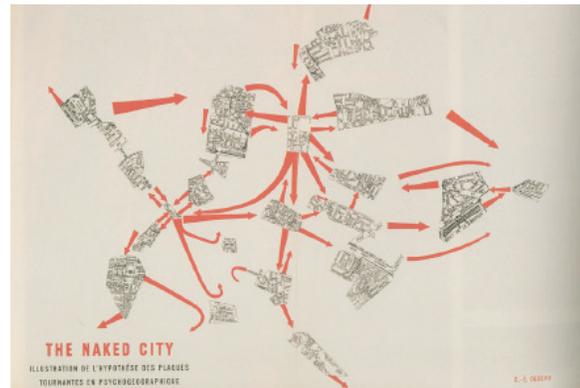
After shifting from materiality towards immateriality at the end of the twentieth century, we have recently been experiencing opposite shifts. Whatever we may call these trends — “re-materialization”, “vintage media”, “neo-analog”, “post internet”, “post-digital”, etc. — they all deal with the inverse paths starting from the immaterial or conceptual and heading towards material or physical space. The low-tech aspect of the net.art movement in the mid-1990s was probably among the first signs of the post-digital era.

As we shall see, P.A.D. establishes a correspondence between *dérive* in physical space and *dérive* in conceptual space, which, I believe, blurs the border between digital and post-digital — if ever it is possible to blur it more. My opinion about how to handle post-digital is as follows: imagine somebody creates an artwork that uses a digital tool; once the work is set up, remove the digital tool and observe what remains afterwards; if the work still holds, one may say it is a post-digital project. In the *Google Adwords Happening* [1] for instance, I point towards a strange and explicit relation between two very old media, language and money. Without Google the project couldn't have been done. However, forgetting about Google and the Web, this relation may still hold and thus it might qualify as a post-digital project.

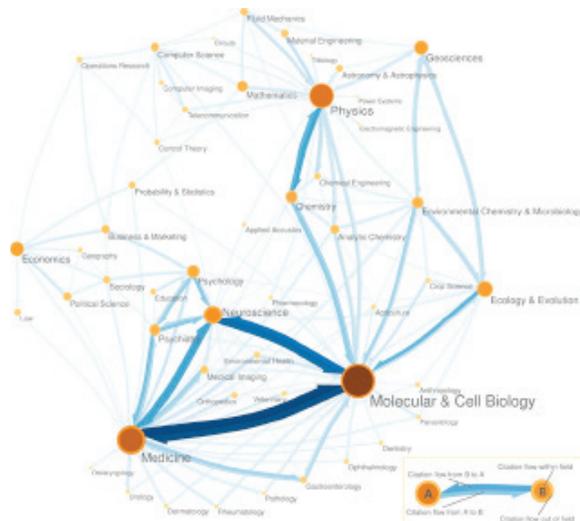
* * *

Psycho-geographic *dérive* invites us to browse the urban space by listening to our emotions. As Guy Debord wrote in *Theory of the Dérive* (1956):

One of the basic situationist practices is the dérive [literally: 'drifting'], a technique of rapid passage through varied ambiances. Dérives involve playful-constructive behavior and awareness of psychogeographical effects, and are thus quite different from the classic notions of journey or stroll. [2]



Instead of *dérive* in geographic space, let us now consider *dérive* in conceptual space. Actually, nobody really knows what conceptual space is! So, to make things more practical, let us replace conceptual space by one of its possible representations, for instance, by the following map of the 2008 academic space by Rosvall and Bergstrom.[3]



Rosvall and Bergstrom 2008. A map of science based on citation patterns. Analysis of 6,128 journals connected by 6,434,916 citations were clustered into 88 modules and 3,024 directed and weighted links.

In a psycho-geographic *dérive*, you don't just browse the city in a passive way, instead you produce new paths, one step after the other. Each step may lead to a new world... or not. In the same way, P.A.D. is not about reading or watching the conceptual landscape but about writing or producing new elementary steps. A series of steps is a link between nodes of the network, i.e. between different knowledge communities. Those called "weak ties", which provide improbable short-cuts, turn out to be essential to the large scale structure of scale-free modular networks such as the academic network.[4]

P.A.D.'s strategy will consist of writing new academic articles that will produce weak ties between very distant knowledge communities through their citation network, and then observing and measuring how the flow of knowledge is disrupted by these short-cuts. Of course, these academic articles will have to have some peculiar aspects and will be written following some specific rules, which I don't describe here.

In 1994, physicist Alan Sokal submitted a completely nonsensical paper entitled "Transgressing the Boundaries: Toward a Transformative Hermeneutics of Quantum Gravity" to the postmodern cultural studies journal *Social Text* (published by Duke University Press). After it was published, Sokal revealed that the article was a hoax in the journal *Lingua Franca*. [5] The articles I am writing, and that are going to be disseminated in the academic space, have a different status than Sokal's paper though. They could be mistaken as fake articles, but they are actually "fake fakes".

In order not to reveal too much of the project, I will mention only one article as an example. It links art history, media archaeology and microbiology, and is untitled "A case of self-preservation of a parasitic artwork with saprotrophic nutrition". Many others are in preparation, relating for instance:

linguistics, performance studies, complex networks, or cosmology, media archaeology and computer science; media studies, quantitative linguistics, and political economy; ornithology, alchemy, literature, aesthetics and complex networks; media archaeology, quantum field theory and psychoanalysis; and many more.

Sequel of former projects such as the *Dadameter* or *ArtWar(e)*, [6] P.A.D. will be implemented thanks to concepts and tools that witness the deep recent changes that occur at the border between the art world, academic space and networked capitalism, such as: Web 3.0, phase transitions and scale-free modular networks, bow tie topology, low materialism, amateur leeching, phenomenology of the formless, bursts, alluvial diagrams, scrums, rewiring of conceptual and affective information networks, re-branding of space-time, etc.

[... to be continued]

Notes

[1] Christophe Bruno, *Google Adwords Happening*, 2002. <http://www.iterature.com/adwords>.

[2] Guy Debord (1956) *Theory of the Dérive*. Les Lèvres Nues #9 (Paris, November 1956). Reprinted in *Internationale Situationniste* #2 (Paris, December 1958). Translated by Ken Knabb.

[3] Martin Rosvall, Carl T. Bergstrom, *Mapping Change in Large Networks*, 2010, Plos One. <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0008694>.

[4] We assume the reader to be aware of the contemporary theory of complex networks. See e.g. Barabási, Albert-László, *Linked: How everything is connected to everything else and what it means for business, science, and everyday life*. New York: Penguin, 2002.

[5] http://www.physics.nyu.edu/faculty/sokal/transgress_v2/transgress_v2_singlefile.html
http://www.physics.nyu.edu/faculty/sokal/lingua_franca_v4/lingua_franca_v4.html.

[6] <http://www.iterature.com/dadameter> & <http://www.artwar-e.biz>.

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