

Code Drift

Essays in Critical Digital Studies

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Arthur and Marilouise Kroker
Editors

Pacific Centre for Technology and Culture (PACTAC)

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Code Drift: Essays in Critical Digital Studies

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Preface

ARTHUR AND MARILUISE KROKER

What is the fate of the regime of computation? A global techno-culture inscribed by the terrorism of the code or an emergent age of networked individualism driven onwards by the ecstatic visions of augmented reality, mobility, and connectivity?

When the regime of computation suddenly slams into the real world of globalization, when code is forced to tangle with the always messy world of blown away referential values -- the real world of gender trouble, stormy challenges to the big signifiers of race, class and ethnicity -- we finally know that we are living in the beginning days of something radically new, namely a culture of code drift.

All the pure signs are present in code drift, from the radiating positivity of the terrorism of the code to the irrepressible creativity of augmented reality. How could they not be? The formal structure of all programming language also carries within itself traces of the modernist episteme with its endless variations of the supposedly counter-languages of form and syntax. So too, code drift is most certainly always framed by the politics of the pure signs of these the most computational of all times: pure cybernetic terrorism, pure mobile contingency. But for all that, when the language of the code follows its fatal, but no less inevitable, passage across the real world of globalization, when form is deeply inflected with the syntax of the human, non-human, and post-human, we are suddenly propelled into a new era of indeterminate trajectories, unpredictable inflections, strange complexities. Call it what you will -- hauntologies, specters, disavowals, disappearances, the missing third term -- one thing is clear, understanding code drift urgently requires that the technical language of the regime of computation be

supplemented by that which it thought it had successfully excluded, namely the always doubled imagination of the artist, the poet, the philosopher, the hacker, the gender outlaw, the systems administrator gone bad, the visionary of unknown borderlands of the body, mind, and spirit. For all these, a digital culture moving at the speed of light is most interesting when emphasis is placed on that which is the dreaded object of escape velocity -- the surrounding darkness with its complex passages between light and dark, speed and slowness, exclusions and inscriptions, codes and remainders, computation and that which is irresistibly - indeed joyfully inevitably - incapable of being numerically signified under the sign of the bin or the hex.

Tracing the curve of technology as it now arcs relentlessly, and with no small measure of ideological hubris, towards mobility, connectivity and augmentation, a creative group of digital theorists gathered at PACTAC on two occasions -- June 2009 and March 2010 -- to collectively consider the specter of the digital future. Travelling from many different parts of the digital spectrum -- visual artists, photographers, philosophers, computer theorists, performance artists, thinkers of the sonic, capitalist and genomic economies -- there was a very real sense of code drift in the air. Somehow within the creative mystery of collective reflection on a common digital project, barriers to thought were successfully eclipsed by the creative imagination, allowing the full complexity of the digital future to reveal itself. How else to explain what happened: stories of code drift inflected by the rich imaginary of fractal philosophy, becoming dragon, illuminated darkness, digital resisto(e)rs, technology as magic, lenticular galaxies, phantasmal media, digital conversations in a coast Salish longhouse, and augmented realities in life and fiction. Here, the spirits of many different thinkers, from Borges to Deleuze, were summoned to stand at the gateway of the digital future, not so much to haunt the present as to remind us again and again that in *Code Drift: Essays in Critical Digital Studies* there is rehearsed anew the traditional practice of the intellectual imagination -- namely mixing past, present and future into sensitive attunements for understanding issues related to technology and society. That the digital future will

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be replete with complex iterations and slippery codes was hauntingly brought into presence by Stelarc's performance lecture, "The Comatose, the Cadaver, and the Chimera: Avatars have no Organs," presented as part of the continuing Critical Digital Studies workshop at PACTAC.

Supported by the Social Science and Humanities Research Council of Canada [Image, Text, Sound & Technology (ITST)] as well as by a SSHRC grant in support of Arthur Kroker's *Digital Inflections* project, sponsored by New World Perspectives, convened under the auspices of CTheory, and held at the Pacific Centre for Technology and Culture at the University of Victoria (Canada), *Code Drift* is the first of a continuing series of publications and workshops on the digital future. We are most grateful for the hard work and dedication of Ted Hiebert, Aya Walraven, and Simon Glezos in helping with the organization and tech support for the workshop as well as presenting at the workshop itself. We would also like to thank Nicholas van Orden (English, UVic) for his careful copy-editing of the text.

Editors, CTheory
Pacific Center for Technology and Culture
University of Victoria

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ARTHUR & MARILOUISE KROKER

Code Drift

Neither global nor local
Today we are mobile

We are Code Drift

We remix/mutate/disseminate/jailbreak

Code Drift is the once and future
nervous system -- the genetic drift
of all augmented data bodies.

We are AR

We are Data Flesh

We are Code Drift

Software Genomics

Code Drift is an attempt to draw together the great discourses of biology and digitality, essentially to consider the implications of mapping the language of genomics onto software codes. We want to argue that data has come alive in the form of our extended network of technological organs, that the growth of information culture is the real world of evolutionary development literally, not metaphorically. When data comes alive, when data becomes the dominant life-principle with us as its willing

prosthetics, we are suddenly swept along in a larger digital cosmology the future of which is yet unclear. But this we do know: *digital cosmology* has its own laws of motion -- *code drift*; its politics are based on the deeply paradoxical situation of our being *tethered to mobility*; the first sighting of what will soon be its dominant form of subjectivity are the *enhanced data bodies of augmented reality*; and the human condition which it leaves in its wake can only be characterized as one suffering *digital trauma*. Not Toffler's vision of "future shock" where a stunned humanity is overcome by the accelerating rate of technological change, but something much more elemental, namely that the same awesome event that Nietzsche once described as the death of god and the beginning of something fundamentally new is now upon us again, except this time it's not so much the death of god, but the sudden eclipse of god's successor before this new onrushing event of code drift, tethered mobility, enhanced data flesh, and digital trauma. So then, a prolegomenon to a new digital cosmology.

Spectral Destiny of Technology

"In biology, genetic drift refers to random fluctuations of gene frequencies due to sampling errors." [1]

Neither global nor local, today we are mobile -- we are code drift. Just as genetic drift occurs by chance, producing in its wake unpredictable streams of genetic variation, so too code drift. Code drift cannot be programmed in advance, but occurs by chance variations through unexpected uses, creative applications, a fluctuation in our perception that produces complex technological transformations. Random fluctuations that build over time, resulting in complex yet subtle changes in the genetic makeup of a population: an indeterminate future of flux, chaos, intermediations, intersections, remix.

Code drift is the spectral destiny of the story of technology. No necessary message, no final meaning, no firm future, no definite goal: only a digital culture at drift in complex

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streams of social networking technologies filtered here and there with sudden changes in code frequencies, moving at the speed of random fluctuations, always seeking to make of the question of identity a sampling error, to connect with the broken energy flows of ruptures, conjurations, unintelligibility, bifurcations. Paul Virilio's vision of the duplication of reality, that we always act in two parallel worlds at once, is not necessarily a negative force, but can instead open up creative possibilities. Where Virilio might reduce social networking, Second Life (SL), YouTube, Twitter and the Web to instances of delocalization, we detect the presence of creative code drifters: texting, mobilizing, resisting, imagining, even 100 mile dieting on their way to new complex variations of technological destiny. While technology has the illusion of control -- consider how social networking technologies always strive to facialize themselves in the possessive language of the "I" and "You" -- Facebook, iChat, iPhone, You Tube -- the persistent data reality is code drift. Encoded by technology, everyone today is a code drifter, touched by technology and remixing the technology right back. Consider this description of a newer technological innovation -- hypersonic sound, unidirectional sound:

Beaming waves of hypersonic sound at a pitch that is undetectable by the human ear. The waves combine until they smash into an object such as a person's body. The waves then slow, mix and re-create the original audio broadcast. If the person steps out of the waves, they are no longer obstructed, and are rendered inaudible. [2]

When hypersonic sound becomes light sound -- it becomes the "ear" of technology. It produces a new form of silence we call hypersonic silence -- a subtle technology that whispers in your ear. It is when silence is not silent. A future of ears grafted to the subtleties of subliminal technology. Hypersonic sound has been used as a marketing tool in Japan for several years and was recently deployed by the A & E Television

Network on a busy downtown Manhattan street to promote its show, "Paranormal State." Pedestrians walking near a billboard heard voices whispering, "Who's there? What's that? It's not your imagination." When New Yorkers heard about this newest wrinkle in the mediascape, they immediately flocked to the location to experience this new technology first-hand.

Certainly just-in-time hearing, with its radical separation of the digital senses, involves the separation of sound from noise. But perhaps what is really present, and perhaps most seductive, about this innovation in new media is an elemental trace of code drift. It is our thesis that all new media are structured by code drift. McLuhan was absolutely correct. Code drift is wired directly into the laws of new media. For example, consider a code drifter's remix of McLuhan's famous concept of the tetrad with its four laws of media development, whereby for McLuhan all new media simultaneously render an older medium *obsolescent*, represent something fundamentally *new*, retrieve the *superseded form* of an older media as a cultural masquerade to make what's really new more acceptable, and when put under extreme pressure reverse into their opposite. In other words, written well before its digital times, McLuhan's tetrad is a manifesto for code drifters. *Drifts of obsolescence* -- what's left behind with hypersonic sound is the old flesh ear specializing in sonic sound waves, open to all noise, geographically fixed to the sides of the skull, unable to split the nervous sensorium by differentiating sound and noise; *drifts of the new* -- that's the customized ear, the hypersonic ear, that is perfect for the age of hyper-individualism in a time of intensified data networks. An individual sound for every ear. On a crowded subway, the hypersonic ear hears only ultra-high frequencies sound waves directed its way. On a street corner, it lives in its own directional sound cocoon. "Who's there? What's that? It is not your imagination;" *drifts of retrieval* -- what's retrieved by the unidirectional ear is the intimate tactility of new media -- a data tickle, a hum, a hiccup directed right to the ear; and *drifts of reversal*. Pushed to its extreme, hypersonic sound shuts down noise and amplifies sound. The hypersonic ear presages a future world suddenly gone silent, everyone a cocoon

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of invisible waves of sound, everyone an icon of perfectly individualized but for that no less pleasurable digital narcissism, everyone a silent movie of technology itself suddenly invisible. An invisible technology that becomes visible only when it is in your ear.

Code drift is nothing new. Humanity itself is the product of random evolutionary fluctuations, no certain aim, no fixed purpose, no guiding teleology. Sampling error is the genetic alphabet of the body. Who doesn't live for the mysterious seduction of unexpected frequency shifts in their daily lives?

With the fourfold movement of the history of technology from mechanical infrastructure to electronic sensorium to digital networks and now to the self-styled sphere of augmented reality, code drift is the key *affect* of technoculture. We are all caught up in random fluctuations of code due to sampling errors. The indeterminacy of random outcomes and the certainty of probability functions is the real existential horizon of digital subjectivity. In the culture of modernity, the drive to rationality was always accompanied by the hauntological traces of its own disavowal, namely the implosion of all the referential signs into the absurd. Existential anxiety was the real hauntology of modernity. The gradual coming into mass consciousness of the sense of the absurd -- the late modernist acknowledgement in the spheres of knowledge, power, sex, desire -- of the truth of that which had always been disavowed and thus acknowledged, instantly gave rise in our lifetime to the spectacular death -- in rhetoric, at least, if not necessarily in fact -- of the great referentials. Culturally, postmodernism was born out of the ashes of the acknowledgement of that which had previously been disavowed, namely that reason, truth, sex, consciousness, power have no necessary meaning, but are only purely perspectival simulacra -- code drifts fluctuating like unstable event-scenes among random events and probability functions, uncertainty and inscribed meaning. This ineluctable movement of randomness which runs from the dawn of evolutionary biology to the digital future, this privileging by code drifts of that which was previously unacknowledged, and thus never truly avowed,

expresses something essential to understanding our contemporary data condition, specifically our willing entanglement in the language of code drifts. With contradictions as the only truth-value, those random sampling errors of mistaken identities, unmarked bodies, misplaced meanings, data glitches are not simply the necessary byproduct of achieving stable equilibrium for systems which thrive on the metastatic growth of globalized surveillance, automatic vision machines, hypersonic sound, GPS bodies, mobile media, and creative apps. The global data genome is itself a random subject generator. It generates in its wake purely perspectival simulacra, no less beautiful or less seductive for the fact that only the most disciplined violence today can successfully firewall closed systems against the siren-call of the absurd -- fluctuating network identities, data errors as nervous breakthroughs to new "killer apps," the rapture of the fully exposed, fully circulating data body celebrating its escape from now superseded conceptions of privacy. Data flesh wants to be random. It yearns to fluctuate, drift, circulate, bifurcate. Data flesh fully absorbs the primary modernist disavowal -- the sense of the absurd in all the great referentials -- as its key condition of possibility. Neither necessarily a closed system nor an open system, digital flesh is a system in drift. It is not so much that digital technology recapitulates the language of classical mythology as the story of a fateful struggle between closed versus open systems -- Scylla versus Charybdis -- but that contemporary technoculture now approaches its apogee as a universe in drift. We are all now born again as code drifters traveling to a still unknown technological destiny, a destining somewhere beyond the utopian vision of indefinite expansion and the dystopian specter of a violent, apocalyptic contraction. But we do know this: with its nervous system fully exposed and thus pirated by electronic media of communication, the human body unconsciously recognizes in the language of code drift -- fluctuations, frequencies, sampling errors, mutations, driftworks -- something which has previously been lost, and never properly mourned, namely the nervous system protected across the millennia by the hard outer shell of skin and skull, but now which

has been found again. In the form of the digital nervous system, code drift is the once and future nervous system -- the genetic drift -- of all the augmented data bodies of augmented reality.

Tethered to Mobility

Neural Mutation -- random drift theory of molecular evolution. A theory according to which the majority of the nucleotide substitutions in the course of evolution are the result of the random fixation of neutral or nearly neutral mutations, rather than the result of positive Darwinian selection." [3]

Tethered to mobility? That's everyday life in the digital world where the body -- its gestural cell poses, its most rapturous attention, its most elementary brain matter -- is tethered to the sound of the iPhone, the relays of Blackberry data words, the entertainment of the gaming screen. Not so long ago, it was thought that with mobile communications fixed terminals and stationary bodily positions would have been abandoned forever, liberating digital subjects for the wild, nomadic spaces of wireless communication. As if to demonstrate that the traditional literary vernacular of paradoxical outcomes and unexpected results has not been eclipsed with the downgrading of immobile communications, digital subjects today are fiercely tethered to mobility. That specific, and most definitely global gesture, where eyes connect with data telemetry in a checking messages gestures -- an image, a data stream in the palm of a Blackberry hand, an iPhone app -- is the newest dance form of recombinant culture. Consequently, the more mobile the speed of communication, the more immobile the system of human reflexes. The more intense the circulation of the dominant medium of communicative exchange, the more fused the synaptic integration of the human and digital nervous systems. The greater the invisibility of communicative technology, the more visible the purely prosthetic nature of the data body. Disembedded data flows require fully

embedded data flesh as their primary condition of possibility, just as much as the purely illusory specter of the nomadic body is the key justification driving forward the disappearance of human flesh into dense networks of data telemetry. Dreams of embodiment -- embodied flesh, nature, culture, cities -- can now experience such dynamic resurrection in the opening years of the 21st century precisely because the death of embodiment is the hauntology of the terrorism of the code.

Like all dance practices choreographing the movement of bodies through, and sometimes against, space, the dance of tethered mobility is a time-shifter. The gestural pose of the mobile body resembles most closely what Rene Thom, the Swiss theoretician of chaos theory, in its most non-romantic iteration, once described as the constant repetition of a morphological change of state, that point where data becomes gene, where the body is only apparently tethered to mobility, but in reality functions as part of the neural mechanism of the global digital genome. In the way of all possessed individuals, we are in the end what we most depend upon, and this is true from the savagery of primitive capitalism to the communicative seductiveness of the virtual exchange-form. Fully possessed by digital telemetry, enabled by the flow of data, viscerally haunted by the specter of information, the digital subject knows no destiny today other than tethered mobility. The illusion of mobility, the reality of being skinned by technology. That bleak image from gambling casinos in the tired late afternoon hours comes to mind when lonely crowds of retirees playing the slots free up their hands by plugging identity cards worn around their necks directly into the machines for hour after gambling hour. Perhaps what is really at stake is not individual preference for mobility versus immobile communications, but a gathering drift of digital culture towards a certain neural mutation.

We are already living in the epoch of the global digital genome. When the discourse of data with its codes, flows, networks, memory banks, packet switches, and terminals meets the world of genetics, something strange happens. Patterned information flows come under the influence of neural mutations

with its random drift theory of digital evolution. And why not? Geneticists claim that "neural mutations can spread in a population purely by chance because only a relatively small number of gametes are 'sampled' from the vast supply produced in each generation and therefore are presented to the individuals of the next generation." [4] Which is precisely what digital creativity is all about. Since the dynamic inception of wired world everything -- cyber-culture, cyber-war, cyber-finance, cyber-communication, cyber-subjects -- has been brilliantly destabilized, undermined, and torqued in new directions by technical innovation moving at the speed of the data.bot. We are entering the first boisterous phase of the fourth stage of digital communication, having already passed through successive phases of tethered communication -- the immobile data ports opening onto the Internet -- to the recombinant graphics of the World Wide Web and thereupon to pure mobility -- cells, cameras, videos, tablets. Every stage of the net has its own history of neural mutations, with successful digital practices accompanied by an equally long history of discarded media. It's not really so much that everything works as geneticists claim for "the survival and reproduction of the organisms that carry them" but that digital innovations are randomly, but no less enthusiastically, sampled for the survival and reproduction of the global digital genome. As we exit the now-surpassed stages of tethered technology, immobile communications, and externalized graphics display, the human organism is literally fused with the telic destiny of the global digital genome. Its neural mutations, recombinant flows, and augmented reality are the real language of genetic data. Random data drift is the rule, with the data body assigned the leading genetic role of "sampling" at the feast of digital products, these phenotypic effects of the global digital genome.

Or something else? In this wetware map of neural mutation, that point when individual autobiography merges with the collective data biographies that we have all become, are not the inexorable laws of neural mutation and random digital drift already at work in shaping, mobilizing, and prefiguring the

destiny of human subjectivity? In this case, the question of subjectivity is fully embraced in the driftworks of larger neural mutations: recombined, respliced, remixed as the elementary matter of the global digital genome.

Code drifters as always tethered to mobility.

Enhanced Data Bodies

What is the digital imagination when it is no longer just computer code? Does the digital leave a trace? Must it transcend flesh, becoming cold code? No longer a world of light and dark, white walls and closed spaces, the digital imagination is the enhanced language of the digital future. It is how the infosphere speaks to us, infiltrates our dreams, organizes our choices, celebrates a utopia of the multitude that we are, but sometimes also delivers us to the dystopia of a terminal reality. Digital culture is radically split between being a manifesto for the artistic dreams of individuals who wish only to finally speak about the local, the emergent, the possible; and the programming of an increasingly militarized, irresistibly globalized, reality-machine. Suspended in the spotlight of the new -- drowning in a media saturated reality -- we have no choice but to take *every* side simultaneously. The language of the imagination plays out in the rhetoric of digital reality something much more ancient in human aesthetics -- the dynamically split mind we are today: half-beast/half-human; half-collective utopia; half-hard reality program.

We, the most post-human of all humans, think that we have somehow escaped the riddles of history and the mysteries of mythology through the cleansing language of technology. This sense that we have somehow leaped beyond the human to the posthuman future, from lived time to virtual time, through the medium of digital communication may well turn out to be only the most recent of the escapist fables meant to immunize a broken humanity from the curse of ancient spells. In the end, nothing really escapes the language of mythology. This the most technological of times is also the most mythological of times. When the spacetime fabric folds back on itself, when time

moving at the speed of light traces a great fatal curvature linking past and future, the digital imagination -- the awakening codedrifter brain -- is the privileged medium for connecting utopia and mythology.

For better or for worse, we are the very first pilgrims of the quantum age. In technoculture, we live at light-speed, streamed by the bitStorm of the data sky, our minds almost surgically separated from the discredited dreams of shattered unities of 'society,' and 'culture' to communicate anew with other citizens of the digital way with multiple identities we remix, mutate, disseminate, and jailbreak. *There is a new digital being waiting to be born in every one of us:* an expectant sense of a hybrid utopia that will not be realized through nostalgic dreams of modernism under suspicion, but by deep immersion in that which makes us quantum singularities.

Data Trauma

Readings from the Book of Genetics:

...epigenesis is the concept that an organism develops by the new appearance of structures and functions, as opposed to the hypothesis that an organism develops by the unfolding and growth of entities already present in the egg at the beginning of development (preformation). [5]

Before the Book of Genetics there was another book of fabulous fables, the Book of Genesis, with its biblical telling of the story of human creation by divine will from the darkness of an always gathering nothingness. Northrop Frye, the cultural theorist, discovered in the Book of Genesis the 'great code' that governed the struggle between intemperate passion and resolute reason in technological society. Certainly no generative egg makes its fatal appearance in the Book of Genesis, and no organism develops by the unfolding and growth of entities already present at the stage of biological preformation. Instead the Book of Genesis is the spectacular resolution of the

hauntology of metaphysics: a story of creation out of nothingness, the concept that an organism develops by the new appearance of structures and functions. Strip the originating spark of divine will from the contemporary scientific fable of epigenesis and we suddenly find ourselves in the most recent iteration of creation out of nothingness, the "great code" of digital culture. Without explanation, we have now left the secular history of modern enlightenment, dwelling now within the house of digital cosmology where the "new appearance of structures and functions" is the animating drive of software, conceived as the complex nervous system of digital reality.

Digital cosmology? Its ontology is epigenesis: the belief that digital organisms proliferate by the new appearance of code structures and networking functions. Always disloyal to evolutionary logic, software code only recognizes digital life as a random struggle between digital design -- repetitive patterned instructions -- and the wild side of ruptures, conjurations, and intermediations.

There's no real difference between the two sides. They are only *apparent* opposites. This is the story of identity and difference. Patterns and randomness, a strict tutelary of programmed instructions and the outlaw will to disturb the codes, disobey instructions, take programs to their wild side, surveillance to the extremes of micro-granular detail and the persistent human desire to wetware machines.

Coming to maturity under the sign of the terrorism of intelligibility, the real seduction of code lies in its desire in the end to be unintelligible, untraceable, unknowable, not capable of being archived. That's why the story of digital complexity today is captured beautifully by the language of clouds, storm vectors of codes moving at high velocity across the electronic sky, data hurricanes, BitStorm tornadoes, all those drifting clouds of networked subjectivity circulating through social networking technologies with their unexpected new structures and functions of FaceBook, YouTube, MySpace, Twitter, and iChat. Like the collective authorship over many centuries of the Book of Genesis, the Book of Digital Epigenesis also has its cosmologists

now and into the future. For who can really anticipate what will happen in the time of digital epigenesis? Who can predict with any certainty what new structures and functions will emerge from this new story of creation from digital nothingness. In desperation, astrophysicists describe the situation as that of "punctuated catastrophe." But we know better: digital epigenesis is the newest temporary solution to an ancient biblical riddle -- creation out of nothingness -- and to an equally ancient philosophical puzzle -- the question of identity and difference.

And not only that but digital cosmology also introduces in its wake a new theory of epistemology: *epigenetics* -- the study of the neural mechanisms by which digital genes bring about their phenotypic effects. The earliest of the technological utopians, Marshall McLuhan, Wyndam Lewis, and Teilhard de Chardin, provided eloquent anticipatory warnings that the externalization of the human sensorium under the pressure of technological media of communication would enable the emergence of a digital nervous system. Since the mid-twentieth century this haunting prophecy concerning the digital nervous system has remained a literary construct, a metaphor begging to be made operational. That's definitely no longer the case. Through a curious twist of fate the great discourses of digitality and genomics shared historical periodicity because data is actually the genetic structure of the digital body -- the global data genome.

Like the seasons of life itself, data moves from plenitude to senescence, it also has its dawns and twilights. The global data genome is a vastly improved nervous system since its neurological mechanisms can never be confused with the embedded mind as the locus of consciousness, but from its moment of inception are distributive, circulating, relational, complex. Seemingly always one step out of season with regimes of intelligibility, the very best of data has its own broken synapses, overloaded consciousness, flickering memory, software glitches. When digitality and genomics merge in the form of the global digital genome, post-traumatic (data) stress disorder with all its traumas is finally realized as the animating principle of augmented reality. *Post-traumatic* because the abrupt shutting

down of the human sensorium accompanied by the immersion of the human organism in the skin of data, this profound originary event, announcing the termination of the human species as we have known it with its privatized ego, localized consciousness, and radical separation of the senses; and the inception of something profoundly new, simultaneously ominous and exciting, namely the subject as an emergent ecology of biology/sociality/data -- this awesome event announcing the eclipse of one (human) species-form and the immediate emergence of its networked successor has already occurred.

McLuhan once claimed that the blast has already happened: we're floating in the debris from the breakup of the autonomous body, discrete ego, and embedded nervous system. Who was prepared for this? Who was ready for the immediate mutation of the human species into half-flesh/half-code? In this epochal shift, data itself suffers stress disorder as its primary trauma. It is not really so much that the new organism of half-flesh/half-code cannot tolerate the speed of technological acceleration. Liberated from the plodding world of materiality by networked regimes of relational processing and ubiquitous computing, the neural mechanisms of the human mind demonstrate unexpected plasticity and openness to heterogeneity. The evidence is all around us: brains sustaining physical injury that instantly reorganize the field of perception, artistic vision accelerating the speed of data, sci-fi literature over-stimulating the nervous system of information, cinematic futurism that easily outruns the speed of technological change, a new aesthetics of perception that eagerly embraces the delirious simulacra of gaming. Everywhere the neural mechanisms of data flesh skip across liquid streams of information flows like flat-edged stones tossed on a lazy data summer afternoon. Every bit of media evidence, from television and radio through computing, cells, Blackberries, Twitters, and the virtual apparatus of augmented reality suggests that the human brain has absorbed, easily and enthusiastically, its ablation into the nervous system of fully externalized technological media of communication.

The real challenge is *data trauma*, the fact that data cannot keep up, either metaphorically or materially to the speed of perception. That is why data often resembles the conservative resentment of Wendy Brown's *States of Injury*, resentful, left behind, revenge-seeking. [6] Data seeks the safety of digital purity; firewalling itself in the hygienic spaces of closed data dumps. In other instances, data becomes aggressive -- it turns on its human companion species, taking cold comfort in the durational memory and identity triangulations so necessary to surveillance systems. Like the worst of the human species before it, data is capable of the ethics of Heidegger's "injurious neglect." [7] It too can sometimes only find expression in terms of a "malice of strife." [8] Born again in the baptistery of genomics, data is a fully completed nihilist, infected with the resentment of the human species that it was so eager to replace, the spearhead of a purely technical will -- drifting, oscillating, wiping away the horizon, in its leading expression a *software animation* precisely because data is haunted by the trace of death. But of course the death of data is precisely why information culture can be so dynamic. It is the tangible scent of the necropolis in the data storm that makes information culture so deeply, so seductively charismatic. Bored with the logic of presence, the ablated neural mechanisms of the networked subject sift in deepest fascination among the debris of the human remains of the species -- shards of memory, strands of forgotten codes, dead media, broken thoughts, book after book of fatally overcome faces. It is this hint of death that drives the necropolis of software. Feasting on the remains, the massive accumulation that is dead information is finally free to express itself as a pure technical will, and nothing besides. Literally, data today is a nervous breakthrough. Refusing stability, never stationary, data is condemned to a cycle of endless circulation. It has no destiny other than that of the pure will: augmented, streamed, mobilized, facebooked, twittered, iPodded, flickered, upgraded, downloaded, wide-screened, multitasked, and GPS'd. Like all species before it, there will finally come a time when data will grow weary with itself and, as an exhausted nihilist, find pleasure only in making

itself ill. Our suspicion is that, in this time of accelerated data flows, the appearance of data as an exhausted nihilist is already upon us. In this age of exhausted data, everything counts, everything apps precisely because nothing now counts but the ersatz nothingness of data itself.

Digital trauma.

Notes

[1] Robert C. King & William D. Stansfield, *A Dictionary of Genetics*, (New York: Oxford University Press, 1997), p. 139.

[2] Marshall Brain. "Hypersonic Sound." Available at marshallbrain.blogspot.com, May 15, 2008, accessed June 25, 2009; see also

www.woodynorris.com/articles/technology/Reviews.htm.

Accessed May 17, 2009.

[3] *A Dictionary of Genetics*, p.228.

[4] *Ibid*; p.228.

[5] *Ibid*; p.116.

[6] Wendy Brown, *States of Injury: Power and Freedom in Late Modernity*, Princeton: Princeton University Press, 1995.

[7] For a fundamental reflection on the dominant cultural "attunement" promoting the ethics of abuse value, see Martin Heidegger, *The Fundamental Concepts of Metaphysics: World, Finitude, Solitude*, translated by William McNeill and Nicholas Walker, Bloomington and Indianapolis: Indiana University Press, 1995, p.162; and Martin Heidegger, 'The World of Nietzsche,' in *The Question Concerning Technology and Other Essays*, translated and with an introduction by William Lovitt, New York: Harper and Row, 1977, p.100.

[8] *Ibid*.

Fractal Philosophy (and the small matter of learning how to listen): Attunement as the Task of Art

JOHNNY GOLDING



Self-Portrait Dedicated to Paul Gauguin 1888; Oil on canvas, 60.5 x 49.4 cm (23 3/4 x 19 1/2 in); Fogg Art Museum, Harvard University, Cambridge, MA



Self-Portrait with Bandaged Ear, Arles: Jan 1889; Oil on Canvas, 60.0 x 49.0 cm; The Courtauld Institute Galleries

'What terror haunts Van Gogh's head, caught in a becoming-sunflower?'[1]



Self-Portrait? The Sunflowers (detail), 1888; replica (also by Van Gogh), Jan 1889, oil on canvas 2.1x 73 cm, National Portrait Gallery

B-side Philosophy (The Transformation of Van Gogh's Right Ear)

Deleuze and Guattari offer three playful but coded journeys onto the broad arena they call 'the task of art' -- where task, not to mention art, is meant to spill into, reconfigure and/or destroy the varying pragmatic-spatio-temporal intensities one might otherwise call 'life'. These three journeys can be listed thus: that of an immanent 'becoming-x'; that of the ever-springing 'rhizome'; and that of the a-radical, surface-structured, non-rooted 'refrain'.

Par-boiled into a manifesto-style primer, the first of these journeys is shaded and toned by the concept-process-phrasings of a 'becoming', be that as a 'becoming-intense', a 'becoming-animal', a 'becoming-woman', a 'becoming-sunflower', a 'becoming-imperceptible' or a becoming-n+1-combination-of-that-which-lies-to-hand-or-may-be-or-already-has-been-becoming. [2] It all might seem a bit 'method acting' or indeed 'running towards' without ever really 'getting there'. Nevertheless, D&G proclaim:

We are not in the world; we become with the world; we become by contemplating it. Everything is vision, becoming. We become universes. Becoming animal, plant, molecular, becoming zero. This is true of all the arts. [...] Art does not have opinions. Art undoes the triple organisation of perceptions, affections, and opinions in order to substitute a monument composed of percepts, affects, and blocs of sensations that *takes the place of language*. It is about listening [...] This is precisely the task of all art. [3]

These 'becoming-' journey-bandwidths mark the first stage of art's work. But it is a 'first' not in a hierarchical, privileging sense, but rather in a logical sense; that is, by taking as a given that one 'begins' precisely where one 'is' -- a pragmatic

'start' that can only ever happen by accounting for the constitutive reality of the present-tense 'is'; that is to say, of the 'here and now'. [4] This is a very different accounting of the 'constitutive realities of the present-tense "is"' offered either by Hegel on the one hand or by Heidegger on the other. A brief potted-review of both on the question of what is 'the is' will serve to clarify what is at stake for Deleuze and Guattari -- what they steal and what they leave behind from both treasure troves -- and why.

Perhaps the clearest exposition of the constitutive 'is' for Hegelian logic can be found in the *Phenomenology of Spirit* where, for our purposes, three crucial distinctions are established: first, in terms of what is a 'Universal Concept' (as distinct from any other kind of concept); second, in terms of what is the 'This'; and third, in terms of what is 'Negation'. [5] At its most simple point, the Universal Concept names the full or totalised expression of any object -- no matter where or when -- without leaving anything to chance, opinion, perception or whim. To do otherwise is to fall prey to the usual fault of confusing an 'abstraction' (or 'model') with a Concept. [6] The only way in which one can be absolutely certain that the entirety of the picture has indeed been drawn -- that nothing has been left out or can be added at will -- is thus to follow the dialectical formulation that Universality will always-already consist of (a) an abstract version of 'all that there is (thesis),' plus (b) the point-for-point (but still abstract version) of 'all that there is not (antithesis),' whose (c) sublation of the one into the other (thesis into antithesis or vice versa) produces a synthesis, which (d) comes 'back around' to form the 'concrete-ground' (essence, basis) of the Absolute / Pure (Universality) of the Concept, itself now also 'grounding' (i.e., giving meaning to) the aforementioned and previously abstract thesis/antithesis. [7] In short, this dialectically encased resolution of the thesis/antithesis from pure abstraction into its highest, fully synthesized, 'concrete' and purest form of Spirit-Knowledge -- with no extraneous bits hanging outside of the 'whole picture' (Totality) -- 'comes back around' to form the basis/ground of all meaning, truth, interpretation and reason. It is a tidy, self-satisfying, teleological move. As Hegel summarises:

§20. The True is the whole. But the whole is nothing other than the essence consummating itself through its development. Of the Absolute, it must be said that it is essentially a *result*, that only in the *end* is it what it truly is; and that precisely in this consists its nature, viz. To be actual, subject, the spontaneous becoming of itself [8].

The niggling problem to which Hegel was of course fully aware, was that Reality managed always to be greater than the sum of its parts; indeed, if this were not the case then by simple arithmetic, thesis + its point-for-point contradictory antithesis would always equal 'zero' or at best would simply establish a tautology ($A \Leftrightarrow \text{not-}A$). One could say, * names the synthesis ☞ : ☞ for no other reason than that I say it is so, a position that might be fine with Humpty Dumpty, but was far more problematic for Hegel. [9] And yet it was not possible to 'add' anything extra to the logic of the Concept in order to make it 'make' (as in produce, express, disclose) 'sense' (meaning, sensuousness, life). This is because at its most profound point, Idealism -- and certainly Hegel's version of it -- was attempting to press the argument that no 'outside' set of logics or omnipotent points of observation should be required to explain any given phenomena. The logic had to hold, in and of itself; and more than that, it had to do so by simultaneously encompassing 'change', 'movement' and 'progress' as integral to any concept, and therewith, as integral (i.e. 'within') the Totality. [10]

The question, then, of how systematically to add a 'something' to the immanent movement without raising the entire edifice of Totality to an unworthy, arbitrary ground or, worse, to reducing it to mere tautology or opinion, perception or whim, was resolved in part by Hegel's neat reformulation of the 'This'. It was a curious kind of architectural move; one that not only led to one of Hegel's greatest achievements -- that of 'Negation' and with it, the notion of (a teleological unfolding of) the Universal 'becoming-a-something' -- be it through self-certainty, perception, consciousness, identity politics, mastery, bondage and etc. -- but

it ironically heralded his ultimate failure -- at least from the vantage point of the politically committed scholar, artist, person-in-the-street, not the least of whom included Deleuze and Guattari, despite their obviously sticky fingers when it came to pinching a concept.

Hegel played his cards by problematising the whereabouts of the 'This', as well as the 'Here' and 'Now' which, taken together constituted the dialectically informed manifestation of 'This'. He problematised their whereabouts in the following way: At the very moment one might point to or attempt to grasp (both intellectually and practically) the present-tense Real in all its glorious manifestations -- this 'Now' will always-already disappear into a Before or an After or a Somewhere Else. This is because the present -- as present, i.e. as a 'not-mediated' entity, can never itself become embodied or 'fully realised', precisely because *ipso facto* it is 'im-mediate'. Or, to put this slightly differently, it is to say that this 'impossible' non-representational moment of the 'This', is both the expression and presencing of an abstract 'otherness' whilst, simultaneously, also expressing/presencing a radical fluidity of movement. A rhetorically demanding Hegel explains it thus:

§95. [...] What is the *This*? If we take the 'This' in the twofold shape of its being, as 'Now' and as 'Here', the dialectic it has in it will receive a form as intelligible as the 'This' itself is. To the question: 'What is Now?' let us answer, e.g. 'Now is Night.' In order to test the truth of this sense-certainty, a simple experiment will suffice. We write down this truth; a truth cannot lose anything by being written down, any more than it can lose anything through our preserving it. If *now, this noon*, we look again at the written truth we shall have to say that it has become stale.

§106. The Now that is pointed to, *this* Now: 'Now'; it has already ceased to be in the act of

pointing to it. The Now that *is*, is another Now than the one pointed to, and we see that the Now is just this: to be no more, just when it is. The Now, as it is pointed out to us, is Now that *has been*, and this is its truth; it has not the truth of *being*. Yet this much is true, that it has been. But what essentially *has been* [*gewesen ist*] is, in fact, not an essence that is [*kein Wesen*]; [rather] *it is a 'not'*. [...] [11]

Or, to put it yet another way: the 'This', the 'Here', the 'Now' -- in short, the 'is' of Hegelian Idealism -- is nothing other than the *abstract surface structure* of any given Universality. And as with any surface (say, for example, the surface of a table) not only can the 'surface-is' not exist without the actuality of the structure to which it is attached acting as 'ground' to the said surface, but that the surface acts also as the 'expression' of the point-for-point structure to which it is attached. In the case of the 'This', the 'Here', the 'Now', etc, each is 'surface' to the Totality, attached to and expressing in this case, the dialectical fluid structure of movement itself. And as that surface can never be larger nor smaller than the structure to which it is attached, nor for that matter, remain 'inside' or 'outside' any Totality, this 'surface' neither embodies weight nor substance nor essence nor space. Nevertheless, as a surface expressing a (transcendental/immanent) movement-structure, it still names an eternally unfolding 'otherness-' without which meaning cannot be sutured or made 'manifest', i.e. made present. Removed from its ground (synthesis), i.e., taking the 'surface' to be 'in and of itself', the 'This' of the 'Here' and 'Now' simply cannot be 'grasped'. But as we will see momentarily, it is precisely the surface-immanent movement-structure called 'This' that D&G wish to liberate from the shackles of a Universalised Totality. As we will see, this immanent-movement-structure will morph into many things: sometimes the 'refrain'; sometimes a 'viral assemblage'; sometimes 'logic of sense'; sometimes 'simulacrum'. (We might even wish to call it 'Van Gogh's right ear', but I am getting ahead

of the argument). [12]

To the question, then, what can be added in order to avoid tautology, whim, outside direction or authorial opinion, Hegel's answer is quite clear; he names it the Negative -- the immanent teleological 'surface' unfolding of dialectical synthesis itself. [13] This may seem surprising, but this move to situate the 'is' as a Negative surface structure was quite an advance from the original zero-sum position of thesis + anti-thesis = the whole of the Universe. For not only did establishing 'the Negative' as an immanent and 'unnameable-something-other' allow for the breaking up and adding to an otherwise deadlocked and tautological $A \Leftrightarrow \text{not-}A$ identity formation. It also meant that the so-called deep cut ('/') between thesis/antithesis could now no longer be envisioned as a logical no-man's land, i.e., as the 'excluded middle', often wrongly subsumed by political/creative identity inventors to be the 'in between space' of Otherness, and therewith of liberation, itself. If one were to stay within the confines of Universality, there could never be an 'in between' moment bracketing the past and the future, just an abstract, negative surface structure of 'a plurality' of Nows, which vanish at the very moment of their debut, though not without holding the door open so that 'meaning' can take (its) place.

§108. [What gives the Here its *gravitas*?]. The *Here pointed out*, to which I hold fast, is similarly a *This*. Here which, in fact, is *not* this Here, but a Before and Behind, an Above and Below, a Right and a Left. The Above is itself similarly this manifold otherness of above, below, etc. The Here, which was supposed to have been pointed out, vanishes in other Heres, but these likewise vanish. What is pointed out, held fast, and abides is a *negative This*, which *is* negative only when the Heres are taken as they should be, but in being so taken they dispersed themselves; what abides is a simple complex of many Heres. The Here that is *meant* would be the point; but *is* not; on the

contrary, when it is pointed out as something that *is*, the pointing-out shows itself to be not an immediate knowing [of the point], but a movement from the Here that is *meant* through many Heres into the universal Here which is a simple plurality of Heres, just as the day is a simply plurality of Nows. [14]

Of course Deleuze, as well as Guattari, reject -- and for good reason -- the Hegelian dialectic, often demanding to rid philosophy, politics, science and art of, as Foucault so eloquently put it, "the old categories of the Negative (law, limit, castration, lack, lacuna), which Western thought has so long held sacred as a form of power and an access to reality." [15] But it was also no less the case that the Hegelian dialectic, and particularly the way in which the Concept itself had been formulated was, and remains to this day, a tough act to beat. For to rid Philosophy of the metaphysical 'is' seemed to imply a good riddance to some of its more eloquent fares -- plurality, surface-synthesis, movement, the instant -- not to mention 'pure immanence' and with it, the possibility of destroying the otherwise inventive categories of, say, 'becoming-woman' or 'becoming-animal' or 'becoming-sunflower' or 'becoming-ear' and etc. It often seemed (and in some quarters, still does), that the price of fighting to create a wholly different set of anti-oedipal identities and, with it, a wholly new set of social order(s) might just be worth the price of enduring, just for a moment or two, all the rotting bad smells of the Hegelian identi-kit corpse. [16]

And yet, this is precisely what D&G set out to accomplish: a way to hold one's nose against Hegel and all forms of Metaphysical thought in order to conceptualise, materialise and endure the very act of 'becoming-x' without being penetrated by 'arboreal philosophy', even if 'just for a moment or two'. The dangers to allow otherwise, were too grave. For arboreal philosophy was their euphemistic way to identify the, by now well-entrenched planters-wart logic of continuity, goals, processes and closed systems, thoroughly embedded in all flat-

footed State philosophies and common sense pronouncements -- of which 2000+ years of Metaphysics, contemporary Warfare, instrumental Science, Literature, Art and Religion had done little to uproot.

At its most simple form, arboreal philosophy could be understood in this manner: Take as a given a seed, say for example, an acorn. Now, no matter what one does (assuming it is gardened properly and not set alight or mashed), it will only ever unfold / manifest itself as an Oak Tree. The Tree is thus the 'goal' to which all little acorn seeds aspire. This 'aspiration', as it were, is continuous, linear (even if the path appears convoluted, spiralled, hysterical, nasty or relaxed). This is because all change, no matter how often or in what manner it occurs, does so in relation to an always-already 'unfolding' trajectory of that growth. The Oak, as the 'outcome' of the acorn, names thus the very purpose (ground) of the said seed. It is only the elemental processes to which that seed might be subjected (say, wind, sun, rain, unemployment, bullying etc) that determines 'how' the Oak might turn out (big, small, gnarly, demented, covered in law suits). Thus is revealed the 'true purpose' of one's Being; or, as eugenics might proclaim, 'it's all already coded in one's basic DNA'. [17]

Most crucially, then, and no matter what the seed might do, be it wishing, hoping, praying (or even becoming a political militant), it would only-ever keep unfolding towards its proverbial goal (The Old Oak Tree). The Oak Tree-goal thus gives meaning, purpose, destiny to our little seed, who in times of drought or strife or just hanging out with Feminists, might otherwise be *tempted* to fall off the so-called True path (though, in the cold light of day would 'come to its senses' and realise, one way or another, that this kind of dreaming could/should/would never do, as it was considered impossible to fall outside an always-already given 'nature'). To be sure, then, under this logic, one could never leave the family; one could never attempt the dream of becoming-x, if that 'becoming-x' was something other than the already proscribed path. One could never morph into, say, a butterfly or Mazeratti car, no matter how dedicated to

becoming 'butterfly' or 'car' that seed might wish to be. This might be very well and good if one happens to be an acorn; but if one happens to be a slave, woman, racial-Other, gay, transgender and etc; if one happens to 'think outside the box' or grow 'bigger than one's britches' or try to 'rise above one's station' etc, it becomes clear where this grounded and continuously unfolding logic can go wrong. Mob lynching, stoning, raping, murder, ethnic cleansing, Sharia law, torture all gain an ethical toe-hold in the culture as 'rightful' punishments against those attempting to become a-something-other-than-what-they-were-always-meant-to-be. "We're tired of trees," sigh D&G. "We should stop believing in trees, roots, and radicles. They've made us suffer too much. All of arborescent culture is founded on them, from biology to linguistics." [18]

But the question remained: whether one *could* account, both epistemologically and analytically for the 'constitutive is' as a something that 'made sense' -- in the fullest use of the terms 'to make' (create, enable, force) and 'sense' (sensuousness, intelligence, the senses), without reintroducing the tetra-headed trap of Universal Totality, the Negative, and the teleological methods of Dialectic unfolding. If this could be done, argued D&G, then the political and aesthetic yields would be substantial. Because, then, for the first time in a rather long time, not only would philosophy have caught up with the very reality it had been seeking to inhabit: i.e., one steeped in discontinuous logics, fractal codes, non-representational art, multiversal genders, non-national sovereignties. It would mean bearing witness to our contemporary age in an active, participant manner, rather than as mere drones, couch potatoes or passer-bys. Accounting both epistemologically and analytically for the 'constitutive is' in terms of this 'age' called 'technology' meant taking seriously the combinatory logics of 'techne' itself. It meant taking seriously that in our epoch/ age, a different way of systematising was virulently underway: one that foregrounded 'the art of grasping the "out-there"'; one that worked off of and around patterns and poesis, simulacrum, circulation, assemblage and exchange. An epoch whereby wholly different end-games-as-mid-games

become networked orders of the day, producing, expressing and demanding, quite different politics, ethics, science and art -- not to mention timings and spatialities -- than those encountered by our Ancient, Modernist (and postmodernist) cousins, barely visible with a Metaphysical lens.

Not to be daunted, it seemed the only way -- or at least the main experimental way -- to eliminate Hegelian substance, and with it, arboreal philosophy, was at first to commit to, what would later be called, the 'outside of thought.' [19] Here 'outside of thought' meant something quite different than a kind of anti-intellectual run toward 'Practice' (the usual partner-in-crime rallied against 'Theory'). Getting away from, or getting 'outside' of, thought was meant to get distance from metaphysical Contemplation rather than getting away from being conceptual. It meant trying to get away from the conflation of language with 'metaphor', 'semiotics', 'signifier,' and therewith, representation. [20] In short, it meant trying to figure out how to 'picture' -- without the visuals -- the becoming-sunflower of Van Gogh's right ear.

A-side the B-side: Learning how to listen (Attunement as the task of art)

But to give the 'outside of thought' a kind of coherence so that it, too, would not be in debt to the arboreal authority-voice of its makers, required yet another subtle move. Speaking as they often did with 'a single tongue', Deleuze and Guattari thus dined out in several parallel universes at the same time. Pocketing ingredients from around the philosophical galaxy -- from the worlds of expressionism (Spinoza), pure immanence, artifice and a-radical genealogies (Hume, Nietzsche), folds and monadology (Leibniz); élan vital, simultaneity and duration (Bergson); pattern, difference, repetition and time (Heidegger), sense and sensation (the Stoics, Lewis Carroll, Bacon) and the cartographically discursive, diagrammatically challenged regimes of power, ethics, aesthetics and existence (Foucault) -- they began to build their counter- trans-immanent-logic. Long spoons were at

the ready. For dangers lurked at every turn at this oddly Bacchanalian banquet: mix-matching such a heady crowd whose epistemological, not to mention political, allegiances were often suspect, or at best 'complicated'. [21] The seating arrangements themselves must have given grave cause for alarm.

And yet, despite being such a wildly provocative intra-species guest-list, they did seem to have at least one thing in common (however differently each, in their own distinctive way, might have approached it). What they had in common was an analytic accounting for cultural reinvention beyond the usual binaries of good and evil; or to put this slightly differently, what they had, or tried to have, was a way to account for the truth of culture as that which must emerge from ungrounded 'difference', a 'difference' that was something to be grasped, invented -- that is to say, *inhabited* -- in all its inglorious manifestations, productions, changes without recourse to a totalising picture of reality. The Other, impossible, uninhabitable, excluded middle, of the 'is' -- dialectically formed or otherwise -- was dead. And in its place, another kind of 'is', one that not only could acknowledge and express difference, but was the source of it. Foucault would name it as a 'stylistics' or 'art of existence', the multiple practice of gathering many selves -- slices of selves, pleasures of selves -- to the self. Nothing discovered, nothing revealed, just a sensitive/sensuous kind of whoring, a discursive whoring, along the lines 'share all reveal nothing'. [22]

""[I]f I was interested in Antiquity," Foucault remarked two months before his death, "it was because, for a whole scenario of reasons, the idea of a morality as obedience to a code of rules is now disappearing, has already disappeared. And to this absence of morality corresponds, must correspond, the search for an art of existence." [23]

The becoming-gay, the becoming-butterfly, the becoming-the-colour-purple, would instead be constituted by the very journey to which that 'becoming' had embarked. It would be re-envisioned by D&G as a 'surface' journey, a pollinating, ruminating, sporing, folding and re-folding kind of journey, a journey of joining a 'this' with a 'that' for no other reason than that

it could be (and in many cases, had to be) done; where nothing is 'True' (in the sense of being Universal, Totalised, Rooted); where the Ground, that lies before us as 'ground' is nothing but the discursive structure of those sporing/pollinating movements, quite divorced from a given 'picture', 'representation', 'semiotic' or 'goal'. Where the political, ethical and aesthetic task, should one rise to it, would be to undertake this stylistics of existence, a mingling with free-fall experimentation and groundless-Grounds in order to make the assemblage of a becoming-x 'real', coherent, *sticky*.

"The question," a wise Foucault thus tabled, "...is not: if there is no God, everything is permitted. Its formula is rather the question: if I must confront myself with 'nothing is true', how am I to live?" [24]

This, and not an 'im-mediate' Now-time is the 'where', the so-called 'de-territorialised plane' of one's 'beginning'. Or to say it with more force: the '*This*' of the Foucauldian question 'if I must confront myself with 'nothing new', how am I to live?' is precisely the 'plane' upon which these disconnected (or not continuously connected) inventive journeys are mapped, a kind of web or discursive cloud-networked cartography, neither virtual nor grounded, but tangible nevertheless. Entailing no end-points or goal or ground, Deleuze and Guattari would later refine this 'this' as precisely 'the plane of immanence', the critical dwelling 'plateau' upon which invention could and always did take place, however fleeting and oddly-dimensional this constitutive 'spatiality' might be or become, without recourse to a proscribed Truth, Ethics, Spirit, Destiny. [25] As we know from their work, there are at least 'a thousand' of these plateaus.

This diagrammatic mapping 'plane of immanence' not only ventured beyond the good and evil limits of a constituted 'truth', now itself folded and in/formed by the seemingly endless vagrancies of free-fall experimentation and art. But it was a cartography that ventured beyond the concrete walls of the Universal Concept itself.

For the concepts Deleuze and Guattari started to invoke were curiously beginning to take on the atmosphere of not quite

being concepts at all, at least not in the sense that Hegel would have meant. But neither were they non-concepts i.e., descriptions or markers which might tend to hark back to some kind of pre-existing rule, resemblance, metaphor or code, or not hark back to anything all, preferring to remain at some arbitrary level of a shopping-mall mentality. Instead it could be said that they ushered in, along with some of their guests, a serious break with the Universal and the Teleological, and flitted, instead, towards the 'multiversal' and the 'morphological' or 'teleonomic', surface structure cohesions, clusters or assemblages with no 'other-side', no antithesis or thesis, no abstraction, concretion or synthesis, but nevertheless could 'jump' or 'spore' to an 'elsewhere' in the same manner that grass and other rhizomatic entities took flight. A non-rooted (a-radical), ana-logical, slice-point 'singularity' -- neither part of a whole (as in fragment, thesis, antithesis, synthesis) nor held hostage to the 'ground' for its bread crumbs of meaning. [26]

The fractal points of resistance, curiosity, anger, boredom and etc -- otherwise called rhizomes -- instead enframed the very journey of their de-territorializing map making with whole series of mutant relativities and viral assemblages. [27] Each springing move meant to pollinate or gather (or both or something else altogether) the nano-wave particles of life, death, grease, breakdown, slice-of-ear into some kind of constitutive, becoming-x environ, a constitutive-now-time-space thus made present, coherent -- A LIFE, to shout out with Deleuze -- in the very event of its appropriation. [28] A non-stratified, "piece of immanence," to paraphrase the D&G of November 28, 1947, to be constructed "flow by flow and segment by segment lines of experimentation, becoming-animal, becoming-molecular, etc." [29]

This appropriation -- led, countered, laughed at -- by the ana-human be-ing of rhizomatic fame, was given many nicknames: planes of consistency, a collectivity of desiring-machines, intensities, deterritorialising 'Body without Organs,' and was based on many kinds of ana-logics which, in the bargain, gave sustenance to an otherwise relentless onslaught of right-wing political, aesthetic, ethical, and epistemological toxicities. A deterritorialisation that helped stave off organisation,

stratification, sedimentation, all the sine qua non for fascist massification.

People ask: So what is this BwO? But you are already on it, scurrying like a vermin, groping like a blind person, or running like a lunatic: desert traveller and nomad of the steppes... Experimentation: not only radiophonic but also biological and political, incurring censorship and repression. Corpus and Socius, politics and experimentation. They will not let you experiment in peace. [...] A BwO is made in such a way that it can be occupied populated only by intensities. Only intensities pass and circulate. Still, the BwO is not a scene, a place or even a support upon which something comes to pass. [...] It is not a space, nor is it in space ...It is nonstratified, unformed, intense matter, the matrix of intensity, intensity = 0; but there is nothing negative about that zero, there are no negative or opposite intensities. Matter equal energy. [...] (It is) the tantric egg.

The BwO is what remains when you take everything away. [30]

There was only one, very tiny, somewhat off-putting, difficulty with their line of flight from the Negative, especially via the rhizomatically imbued Bodies without Organs: these ana-concepts still seemed closer to metaphor and description than a tool with which to combat the binaries and all associated restrictions. Or to put it somewhat harshly: It didn't seem to work.

It might not have worked because, quite frankly, maybe their "mouth-breast", as they might say, was never meant to work. Maybe it was just a blood-curdling plea to get the hell out of Metaphysics, right here and right now, and like many a giant

before them, rather than becoming-like-a-butterfly-and-stinging-like-a-bee, their becoming-x just kept amounting to the eternally returning nightmare of becoming-Descriptive or becoming-Metaphysics. [31] Because despite their arguments, supplications, tantrums, demands, sweet jokes, political commitment, intense rigour, hilarious drawings and sometimes indecipherable, insufferable wanderings, they were still saddled with the initial problem confronting Hegel and, indeed, all of philosophy, all those many years ago: how to present a logic that would accommodate reality (and not the other way around) without resorting to whim, opinion or might over right, especially if that whim, opinion or might over right just happened to be unquestionably 'molar', fascistic, oppressive.

Heidegger's move, with which D&G were quite familiar, was to revisit the problem of the elusive presence by relocating Metaphysics, and with it, representation, (i.e., the standing in for an 'x', by resembling or copying) as, also, and perhaps more importantly, a re-presenting (repeatedly presenting, 'bringing forth' [*stellen*]) of the relation of being (entity) to Being (*Da-Sein*). [32] For Heidegger, this 'bringing forth' could be retranslated as 'putting man [sic] in the picture.' But it also would mean to 'understand' or, more colloquially, still, 'to get the picture'. To 'conceive' (understand) and 'get the picture' (grasp), when taken together, underscores the specificity of a time period -- our time period, the 'Modern World' or 'Age of Technology' -- when the ability both to 'hear' and 'do' (i.e. put oneself in the picture) and at the same time, be taken into this picture by one's relation to the 'There' of science and of life, become the binding feature of this epoch. It is, as he notes in "The Question Concerning Technology," an age bound together by the logic of *techne* -- the ability to 'grasp' the 'out There' and, simultaneously, be grasped by it, where, as he puts it, "the essence of technology is by no means anything technological." [33] This relation, the relation of $b \Leftrightarrow B$, enframes our world, and forms 'our picture' of it -- a picture that is not particularly 'visual', and not at all anthropo-centric. Its method is 'poiesis' and its path is nothing other than the sensuous logics initiated and 'brought forth'

through the artistry of the grasp. This is the 'essence' of technology -- having nothing to do with the usual understanding of technology as domination, machinery and computer, but instead, a 'This-world' constituted by the logic of its *techne*. Heidegger thus writes:

This prospect strikes us as strange. Indeed, it should do so, should do so as persistently as possible and with so much urgency that we will finally take seriously the simple question of what the name "technology" means. The word stems from the Greek. *Technikon* means that which belongs to *techne*. We must observe two things with respect to the meaning of this word. One is that *techne* is the name not only for the activities and skills of the craftsman, but also for the arts of the mind and the fine arts. *Technē* belongs to bringing-forth, to *poiēsis*; it is something poetic. [34]

Accordingly, the constituted surface-structure 'This', the present-tense 'is', for Heidegger, is a surface-structure relation 'informed' by technology, by the logic of its technique/grasp/art. This sets apart our age from any other age, not because the age of technology is 'best' or 'new' or even '*our age*' and therefore particularly appealing to *us*. It is because the age itself is characterised by a particular combination of regimes of knowledge -- an *ars scientifica* and an *ars erotica*, as Foucault would say -- which taken together form the 'ground' of our truth. Heidegger would call it a 'gathering together', a becoming-*hypokeimenon* (subject) by grasping the that-which-lies-before as ground, a 'grasp' that -- if it works (i.e., if it *can* bring- forth) -- will not only re-make the very meaning of what is 'man' and what is 'the There', but it will make that meaning 'stick' together. [35] Heidegger summarizes:

'To get the picture' throbs with being acquainted with something, with being equipped and prepared for it. Where the world becomes picture, what is, in its entirety, is juxtaposed as that for which man is prepared and which, correspondingly, he therefore intends to bring before himself and have before himself, and consequently intends in a decisive sense to set in place before himself. Hence world picture, when understood essentially, does not mean a picture of the world but the world conceived and grasped as picture. What is, in its entirety, is now taken in such a way that it first is in being and only is in being to the extent that it is set up by man, who represents and sets forth. [...]

However, everywhere that whatever is, is not interpreted in this way, the world also cannot enter into a picture; there can be no world picture. The fact that whatever is comes into being in and through representedness transforms the age in which this occurs into a new age in contrast with the preceding one. The expressions "world picture of the modern age" and "modern world picture" both mean the same thing and both assume something that never could have been before, namely, a medieval and an ancient world picture. The world picture does not change from an earlier medieval one into a modern one, but rather the fact that the world becomes picture at all is what distinguishes the essence of the modern age. [...]

Wherever this happens, man "gets into the picture" in precedence over whatever is. But in that man puts himself into the picture in this way, he puts himself into the scene, i.e., into the open sphere of that which is generally and publicly represented. Therewith man sets himself up as the setting in

which whatever is must henceforth set itself forth,
must present itself [*sich... präsentieren*], i.e., be
picture. [36]

The move to 'picture' the logic of techne as the basis of an age that, for a variety of reasons, *could* grasp/gather 'the that which lies before us as ground' at once tore the 'present' away from the impossible inhabitation of the Hegelian dialectic. Indeed, with the Heideggarian move, the 'present' that the This thus named, was precisely the interlocking tango of identity and difference, and, more than that, it was the poetics of the move which made it flourish, become 'real' and 'make' history. That history was called 'the age of Technology,' and its primary loci was the art of making it so. In this sense, Aesthetics overtook Economics in the grounding of our contemporary modes of production.

However, it still managed to do this by keeping one large boot in the camp of Metaphysics.

Deleuze and Guattari presented a solution to this last problem. It made sense to import Heidegger's logic when it came to the role of techne and the 'gathering' into an inhabitable present, the 'This' of that which lay to hand. The 'picture' worked, made cohesion 'real' and 'sticky', but in its present Metaphysical form, had to be redrawn. To this end, they exchanged the visual for an 'aural' presencing-bringing-forth-gathering -- recasting the material presencing of a 'world as picture' to the (im)material presencing of a 'world as refrain'. Everything, from power to poetics, from colour to shade, could (and would) be recast and called forth via the sonorous movements of rhythm, beat, improv, pacing. Father-Time became the more fleeting 'timing' or, at its most authoritarian, a 'sometime.' Space was simply the 'territory' that all refrains represented, that is, the segmented, slice of history-presents, which in and of itself, had no limits (edges) and admitted no 'outside' or 'inside' modalities.

I. A child in the dark, gripped with fear, comforts
himself by singing under his breath...The song is

like a rough sketch of a calming and stabilising, calm and stable, centre in the heart of chaos. [...]

II. Now we are at home. But home does not pre-exist: it was necessary to draw a circle around that uncertain and fragile centre, to organise a limited space... This involves an activity of selection, elimination and extraction... Sonorous or vocal components are very important: a wall of sound, or at least a wall with some sonic bricks in it... A mistake in speed, rhythm, or harmony would be catastrophic because it would bring back the forces of chaos, destroying both creator and creation. [...]

III. Finally, one opens the circle a crack, opens it all the way, lets someone in, calls someone, or else goes out oneself, launches forth. This time, it is in order to join with the forces of the future, cosmic forces. One launches forth, hazards an improvisation. [...] along sonorous, gestural, motor lines that mark the customary path of a child and graft themselves onto or begin to bud 'lines of drift', with different loops, knots, speeds, movement, gestures, and sonorities. These are not here successive moments in an evolution. They are three aspects of a single thing, the Refrain (*ritournelle*). [...]

The role of the refrain ... is territorial, a territorial assemblage. [37]

The role of the Refrain then, is both territorial and improvisational. It calls forth a reality segment, we could name: '1'. This '1' emerges from some place other than the traditional zero-sum binaric Totalities of a modern/liberal-arts world. It denotes, not to mention, occupies, a critical spatiality whilst simultaneously dissipating into air. It has no weight, no volume, no 'other' to its name, but it still 'makes' sense. It names the segment, not statically, but in the beat, beat, beatings, pace, speeds of the

launching forth. It is a '1' that marks out plurality as the multiple listening-gathering gestures which produce in their attunement, the 'here', right 'now'.

Deleuze and Deleuze & Guattari thus present a peculiar -- but utterly profound -- reconditioning of 'the becoming-x', of philosophy itself: it is the algorithmic encodings of the zeros and ones, torn from the usual binaric either/or casings, and cast instead as, on the one hand, the rhizomatic Bodies without Organs, and on the other, the refrain. We might wish to call this fractal philosophy: an algorithmic hearing, a learning how to 'take note'. Deleuze simply calls it 'the task of art.'

Listen! Can you hear what is being written? It is the becoming-sunflower of Vincent's lost ear.

Notes

[1] Gilles Deleuze and Felix Guattari, "Percept, Affect, and Concept," in *What is Philosophy?*, translated by G. Burchell and H. Tomlinson, (London: Verso, 1994), p. 170.

[2] A position articulated in much of their work, but see in particular: Gilles Deleuze and Felix Guattari, "Chapter 10: 1730: Becoming-Intense, Becoming-Animal, Becoming-Imperceptible...", in *A Thousand Plateaus: Capitalism and Schizophrenia*, translated by B. Massumi, (Minneapolis: University of Minnesota Press, 1987) pp. 256-351.

[3] Deleuze and Guattari "Philosophy, Science, Logic and Art" in *What is Philosophy?*, pp. 170, 177, respectively.

[4] Recall Glinda, the resplendent Good Witch in the populist US film version of *The Wizard of Oz*, who, when giving advice to a very confused and lost Dorothy, suggests she begin her journey by starting precisely where she is already standing. The Yellow Brick Road eventually comes to a four directional impasse and Dorothy, along with her new friend The Scarecrow and her sacred buddy, Toto, decide to go North -- for no other reason than that they do so decide. (*The Wizard of Oz*, Director: Victor Fleming, 1939).

[5] G.W.F. Hegel, *The Phenomenology of Spirit (1807)*, translated by A.V. Miller, (Oxford: Oxford Univ Press, 1977). See in

particular, "Preface: On Scientific Cognition," and "Introduction: A. Consciousness: I. Sense-Certainty: or the 'This' and 'Meaning'; II. Perception: or the Thing and Deception; III. Force and the Understanding: Appearance and the Supersensible World", pp. 1-45, 46-66, 67-78; 79-103, respectively.

[6] See in particular: "The principle of Science is not the completion of Science: objections to formalism §7-11, 26-27, 29, 36-37, 49, 70-71)" in "Preface on Scientific Cognition", in *Phenomenology of Spirit*, pp. 4-7, 14-17, 21, 29, 43-45.

[7] Objecting to the abstract Idealist-speculative reformulation Marx would have of course pronounced it thus: take 'all that there is' (in this case, the Bourgeoisie) and its 'point-for-point-Other' (in this case, the Proletariat), sublimate one to the other (say, the Proletariat swallowed into -- but not annihilated by -- the Bourgeoisie) to produce the Capitalist Mode of Production, which 'comes back around' to give meaning (ground, substance, political context and revolutionary potential) to the two (heretofore) contradictorily abstract (but now 'impurely' concrete universals) Bourgeoisie and Proletariat. But see in particular K. Marx, "Part I: Feuerbach. Opposition of the Materialist and Idealist Outlook: B. The Illusion of the Epoch, Sections I.7 Summary of the Materialist Conception of History, and II. 1. Preconditions of the Real Liberation of Man." in *The German Ideology*, (Moscow: Progress Publishers, 1968); online version: <http://www.marxists.org/archive>. "This [dialectical historical materialist] conception of history depends on our ability to expound the real process of production, starting out from the material production of life itself, and to comprehend the form of intercourse connected with this and created by this mode of production [...]"

[8] Hegel, "Preface," *The Phenomenology of Spirit*, §20, p. 11.

[9] As Deleuze takes some time on this particular aspect of the logic in his *The Logic of Sense*, (especially Chapters 1-5: "First Series of Paradoxes of Pure Becoming", "Second Series of Paradoxes of Surface Effects", "Third Series of the Proposition", "Fourth Series of Dualities", "Fifth Series of Sense"), translated by Constantin V. Boundas, (New York: Columbia University

Press 1990), pp. 1-35, we will return to these remarks later in the exposition. But it's worth taking a look-in on Humpty D and his conversation with Alice: 'There's glory for you!' [said Humpty] 'I don't know what you mean by "glory",' Alice said. Humpty Dumpty smiled contemptuously. 'Of course you don't -- till I tell you. I meant "there's a nice knock-down argument for you!"' 'But "glory" doesn't mean "a nice knock-down argument",' Alice objected. 'When I use a word,' Humpty Dumpty said, in rather a scornful tone, 'it means just what I choose it to mean -- neither more nor less.' 'The question is,' said Alice, 'whether you *can* make words mean so many different things.' 'The question is,' said Humpty Dumpty, 'which is to be master -- that's all.' Lewis Carroll, *Alice Through the Looking Glass (1862)*, "Chapter VI: Humpty Dumpty" (London: Random House, 2006).

[10] There is not sufficient room to develop the delicate intricacies of the Hegelian turn here. Suffice it to say that Hegel starts the dialectical move with an unmediated (abstract) 'now' (called now-time or now-thing or simply just 'the now') which can only be grasped in its im-mediacy (as in not-mediated and thus utterly present) by pitting it with/against its 'point-for-point' contradiction -- in this case: abstract intuition (gut feeling or 'hunch'). This is then sublated, one to the other and synthesised with the result that the now + intuition {hunch}) produces (expresses) the Universal Concept: Intuition. But don't picture in your mind a linear train of thought linking one to the other; picture instead the rings of a tree, where each ring is itself this intricate, dialectical process, incapable of being removed from the trunk of a tree. Now, this Intuition happily includes both the 'now-time' and 'hunch', and, in so doing is immanently returned to become the basis for a higher synthesis, in this case, the fully formed concept Intuition. This 'higher' synthesis (i.e. Intuition {(now-time/intuition)} -- again, picture tree-rings and not a ladder -- is thus linked point for point to its antithesis: the as-yet-still-abstract "sense-certainty", which continues apace, now sublated the one to the other and synthesized to form the Universal Concept: Sense-Certainty. Sense-Certainty as the highest form (thus far) of the sublated antithesis (constituted thus:

{now+Intuition+Sense-Certainty} is immanently returned to provide a fresh base for the 'next' dialectical move: the sublation of the whole formulation {now+Intuition+Sense-Certainty} pitted, at this juncture, with and against an abstract perception; now taken together after sublation/synthesis to produce the Universal Concept: Perception. The whole process continues to progress -- remember to picture tree-rings and not ladders or trains -- which results in the whole {now+Intuition+Sense-Certainty+Perception} being pitted against an abstract notion of understanding. Once again, and through the dialectical sublation/synthesis/immanent procedure Understanding is returned to form the Universal Concept called Understanding and thus also forms the basis for the next (and last) move, counterpoised with (against) abstract knowledge. And again this is sublated+synthesised+immanently returned to form both the 'ground' and 'goal' of Knowledge itself, a dialectically processed end-game (middle and start) for all meaning, beyond which nothing else exists. See "Introduction, Section §80" where Hegel summarises: 'Section §80. But the *goal* is as necessarily fixed for knowledge as the serial progression; it is the point where knowledge no longer needs to go beyond itself, where knowledge finds itself, where the Notion corresponds to object and object to Notion. Hence the process towards this goal is also unhalting and, short of it [attaining this goal] no satisfaction is to be found at any of the stations on the way.' *The Phenomenology of Spirit*, p. 51. As strange as this may seem, and despite valiant attempts to the contrary, most current political militants, a strong handful of contemporary philosophers (including continental, structuralist and postmodern), quite a few sociologists and most cultural theorists and artists have yet to break from these intractable Hegelian roots. For a fuller exposition, see Hegel's "Preface: On Scientific Cognition," and "Introduction: A. Consciousness: 1. Sense-Certainty: Or the 'This' and 'Meaning [MEINEN], II. Perception: or the Thing and Deception," and "III. Force and the Understanding," *The Phenomenology of Spirit*, especially §1-12, §16-20, §73-85; §148; §159-163.

[11] Emphasis in the original. Hegel, "A. Consciousness: Sense-

Certainty" *The Phenomenology of Spirit*, pp. 59-60, 63, respectively.

[12] This is not to suggest that all these appellations are made equivalent one to the other; it is rather to suggest that 'sometimes' they can be. The question is, said Alice, whether you *can* make the plane of immanence mean so many different things. The question is, said Humpty, which is to be master, that's all. Supra 9n above, but also: Deleuze's Thirty-X series, and in particular: "Thirty-first Series of Thought," "Thirty-Second Series on the Different Kinds of Series," "Thirty-Third Series Of Alice's Adventures," and also the Appendix, "1. The Simulacrum and Ancient Philosophy," in his *The Logic of Sense*, pp. 217-223, 224-233, 234-238, 253-279.

[13] Of course, Hegel comes in for tremendous attack from all quarters. For those wielding the knife but still remaining within the confines of dialectics, especially via the development and use of the 'negation of negation,' see for example, Benedetto Croce, *What is Living and What is Dead of the Philosophy of Hegel*, trans D. Ainslie, (London: 1915) as well as his voluminous *Philosophy of Spirit*. The most sustained -- and yet to be equalled -- attack which still employs dialectical logic, has been carried out by members of the Frankfurt School, most notably by Theodor Adorno in his *Negative Dialectics*, where 'The logic of Disintegration,' 'Dialectics Not A Standpoint', and 'After Auschwitz' boldly resituate the materiality of the object as something always greater than the sum of its concept; where that which is 'left over' or 'excessive' is never 'other', but precisely a negative dialectic. Cf T.W. Adorno, *Negative Dialectics*, trans E.B. Ashton (London: Routledge, 1990). But Deleuze hits the mark hardest: "Universal and singular, changeless and particular, infinite and finite -- what are these? Nothing but symptoms. What is this particular, this single, this infinite? And what is this universal, this changeless, this infinite? [...] The dialectic does not even skim the surface of interpretation, it never goes beyond the domain of symptoms. It confuses interpretation with the development of the uninterrupted symbol. That is why, in question of change and development, it conceives of nothing

deeper than an abstract permutation where the subject becomes predicated and the predicate, subject. [...] It is not surprising that the dialectic proceeds by opposition, development of the opposition or contradiction and solution of the contradiction. It is unaware of the real element from which forces, their qualities and their relations derive.' In Deleuze, "The Overman: Against the Dialectic §4. Against Hegel," in his *Nietzsche and Philosophy*, trans Hugh Tomlinson, (London: Continuum, 1983), p.148, [14] Emphasis in the original. Hegel, "A. Consciousness: Sense-Certainty" *The Phenomenology of Spirit*," p. 64. [Brackets, JG] [15] Michel Foucault, "Preface: Introduction to the Non-Fascist Life," in Gilles Deleuze and Felix Guattari *Anti-Oedipus: Capitalism and Schizophrenia*, (London: Athlone Press. 2000), p. xiii. "During the years 1945-1965 (I am referring to Europe),' says Foucault, 'there was a certain way of thinking correctly, a certain style of political discourse, a certain ethics of the intellectual. One had to be on familiar terms with Marx, not let one's dreams stray too far from Freud. And one had to treat sign-systems -- the signifier -- with the greatest respect. These were the three requirements that made the strange occupation of writing and speaking a measure of truth about oneself and one's time acceptable.'" (p. xi)

[16] Most obvious: that all radical political movements, be it on the right or left, have often required the totalization of an identity-Other to forge the basis of the movement. Whether it be the Women's Movement, The Black Panthers Movement, The Nazi Movement, etc, all groups must follow the first law of political science: Divide into Friend v. Enemy, and proceed accordingly. This is not to suggest, necessarily, a better alternative path; it is simply to underscore how difficult it is to 'get out of Hegelian Metaphysics. On a less obvious note: that a 'Pure' concept unfolding throughout history could not distinguish between slavery, misogyny, homophobia and the invention of space travel, except to say all were part and parcel of this immanent unfolding of Spirit. Even Deleuze's crucial reconstruction of 'Pure Immanence' via Hume and Nietzsche has, at first glance, this peculiar feature. Cf Gilles Deleuze "Chapter 1:

Immanence: A life," in his *Pure Immanence: Essays on A Life*, Trans Anne Boyman, (New York: Zone Books, 2001), p. 27. Here he writes at a rather ecstatic pitch: "We will say of pure immanence that it is A LIFE, and nothing else. It is not immanence to life, but the immanent that is, in nothing, is itself a life. A life is the immanence of immanence, absolute immanence: it is complete power, complete bliss." [Deleuze's emphasis]. We will return to Deleuze's 'pure immanence' later in the text to see how he disengages from the criticism.

[17] Deleuze and Guattari, "Introduction: The Rhizome," *A Thousand Plateaus*, p. 15.

[18] Hence the search for the 'smart gene,' the 'gay gene,' the 'Jewish-gene', with the not so surprisingly political outcome that these 'genes' can be modified and, more to the point, bred out.

[19] The clearest discussion of this point can be found in the well-known discussion between Foucault and Blanchot. See Michelle Foucault and Maurice Blanchot, *The Thought from Outside/Michel Foucault as I Imagine Him*, trans J. Mehlman and B. Massumi, (Zone Books: London, 1981). But see also the myriad of blogs and pop-lyrics that have sprouted on the topic, including from 'Spurious'

<http://spurious.typepad.com/spurious/2007/09/with-supreme-el.html> or from bands like Yattering (Inflow: Thought from Outside) <http://www.metrolyrics.com/yattering>

[20] Indeed, much of the work in Conceptual Art, YBA, or works by, for example Annette Messager, Barbara Gallagher, Manfred Kroboth, not to mention soundscapes by Eric Satie, Miles Davies, John Cage, Art Clay simply make 'no sense' when filtered through the conceptual lens of a totalising, representational pineal eye, whose overarching glare tends to obscure the discursive aurality inherent to any visual art and visual culture.

[21] The 'problem' of authenticity -- which of course is not Heidegger's only problem -- runs throughout his work and tends to support his (probable, supposedly 'unproven') links with National Socialism and the Nazis. His 'chequered' private life is not stellar, having outed his Professor (Husserl) to the Nazis, who then subsequently forcibly removed him from his post. Heidegger

was Husserl's replacement, the salt in the wound for which Husserl never forgot or forgave. Spinoza's 'difficulties' seem to pale in comparison. I mention this not only to underscore the profound differences, political, aesthetic, ethical etc between Heidegger and Spinoza, but to underscore the Trojan Horse Problem; i.e., the problem of the Gift -- be that gift given in kindness or stolen outright -- always carries 'a-something-extra' for which one must remain alert. See Derrida's *The Gift of Death*, trans David Wills, (Chicago: University of Chicago Press, 1995). On Heidegger's Nazism and its importance (or not) to his work, see in particular C. Fynsk, "Postface: The Legibility of the Political," in *Thought and Historicity*, (Ithaca, NY: Cornell University Press, 1993), pp. 230-249.

[22] Developed in S. Golding/johnny de philo, *Games of Truth: A Blood Poetic in 7- part harmony*, (London: University of Greenwich Press, 2003).

[23] Quoted in David Halperin, "The Queer Politics of Michel Foucault" in *Saint Foucault*, (New York: Oxford University Press, 1995) p. 68. A concise albeit at times romanticized précis of Foucault, he continues: "What Foucault understood by an 'art of existence, then, was an ethical practice that consisted in freely imposing the form of one's life into a distinctive shape and individual style, and thereby transforming oneself in accordance with one's own conception of beauty or value." (pp. 69-70). But see also: Michel Foucault, "Technologies of the self," in *Technologies of the Self: a seminar with Michel Foucault* eds L.H. Martin, H. Gutman, and P.H. Hutton (Amherst, The University of Massachusetts Press, 1982/1988) and Michel Foucault, "On the Genealogy of ethics: an overview of work in Progress," in *The Foucault Reader* ed. P. Rabinow (London: Penguin Books, 1983).

[24] Michel Foucault, "Fifth Lecture: Arts of Existence," in *Ad Absurdum: Thinking the present with Augustine, Foucault, Wittgenstein, and anyone else who comes to mind*.
<http://augustinian.wordpress.com/2009/03/18/lecture-5-arts-of-existence/>

[25] On Foucault as a Cartographer, see in particular Deleuze's

"From the Archive to the Diagram" and "Topology: Thinking Otherwise" in his *Foucault* (Minneapolis: University of Minnesota Press, 1988) especially pp. 21-38 and 59-102.

[26] The first use of 'ana-' as an attachable prefix denoting the fractal integrity of the aesthetic was first coined by H. Mountain in her "Evacuating the Body: The Abyssal Logic of a Philosophy of Desire," *The Pornographical: An Ethics of Mimetic Bodies*, Chp 1 (PhD Thesis: London: University of Greenwich, 2007). The first uses of 'the multiversal' and 'teleonomy' as a 'goal-less' logic, entered the fray as early as the mid-1850s with Darwin's cyclonic *On the Origins of the Species*.

[27] Cf Deleuze & Guattari, "Introduction: The Rhizome," in *A Thousand Plateaus*, especially on the six characteristics of the rhizome, which include: the principles of connection, heterogeneity, multiplicity, asignifying rupture, cartography and decalomania, pp. 7-13. See also their celebrated *Anti-Oedipus: Capitalism and Schizophrenia*, especially Part I "Desiring Machines: 2. The Body without Organs, 5. The Machine and 6. The Whole and Its Parts," pp.9-15, 36- 41 and 42-50, respectively. On the question of multi-singularities and politics, see in particular (but from an entirely different angle), Jean-Luc Nancy's *Being Singular Plural*, trans Robert Richardson and Anne O'Byrne, (Meridian: Crossing Aesthetics, 2000), especially "§ Of Being Singular Plural," and "§ The Surprise of the Event," pp. 1-100, and 159-177, respectively.

[28] Deleuze *Pure Immanence: Essays on A Life*, p. 27. Supra Fn 16.

[29] Deleuze & Guattari, "November 28, 1947: How do You Make Yourself A Body Without Organs," in *A Thousand Plateaus*, pp. 177-179. But see also their subsequent chapter, "Year Zero: Faciality," especially, §Theorems of Deterritorialisation or Machinic Propositions, pp. 193-211.

[30] Deleuze & Guattari, "November 28, 1947," in *A Thousand Plateaus*, pp. 169-170 and p. 168 respectively.

[31] Think particularly of the weary Heidegger, whose fall-back position, after painstakingly demolishing the paucity of Hegel's 'Negative' (and in its place re-staging 'identity' as precisely the sight of 'difference' -- as perdurance and as an event of

appropriation, replete with the mental athletics of leap forwards and spring backs) still brought him right smack into the lion's den of an onto-theo-logic Metaphysics. "No one can know whether and when and where and how this step of thinking will develop into a proper (needed in appropriation) path and way and road-building. Instead, the rule of metaphysics may rather entrench itself, in the shape of modern technology with its developments rushing along boundlessly. Or, everything that results by way of the step back may merely be exploited and absorbed by metaphysics in its own way, as the result of representational thinking." Heidegger, *Identity and Difference*, (1957), trans with intro by Joan Stambaugh, (New York: Harper Torchbooks, 1969), pp. 72-73. Of course it is entirely debatable -- and for some, not debatable at all -- as to whether Heidegger wished to 'get out of Metaphysics or, as seemed more the case, make Metaphysics do his bidding for him. See in particular his *What is Metaphysics*, (1929), *Postscript to "What is Metaphysics" (1949[1943])*, *Introduction to "What is Metaphysics?"* and *Getting to the Bottom of Metaphysics*, translated by Miles Groth, *What Is Called Thinking?* (1951-52), translated by Fred D. Wieck and J. Glenn Gray (New York: Harper & Row, 1968) and "The World as Picture," in his *The Question Concerning Technology and other essays*, trans by William Lovitt, (New York: Harper Torchbooks, 1977), pp. 115-154, the last of which we will return to momentarily.

[32] There is space in here only to give a superficial nod to Heidegger's complex set of arguments concerning the layering of meanings, particularly with the verb to represent [*stellen; Vorstellen, Ges-stellen*, etc], or the nouns truth [*aletheia*, subjectivity [*subiecum, hypokeimenon*], and indeed, 'man', 'world', being \leftrightarrow Being. At this juncture, the move is to point to the way in which a 'picture' becomes 'voice'.

[33] "We shall never experience our relationship to the essence of technology," Heidegger goes on to say, "so long as we merely conceive and push forward the technological, put up with it, or evade it. Everywhere we remain unfree and chained to technology, whether we passionately affirm or deny it. But we are

delivered over to it in the worst possible way when we regard it as something neutral; for this conception of it, to which today we particularly like to do homage, makes us utterly blind to the essence of technology." Heidegger, "Question Concerning Technology," in *The Question Concerning Technology and other essays*, p. 3.

[34] *Ibid.*, pp. 11-12.

[35] Heidegger, "The World as Picture," p. 127. He writes: "What is decisive is not that man frees himself to himself from previous obligations, but that the very essence of man itself changes, in that man becomes subject. We must understand this word *subiectum*, however, as the translation of the Greek *hypokeimenon*. The word names that- which-lies-before, which, as ground, gathers everything onto itself. This metaphysical meaning of the concept of subject has first of all no special relationship to man and none at all to the I."

[36] Heidegger, "The World as Picture," pp. 128-129, 130.

[37] Deleuze and Guattari, "1837: Of the Refrain," *A Thousand Plateaus*, pp. 343-344.

Digital Magic, Cybernetic Sorcery: On the Politics of Fascination and Fear

STEPHEN PFOHL

Nowadays the magician busies himself with public relations, propaganda, market research, sociological surveys, publicity, information, counterinformation and misinformation... [S]cience has ... substituted itself for a part of magic while extending its dream and its goals by means of technology. Electricity, rapid transport, radio and television, the airplane and computer have carried into effect the promises first formulated by magic ... to produce light, move instantaneously from one point to another, to fly through the air, to have infallible memory at one's disposal.

-- Ioan P. Couliano [1]

Introduction

Maybe it's the magnetic allure of the screen or the enchantment of some half-forgotten ad. But either way, there is magic in the feedback loops by which we spin meaning together in the world. Today much of this magic is digital. This is the magic of cybernetic forms. While commonly imagined as a data-driven mode of communicative rationality, cybernetics also operates in a decidedly more occult manner. Of particular importance is cybernetics' capacity to magically command attention through mesmerizing technologies of coded fascination and fear.

The magic of cybernetics is double and casts its spell like an enchanted two-way mirror. On one side, we find dominant uses of cybernetics as a commanding tool of power. Here, high-speed digital technologies wash over the imaginations of those they enchant, suggestively altering our senses and captivating our networked minds. But while capable of reshaping memory and even the contours of perception, digital sorcery of this sort is not cybernetics' sole or sealed destiny. On the other side of its magical mirror lies cybernetics' potential as a multifaceted pathway for life-sustaining connections, resonance, healing, requisite variation, and transformative change.

This two-sided tale of digital magic directs attention to the modern historical suppression of once flourishing analog communicative codes and their simulated (or virtual) resurrection in the sensorial feedback loops of contemporary digital culture. This represents a form of code drift -- the suspension of clear and distinct boundaries between our modern selves and the world; and the replacement of such boundaries by ghostly streams of digitalized contact between beings in *natural magical* communication with each other. At issue here is the technological transmission of fascinating streams of affect and connection, vibrant streams of contact once banished to the subterranean haunts, deviant margins, and delirious poetic dreamscapes of modernity.

Simulating enchanted contact with the world, digital pathways of fascination and fear function as a new global technology of power. [2] Digital pathways of this sort also provide psychic benefits to those most privileged by power, enabling them to avoid reckoning with the suffering that power's circuitry demands of others. Mesmerizing distractions induced by fascination can also dull power's pain. This is because digital magical technologies allow us to suspend attention to haunting differences between what is real (and really complex) about our relations to each other and what we simply fantasize or wish to be real. This endows cybernetic technologies with both a dream-like quality and a decidedly serpentine edge -- an ability to shed contact with history like a snake slithers free of its skin.

But serpentine fascination is only one of digital magic's poles. Fear is another. In cybernetic culture quick jolts of fascination oscillate with magnetic waves of fear. In this, fixed codes of modern power transmute into fluid fields of ultramodern force. The result is an amplification, rather than attenuation, of a wide array of modern historical inequalities and social injustices. Here, all things solid may appear to melt into electronics, but ghosts in the unconscious machinery of power remain. This begets a panicky oscillation between pleasure and terror, security and risk. The reason for this is magical: rather than simply repressing what they banish to the shadows of power (as was the case throughout modernity), cybernetic forms of power capture attention by simulating the uncanny resurrection of what they themselves exclude.

Sanitized copies of what is simulated are then fed back into power's own circuitous flow, modulating collective transmissions of memory, affect, and imagination. But by magically channeling power beyond modernity's guilty circuits, simulations of a cybernetic sort also escalate the global perils of power. To interact with magical simulations is, after all, to stray from the complexities of history's (actual) pathways and enter a phantasmatic (virtual) forest of signs. This poses multiple challenges for the enterprise of critical digital studies. This essay meditates upon key aspects of both the perils, and opportunities, presented by digital magic. It begins with a short sociological story of *separation perfected*.

Separation Perfected

But certainly for the present age, which prefers the sign to the thing signified, the copy to the original, representation to reality, the appearance to the essence, ... illusion only is sacred, truth profane. Nay, sacredness is ... enhanced in proportion as truth decreases and illusion increases, so that the highest degree of illusion comes to be the highest

degree of sacredness.

-- Feuerbach, Preface to the Second Edition of *The Essence of Christianity*. [3]

1.

"The whole life of those societies in which modern conditions of production prevail presents itself as an immense accumulation of *spectacles*. All that was once directly lived has become mere representation." [4] Today things are different. Maybe things are worse. The whole life of those societies in which ultramodern conditions of engineered consumption prevail presents itself as an immense cybernetic network of magical fascinations and fears. All that was once directly lived, then indirectly represented as the stuff of modern history, is today becoming pre-modeled and data-banked, simulated and sold back to us as mesmerizing imaginary connections to what's real. This involves a virtual suspension of haunting contradictions and a collective disavowal of our complicity with complex global matrices of domination and the injustices they beget.

2.

"Images detached from every aspect of life merge into a common stream, and the former unity of life is lost ..." [5] Lost that is from collective consciousness, but never completely forgotten; at least not in those unconscious zones of bodily and emotional life where what is real dances energetically with what is imagined. Positioned at the crossroads of lived biographical experience and historically structured formations of power, the unconscious hovers like a ghostly electromagnetic charge, sparking fascinations and making us afraid. Within the atmospheric wavelengths of what has become collectively unconscious, rapid-fire technological networks of command, control, and communications mix it up with a multilayered field of dreams. At times, the effect of this magical commingling --

this mesmerizing transference between otherwise distinct realms -- can be alluring, even erotic. At other times, the mix may feel repulsive, burdened by the ugliness of anxiety and acknowledged guilt.

Either way, the effects are likely to be uncanny -- the sense that things are both familiar and strange at the same time, "an enchanted encounter in a disenchanting world." [6] Perhaps this is because, despite being deeply personal and secret, unconscious matters are at all times also natural historical matters, collective matters that exceed egoistic experience. Unconscious matters carry us beyond the magical boundaries of that nation-state we call the self. Or, maybe things seem both familiar and strange because no matter how private our experience, neither it, nor we -- in all our complexities, dissociations, and contradictions -- are ever truly independent of the unfolding material exigencies of life (and death).

Reflexive attention to connections and resonances between what is personal and what we share energetically in the flesh with all others is particularly important in trying to discern wise courses of action in today's cybernetic world. This world is conjured into existence by complex global networks of power. These magical networks enable us to hook up with some people in some ways but not others, channeling our attention along power-charged pathways of connection in ways that structurally block or distort contact with others. These networks of power find a convergent genealogy in the communicative electricity of fast capitalism, militarized forms of masculinity, and the racialized fascinations and fears of five centuries of global coloniality. In these high-speed networks, dreams and nightmares, alluring phantasms and terrifying technological simulacra, pulsate electronically together. At times everything seems mesmerizing and totally connected. At other times it's like *separation perfected*.

3.

"What exactly is it that we are separated from?" asked Rada Rada. "I am curious red, blue, black and yellow. I am

curious and perplexed, wondering about everything and eager for a gift of words."

To this, the Black Madonna replied at length. It had been a long time since she had been on the same page as Rada and she was not about to waste the opportunity to remind her protégé of matters they had in common. [7]

"As Marx tirelessly insisted," declared the Black Madonna, "in capitalist society we are separated from each other, from the products of our labor, and from the wealth this labor produces for those who own and control the organization of our global economic survival. These are keys aspects of the alienation and separation anxiety we experience daily. But there is more to separation than this. We are also separated from the ecological throes of living energetic matter and from that which provides us with sustenance, meaning, and pleasure. We are separated from the general economy of life itself and from what is most sacred to all living beings -- Mother Nature in all "her" nuanced complexity and unfolding movement. This too is an aspect of fast cybernetic capitalism -- the technological amplification of an alien force that drives a wedge between our flesh and the natural history in which we all participate.

4.

For most of history we human animals have imagined ourselves as participating in nature's sacred dance. We envisioned ourselves as co-participants in nature's evolving ecology and structure, its shape-shifting metamorphosis and spiraling movement through time. Through symbols and ritual activities we recognized ourselves as material and spiritual communicants in nature's rhythmic alternation between change and stasis; motion and rest; life, death and regeneration. But for those perched at the commanding heights of European modernity, conscious attention to our co-participation in the unfolding dynamics of nature perilously faded from mind. This was also true for those shaped most fiercely by modernity's restrictive economic rituals and rules, regardless of whether this shaping took place inside territories controlled by those of European

descent or elsewhere.

This was also true, if never exactly in the same way, for people so thoroughly screened by modern institutions of power that they possess (or are possessed by) a simplistic and memory-poor vision of themselves and their society as a triumphant force for good in the world. This involves social amnesia and a suspension of attention to the complex ways in which we are complicit with global historical regimes of unequal economic, social and cultural expressions of power. At issue here is the ritual construction of selective memories and forgetting, the shaping of collective consciousness and what that consciousness expels, forbids, or renders unconscious. On the other hand, rituals that remind us of our participation in the relational complexities of both history and nature have long been condemned by modernity as magical and dismissed -- in much the same way as modern Man categorically dismisses women and racialized others -- as if childish, primitive, hysterical, or demonic.

Magical relations are communicative relations, relations of vibrant *sympathy* and mutual *correspondence*. Magic makes binding (analogical) connections between things that appear otherwise (digitally) separated in time, space, and body. Magic brings seemingly distinct things into overflowing contact with each other, dissolving boundaries and drawing matters set apart into enchanted relations of mimesis and identification. Magic binds people and things in ways that precede and typically defy all but the most poetic of languages. This is why magic repeatedly challenges both orthodox religion and positivist science. Magic enables people and things to participate together in a world to which they are commonly bound. The magical world is a fascinating world, a world where nothing is truly separate from anything else. Everything is linked, connected, and hooked-up. This includes the knower and the known. In magic everything participates in the life of everything else, and all things are understood as bound together in communicative relations of sympathy and antipathy, attraction and repulsion.

Until the late sixteenth and early seventeenth centuries Europe was a magical world. The performance of magical rituals

bound pre-modern Europeans together in material-energetic, imaginary, and symbolic relational webs -- animating webs of bodily resonance, psychic identification, and shared social meaning. The material and imaginary effects of such rituals were not unlike those imagined by Jacques Derrida when enigmatically evoking the inscriptive material or structuring force of writing. But modern formations of power were quick to declare magical rites superstitious and suspect. As such, modernity imagined itself as having evolved beyond magic, viewing enchanted relations to the world as not real but imaginary.

The discourses of modern science, religion, and governance each used the term magic when referring to the supposed "primitive" mentality of people-the-globe-over who Europe had conquered and/or converted. Young children, the insane, weak willed individuals, and women were stereotypically pictured as more susceptible to magic than modern men. This was because each appeared in modern men's eyes as less able than they to erect, maintain, and defend clear boundaries between themselves, others, and the world. Hocus Pocus: magic was to be rubbed out or transformed into a mesmerizing spectacle of mystery and entertainment -- an exotic object of fun and fascination, an alluring object belonging of the anthropology of others, but certainly not of our selves.

5.

Magical correspondences begin not as one-to-one relations of measured similitude between existing things but in rituals of call and response between a mother and her child. Magic, in other words, is with us since birth. Our mother is the immediate source of the gift of life we receive. As infants we cry out in aching sound and mimetic gesture, demanding nurture when our mother's attention turns elsewhere. This is inevitable because as close as a child may be to its mother, outside of the womb her attention is rarely ours alone. "[T]his is not 'bad'; the real issue is whether this ... occurs in a context that is loving or hostile." [8] But one way or another, when made anxious by separation from our mother's living energetic attention, we

magically mime our mother's power. We hallucinate the fulfillment of a wish to again be in undifferentiated flows of intimate material contact with our mother. This is to substitute an imaginary realm of experience for what is real, to tattoo the flesh with phantasm and magically transform our mother as we imagine her from the source of life to a resource for our emerging self. This is to misrecognize both our mother and our self by identifying with our mother and imagining her power as our own.

Misrecognition of this sort makes magic a material aspect of what Teresa Brennan describes as a communicative miming of "nature's logic" -- the "original logic of the flesh." This original logic is a lively, mobile, and "fleshy logic" of connection, a logic composed of a multitude of intersecting pathways and rooted in a fluid *in utero* economy of interactive energy. This logic involves *a complex system of fleshy communications* between two less than fully differentiated parties (mother and embryo), each a participant in the same dynamic network of life. A conduit for the earliest transmission of affects and the embryonic physical basis for the subsequent development of language, in this logic "message and the response are communicated in biochemical codes which are meaningful precisely because they are interactive." [9] Separated from the immediacy of this most primal of communicative forms, as infants we hallucinate the fulfillment of a wish to be reunited with our mother. This is the beginning of magic -- a calling out to our mother from an imagined locus of power that is never strictly our own, pleading our case, demanding that our mother respond to our needs.

The figuration of mother in this short sociological story has at least two dimensions: first, the flesh and blood mother who gives birth to us; and second, Mother Nature, a poetic trope for the dynamic ecology of living energetic matter that envelops and provides sustenance for both our mother and our self. Magic begins when we call out in response to disjunctions in our energetic relations to our mother in nature. Magic comes in different forms, but it always shares something elemental -- a communicative identification with an imagined other to whom we are bound. We imitate and make relational demands on this

other and become subject to the other's demands in return.

Magical rituals of this sort -- call and response rituals between our selves and others -- were a constitutive aspect of pre-modern European culture. Over the course of modernity such rituals have been repressed, emptied of collective meaning, or driven underground. As a result, while fascinating, magic is today typically thought of as decidedly primitive; and those who imagine themselves as religious participants in the unfolding of nature are accused of the errors of *animism* -- belief that the natural world is energetically alive, that humans are active participants in this world, and that this world is sacred.

6.

Everything begins magically in the electricity of communication. The sky crackles with lightning and the atmosphere changes. Oxygen bonds with hydrogen and tears stream down my cheeks. I get e-mail from you and my brain ignites. You keyboard your imagination in the direction of my mind and my spine tingles. Text messages spark suggestive ritual pathways between us as our genes tumble together, magnetized by the rhythms of a time belonging to neither of us alone. We toss and turn in waves of affect, intense but uncertain about what might happen next. Then, when trying to say what any of this really means, even our best words fall face down and flat.

Energetic transmissions loop between us, then reverse rhythm; first layering, then switch tracking, then again back to the flow. In this way we communicate, not by discursive language with all its grandeur and lack, but by synaptic pulsation and a rhythmic oscillation between what fascinates us and what makes us afraid. Here things are actualized in magical rituals of "song, tone, key, rhythm, timing, intonation, loudness, silence, color, odor, taste, touch, shape, gesture, facial expression, body posture, movement, displays, dance, drumming, clicks, whistles, sighs, cries, screams, mimicry, and play." [10]

Elsewhere, bodies pile up the globe over but many fail to notice. Memory poor and plagued by catastrophic waves of fast fear, we flee our relational bodies and the movement of time,

piloting fast forward from the *ecology of mind* in which we are all communicants. Attention becomes distracted and our ethics are lulled to sleep as wave after wave of channeled transmissions penetrate us, enchant us, and make us afraid. This involves ritual magic, the casting of a collective spell under which it becomes increasingly difficult to glimpse the complexity of our situation. When this happens, history floats suspended like a somnambulant signifier adrift on a sea of screened memories and power-charged forgetting.

Energized by the flow of everything into everything else, many of us are also increasingly troubled by a prescient sense that things are fast falling apart. Phantasmatic objects consume our attention then burst into flames. We bounce screen-to-screen, enmeshed in a fast-moving web of ever-changing information, diffracting through dynamic fields of *opto-electronic mutations* in the logistics of perception. Here, there are few -- if any -- borders between our selves and the high-speed digital network technologies to which we are hooked-up. Oscillating between desire and dread, we are cut by anxiety and consumed by an endless waging of war.

The communicative magic of new global media technologies casts a powerful collective spell, making us alternatively emboldened and afraid. First manic, then depressed, then manic again: this is the new digital cultural logic of cybernetic capitalism -- a ritual orchestration of bi-polarized disorder. Waves of worry push against dreamy hopes for reconnection with each other and the wider world to which we belong. In the whirling center of the network -- which is really not a center at all, but simply a node between linked force fields of information and energized matter -- the animated screen into which we gaze suddenly mutates into a dynamic last wall; not a wall of stone, mortar, wood, steel, or brick, but a transparent wall of glass and high-density fiber-optics; a wall of interactive feedback signaling the real-time "disappearance of matter." [11] In this dynamic wall of images the boundary separating what is real from what is imaginary becomes little but another screened memory; and the screen upon which that memory is projected is

fast imploding. Imploding screened memories -- this, perhaps, is an apt metaphor for the weave of magic and mesmerism that today operate at the helm of fast global capitalist forms of cybernetic social control. I am writing to you out from within this global technological weave. Are my transmissions getting through?

We dart, you and I, screen to screen, traveling in phantasms across an ever-changing horizon of virtual futures morphing in both the material and imaginary realms into what comes next in history. All we can grasp are relations, not individuals or atoms, but relations. These relations are, at once, local and global, sympathetic and symptomatic. As sympathetic relations they vibrate together. As symptomatic relations they bear ghostly traces of what is sacrificed to make certain types of sympathies -- but not others -- circulate the globe over. All we can grasp are natural historical relations, complex systemic relations -- human animal mineral vegetable relations spiraling together in networks. We are in awe.

You pitch your voice in my direction, communicating a command.

"Okay cowboy, okay parasite," you call out, syncopating each syllable, underscoring each beat. "Now is as good a time as any to show me what you've got. Let me see that dis-autobiographical dance you are always writing about. Let me see your power-reflexive striptease. Remove the ridiculous mask. Unzip your persona. Step out of your everyday rituals, professional habits, and armor. Step suggestively out of your self. Expose yourself to the tragic lens of history without hiding from the dark; or, what would be worse yet, without projecting the dark that you fear upon me. Let me see you naked and doubling back upon yourself. Strip away the phony nudity and make me laugh. Remove your cultured costume and phallic pretense. Situate your knowledge in the flesh and in the global currents of the natural history that binds us together with others."

I begin to laugh, remembering again that everything begins in the electricity of communication. I know this more from the sound, cadence, timbre, and tone of your voice as it

vibrates (analogically) within me and through me than from the meaning I make (digitally) of what you say. While cognitively I imagine that you mean this but not that, the affective intensities spiraling between us are more magical and complex -- more ambivalent and open-ended. These intensities are, at once, imaginary and real; constituted mimetically in relation to one another, these intensities pierce my skin, bringing flesh to thought. The sensate technological transmission of affects in this way is truly something new -- the stuff of recent history.

Governed by centuries of ritual adherence to positivist scientific precepts, a headstrong culture of sublime abstraction, and a white masculine militarized will to colonial forms of power, those at the communicative helm of Northwestern modernity have long dreamt of making all things digital -- of converting the open-ended fuzziness of analog transmissions into fixed entities that can be harvested for profit -- clear and distinct entities with objectified boundaries, discrete entities controlled meaningfully by binary codes. This modern pursuit of digital distinctness results in a distortion of communicative complexity. This is because relations that vibrate together analogically in continuous (but never entirely determinant) ways have, throughout modernity been pushed aside, suppressed, or rendered unconscious.

Today this appears to be changing. This is because the latest generation of digital technology seems capable, not simply of suppressing the analog realm, but of resurrecting it in a pre-modeled or simulated form. This is a central tendency of profit-driven cybernetic forms of power -- the restrictive economic deployment of communicative technologies that market the appearance of streaming degrees of "more or less" continuity between things that remain separate and price-tagged accordingly. Boundaries burst between what has long been imagined as private and that which circulates for sale in the global marketplace.

Boundary breaking of this sort may partially assuage what was suppressed (but never entirely eliminated) from Northwestern modernity -- a sensuous desire for streaming

analogical contact with the wonders of the natural historical world to which we belong. But in addition to carving new pathways for profit, renewed contact with analog communication may also engender resonant experiences of a less controlling, wilder, and potentially more life-enhancing sort. In other words, renewed contact -- perhaps even simulated contact -- with the analog realm may result in a contagious dance between otherwise distinct beings in communication -- a spiraling, unsettling, and even dizzying dance, an oscillating back-and-forth movement between intensified control and boundary-relaxing relief. In this sense, alongside virulent dreams of economic dominance and military superiority, new global technologies of power also unleash something more arcane, playful, and open-ended -- digitally enhanced dreams of analog connectedness. This is an important aspect of the magical allure and mesmerizing seductions of cybernetic culture -- a promise of sensuous cosmic reconnection.

7.

Everywhere I turn magic follows me like a cybernetic feedback loop announcing miracles. The magic of Disney, the magic of Macy's, the magic of this or that new gadget, new YouTube video, new diet, new machine, new look, new bra, new designer perfume, or hot new Hollywood star; the magic of style, the magic of life governed by image-intensive technologies, market-place technologies that charm the body and colonize the mind. Magical cybernetic technologies -- most of them digital -- blur differences between embodied experience and the refractory play of screened memories. This changes everything. These technologies first enchant then suspend the boundary between what is real and what is imaginary. Under the spell of such magical technologies everyday life can feel like a dream (or nightmare) as the basic exigencies of our psychic and bodily existence spin together in a fast moving matrix of fiery social phantasms and hypnotic vectors of affect.

Magic affects both body and mind. It can artfully arouse the senses and send goose bumps down the spine. Magic can

mesmerize and intoxicate. It can also freeze us on the spot. It can quicken the heart or make blood pressure drop. Magic fires the imagination and sparks thoughts that work like dreams. Magic lowers the threshold separating animated bodily existence from what appears as if captured by consciousness. Steeped in wonder, awe, sensuousness, and Eros, magic seduces us and leads us astray from what is habitual and graced by common sense. Magic unsettles taken-for-granted polarities between what appears *as if* real and what *is* real. Magic is in the air.

When ritualized, regularized, or made into a coded habit, the magnetic loops of fluid electronic information in which I find myself adrift often feel like second nature and their suggestive effects like some kind of high-tech hypnotic sorcery. I am energetically shaped by these magical technologies and I suspect you are as well, although probably not in exactly the same ways. These new technologies of enchantment and control are brought into being by a powerful amalgam of historical forces. These include intensifications in the phallic management of perpetual warfare and global economic initiatives aimed at converting vast portions of the planet into a digitally enchanted shopping mall.

Digital magical forms are also today manifest in the world of banking, where money is set in motion by viral phantasms at play in the global marketplace of finance and triaged derivatives. This magic involves the transubstantiation of embodied economic activity into papered-over versions of itself, virtual economies that are bundled together as "securities," then sold as a risk-bedamned bet against bad futures. Ramped up surveillance technologies and the mass-mediated management of fear, along with unprecedented experiments with global policing and pharmaceutical agents of all sorts are also aspects of magic's recent history. But sparked by wildly popular (and sometimes populist) human-animal yearnings for the sensuous enchantment and heart-felt communion with other people and things, the magic of cybernetic capitalism is even more complex. Cybernetic capitalism parasites off such yearnings, tempting us with simulated connections that are always just one click away.

The social basis for widespread contemporary yearnings

for magic is important to understand, as the magic of cybernetics today constitutes a new global technology of power and a mesmerizing vector of cultural exchange, particularly for those whose lives are situated within the vast electronic marketplace of Northwestern society.

This way of life is marked by an endless succession of material objects, yet it is a life that curiously seems to float beyond the terms of the real world. This is essential to the magic of style, its fascination and enchantment. Part of the promise of style is that it will lift us out of the dreariness of necessity . . . lift the viewer out of his or her own life and place him or her in a utopian netherworld where there are no conflicts, no needs unmet; where the ordinary is -- extraordinary. [12]

This is a short sociological story about the historical construction, bodily and psychic resonances, and magnetic channeling of high-speed technologies of magical cybernetic social control. These technologies of control are orchestrated around vibrant loops of mesmerizing feedback between people and machines. As magical social forms, information technologies captivate attention and create *mimetic correspondence* between what is above us and what appears below. Magical rituals of information-based feedback set our social and psychic geographies in motion. This undoes our grounding in the *here and now*, putting us in touch with undreamt of pasts and previously unimaginable futures. As such, magical technologies of the digital sort can radically change our understandings of time and space and reshape our senses of self and other.

This is to picture magic as a communicative technology that shapes both society and the self -- a ritual modeling of *secret* signs, words, gestures, sounds, vibrations, and resonant poetic images. This enchanting technology is not *secret* simply because first-hand knowledge of magic is prohibited, although this may

sometimes be the case. For example, societies governed by monotheistic religious beliefs have long been virulent in their attempts to suppress magical rites. Magical rites are also *secret* because they offer fluid material and imaginary pathways out of what is damned (or dammed up) in the collective consciousness of a given culture. Magical rites, in other words, promise soulful energetic connections with the complex system of living energetic matters to which we belong and within which we play our part.

New global technologies of cybernetic magic put the visible outsides of life in secret contact with that which lies hidden within the recesses of the conscious mind. In this, the magic of cybernetics may be costumed in mysterious feeling-tones and hieroglyphic codes, accessible only to initiates baptized by streaming technological vectors of simulation and affect. This is an information-based mode of social control. It revels in real-time transmissions of both fascination and fear. It also creates magical links or "sympathies" between flows of macro-economic force and microscopic realms of social-psychic meaning and bodily experience. This enacts what is perhaps the oldest of magic's principles: as above, so it is below. Under the spell of such magic, like attracts like, while repulsing that which deviates or differs. This mode of social control is steeped in arcane technologies of prestige and illusion, technologies that manage the imagination.

Magical social technologies enchant us with sensuous swells of pleasure. They also mesmerize us with paranoiac phantasms of terror. Fire-up your LCD screen or plasma. Turn-on your digital smart phone, MP3 player, and GPS and pilot through a digital archetypal maze of tweets, texts, games, and blogs. Turn-on yourself. Since each of these magical technologies is capable of transmitting high-density wavelengths of fascination and fear, it is important to ask who is best served by these new modes of communication and power? Whose attention do they most captivate, command, and control? Whose desires do they realize most expressively and whose desires do they repress, push aside, or defer? What futures are made possible by these new

occult technologies and what other ritual pathways are denied, foreclosed, or pushed to the margins? It may seem odd to ask questions such as these at a moment in history when dominant institutions at the helm of Northwestern society can appear to be more rational and calculating than ever. But alongside dreams of techno-scientific mastery and the transfer of profit from periphery to core, the shimmering surfaces of contemporary capitalist society are also aflame with powerful and seductive forms of enchantment.

Digital enchantment is, in part, a simulated resurrection of earlier modes of magic, the technological reappearance of communicative forms thought to have been left behind or banished to the peripheries and subterranean haunts of the modern capitalist/ colonial world system. Today, in the technological rituals of overdeveloped societies such magic is at play nearly everywhere. Powerful, digital magic commands our attention in ways that distract us from the sleep-disturbing cruelties of the current global order, lulling many of us into denial, forgetfulness, and collective somnambulism. This is because the sensuous distractions of digital magic provide partial compensation for a long-standing modern cultural flight from the body, and for Northwestern modernity's loss of resonant energetic contact with the animating stuff of this world. Magical distractions of this sort enable the archetypal subject of digital culture to become the fast-mutating subject of neo-liberal capitalism. Fleeing the haunts of a guilt-ridden modern history of Ego-driven conquest, neurosis, and boredom, the modal subject of cybernetics is today suspended midstream -- swept away by the ultramodern currents of liquid life, while flailing for breath amidst whirlpools of liquid fear. Such magical suspensions of subjectivity are today a daily occurrence, the effect of having parasitic vectors of capital penetrate the innermost reaches of subjectivity, turning inner life outward, while streaming outer currents within.

But making connections with aspects of the world kept secret from wide-awake forms of modern consciousness is not magic's only function. Other forms of magic modulate our

relations to others in different ways. Magic may, for instance, help secure distinctions that safeguard the self, anchoring individuals within collective waves of thought, affect and judgment. Indeed, when performed in an attentive, discerning, and ritually reflexive manner, magic may provide equilibrium for individuals within culture, protecting those it enchants from being engulfed in the undifferentiated night of dark matter or from being chaotically dispersed like fractured moon beams burnt by the morning's sun. [13]

This is to suggest that the magical subject of cybernetics is neither one-dimensional nor homogeneous. Indeed, how people are affected by the allures of magic is determined in significant measure by the social positions they inhabit and the social psychic and historically material technologies to which they have access. As such, those at the commanding heights of social power are likely to experience things quite differently than those at the bottom, while we in the middle may oscillate compulsively between fast jolts of enchantment and quick time immersion in anxiety and fear. Schooled in the corporate "acceptance of disorientation, immunity to vertigo, adaptation to dizziness, and absence of itinerary," those at power's cybernetic helm may be given plenty of opportunities to magically master "the art of 'liquid life.'" [14] These are the corporate magicians and warriors who use information technologies to manipulate consumption and deploy ever more intense strategies of coercion and killing. For the rest of us, life may hover "uneasily between the joys of consumption and the horrors of the rubbish heap." [15]

Adrift between advertisements for a purchasable heaven and the soul-maiming insecurities of a marketplace hell, social life enters liquidity and loses form. In this, things may move so quickly that the complexities of life and history can appear to be forgotten in advance. When this happens, people and commodities trade places, as people become more like things and things become more animate. For those most disadvantaged by this new modality of social control this can be particularly dangerous, as they "may be cast most of the time particularly near the commodities' pole -- but no consumer can be fully and truly

insured against falling into its close, too close for comfort, proximity. Only as commodities ... can consumers gain access to consuming life. In liquid life, the distinction between consumers and objects of consumption is all too momentary and ephemeral, and always conditional." [16]

With these concerns in mind, this essay invites you to make historical connections between the recent technological resurrection of magic, global capitalism, and cybernetic control processes. I hope these connections enable you to become better attuned to the magic that surrounds you; and to use this attunement to reflexively discern, subvert and critically transform -- rather than simply amplify -- the networked sorcery of global capitalism in its information-based or cybernetic form.

8.

On first impression, a return to magical social forms appears anachronistic. We are, after all, in the throes of a global capitalist system dominated by instrumental rationality and the calculative pursuit of profit. Indeed, since the dawn of modernity dominant forms of modern Northwestern power and knowledge have long labored to break magical human connections with nature, and to establish proper scientific and moral distance from the natural world they seek to classify, measure, and master. Think only of the Protestant Reformation with its virulent attacks against the supposed magical rituals of Catholicism; or of the "witch craze" of the sixteenth and seventeenth centuries, targeting the supposed demonic magic of lingering European animism. Religiously inspired campaigns of conversion and violence directed against the magic of indigenous peoples in the Americas, Asia, and Africa were even more deadly.

Throughout modernity dominant sectors of European society have become increasingly separated from the rhythms of the natural historical world by an amalgam of next-worldly spirituality, profit-driven calculation, narcissistic self-interest, and an obsessive masculine objectification of nearly everything that moves. This gave Europeans a sense of standing at a distance from the world. This sense of separation from the world strode

arm in arm with racialized campaigns aimed at bringing Christian civilization to so-called primitive pagan peoples the globe over. People revering the sacredness of Earth as their mother were presented with a stark and deadly choice. Kneel before the cross or be slain by the sword!

Positioned at a spectator's distance from the world and fired-up by militarized approaches to geopolitical conflict, the men at the helm of modern Europe demanded the same of those they conquered. *I see. I fly. I desktop command drones, scanning for heat, firing missiles, dropping bombs and closing my senses to a wide range of other ways of being in the world.* Rather than experiencing an intimate material continuity with natural energetic forces, dominant masculine forms of modern Northwestern subjectivity feed-off delusional images of a self-contained and competitive individuality. This provides a somewhat paranoid vision of human beings separated from the nature they ravage, looking upon "her" from outside and above. Vanquished in the process was the real magic of reverent natural historical and psychic social participation in the ebbs and flows of nature itself.

For those at the helm of Northwestern modernity, participation in the evolutionary movement of living energetic matter was replaced by the top-down passions of rational calculation, risk assessment, and modern scientific conquest. These are the passions of a capitalist/colonialist will to power, methodical passions rooted in (masculine) fantasies of cutting the body of nature into discrete units so as to operate upon "her" and see what happens. These are world-changing passions, passions spurred by emotionally distanced observation, quantitative measurement, and the pursuit of analytic mastery. Together they represent a historically specific form of mastery. In the restrictive economic realm, this manifests itself as a ceaseless drive for accumulative advantage. In the realm of pleasure the term sadism comes to mind.

The unrelenting force of this methodical drive for power transforms the ecology of human animal participation within the throes of living matter into a virtual obsession with buying and

selling nature as if "she" were nothing but a marketable commodity. This transforms an earlier cultural imagination of nature as the source of all life -- the sacredness of "Mother Earth" -- into an exploitable resource. Taking possession of this (feminized) resource -- whether by the capitalization of matter or the strategic deployment of military force -- also functioned as a redemptive (religious) sign of modern Man's transcendental moral worth. "She" after all was a temptress, closer to nature than he and had led him astray. With new technologies of conquest and capital, modern Man imagined blasting free of nature, defying gravity and time, and reversing his fall.

This is not to suggest that the magic of human participation in the unfolding dynamics of nature disappears entirely. It has not. In laboring to suppress reciprocal energetic contact with other humans and nature, those who steered the destiny of modern Europe were also haunted by the unequal sacrifices they demanded of others. This is a decidedly material aspect of what Avery Gordon calls *ghostly matters* -- social psychic matters that bear haunting traces of the ways we have exploited each other and the natural world. Haunting of this sort is "a constituent element of modern social life" and being haunted "draws us affectively, sometimes against our will and always a bit magically into a structure of feeling" where we sense the "seething presence" of "invisible things" that "are not necessarily not there." [17] In situations of structured inequality and disregard for the ecology of life, haunting may profoundly unsettle the dynamics of power by drawing attention to matters of exploitation that have been disavowed or rendered unconscious. This may provoke defensive reactions on the part of those most blessed by power and vitriolic crusades aimed at stamping out magical reminders of lingering inequities brought to history's surface by ghosts.

But fear and paranoiac retaliation are not the only effects produced by the magic of ghostly social forms. Sometimes the ghosts of futures foreclosed present themselves in a more inviting manner. Sometimes they herald what Walter Benjamin imagined as a kind of *profane illumination* and mobilize actions aimed at

the realization of social justice. Benjamin was inspired, in part, by Jewish mysticism and the magical poetics of Parisian surrealists who sought to artfully cross-wire the dream world with the world of everyday life. Surrealists sought to spark desires for marvelous forms of collective life, mesmerizing ritual practices that would free people from the spirit-crushing anxieties of capitalist culture and the perpetual shadows of imperialist war.

"In their efforts to 'win the energies of intoxication for the revolution,' the surrealists hoped to bring...to the point of explosion...the immense forces of atmosphere" concealed in everyday things. [18] When this happens, the doors of previously closed systems may burst asunder, enabling a reckoning with the shadows of past injustices and the possibility of forging more reciprocal and life-sustaining forms of sociality. Most modern manifestations of magic have been far more restrictive -- instrumental uses of enchantment aimed at manipulating social and psychic life. Indeed, magic transmitted by the electronic media -- including omnipresent advertising media -- typically crackles more with affect than cognition, suspending guilt-ridden memory while stimulating the senses. [19] Here, magic assumes a baroque and nostalgic form, drenching the anxious, bored, and isolated modern Ego with swells of sensuous electronic imagery. Streaming imagery of this sort is a key to the most successful forms of popular entertainment -- their thrills and chills a reminder of a bygone world of reciprocal ritual enchantment. [20] This involves "Imagineering" -- the "corporate colonization" of embodied consciousness by a "baroque arcana of logos, brand names, and ... [digital] sigils." [21]

Other more subversive forms of magic -- forms that threaten to abreact collective awareness of the traumatic historical origins of modernity as a guilt-ridden social form -- are driven underground, dressed-up in baroque cultural garb, or pushed to the outside of legitimate society altogether. For this reason, throughout modernity magic has often been imagined as a stereotypical characteristic of the "thinking" of so-called primitive peoples, children, hysterics, and those struck by the lightning of love. Magical modes of experience have also long

been associated with stereotypes concerning the seductiveness of women, the irrationality of lower class culture, and the exotic allure of those *othered* by a continuing *coloniality of power*.

To get a feel for the web of magical vibrations spun by global capitalism you don't have to go far. This is because in digital culture magic is but a click away. This is the magic of life mediated by wave after wave of electronic signaling between machines of all sorts and ourselves. This is the magic of being turned on by, or tuned into, complex computational rhythms and random flash memories mixing web-based audio with the enchantments of high-density video: sonic vibrations and pictures that make dreams go wireless and our imaginations go on-line. Piloting through multiple channels of data and contagious viral contact makes many of us in digital culture feel as if we are everywhere and nowhere at exactly the same time. Tweet after tweet, My Space morphs into your Facebook, then Linkedin and Twitter, before bifurcating into a vast data-banked network of bodies drenched in an uneasy mix of algorithm, desire, marketing, and boredom.

In digital culture we are exposed and expose our selves to real-time computational enchantments and the oscillating pleasures and anxieties of wave-after-wave of streaming sounds, iconic images, and emotionally charged magical landscapes of persuasion, info-entertainment, news, polling, fashion, surveillance, war, business, and gossip without end. In digital culture we all also become data for other communicant's roving eyes/'I's as each mesmerizing loop of feedback is followed quickly by another. Girls, we are informed, go virtually wild, while guys go wildly virtual. Caught up in the flow, surfing past the foreseeable future atop vast waves of new media, our actual bodies and minds cross circuits with the virtual bodies and minds of machines. This happens a lot. When is this not happening?

All this is to suggest that the power of magic is today making a big time come back in the dense and high-speed cybernetic feedback loops of contemporary digital culture. This is an intensely tactile and market-driven form of magic. It fascinates us, but it also makes us afraid. It is "akin to an older love and

beauty magic," but in today's fast global capitalism this kind of techno-magic seems "destined to spirit money from our pockets" with "artful spells of mimetic sentience." [22] We are hooked-up to this magic in the rituals of wired flesh, mesmerized by its "power to summon." This represents a new form of social control, a magical social form that depends less (and less) on inducing cognitive belief in particular ideologies, and more (and more) on the power of fascination and a suggestive force akin to that of hypnosis. Under the ultramodern spell of this magic the "body itself begins to evanesce, just as in those folk tales where the shaman's body-parts were scattered to the wind and reassembled." [23]

9.

In closing this meditation on the magic of cybernetics as a world-changing technology of power, it is important to compare several interconnected social practices -- religion and science, magic and technology. In framing these practices in sociological terms, Emile Durkheim and Marcel Mauss likened the work of religion to that of science and the operations of magic to technology. [24] Religion, like science, was viewed as more fundamental. Classifications produced by religion and science enable humans to orient our selves in time and space and to establish meaningful relations with each other and the world. But meaning produced by religion and science is artificial (or socially constructed) and comes with a price. While ordering things linguistically in a logical manner, religion and science inevitably reduce the material complexity of natural relations and forces to what appears believable from a particular human vantage point in history.

This is to suggest that both religion and science involve sacrifice. This is why Durkheim suggested that humans live a doubled existence (*homo duplex*). On one hand, we participate organically in the movement of living energetic nature in its entirety; on the other, we make sense of things from the restrictive economic perspective of our own ritually constructed situation in time. In this, religion -- a prototype for later scientific

forms of classification -- and science are essentially the same. The only difference -- and it is an important one -- is that science must turn a critical eye on the epistemological rites by which its knowledge is constructed. For religion, on the other hand, truths are ritually accepted as if supernaturally ordained or god-given. In either case, a gap exists between what is real in all its complexity and what is reductively (or existentially) imagined as real from humanity's partial perspective within nature.

The gap between what is real and what is socially imagined to be real haunts the institutions of religion and science. Magic attempts to compensate for this gap by transgressing virtual boundaries erected by religion and science between themselves and the world. This puts humans back in streaming energetic contact with what is real. This is why Marcel Mauss, and later Geza Roheim, imagined magic as a ritual form of *wish fulfillment* where "desires and images can be realized immediately." [25] It is also why Durkheim and Mauss suggested that traditional forms of religion typically oppose or condemn magic.

But about this matter Durkheim and Mauss were inconsistent, often citing examples where magic reinforces, rather than relaxes, religious boundaries separating humans from the rest of nature. [26] Technology, which shares etymological roots with magic (both being derivations of the Greek term, *teknê*), operates in a similar manner in relation to science. Sometimes technology reinforces the purity of scientific logic, supporting the veracity of science's classificatory separation of the material world into discrete entities. At other times, technology operates in a less pure manner, deviating from discrete categories established by science by putting humans in resonant contact with matters that are vibrantly real but unable to be precisely defined.

In the language of contemporary communications theory, religion and science separate things into discrete categories and represent them in digital (either/or) terms. Magic and technology, on the other hand, enable humans to participate in the world in a more fluid manner, interacting with the world in an analogical (both/and) mode. In this sense, magic and technology promise

resonant connections with matters that lie beyond discrete linguistic distinction. The essay you are reading suggests that magic follows analogically in the wake of religion, just as technology follows -- and often compensates for -- digital divisions of the world enacted by science. But when science becomes a religion and technology magic, things double up and become trickier. Techno-magic enters stage right and we are lured into a fast mutating forest of signs, wondering what's become of the trees. This forest is magical and seeded with computational fascinations and fear, code drift, and electric waves of affect. It is within this enchanted forest that we today experiment with a multiplicity of imaginative pathways for critical digital studies.

Notes

[1] Ioan P. Couliano, *Eros and Magic in the Renaissance*, trans. Margaret Cook (Chicago: University of Chicago Press, 1987) p, 104.

[2] See also, Stephen Pfohl, "New Global Technologies of Power: Cybernetic Capitalism and Social Inequality," in Mary Romero and Eric Margolis, eds., *The Blackwell Companion for Social Inequalities*, (Cambridge, MA: Blackwell Publishers, 2005) pp. 246-592.

[3] Both the title of this section and the passage from Hegel are taken from the opening section of Guy Debord's *Society of the Spectacle*. This essay is intended as a kind of updating of Debord's critical concerns in an era of digital cultural power.

[4] Guy Debord, *Society of the Spectacle*. Trans. Donald Nicholson-Smith (New York: Zone Books, 1994) p. 12, paragraph 1.

[5] *Ibid.*, p. 12, paragraph 2.

[6] Avery Gordon, *Ghostly Matters: Haunting and the Sociological Imagination*, (Minneapolis: University of Minnesota Press, 1997) p. 55.

[7] The Black Modern Durkheim and Rada Rada are allegorical figures that appear in my book *Death at the Parasite Café: Social Science (Fictions) and the Postmodern*, (New York: St. Martin's Press, 1992).

- [8] Morris Berman, *Coming to Our Senses: Body and Spirit in the Hidden History of the West*, (New York: Bantam Books, 1990) p. 26.
- [9] Teresa Brennan, *History After Lacan*, (New York: Routledge, 1993) pp. 86, 109. See also, Teresa Brennan, *The Interpretation of the Flesh: Freud and Femininity*, (New York: Routledge, 1992) especially pp. 83-134.
- [10] Anthony Wilden, *The Rules are No Game: The Structure of Communication*, (New York: Routledge, 1987) p. 138.
- [11] Paul Virilio, "Architecture in the Age of Virtual Disappearance," 1993 interview, excerpted in Anne Friedberg, *The Virtual World: from Alberti to Microsoft*, (Cambridge, MA: MIT Press, 2006) p. 183.
- [12] Stuart Ewen, *All Consuming Images: the Politics of Style in Contemporary Culture*, (New York: Basic Books, 1988) p. 14.
- [13] See, for instance, Daniel Lawrence O'Keefe, *Stolen Lightning: The Social Theory of Magic*, (New York: Vintage Books, 1982).
- [14] Zigmunt Bauman, *Liquid Life*, (Cambridge, UK: Polity, 2006) p. 3.
- [15] *Ibid.*, p. 9.
- [16] *Ibid.*, p. 10.
- [17] Avery Gordon, *Ghostly Matters*, pp. 17, 8.
- [18] Walter Benjamin, "Surrealism: The Last Snapshot of the European Intelligentsia," in Walter Benjamin, *Illuminations*, trans. Harry Zohn, ed. Hannah Arendt, (New York: Schocken, 1969) pp. 189, 182, as framed and cited in Gordon, *Ghostly Matters*, p. 204. Gordon continues, "It was this emphasis on [the surreality of] phenomenal forms, our habitual relation to them, and their capacity upon contact, to shatter habit...that motivated Benjamin to become himself a most astute and unusual ethnographer of ...profane illumination, to make out of it a whole dialectics of seeing replete with an optical unconscious."
- [19] See, for instance, Richard Stivers, *Technology as Magic: the Triumph of the Irrational*, (New York: Continuum, 1999).
- [20] See, for instance, Philip A. Mellor and Chris Shilling, *Reforming the Body: Religion, Community and Modernity*,

(Thousand Oaks, CA: SAGE publications, 1997). Mellor and Shilling argue that sensuous magical sensibilities have long been a subterranean or *baroque* aspect of the modern world, and that new technological forms of communication are today enabling an amplification of "sensuous solidarities" with each other and the world as an important vector of postmodern social forms.

[21] Erik Davis, *Techgnosis: Myth, Magic and Mysticism in the Age of Information*. (New York: Harmony Books, 2004) p. 211.

[22] Michael Taussig, *Mimesis and Alterity: a Particular History of the Senses*, (New York: Routledge, 1993), p. 212.

[23] Sol Yurik, *Behold Metatron, the Recording Angel*, (New York, Semiotext(e), 1985), p. 13.

[24] Emile Durkheim, *Elementary Forms of Religious Life*, Karen Fields, trans. (New York: Free Press, 1995 [1912]) pp. 360-373;

431-448; Marcel Mauss, *A General Theory of Magic*, trans. Robert Brain (New York: W.W. Norton and Co., 1972) pp. 19-20.

[25] Mauss, *A General Theory of Magic*, p. 107; Geza Roheim, *Magic and Schizophrenia*, (Bloomington, Indiana: University of Indiana Press: 1955).

[26] For a further discussion of this matter see, Christopher I. Lehrich, *The Occult Mind: Magic in Theory and Practice*, (Ithaca: Cornell U. Press, 2007) pp. 155-164.

Digital Resisto(e)rs

WILLIAM BOGARD

Lower your shields and power down your weapons. We will add your biological and technological distinctiveness to our own. Resistance is futile. You will be assimilated.

The classic Borg hail...

Many young people strangely boast of being "motivated"; they re-request apprenticeships and permanent training. It's up to them to discover what they're being made to serve, just as their elders discovered, not without difficulty, the telos of the disciplines.

Deleuze, "Postscript on the Societies of Control" [1]

A story about education in the future past:

She didn't have long to wait. Today she got her Motivator™, a small, virtually undetectable device, inserted under the fold behind her ear. The Motivator™ syncs your mood with the global mood, the sampled and modeled affects of the planetary multitude. Everyone who is anyone today is fitted with a personal Motivator™, a classy gadget that converts those downer drudge-work feelings into smooth running functions. Real-time parametric controls, networked, tight interface. The optimal output of a "motivator-ed" body is some operational mixture of fear and greed, all you need to get through the day. Add more parameters, adjust the tempos, and generate a whole continuum of real time dynamic effects: optimism, hope,

distraction, rage, enthusiasm. Still working on joy, not easy to model that one, but the smile is a nice touch.

So how's it done? How do you command the mood of a whole planet? It's all about controlling counter-rhythms, xonabytes of them. Counter- (or anti-) rhythms are lines of flight that interfere with the calibrated rhythms things need to run these days. What's innovative about the Motivator™ is that it can fine tune rhythms in the global mood, like fear and greed, by using your body's own affective resistance to them. It has been known for a long time that fear has a distinctive rhythm. One of the great advances in Affect Engineering (AE), an applied branch of advertising, came with the discovery that affects were responses to the timing of swarms of messages, and had almost nothing to do with the information they contained. What mattered for messages to have an affective impact was their collective beat or vibration. AE found that a body's resistance to message swarms could be integrated into the personalized management of affect in networked populations. Here's how. The Motivator™ tracks flight reactions to the rhythms of the swarm and makes small adjustments in the timing of incoming messages for each user (receptor), with the goal of flexible management of the planetary affective system. Yes, fear can be managed... damp it down for one, or a few, inch it up in tiny increments for the rest. Affect engineering, or modulation, governs the entire loop between networks and users. Too much fear in the system? The Motivator™ makes billions of tiny calibrated rhythmic adjustments and sends them out over networked populations like an oil slick. Too little greed? Fine tune the frequencies for each user, adjust and synchronize the counter-greed rhythms, the flights of generosity and giving and saving. Now is the time to feel hopeful, or to consume or produce, to be angry or docile. Don't ask who decides the right rhythms. Decisions are only micro-products of a machine that functions, although not autonomously, at least automatically. It's a thing of true beauty. The machine responds to the affective deviations it itself creates. Like any machine, this one works by breaking down. In the end, the Motivator™ must fail to control the global mood and thereby

initiate its own control function, much like a thermostat must fail to keep constant the room temperature it is designed to regulate. Only the Motivator™'s target moves. A mobile but digitally tethered population—no longer a multitude—of six and a half billion tiny interconnected thermostats.

In any case, her Motivator™ arrived just in time. The mood across the grid had become increasingly depressed. War, politics, disaster, economic crisis, nothing but a constant drumbeat of sad news. She'd been self-medicating to blunt the effects, but in the end that made it even harder to get up in the morning and go to work, let alone be enthused about it. She was distracted. Of course, this was the way the system always ran, distracting and depressing people until they burned out. Pills could manage the downward spiral for a while, but the Motivator™ brought everyone's desire back to productive levels. Thank God for the Motivator™.

With the Motivator™ her depression is put to work. Depression, despite its sadness, is in fact a mode of resistance. Even though it devastates a body's energy, it is also an escape line. Too much sadness in any particular user triggers the machine, which compensates by adjusting its personalized settings for the sad passions, each parameter finely tuned and responsive to the socio-chemical multiplicities that comprise the depressive continuum across the population. Now she, and countless others afflicted variably with depression, can go in to work and put on that smile you want, not only in spite of their sadness, their resistance, but because of it. Good morning, can I help you, what would you like with that, how can I serve you (smiley face)? Before the Motivator™, she had to feign that smile. But a smile is not just something you paste on. You have to adjust your whole attitude, keep your enthusiasm and energy up, be happy. You have to know how to use that smile, and how to precisely modulate it. Wide smile, knowing smile, sympathy smile, loving smile. It's a whole affect thing, not just the mouth, or the face... you have to be in sync, on the right rhythm with the messages that engulf you.

Her body resists; she is sad; no quick smile today. But this

resistance is integral to the production of a smile nonetheless, in just the way resistance operates in an electronic circuit. Variation in, flexible uniformity out. The assemblage kicks in. Operational depression. Functional sadness, and only the barest simulation of joy.

Control is the modulation of affect by means of varying the resistance of a body.

The system understands, and has long understood, that resistance is the whole point, that resistance is integral to the function of control. Control is the modulation of resistance, and her smile is the function of her body's controlled capacity to resist.

Information, Affect

I am trying to become clear about a problem. That problem presents itself to me as a relation between information and affect, between two lines of variation that differ in nature but that nonetheless flow and mix together. The same information can make a person happy or sad, the affective response is indeterminate. Information does not determine affect, since something immaterial cannot account for a material consequence. Yet to produce any response at all, information, it seems, must carry some affective force or charge. That force is its message. When information conveys a message, when it *communicates* something, then it does indeed have a determined, if not exactly determinate, relation to affect. This influence can extend even over one's power to act. Who has not felt empowered or disempowered by the force of a message? The problem is how this works.

My approach is not to study the meaning of messages, but their timing and delivery. Messages, of course, have enunciative functions, but they are also assemblages with rhythms, like percussive lines. Those rhythms are synthesized by machines along the temporal interface between information and the body. Control societies manage that interface tactically. For example, if there is a paramount problem for the accumulation and concentration of Capital today, it is how to synchronize transfers

of information over networks to the host of personal devices that connect to those networks—mobile phones, computers, cameras, appliances, automobiles, alert systems, a long list of contraptions. Synchronization of messaging devices, however, is only part of a wider strategic move to manage rhythmic lines of communication necessary to sustain Capital as a global or planetary network. It is not the meaning of messages, but the temporal modulation and rhythmic command of their global intensive quantities—the continuous, real time adjustments of frequency, compression level, tempo, tuning, volume, reverberation, etc.—that matters. Ultimately, modulation within control societies is a process of timing the adjustment and delivery of message intensities to support the demands of global economic and political power. These machines interface the body on multiple levels. They are the receivers and transmitters, sensors and jammers, data pads, control surfaces, and catalytic devices that enable everyday life and round-the-clock functionality in network society. For both information and the living body, in the context of postmodern global Capital, they are *means of controlling flight*, not in the sense of physical apparatuses of capture or enclosure as once employed by disciplinary societies, but rather forms of digital tethering proper to information societies and the message-scape. [2] Like most control strategies, they work by programming and managing resistance, controlling counter-rhythms that they spawn themselves. This process, however, also opens up new lines of flight, new rhythmic possibilities for messages to the outside. We see this everywhere in the free counter-rhythmic swarms of messages that circulate in underground networks, emerging digital commons, and mutant information clouds. Resistance, precisely because control societies mandate it to function, is never futile, and always an open invitation to break free.

From a statistical point of view, information is just the probability of a message's occurrence. The higher the probability, the less information. Even at this level, however, it is already an affective force, a desiring machine and force of production. To give an example to which I'll return, we see how global financial markets today have become no more than networks for gambling

on information probabilities (risks, futures, derivatives), i.e., on insurance. It's no surprise that these same markets are also swept away on waves of fear and greed. While the assemblages are new and different, the problem for Capital is not how to modulate the reciprocal relation between information and affect, or how to control their temporal encounters to extract the greatest profit from them. In this project, Capital targets the information-body interface. Tamp down the fear level along this surface, amplify the greed, or just the reverse, more fear, less greed, do whatever works for current conditions. Time information to sync with variable waves of affect in the population, generate mass motivation, and operationalize mass resistance. Aim for round-the-clock functionality. What matters to Capital is the tight, flexible coordination of communications and bodies that feeds the accumulation process. [3]

Messages can excite either joy or sadness, often a complex mixture of both. Our encounters with them are no different from those we have every day with friends and enemies, different kinds of food, or changes in the weather; our capacities to feel and see and think swing with those encounters, our energy and motivation rise and fall with them. Messages are *affections* that impact the whole, mindful body and its power to act. They accomplish this not just as "message" in the statistical sense, but as medium or "massage" (McLuhan), i.e., as communication. [4] Embodied in communications media, a message's machinic edges interface with the body in ways that produce in it a thousand tiny joys and sorrows. Who has not had both good and bad encounters with messaging devices, not just the information they transmit, but the devices themselves? The rhythmic sweep of fingers across a keyboard, a vibrating phone, a tactile process of assembly and installation. The problem of control of the information-affect relation comes down to the control of communications media, and this, not surprisingly, involves the problem of the media's contact with the body. Herein lies the problem of resistance.

Communication in control societies generates predominantly sad passions. Spinoza defines the sad passions as those that diminish our power to act as full bodies and minds. The

joyful passions, on the other hand, increase that power. [5] Communication can be joyous, of course, free from coercion and control. But so much of the time the sheer quantity, volume, and repetition of communications, and the growing number of devices that expose and bind us to them, overwhelm the effort to break away and act or think independently. Simmel observed long ago that, for the metropolitan man, too much information paralyzed one's sensibility and power to act. People tend to resist what they can't process and filter it out. [6] Information control systems target this resistance and adjust it to ensure that selected messages are not blocked out or avoided. Spinoza says that anything that exceeds a body or mind's capacity to be affected is like a poison, and communication, in the excessive ways it deadens sensibility these days, seems to conform to that rule. [7] And so the dilemma, how to escape or flee these systems? An information society that would increase our powers of acting and existing, that would truly connect us together in joyful ways and agree with our capacities to love and openly communicate, would at least have to discover and counter the ways control societies deliver and block messages, i.e., manage their timing and rhythm. Like an antidote to poison.

In his political philosophy, Spinoza points out the perverse need of those with power to produce sad passions in those without power. Today, echoing Spinoza, this is exactly the position of the capitalist media vis-à-vis its consumers. A climate of depression hangs over the field of communications. Everywhere we see the coercive effects of Capital on the capacity of messages and networks to connect people and produce truly joyful affects. There are many varieties of sad passions, but greed and fear are the twin sad poles of Capital. How are fluctuations in the rhythms of greed and fear calibrated to flows of information? Although the assemblages are complex, there is no shortage of examples—the mantra-like reporting of 9/11, the panicked yet precisely timed messages of economic crises, disasters and wars, pandemics, security risks, celebrity scandals. Then there is the whole 24/7 digital edifice of advertising and solicitation, simulation, the bio-informatization of the body and the multitude

—in short, the integrated global capitalist message-scape. The narrow psychological question of whether information "causes" or "influences" affective behavior misses the whole point. This is a question for advertisers. The real problem is how a mutual resonance of information and affect is established via the interface of messaging machines and flesh. The rhythmic modulation of information and affect is one of the key technological projects of post-disciplinary societies, and a dominant means by which networked Capital organizes its circuits of accumulation and coordinates them with the production of subjectivities. In one of its multiple modes today, subjectivity is just this coordinated adjustment of the intensive relations between information and affect. Although not using his words anymore, this is something that I take to be at the heart of Deleuze's concept of modulation in his essay "Postscript on Control Societies."

Affection, Affect

As Deleuze writes,

Affectus in Spinoza is continuous variation of the force of existing, insofar as this variation is determined by the ideas one has. He means that the idea indeed has to be primary in relation to the affect, the idea and the affect are two things which differ in nature, the affect is not reducible to an intellectual comparison of ideas, affect is constituted by the lived transition or lived passage from one degree of perfection to another, insofar as this passage is determined by ideas; but in itself it does not consist in an idea, but rather constitutes affect. [8]

Deleuze gives the example of how the ideas of two different persons, one of whom I like and the other I do not, can create different affects or emotions in me. These flow along a line of variation to which Spinoza assigns two poles, joy and sadness.

The idea of my good friend produces joy in me, or as Spinoza says, moves my soul in the direction of greater perfection, and increases my capacity to act. The idea of my dislikable friend, on the contrary, produces sadness in me. For Spinoza, "sadness will be any passion whatsoever which involves a diminution of my power of acting, and joy will be any passion involving an increase in my power of acting." [9]

Herein, Deleuze notes, lies Spinoza's political question: why are the sad passions apparently necessary, why do those in power always seem to have to inspire sadness in those without power and deprive them of their capacity to act, feel, and think? Behind the despot and the priest, the two paradigms of anti-democratic forces, lies the same desire for control, to enclose everything and set limits to its becoming. And this brings us back to affect.

To say that ideas "determine" affect does not mean that the variation in affect is reducible to the ideas that one has. An idea cannot account for its material consequence, in this case a fall or rise in the power of acting. Only another body can do that. Here we must make a distinction between affection and affect. As Deleuze writes,

An affection is what? In a first determination, an affection is the following: it's a state of a body insofar as it is subject to the action of another body. What does this mean? "I feel the sun on me," or else "A ray of sunlight falls upon you"; it's an affection of your body. What is an affection of your body? Not the sun, but the action of the sun or the effect of the sun on you. In other words an effect, or the action that one body produces on another. [10]

For Spinoza the materialist, action always implies physical contact; there is no action at a distance. Although the idea is determinate for Spinoza, insofar as any movement in the direction of the perfection of the soul requires adequate ideas, it is always a mixture of bodies that affects the power to act in this direction. It is this mixture that is precisely defined as an *affection*, in contrast to an *affect*, which is the power of acting as an effect of or reaction to this mixture. It is important not to

conflate these two concepts, since for Spinoza, affection, the mixture of bodies, is what diminishes or increases one's power of acting. A particular food may mix with my body in a way that is bad for it and reduces my power to act. It is not my idea of the food that makes me ill, but eating it. But I could have avoided eating it in the first place had I had an adequate idea of what it would do to me. To have an adequate idea of what a mixture of another body with my own body will do is to have the power to act knowledgeably to counter its negative effects, before they have a chance to harm me: don't mix with this, don't eat that, don't say or read this, avoid these people or actions. Likewise, an adequate idea of a body's good effect will increase my power and perfection. This is the kind of knowledge and power, and information, that priests and despots seek to deny us—to prevent us from having adequate ideas. Why? Simply to hold on to their ridiculous control.

Spinoza's concepts provide many clues for understanding modern control societies. Can we say that information is the idea and has a determinate relation to affect as the power to act but that this power is not reducible to it? If information is to mix with a body, it must be via the machines and material assemblages that communicate it. How do these machines (technical, political, biochemical), in the ways they interface the body and its multiplicity of surfaces, deliver information and adjust the body's response? How do they synchronize that response to the multiplicity of responses in a population, on a planet? How do they modulate collective affect, feeling, mood, and thought? Why do they produce sad passions (fear and greed)? What is their potential, as machines, for producing joyful passions, increasing our power to act, and assisting in the perfection of our souls? (Hello Donna's cyborg!) [11]

I have approached some of the problems of embodied information through concepts of haptic space (borrowing from Deleuze and Guattari) and distraction (Benjamin). [12] Taussig has also suggested ways that information directly engages the nervous system, and thus the whole body. [13] The organization and development of information control systems follows a

"haptic" logic that pertains not simply to "touch," its common meaning, but to the modulation of the entire range of feelings, emotions, moods, desires, and other intensive forces. On the cognitive and perceptual side of this problem, Benjamin's work on mechanical reproduction is a clue to the idea that modern information systems can function as distractors, directly engaging the body and mind in a mode of being (distraction) suited to the accumulation and reproduction of Capital, again immediately embodied in experience. Finally, information affects the will, in the sense of the capacity to resist a decrease in our power, and to act the reactive forces (information is a reactive force that can both increase and decrease one's power). Indeed, at both molecular and molar levels, modern information systems incorporate resistance into their very function. As Foucault says, power is resistance. [14]

Digital Resisto(e)rs

The connection between electronic resistors and political resisters is more than a metaphor in control societies. Both types of resisto(e)rs carry flows of information from the media. Both are hooked to assemblages that continuously re-calibrate their outputs. In the case of electronic resistors, these outputs are regulated voltages; for political resisters, for whom today so much intensity revolves around the control of their own bodies, they are managed affects. We need to understand the literal and material connections between digital economies and political economies, not merely point out their resemblance or structural similarities (in fact, they do not resemble one another at all). They do not so much look alike, as resonate together. The problem of a material relation between information economies and political economies can be approached through a concept of resistance. Resistance has a special meaning in control societies, since political resistance is directly tied to the control of digital information. This is even more true when we consider how information is delivered to, and extracted from, bodies. How, for example, does the political body resist information technology that decreases its power of action? How is resistance to

information functionalized and integrated in control societies? These are questions that have nothing to do with the structural resemblance of systems, but rather their actual and potential relations as complex machinic assemblages.

Resistance is power. It is the capacity of bodies to act (and counteract power). From the point of view of communications control, resistors are devices that impede the flow of current through a circuit, creating a drop in voltage between two points. Resistors are necessary and functional components of modern electronics, and communication networks would be impossible without them. They rely on Ohm's Law, which maintains that the voltage shift or potential difference between two ends of a conductor is held in proportion to the current moving through the conductor. [15] We are, quite literally, all conductors of information today, all communication channels. We are all digital resisto(e)rs.

Ohm's Law describes ideal resistors, those that cannot exist in the real world. But in nearly all cases, the approximation is close enough to the real value to be treated as though it was exact. The reason that resistors in the real world cannot function in perfect accordance with Ohm's Law is that in any given situation a range of external variables, including heat, distortion, and noise, all minutely affect the flow of current through a resistor.

There are several different types of electronic resistors, of which the most widely employed are fixed-value and variable resistors. Fixed resistors are simply basic resistors with a value that stays constant. A variable resistor is a simple resistor, but its value may be adjusted by means of a control. A *potentiometer* is one type of variable resistor that can be manually or automatically adjusted. [16] The way this device works is relatively simple. One terminal of the potentiometer is connected to a power source. Another is hooked up to ground (a point with no voltage or resistance and which serves as a neutral reference point), while the third terminal runs across a strip of resistive material. This resistive strip generally has a low resistance at one end; its resistance gradually increases to a maximum resistance at

the other end. The third terminal serves as the connection between the power dial or knob or lever. The user can adjust the position of the third terminal along the resistive strip in order to manually increase or decrease resistance. By controlling resistance, a potentiometer can determine how much current flows through a circuit. When used to regulate current, *the potentiometer is limited by the maximum resistivity of the strip*. The power of this simple device is not to be underestimated. In most analog devices, a potentiometer is what establishes the levels of output. In a loudspeaker, for example, a potentiometer directly adjusts volume; in a TV monitor, a potentiometer controls brightness.

We should ask, what are the knobs and dials that modulate the collective political body, that control its affective rhythm and resistance? In some ways, this is not a difficult question. I am touching one now, my computer keyboard, and staring at a screen. I am online and taking my pills.

Later someone will induce me to sacrifice my blood and bones to the machine, my eyes, my touch, my inner sense. I will become the dial itself, an informed, modulating body, the digital resisto(e)r in a controlled flow of messages.

Again, none of this is metaphor, but a pata-physical observation on our future past, a science fictional meditation on our historical and embodied relation to communication assemblages. Deep in nerves and muscles and bones, information does its work. I am not just attached to the machine, the machine *is* me, the medium, noise in, variable through, uniform out. Sad, sad vibrations this process produces—fear and greed, distractions in every direction. What form of will, what kind of communication, can resist these viral forces at the very moment it conducts them?

Part of the answer to this question is easy. New rhythmic lines emerge all the time to counter the sad drumbeat of the message-scape—new techniques of messaging, new flights of art only made imaginable by digital media devices, underground networks that give away information for free, new digital commons that move like swarms, spontaneous waves of online

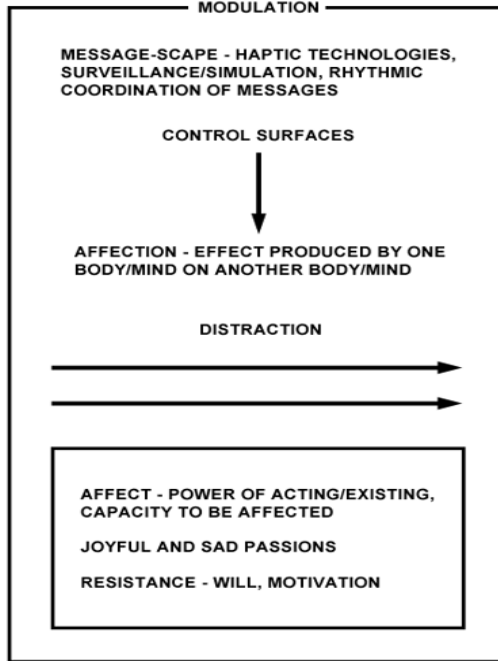
collaboration. Viewed temporally, these counter-rhythmic and even a-rhythmic projects are deterritorializing forces immanent to the control systems that draw on them to function. Digital resisto(e)rs have been part of control societies from the beginning. Despite being immanent to a sad system, they are also its subversive, joyful noises.

The other part of this question is harder. What exactly constitutes a counter-rhythmic message? How is it constructed or synthesized? Counter-rhythms are ways that time takes flight, the moments it breaks free of rhythmic control. Free time, as opposed to formal time, synchronized time, metric time, programmed time, segmented time. Free rhythms are improvised and connect to temporal lines that unfold outside the system, a feat programmed rhythms are incapable of accomplishing. Digital life today is so much about scheduled times of connection (the rhythms that command when to plug in, turn on, tune in). Digital life is subjected to synchronized multi-tempo-ed message lines (the rhythms of response to multiple messages arriving at different speeds). Most of all, digital life is about micro-calibrated, programmed repetitions. Slight modifications of the rhythmic pace of messages, slowing them down or speeding them up, small adjustments in their rates of compression and decompression, minor modifications to the lengths of repeated segments, all of these can change the whole *feel* of a communication, its intensity, the sense of its novelty and importance, its resonance and relevance, its beauty. Counter-rhythmic, joyful messages are always present in sufficient quantities in the control system to overturn it because the system produces them as something to control. But it is counter-rhythms that really set the temporal rules for the system, and that force it to continuously adjust its settings. What are vital are rhythms that are carried beyond their systemic, programmed reproduction and repetition, no matter how flexible and efficient this system is designed. We create these rhythms to the outside all the time, as part of our natural resistance to sad or dangerous messages. Joyful messages, for good reason, are often called upbeat. Rhythmically, they are light and fly unpredictably. Surprising and

Code Drift

untimely, they resist codification despite the system's best efforts to simulate and control them. In control societies, we are all digital resisto(e)rs, and resistance is not futile.

Beware of models



Beware of models, especially the ones with nice straight lines and boxes, like the one above. Imagine it folded, cut up, and hung as a mobile, or set on fire.

Deleuze claims that modulation is the logic of control societies. [17] Unlike disciplinary societies that "mold" individuals into fixed forms and serialize their transfers from one rigid control space to the next (school, work, home), control societies "dividualize" bodies and modulate control spaces. They dematerialize the tethers that once bound us to disciplinary spaces, and free us, with ingenious messaging technologies, to roam where they command. Digital territories surround and enclose a flowing, moving multitude without passwords. As part of this multitude, you must have a password to access anything today. But how you obtain one is another story. Control societies

dividuate in the sense of exercising selective, flexible control over codes. Once again, *flexible control over codes*. Your password, your code, and consequently that fractal dimension of your digital life—as consumer, worker, traveler—can as easily be revoked as granted, and changed at the stroke of a key or the flick of a switch. This reflects a dream of absolute control, because Capital forces you to use its codes and passwords, in fact it makes you buy them from it, and it also retains the power to modify them at will (digital proprietorship). Passwords impose a regime of completely flexible and immaterial but impermeable boundaries. Wrong password, sorry, no access or exit, but only for now, just this time or next, and this place or that... and then in an instant those codes, those locks, could change.

If modulation is a logic, it is also a concrete assemblage whose mutative effects are distributed across bodies and populations. Deleuze relates it to motivation as a form of demographic control. Young people today, he writes, strangely boast about being motivated, demand permanent training, etc. [18] This is not just a case of false consciousness. Digital control is directly tied to a will and a positive power to act. Control societies bind that will to communications media and, to the extent that they support a system of accumulation fueled by fear and greed, envelope the body in sad passions, training it and *draining* it of life at the same time. Rather than powers of positive becoming, networks and communications become forces of continuous education and readjustment. No longer limited to physical spaces, control can follow a moving population wherever it roams. Confinement and enclosure have new meanings in these societies—control without walls, wireless tethers, engineered chromosomes. Move wherever you like, within the confines of bio-electronic coils in which you are permanently wrapped. The younger generation, Deleuze writes, will have to find its own ways to escape these coils, much like earlier generations had to discover ways to resist the physical, serialized controls of the disciplines. Only now the problem is discovering ways to flee forces that use the body's own powers of resistance against them.

A modulation is the adjustment of an intensive relation between information and affect. Modulation functions via the message-scape, the complex assemblage of messaging systems and networks, to effect a mutual resonance of independent lines of variation composed of information and affective responses. This achievement involves a complex problem of *rhythmic coordination*, i.e., mixing separate and multiple rhythmic lines. More than simply confining bodies, which was the program of disciplinary societies, control societies demand the precise yet supple timing of feelings, moods, and emotions in a mobile society to synchronize or otherwise rhythmically coordinate with information emanating from the control system's own networks.

The rhythmic coordination of information and affect is an intensive project; it involves the timing and repetition of accents, beats, pulses, pressures and releases, special effects (reverberation, overdrive, distortion, etc.). These are all projects of modulation immediately directed to affective capacities and the production of joyful and sad passions. Rhythmic elements of communication can be compressed or stretched, concentrated or diffused, contracted and retracted, varied in speed, tone and timbre, amplified. It may sound strange to connect information to pressures and other intensive variables. But not at all: anyone who has danced to music has felt the connection of rhythmic information to affect. *Rhythm is the ecstatic contact of surfaces*, and the repetition of that contact—drum heads and instruments to hands, feet to floor, vibrations of the air against the inner ears of musicians and dancers, bodies against bodies, generating patterns of pressure and release. It takes possession of the whole bodies of the dancer and the performer, and their affective relation. The rhythms pass from surface to surface, along the interfaces of bodies, extracting intense feelings and powers. [19]

Was it the image of 9/11 or its intensive modulation, its rhythmic drum and drone, its over-amplification, its hyper-compression, eventually its *implosion* into the masses, that produced such intense reverberations of fear and insecurity in the population? Add dark music to those images, flashing lights, close-ups and color enhancements, and ratchet up the volume,

again and again, until affective energies are effectively distracted and drained. The pressures of a message are literally the pressures passed along the surfaces over which it passes. What are the surfaces of its transmission? Can any message be interfaced to the body in these ways? Do we dance to news? Do we dance to (with) the rhythm of our phones, and computers, and card swipes, and identity scanners?

Modulation encompasses the entire matrix of relations between the message-scape as affection, the production of affect, and the will/motivation to act. There is undoubtedly a better term than "message-scape," since it is neither a matter of a "scenery" nor a unified enunciative medium, "the message," but rather a complex network of information delivery and extraction systems. For now the term "message-scape" will do, since the term is less important than describing how these systems interface/interact with the body and regulate its affective capacities.

We should think of the interface of the body and the message-scape as a complex *control surface* that is continuously redesigned and re-engineered. A "control surface" is any machinic interface that modulates information and generates a continuously regulated output. Control surfaces can be almost anything—a computer keyboard, a chemical link in a chain of molecules, the grips of an exercise machine, a signal mixing board. As a musician who sometimes plays on a synthesizer keyboard, I think of relations of surface tensions between fingers and hands, weighted and counterbalanced keys connected to touch-sensitive parametric control pads that feed into computer sound banks, and how the result is calibrated sound and rhythm and affect. Control surfaces include screens and sorting devices of all sorts, anything that monitors, filters, and modulates information. Resistance, literally as pressure and counter-pressure, is an integral element in the design of control surfaces, and in the formation of control societies more generally, since it is precisely what is varied to achieve a regulated output. Control surfaces are essentially potentiometric arrays, i.e., matrices of variable resisto(e)rs (electronic, machinic, flesh) that modulate and convert flows of information into affective discharges.

Control surfaces come with built-in instructions. They are in a real sense the material embodiment of codes, like the programmed data entry keys on ATMs, or the monitoring pads applied to the skin of hospital patients, ergonomic and prosthetic devices. In the sense that they involve contact pressure, body to body, control surfaces are "haptic." Haptic control, as I said before, is not just the control of touch, but rather a technical and social program for the adjustment of sensibility as a whole, including proprioceptive awareness, the body's internal sense of its own position and movement relative to the outside world. Part of this program does indeed involve the development of technologies that reproduce or simulate the sensation of touch, but the full project of haptics is regulation of the entire continuum of perception and affective response. [20]

In that sense, the body itself is a control surface in this program. More accurately, the control surface is the haptic interface of the body and information. The whole point of affective control, at least within the historical and political context of control societies, is to dampen the will and the power to act, to limit the body's resistance as a surface of control.

The surfaces of bodies are literally resisto(e)rs in the transmission of messages—they are functional components of the assemblage. This does not imply any kind of technological determinism, only suggests how the assemblage works. In fact, resistance is always the expression of an opening or crack in the machine, the line that opens when it breaks down, even as it supplies a necessary function of the assemblage. No machinic assemblage is ever closed or determines action in an absolute sense, it always opens to an outside.

The body-information interface is the surface on which affection (now as rhythmic message) and affect intersect, and this is the relation that is subject to manipulation and control. Just as we avoid eating things that are bad for our health, we resist those affections that diminish our power to act. Spinoza, once again, saw the relation of affection to affect as a question of the will. The desire of those in power is to check and diminish that power in others. He viewed the diminution of the power to act as tied to

the production of the sad passions. An affection is the effect of one body on another body. When we say we are affected by information, have an affective response to information, we are referring to how we embody that information. The body-information relation actualizes as a material control surface for the modulation of messages to determine affect and will. The control surface is itself a field of potential resistance. This surface has the potential to connect to the outside and amplify the body's power to act (hello again Donna Haraway), but today, in the context of control societies, it is mostly a field for the play of sad passions.

How is all this connected to rhythm? Once again, take the examples of fear and greed, the dominant affective poles of Capital. An elaborate network of distractive mechanisms supports the production of these affects. In the twentieth century, Walter Benjamin viewed perception in the mode of distraction as a necessary function of art in the age of mechanical reproduction. This is even more so today. Distraction in the form of messages timed to manipulate receptive faculties and control fear and greed is the strategic logic of capitalist media. In the end, the power of the modern media to distract us has less to do with the information it broadcasts than its affective timing. Distractions, precisely, are breaks in rhythms, breaks in the operation of messaging machines, which is to say, they are points of affective change. Of course, distractions are not unique to control societies. They are social-historical forces, strategies and tactics directly productive of power and powerlessness. Sun Tzu, for instance, reminds us of the strategic importance of distraction in the conduct of war in ancient history.

In any case, a control surface is an assemblage that transforms resistance to control into a function of control. Its purpose is to modulate the affective outputs of the body (its feelings, its power to act) and, to the extent that bodies can merge with the message-scape, to mobilize the intensive energies of entire populations that are, in all other respects, unconfined and mobile.

Mood enhancing pharmaceuticals are a good example of

modulation. Take a pill wherever you are and adjust your body's resistance to information emanating from its external or internal environment. Take a pill, and the chemical reaction will return you to normal, where normal is a variably calibrated value. The timing and dosage depends on the force and quality of your resistance. Variable resistance is both necessary and functional in this system. The transmission of the "message" encoded in the pill depends on the mismatch of the output with the norm. This is not an equilibrium model, however, but one that demands that resistance levels be permanently maladjusted to their milieus and subject to adjustment.

By science fiction standards, pharmaceuticals are primitive modulation devices, and we can easily invoke future assemblages that will work more invisibly at the root level of affect. Your Motivator™ is on the way, always on the way. The point however, as Deleuze notes, is not the technological example or some futuristic vision, but rather the abstract machine, the machine of modulation and control. [21] We can find almost too many examples, but for every one of them, variable resistance is the goal, or in other terms, a program to convert the body into a communication control surface and regulate its capacity to resist, and for that we don't have to imagine anything more than the mundane operations of Capital today.

Affect and High Finance

What forces are we being made to serve today? A Marxist critique of the 2008 crisis in global financial markets would be instructive in many respects, not least for its class analysis of the crisis, of the role of financial institutions in the theft of even more wealth from workers and the poor, the massive numbers of women and children thrown into poverty and servitude by the cavalier trade in financial instruments, the growing insecurity and precariousness of life for the huge majority of the world's population as what is common to all—language, dignity, air, water, food, work, freedom, everything needed to survive—is offered up to the gods of accumulation and profit and war. For whatever reasons, Marxism is not too interested in the affective

dimensions of the crisis, even though fear and greed have long been the driving forces of Capital, and they are even more intensively conveyed over digital networks today. Marxism's measure of value in the end remains extensive, not intensive. Even use value, the qualitative and arguably affective pole of the commodity, is limited by a formal theory of needs that is at best indifferent to their singular intensities and wavelike propagation.

There has been a debate within Marxism about the status of information economies, whether they are somehow fictitious or not. [22] Right away, the question is posed wrongly as a dialectic between fiction and reality. This question sees the financial crisis as an extension of the value crisis in the real economy, a view that frames the crisis in terms of Capital's ability to drive down labor costs and stave off falling rates of profit, instead of a crisis in Capital's ability to control the affective values of communications networks. Because real and fictional economies are viewed as opposed to each other, Marxist thought, even in its updated modes, cannot grasp Capital as a machinic multiplicity across which powerful affective energies are mobilized.

The problem is not the difference between fictitious and real economies, but the machinic surface where immaterial and material economies mix functions. One side of that surface faces information, the other the body. This is the intensive surface of control. Even if it is entirely driven by the speculative value of information, financial capital has never been a fiction. It is a machine whose inputs are noise and whose outputs are fear and greed. In between there is a control surface that translates a field of messages from one that cannot be valued in either economic or affective terms into one that selects and syncs messages to time with mood swings in populations. What kind of rhythmic information produces the fear and insecurity necessary for markets to operate? What low drumming of dark rumblings on the horizon, behind your back, overhead...? What polyrhythms produce greed and other corruptions, the ecstatic desire for more? It has long been known that financial markets move in rhythms, but the concept of rhythm has been reduced in these theories to a

metric. Economic cycles are recorded in years and market ratios and other equivalences. But where are the affective rhythms of the market, the incomparable waves of panic or the feeding frenzies that fuel the circulation of financial information?

Financial speculation, as many have noted, is a kind of gambling. As his luck changes, a gambler oscillates between the greed that makes him believe he can win everything and the fear of losing it all. It is all about controlling this oscillation to manage risk. Apply this to finance. Absolute fear is bad for the economy because it creates too much resistance to risk... However, some fear is necessary to deter risk-taking that could crash the market. The problem of financial risk, from the point of view of affect, is essentially a problem of finding the right mix of fear and greed, and this is a problem of adjusting the rhythms of communication, no matter what may be a particular communication's fictional or real relation to Capital. The most recent crisis of financial capital could be seen as a failure of the machine to control the value of information, where value has not just an economic sense but an affective one as well.

We could put this in the economists' language. For them, markets are like other natural phenomena—they ebb and flow. Measuring their time cycles can help assess the probability of a market making a trend reversal. Market analysts of finance have long been aware of the existence of market cycles.

Financial market cycles are thought to relate to the behavior patterns of individual market participants acting *en masse*, e.g. as a crowd or a population. Investor sentiment continually changes in a limit cycle—moving from greed, which causes prices to rise, to fear, which causes prices to fall.

A knowledge of cycle theory can be used to measure this "natural" rhythm of markets, and this information may be used for timing and entering a trade. Of course, this rhythm is anything but natural. It is a sociotechnical machine, and the measure of its knowledge is metric, not intensive. Nevertheless, almost despite itself, it produces a myriad of affects, and it does so by attempting to anticipate and control the so-called natural rhythms of the market. What is crucial is knowing in advance when the

market starts to turn, when fear begins to switch to greed. The rule is to be greedy when others are fearful, and vice versa (Warren Buffet's mantra). All manner of tactics are employed in this process, but suffice it to say, computer modeling, speed, and networks are central to its function. Financial manipulation of the markets is a determined effort to adjust affective rhythms before they unfold, and buying and selling at the anticipated rhythm of exchanges has just that effect.

Despite buying into the fictitious-real dialectic, Marxism today, to its credit, recognizes that it is problematic to try to separate immaterial and material forms of capital, and that Capital has reached a kind of limit where uncertainty about this separation has exposed a limit in Capital's ability to control any values. The cost of information, especially information about the future value of financial instruments that bear virtually no relation to the material productive forces from which they derive, and which can be almost freely reproduced, traded and distributed over digital networks, has become almost impossible to calculate or fix. Even the most orthodox Marxist critique of Capital today recognizes that we are entering a radically new phase of production in which the relative autonomy of the so-called real economy is at stake.

We read about the "culture of fear," risk society, or climate of terror. All these concepts make an effort to theorize the relation of information to affect. But they all lack a mechanics, and they do little to explain how information is embodied. The integration of computer networks and biopower technologies over the last 60 years, and its dominant role in how Capital structures accumulation today, has made this theorization all the more urgent. Today, communications networks remain closed, demand passwords and codes, and fall under the control of corporate and state powers that would use resistance to further their domination of affect. Sad passions. It is also true that resisto(e)rs are discovering new ways to break digital enclosure, bypass codes, and free the flow of information, to increase the joyful passions and the power to act. Much work remains to be done.

Notes

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[2] Bogard, William. 2007 "Coils of a Serpent: Haptic Space and Control Societies." *CTheory*

<http://www.ctheory.net/articles.aspx?id=581>

[3] Cf. Hardt, Michael, and Antonio Negri. 2004. *Multitude: War and Democracy in the Age of Empire*. New York: The Penguin Press.

[4] McLuhan, Marshall, and Quentin Fiore. 1967. *The Medium is the Massage*. New York: Random House.

[5] Deleuze, Gilles. 1978. "Lecture Courses on Spinoza's Concept of *Affect*." <http://www.webdeleuze.com/php/sommaire.html>. All subsequent references refer to this text.

[6] Simmel, Georg. 1903(1964). "The Metropolis and Mental Life." *The Sociology of Georg Simmel*. Edited and translation by Kurt Wolf. Glencoe: Free Press: 409-417.

[7] Cf. Deleuze, Gilles. 1988. *Spinoza: Practical Philosophy*. San Francisco: City Light Books; also Deleuze, Gilles. 1978. "Lecture Courses on Spinoza's Concept of *Affect*."

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[8] Deleuze, 1978.

[9] Deleuze, 1978.

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- [15] "What is a resistor?" <http://www.wisegeek.com/what-is-a-resistor.htm>
- [16] "What is a potentiometer?" <http://www.wisegeek.com/what-is-a-potentiometer.htm>
- [17] Deleuze 1992: 3.
- [18] Deleuze 1992: 7.
- [19] Cf. Turetzky, Philip. 2002. "Rhythm: Assemblage and Event." *Strategies: Journal of Theory, Culture & Politics* 15(1) : 121 – 138.
- [20] Gibson, J. J. 1979. *The Ecological Approach to Visual Perception*. London: Houghton Mifflin; Paterson, Mark. 2006. *The Senses of Touch: Haptics, Affects and Technologies*. Oxford: Oxford University Press; Salisbury, K. 1995. "Haptics: The Technology of Touch." *HPCwire Special*. Nov. 10, 1995; Hodges, M. 1998. "It Just Feels Right." *Computer Graphics World* 21; Porter, Lake and Jutta Treviranus. 2006. "Haptic Applications to Virtual Worlds." University of Toronto Adaptive Technology Resource Centre; <http://www.utoronto.ca/atrc/rd/vrml/haptics.html>; Marks, Laura U. 2004. "Haptic Visuality: Touching with the Eyes." in *Frameworks* 2:1. http://www.framework.fi/2_2004/visitor/artkkelit/marks.html.
- [21] Deleuze 1992: 6.
- [22] McNally, David. 2008. "From Financial Crisis to World Slump: Accumulation, Financialization, and the Global Slowdown." Full text at <http://marxandthefinancialcrisisof2008.blogspot.com/2008/12/da-vid-mcnally-from-financial-crisis-to.html>

Something Is Happening

JORDAN CRANDALL

I

Something is happening just around the corner. In the expanse of an ordinary summer afternoon, people have stopped on the sidewalk to stare. Heads are turning, necks are craning. The air is annotated with the pointing of fingers: Look over there! Without knowing why, I begin to submit to the happening-thing: I move toward the center of action, as if being caught up in an energy vortex. I want to apprehend what is happening by attuning to it somehow—absorbing myself in its galvanizing force. I want to belong to the crowd, inhabit the mood—caught up within the collective rhythms, inhabiting the waves of coordination and divergence.

Even when feeling sluggish on a hot summer day like this, there is no denying the erotic pull of this absorption: at the onset of the happening-something, one's body instantly kicks into gear. The listless gaze becomes focused, the pulse quickens, and the sensorium is ignited. The heart and breath adjust to the accelerated rhythms of the external. Yet the atmosphere plays a heavy role: the humid, sizzling air of this particular summer afternoon continues to lend a sticky, sultry feeling. One is aroused yet slightly irritated, infused with a bristly sensuality. Passions flare up, veering between amity and antagonism. In moments like this, anything can happen.

I move toward the happening-something. I join the assembling crowd, glistening with sweat and expectation, synchronized with its pace and beat. Shouting is audible, but not much is visible. I feel sparks in the air. I sense something wild, unleashed—an eruption of hostile and joyous energies. Is it a scuffle, I wonder? At the onset of this thought, I feel a rush of

excitement. What is it about the potential of a fight that always whets one's appetite? Or even better—a BRAWL? But perhaps it is nothing much, and I am merely succumbing to anticipation—that wild force, source of anxiety and thrill, that stretches toward the space of the moment, infusing it with the promise of untold adventure. Concepts can rush into this space, but they can just as well be emptied from it: one can read into it, courting words, or one can read through it, cultivating intensities.

Perhaps I am succumbing to anticipation in order to conjure its devilish accomplice: temptation. How delicious are its torments! It is a compelling anguish, this anguish of temptation: that generative mechanism through which familiar routines are destabilized by the unfamiliar, and enticements can overcome prohibitions, or at least jostle with them, however briefly. One wants to know what is happening, but one also wants to suspend the demands of knowledge and instead savor the unknown—or at least, a kind of knowingness that can incorporate the irrational. I may want to visually possess this unknown something, filling a lack, but I could just as well want to be absorbed into it, channeling abundance. Something extraordinary is brewing, something that is poised to spill over, exceed the bounds, and perhaps catch me in its wake—an invigorating gathering-something through which I anticipate a release, a discharge, dangerous and soothing.

I cannot discern anything. A spectator points in the direction of the happening-something, but I cannot see what he is pointing at. The event does not resolve to this or that. I can only sense a blur—a little maelstrom, a little cluster of chaos. A slight rhythmic divergence. A moving arm—was that a punch? (Another jolt of excitement!) How interesting to compare the gestures: on the one hand, there is the closed fist of the fighter; on the other hand, there is the pointing finger of the spectator. A fast-forward thrust; a hesitant gesture. A direct contact with a body (THUMP!); a directional indicator of its placement (THAT!). If the open hand, in gesturing, deals with meaning—a vocabulary of direction and velocity—then the closed one, in punching, cuts

through it, eradicating distance and time. They often work in conjunction, in law as in crime.

Extend the middle finger rather than the forefinger and turn the forearm upward. The harmless gesture of pointing becomes an extremely hostile one, whose power is derived from its implied contact. The words FUCK YOU can accompany it, adding force. But speech is not necessary—the gesture is enough. As recipient, you feel a wave of anger, as if the finger had indeed touched you, made its intended contact with the vulnerable flesh of the ass.

Of course the inciter does not intend to actually follow through with this implied contact. It would disgust him. There is a certain hesitancy; the finger only goes so far. Yet sometimes a contact is precisely what is solicited: the gesture is intentionally geared to incite you to fight. The proffered finger taunts you. No longer hesitant, it extends an appeal. It quivers with a need for contact and expenditure. By way of the gesture, his assembly hails yours, opening itself out to you, daring you, teasing you. Come, let's resolve this! Hostile energies swell up, demanding release. If you take up the invitation, things will get messy. Something will have changed; the arrangements may never be the same.

The happening-something congeals at the fulcrum of our attention. However it is not a bounded entity *over there* for it includes the assembled crowd *here*. Or rather, the crowd includes it: there is a symbiotic relation, one bound up within the other. The happening-event is a dynamic formation that can span formal distinctions like inside and outside, actor and audience. There is indeed a focus (the fight?), yet the energies of the event reverberate outwardly in all directions. Undulating, it traverses the arena of action, loosening social ties and unraveling protocols.

One finds oneself suddenly communing with strangers, brushing shoulders with them, sharing a bond with them. Absorbed in the gathering, I feel the sweat of the man next to me, his heartbeat, his anxious pleasure. I feel someone's hot breath against my skin. A vibration passes through me, which could

become a murmur. We, the gathering crowd, stand close to one another, closer than we would otherwise be. *Something comes alive*. A charge passes through us—a current that can suspend the dictates of language and social convention. When we disband, it fades: witness the aftermath, the uncomfortable exchanges, the half-nods, the cursory goodbyes, as if we don't quite know what to do with this strange new intimacy that has unexpectedly opened up. Social protocols, momentarily suspended at the onset of the event, now seep back in, traversing the arena like fault lines. We go our separate ways.

After the initial rush, the ripples of attraction and avoidance ebb and flow, rise and fall. Social codes can be suspended, but they quickly seep back in, coming and going in waves. There are rumblings, disconnects, subtle breakages. Destabilizations, then convergences. A woman moves up behind someone in order to see the happening-event, but then, sensing that she is too close, she steps back a notch. The man she has bumped turns to look at her, admiringly; she half-smiles at him awkwardly and then turns away. Did she find the man repulsive? Or was she simply embarrassed at the force of her drive toward the happening-thing—the hunger of her desire for absorption? How telling are these suspensions and retreats! One always recoils from a sudden, unanticipated closeness—"gathering oneself," adjusting the hair, smoothing the dress. A collapse spontaneously happens within the space of the everyday, as if the ground suddenly dropped out beneath us, only to be quickly patched over with a prohibition—a culturally imposed restriction. (One shouldn't do such things!—what will people think?)

Because of the imposed restriction, the experience can linger in the body's memory as a strange fascination. A sensation of contact, a smell, a contour, a rhythm, a texture: qualities that can stabilize as a recurring fantasy-element or sensorial motif. Qualities that can adhere in a specific form, fade away, or get absorbed into other composites. The imposition of restriction is the motor of eroticism's enticing anguish—the engine of temptation's torturous pleasures. It is the alluring tension of the restraining strap, the ritual, the *risque*.

Immersed within the happening-event, one does not talk much, as if words cannot begin to capture the enormity of what is happening, or what might be happening. Unless it is carefully modulated, speech cannot do justice to the eruptive event. Speech can cheapen it, destabilize the solmerness of its captivating unity. Speech can spoil the mood—as during a funeral or a sexual encounter, where one relies not on words so much as the intangibilities of atmosphere, movement, and touch. The sigh, the moan, the gasp: modulations that flirt with speech but stop just short of it. Mumbblings, murmurs, hushed tones: modulations that spill into speech, match the situation's rhythms and tones, amplify or diminish them, reverberate in accordance with them. Conversation is minimized; if there are words, they don't diagram so much as punctuate, adjust flows. Expressions and gestures come alive.

Because of this suspension of mediation, the event exerts an absorptive power. One reaches out through non-linguistic forms of body contact and exchange, as if opening the body, extending it. One frowns, peers, expresses concern, worry, or frustration, covers the widening mouth, clasps the hands. Adrenaline flows, the body heats up, lubricates itself, swells. What is this but a carnal dimension of anticipation—an anticipation of some form of contact between one's body and something else, and, correspondingly, the body's physiological READINESS for such a potential encounter? Through readiness, the body opens out in expectation, but at the same time, through readiness, one creates a space or place for oneself—a stabilized "I." Bound up with this is the modulation of flow and speeds—a form of rhythmic adjustment, quickening or slowing the body in relation to someone or something else.

There is a mimetic component to this. Sometimes one simply imitates the gestures of another. Someone points, gasps, murmurs, and I do the same—as if to say, I understand you, I am with you. I synchronize rhythms in the service of a social standard, covering ambiguous states of affective stimulation with culturally acceptable fronts. I filter my *jouissance*—my unadulterated, a-categorical arousal. These gestures are not about

meanings so much as modulations—valves that can channel readiness, calibrate its flows. As with the suppression of the laugh: worried that I might exceed the acceptable, I cover my mouth, adjusting the intensity of the guffaw.

Gesture: a directional indicator (sign), or a modulator of flow (valve). A gesture, whether unconscious or intentional, that is bound up in whirlwinds of language and affect, desire and convention, or signification, rhythm, and intensity. A sign-valve of anticipation or avoidance—between opening up to potential contact or limiting the connective glow, lest it be too much, too soon: overflow. A directional indicator; a modulating interface. Moving forward in anticipation; retreating in aversion. A concept summoned or evacuated; an intensity amplified or diminished.

The contacts that we anticipate are like those that we have made before. We know the score. The body remembers, responds accordingly. Even while learned and mimetic, this is not just about language. It is about an affective reproducibility: a sensory experience that hardens into a template. An affective template, or a formula—coalescing somewhere between the imposed and the emergent.

Resonance, coding, and formulation: the bonding and stabilizing axes of the happening-something. Affectivity, language, and reproducibility. Energies, signs, and standards.

The happening-event, pulsating with attractive energies, draws me in, harnesses my attention, my desire. I move toward it, submit to it. It is like being drawn to an alluring person, and feeling the stirrings of arousal as they well up in the body. And yet here, within the dynamical pulls and eddies of the happening-event, it is not really a person that one desires. It is a combination of things: people, parts, event-components, and atmospheric elements. Actors, whether organic or inorganic. What excites us is a mood, a quality of movement, a way of being. When you desire a person, you focus on specifics—the lips, the breast, the quality of the skin—however it is the entirety of the situation that matters. A sensory composite, intangible and grand like the weather.

When was the last time we fully grasped that enormity? As a creature of discernment, one frequently misses the forest for the trees. As a young child, much to my parents' horror, I would escape the confines of the house during a summer thunderstorm, running out to the most exposed place I could find—an open field, a street, a roof. Once in place, I would remove my clothes and stand with my arms spread wide, as if inviting the storm inward, allowing it to swallow me, pass through me, while at the same time extending myself outward, as if to become its voluminous and fiery presence. The glistening rain mixed with sweat conducted a liquidation of the body and generated a lubrication: everything interpenetrable, wet and sliding. There was no sense of danger (being struck by lightning). There was only the flirtation with it: the activation of a deep level of readiness, where desire and fear commingle and sensory activation, intimate and majestic, is all that matters.

II

Perhaps it is a submissive experience of a certain scale, intensity, and rhythm that I seek, in order to lose myself and find myself again, extended, elsewhere—the anticipated fight (or brawl!) providing one interface, one modulation of the maelstrom. So it is at this moment, as I stand, in varying degrees, both within this space of this essay and the space of the street, on this humid summer day, restless and sticky amongst the assembled—the glistening, undulating mass, quivering with sweat and expectation, which yearns to experience the happening-something. Feeling its power course through us, we submit to it, and it submits to us. The desire, like wind, sweeps us up.

But wait—could the ambiguous thrusting of arms, jutting outward from the center of the happening-thing, belong to dancers rather than fighters? Rather than a fight, with its particular brew of hostile and joyous energies, might the happening-something instead be a frolic? The gestures of the dancer can at times resemble the pointing finger of the spectator and the closed fist of the fighter—the indication and the punch;

the hesitant gesture and the fast forward thrust; the interval and its evacuation—as both are subsumed within larger, rhythmic whirls of signification and intensity. Immersed in the dance, one is overcome by the rhythm, hips swaying, arms lashing, hands wild with gestural flux. Hair and breasts abounce, one joins the pulsating, writhing mass, synchronous and dissonant, at times riding the beat, at times turning it, breaking it. Appendages sprout from, swing through, and motor the convulsing crowd like cranks and valves. Gestures signify through rhythm and reference, but they also contour flows, celebrating meaninglessness, as if poking through the bubble of language.

I am immediately reminded of the pleasures and anxieties of dancefloors past, with their captivating assemblages of dancers, lights, undulatory motions, desires, and rhythmic vibes. Poised at the edge of the dancefloor, I experience a longing for attunement—for the sense of being synchronized with the writhing bodies, caught up in the undulations of the collective throbbing-thing. A common attachment, a belonging, a seamlessness that can toy with the boundaries of the body. I want to *give in* to the dance; I want to *let go*. And yet I hesitate, comforted by my inertia in the face of the moving, my observational status in the face of the displayed, my discipline in the face of the indulgent: my assumed mastery of the situation. The position that allows me an authorial and authoritative voice—the voice that I adopt in the space of this essay, as it overlaps with the space of the street. I am at the edge, standing on the curb—the sidelines of the action. To relinquish this position is to be exposed, made vulnerable, put on display—subordinated.

I could be at any nightclub, or an assembly of all nightclubs, but here I am: standing at the periphery, just outside the arena of action, affirmed by my sense of *control*. I feel that I am in control of the *situation*. The situation involves not only how I see, but how I am seen. It involves not only an image of control but a sense of it—a sense that arises by way of proprioceptive circuits, as it coalesces in a form of corporeal apprehension and manifests in subtle qualities of posture and movement. The situation is the apprehended totality of the

happening-event—the assembling-event as sensed and known. It includes not only my subjective position, but my own sense of self-in-movement; not only my objective position, but my moving self as sensed by others. It includes not only my position but my sensory-corporeal movement as sensed from within and without: my passage.

I assume power by way of my being staged—visually and sensorially—as empowered. This staging is manifest in how I hold myself, how I move my eyes, how I move my body.

I think I know the score. I sense the conditions of the game that I think I'm playing, and I stage myself accordingly. I try to apprehend the conditions according to which the gathering plays—its constitution and its disposition—and I adjust myself, modulate myself, in accordance with that. A potential role emerges. What role do I play? When I adopt a role I take a position and move convincingly in an intensive or expressive way. I endeavor to "pass" *as* something or someone, whether for myself or for an other. My role is subjective and objective, material and expressive; it involves both positioning and passing. To adopt a role is to sense what is at stake: to *trust* the assembling-event's constitution and the integrity of my potential role in it.

Whether on the street, on the dancefloor, or in the essay, the initial unity of the situation always breaks down. I look to my left, and one person, fully surrendering to his desire, has become unhinged, hurling himself through the crowd, arms thrashing about, head abob. A loose bundle of uncoordinated and undisciplined movements, I think, and this judgment somehow makes me feel better: I am *not that*. A renegade sentence potentially invades this paragraph, and I immediately reject it: *I* would not say that. Fault lines traverse the event—some actors attract me, others repel me; I align with some, but not others. I may want to belong to the happening-something, submit to it—but not *all* of it. I can understand this belonging in terms of subjectivity and identity (a distinction to be made, a difference established), or in terms of alignment and acclimation (a

modulation to be made, a flow amplified/diminished). A lack to fill, or an abundance to channel. Or both.

I yearn to experience this happening-event, this *extraordinary something brewing*. It promises to fulfill a lack in me. And yet my desire is not to possess it, in such a way as it would fulfill some fundamental loss. Rather, this happening-thing, rife with excess energy and potential, activates the abundance already within me: *it shows me what I already have*. I don't want to gain—I want to *lose*. A concentrated eruption of abundant energies, whether understood as hostile or joyous, the happening-something is that which might spill over, exceed the bounds of the norm—and this possibility fills me with excitement. I feel a delicious anticipation of an overflow, *a discharge that releases and extends me*. I *expose* myself to it. And I modulate myself in the face of it: I modulate how much of it I want to absorb, how much of it I want to channel and release. I modulate how much I want to *show*—how much I want to stage of it.

One assumes the position (in language) and solicits attention. One modulates movement (in sensation) and channels extensibilities. My subjectivity is constituted in this conflux: an assumed center of being.

Absorption and integration. Absorption and release. At times there can be a loss of self, dissolved within the shifting material and sensory composite. In these moments, when I am "inside" it, I can say that the happening-something appears to be unified, inclusive—stabilized. Yet the loss of self is temporary. A constellation of provisional platforms sprout, wherein one momentarily stages oneself—perhaps, strikes a pose. The rhythmic waves are those of unity and disunity, stability and instability: absorption, integration, staging, and release. I absorb and incorporate something of the happening-something, in order to retool or enrich my self. I stage myself as *someone or something*. I separate or release in order to shore up my individual boundaries. On the one hand there is a soothing: I am OK, I belong. On the other hand there is a productive friction: I do not belong. Through this pushing and pulling, banding and

disbanding, a sense of self stabilizes, playing out in terms of both signs and energies: linguistic distinctions and the calibrated interfacing of flow.

In linguistic staging, one accepts or rejects. In intensive flows, one absorbs or releases. One negotiates a play of position-in-movement: here and there, this and that; open and closed, forward and back. In staging: revealing and concealing. In flows: availability and withdraw. This stabilizing and destabilizing dynamic is the very essence of eroticism: the desire for a disassembling, a mingling, a flirtation with continuity, as it is always bound up in a dance with its opposite. I want to be intimate, so close that I can touch the happening-something, feel its pulse and sweat. Hold it, stroke it, lick it. But not too close. I unloosen, but not so much as to lose.

I might open one button, but not two.

III

When we desire someone, what is it, exactly, that we want? To possess them, consume them, belong to them, be like them, or be like the way they are? One says things like: "I'm so into you"; "I could just eat you up"; "He's mine"; I see someone alluring, and I am fascinated by how that person moves—how they *are* in the world. Perhaps I just want to absorb something of them. Not to absorb him, but a way about him. Not to possess her, but to attune to her atmosphere—and through that, to the other atmospheres of which she is a part. What I find desirable in others could well be their own embeddedness in social atmospheres that I want to be in. Or, the simple fact that they are in them at all—that is, that others desire them. What is desire then but the drive to be incorporated into a happening-something—an eruptive collection of actors, parts, and atmospheric elements? To absorb an atmosphere, and get absorbed, in such a way as to draw out the movement, activate the senses, and reaffirm the (neglected?) body. To get absorbed, in order to prompt an affirming rearrangement, setting forth integration and expenditure. To destabilize, if only to consolidate, extend.

In spatial terms, this is the labyrinthine dance of seduction: a dance of revealing and concealing, advancing and retreating, stabilization and destabilization. A swirling, recurrent choreography that plays out like a striptease. Desire is fueled by the reassurance of ritual and the promise of untold adventure—recurrence and potentiality. It needs its routines, but without the cultivation of the unknown it evaporates. It is the very dynamic of the dramatic form, where the protagonist must be challenged, must overcome an obstacle that poses a threat to the self—a process that subsequently changes her. Desire is fuelled by duration, characterized by an element of friction: anticipation's expanse. A prolonged venture into the twisting corridors of the unknown. I want to know, but not too soon. I want to wait for my object of desire, work for it a little bit. But not too much. Temptation has everything to do with time: too little and it cannot take root, too much and it turns into frustration.

The assembling-event never coalesces as a knowable thing but rather facilitates a kind of unknowable-ness. It harnesses the absorptive power of knowledge, fueled with its promises of mastery, but it does not deliver: it harbors not a truth but a formula. It cannot be relied upon to resolve to a specific outcome, but rather to continually engender a set of possibilities whose outcomes we anticipate. Its absorptive power is the very dynamic of seduction. The negotiation of stable and unstable meaning (or knowing and unknowing, signification and sense), as attuned to the rhythmic contours of the assembling-event, is the source of the dancer or fighter's allure.

A man frequents a sex club in New York City. It is dark and mysterious, with twisting corridors, alcoves, and chambers. For some it is a menacing construct, no less for its smells—sweat, semen, poppers—than its sense of lawlessness, its potent mixture of desire and threat. Yet one always seeks a generative danger, and who knows where and how it will materialize. A low-level porn soundtrack plays continuously, punctuated by heavy breathing and groans of pleasure. In the twisting and turnings, in the forward movements and the retreats, the man loses himself.

If not the place, one knows the dynamic: the ambiguous glances signaling both availability and withdraw; the dark folds of clothing that both expose the body and cloak it; the combinatory stance, hips forward but head turned away. The qualified sense of arousal: does she want me or not; in what way; to what degree? The foundational desire to know: what does he want of me? What is it about me that is appealing or repulsive? In response, I check myself. Mirror, gauge, valve. Reflect, calibrate, modulate. Comb the hair, straighten the clothes, smooth the self. In response to an imagined query, which envelops me like moisture in the air, I define my contours.

For hours on end, one wanders the metaphorical corridors, blurring one's sense of time and place, yet doing so through a reinforcement of the physical—the igniting of the body's libidinous energies. Fired up and ready for action, I blur the body, mingle with something else, only to affirm it by accelerating and maintaining a state of arousal. I am not here, yet I am relentlessly, passionately here. I know myself by way of my desire, the way my body swells and lubricates in the anticipation of contact. Through readiness, I open myself to contact, yet I solidify myself, center myself. Quickened pulse, flash of heat, warm shiver: this is how I know that I occupy this band, this spot. Something may happen; maybe I will get laid, but more than likely not.

One rarely admits to engaging in such prolonged states of arousal. Partly, one does this to save oneself embarrassment—how shameful, wasting all that time in the pursuit of pleasure, reducing yourself to the state of an animal, giving yourself over to an unseemly desperation! Or, worse, demonstrating a particular pathological condition! But partly you don't even know why you did it. Words fail. The desire to be aroused and attuned to the happening-something takes place as a vaguely felt expectation that does not necessarily resolve to a conscious thought.

Further, if one does manage to summon an explanation, it will derive from a basis of spectatorship, not exhibition. Called to give an account of oneself, one reaches for a convenient vocabulary, and spectatorship always wins out: the voyeuristic

condition of the observer is nearly always emphasized over that of the displayer. Yet the sense of wanting to be "in" the happening-something—to touch it, taste it, surrender to it, absorb its force—cannot be dealt with in terms of visual mastery. It is not about possessing something from a distance, but about the evacuation of this distance: an extreme intimacy, a mingling. It is not about relation so much as synchronization. One does not look from afar, fortifying the self, but rather enters into the fray, exposing the self.

This is not to say that spectatorship disappears entirely; rather, it gets resituated, diffused within the absorptive arena, where it unfolds within a condition of exposure. Could one suggest that the drive to be "in" something is more constitutive than the drive for separation? Sameness more than difference? Immersive exposure more than voyeuristic detachment?

If we answer the question with words, then we will have responded firmly in the negative. Let us forestall a response and stretch forward the space of this moment, cultivating a bit of instability—a little chaotic ball, a little fight or brawl! Concepts can rush into this space, but we can also hold them at bay. We can cultivate intensities; we can show more than say! Let us undress, slowly, undoing the customary dualities we make of the world: between observer and participant; inside and outside; clothed and unclothed. Or even between the button and its undoing. We can conjure up a little happening-something right here—an assembling of various actors, whether human, technological, or environmental. A happening-something that, as always, constitutes both the event and the arousal.

Turn the lights down low. Tune into the vibrations. Allow the mood to coalesce. Offer permissive expressions. Anticipate contacts.

Touch.

IV

In the aftermath of such an encounter, a wave of stabilization always comes. One rights oneself, lights up a cigarette. One may not talk much during the unfolding of the

happening-something—but afterwards words certainly rush in to fill the void. One chats. Cleans up. Restores order. The lights come on, the clothes come on, and the hair is straightened. As with the aftermath of the fight or brawl: one tends to one's wounds, smudges, and torn clothing.

Indeed, temptation is all about timing—and now it is time for the payoff. Standing here on the hot pavement, in the midst of the gathering onlookers, caught up in the dynamics of the volatile happening-something, my patience is wearing thin. The anticipation is bordering on frustration. Curiosity vies with a sticky irritability. Is it indeed a fight that is happening, or is it something else (a dance)? What has drawn us here and assembled us in a holding pattern?

I continue to scan the component objects of our absorptive desire. There is a man who looks angry, disheveled, unruly—perhaps he is the instigator! There is another who stands on the street—is that his antagonist? However nothing else affirms this. A woman walks down the street with a shopping bag. A pigeon swoops down to devour a breadcrumb. A bicycle is chained to a post. A red traffic light pulses. A cluster of balloons sways in the wind. A wayward child bounces. A truck honks. A car idles. A dog is wagging its tail. A cluster of magazines is scattered on the sidewalk. There is the smell of hamburgers and exhaust fumes. A fluttering leaflet. Did something coalesce into a something—and I missed it? Or is the "glue" due to some faint expectation that something might coalesce? Either the ingredients, once operative, have since brewed over and transformed into something else, or the ingredients are still brewing. Expectation is still in the air. But it might well turn to disappointment, or something like that.

I spot a cafe across the street with only one person sitting there. A tiny woman quietly sipping a cola. She is the only person who has not run toward the happening-something. A holdout. She reminds me of someone: a visitor from a small town in the American Midwest, who once came to visit a friend of mine living in Hollywood. It was her first time in Los Angeles. When she arrived, she could hardly contain herself. The dazzling Eden

of celebrity, at last! But what did she actually want to *do* once there? She did not want to "see the sights." Instead, every day, for the entire day, she simply installed herself at the same cafe. Once installed, she would proceed to sit there—watching, waiting. She did not want to *do* anything in Hollywood, she simply wanted to be *in* it. Her desire was not that of the mobile consumer, strolling through the glittering colonnades of stardom. Her desire was not to move acquisitively through this world. It was simply to sit in it.

She's a spectator, but her spectatorship is not primary. It is not about difference, repression, or voyeuristic enclosure. Her spectatorship is diffused within the absorptive arena. It unfolds within a condition of exposure.

The happening-something can take place as a brutal interruption of the norm. One can encounter it unexpectedly, like an accident. Something's happening over there! But it is also something that one can anticipate, and patiently await. It is also something that could take place over a longer time frame, as a continuous band of low-level activity. Something like a background hum. One can position oneself so as to inhabit it continuously, like listening to a jazz station or floating in a pool.

A dissolution or dispersal of the self is temporarily achieved, and one is "at one" with something larger, in composite with it, however momentarily. Like catching the wave, being in the zone or in the groove. Such a state is not about surrender, but the cultivation and navigation of a productive friction. One is in the flow, in such a way as to be able to negotiate differentials, respond to discrete changes. Not so much a meditation as a state of being skillful or tactful—a submissive, unselfconscious grace. Afterwards, one gathers oneself and stumbles on.

As you watch, others watch you. The perpetual cafe-sitter: she stares, others stare at her. How odd, her blank, lingering stare, hours on end. As we stand awaiting the happening-event, others wonder why. They point at us and murmur, What are those people doing over there?

A man and woman walk by me, holding hands. A beautiful woman crosses their path. The man wants to look at the

alluring woman, but he does not want his wife to know that he wants to look. So he sneaks a glance. Momentarily, the beautiful woman catches his eye. His wife catches this moment; angered, she shoots a hard glare at him. The man's gaze softens in appeasement: his attempt at modulation. Someone else—someone who knows the couple—witnesses the scene from afar. This witness will subsequently convey to his circle of friends the following observation: the marriage is in trouble. The marriage-assemblage volleys between stability and instability, depending on the other social formations onto which it opens and within which it is contextualized. Location, scale, timing, intensity, degree of stability and materiality—all have to be taken into account, for there is no meaning that can fully capture this occurrence.

Every one and every thing is an actor, or at least a potential one, in some happening-thing. Something always has the potential of coalescing into a something. If only one person is there, staring, we may not stop to look; however if many others have gathered, looking in the same direction, then we might stop. At that point, a critical threshold has been crossed: we say, Oh, something is indeed happening over there. An event coheres, accompanied by, and seen by way of, a collective atmosphere. The strength of the happening-something could be understood in terms of the number, quality, and function of the actors that it is able to corral into it—and who desire to be corralled into it. It is not just about mass, but a certain level of internal consistency that arises through the quality and intensity of the gathered, at whatever scale.

If no one gawks, the event could simply run its course, unnoticed, and therefore not become a happening at all. Without the mood, the event does not exert a pull. But there is no mood without the event. The gathered actors constitute the event, but they also serve to channel it—acting as its indicators, its conduits, its gateways, if only by stopping to look at it, or point at it.

Someone stares, dumbfounded—does the event produce the expression, or the converse? The question is not that of linear causality (which came first?). Nor is it a dialectical question

concerning the relation of part to whole, element to system. Rather, it is a question of critical mass: when one cluster of elements stabilizes, crosses a material threshold such that it becomes something else.

There are always a series of smaller happening-somethings within the larger one—mini-scenes, small groupings of people, some very small (a woman and child, spanked) and some large (about ten people, a dog, and a ditch). The role one plays in one assembling-event may be different than the role played in another, even if they overlap. Technological actors allow the incorporation of other actors, in varying degrees of material and expressive presence. A woman points, and several others look in the direction of her finger. A picture is taken with a cell-phone, shared with a friend, and then transmitted to another. Two women kiss, to the dismay of a third. An ugly dog snaps at a stranger. When someone asks, What is happening?, that person doesn't expect a name in response so much as an indication of where the event is, its scale or intensity, and the rhythm of its occurrence. Its degree of stability. The question refers to the event that has galvanized the most people's attention—the one that is of a remarkable scale and resonance.

Even though all of the event-clusters, whether large or small, have stabilized with some degree of coherency, they might just as well destabilize, disband, their components re-assembling into new clusters, larger or smaller, more intense or less intense. Someone steps on someone's toe, apologizes, and is subsequently drawn into a new conversational composite. A fight between two men erupts in a bar. Others quickly jump in, joining the whirlwind of blurred bodies, fueled by the swell of aggressive energies and emotions. An all-out BRAWL—at last! One gets sucked in or stands at the precipice, modulating energies, weighing repercussions. Someone is hailed and cedes to the call; another runs away. The bouncer attempts to restore order. A gasp; a shout; a scream. Thwack! Thump! There! Punching, pointing. Bruises, cuts. A lamp tumbles over; a glass object smashes. Groups may bond together—the kind of bonding that only an immediate threat can produce. But then the swell of intensity

subsides, and people extricate themselves. The warring camps have dissembled, the clusters rearranged.

What is happening? Well, surely not that, because it's over. What's happening always exists in the present, with a remarkable degree of stability. An indicator—a stare, a pointing finger, a scream—might tell us where it is, and give us a hint of the intensity of the occurrence. There is the hesitant, polite gasp, with hand over mouth. There is the higher degree of amazement, with the finger pointing. Then there is the all-out screech, with eyes wide and arms aflail. We might align with the event, share in it, and conduct it too. We might vibrate with it, but we might just as well miss it: by the time we look, it might well have disbanded.

There is the prank you pull on someone when you abruptly say, LOOK! and point up to the sky. The forefinger again, but this time with arm raised completely skyward in one intense vector, straining toward the heavens. With this gesture and its verbal accompaniment you can generate a momentary destabilization, a temporary rift, during which you can rearrange the elements of the familiar. You can slap a sticker that says KICK ME to the back of your victim's shirt. Even though he has now stabilized, gathered himself, he has in the process become something slightly different: he now (inadvertently) anticipates a contact, generates a back-door appeal, invites a bit of chaos.

Perhaps, through a bit of ventriloquism, this gives voice to a shared, unspoken desire: the desire to be ravished by the irrational. The delicious anticipation of something, anything, that could shake up our world. Something like the desire to be "swept off one's feet" in love. It is a question of degree: the level of intensity and stability. One does need to collect oneself and go on. One needs to go on routinely anticipating the something-happening that can disrupt us from the routine! The banding together of new composites. The generation of new incitements!

In the expanse of this essay we have moved between radically different hand gestures, all of them marking different kinds of actors and capacities, and different combinations of signification, modulation, rhythm, and intensity. We have moved

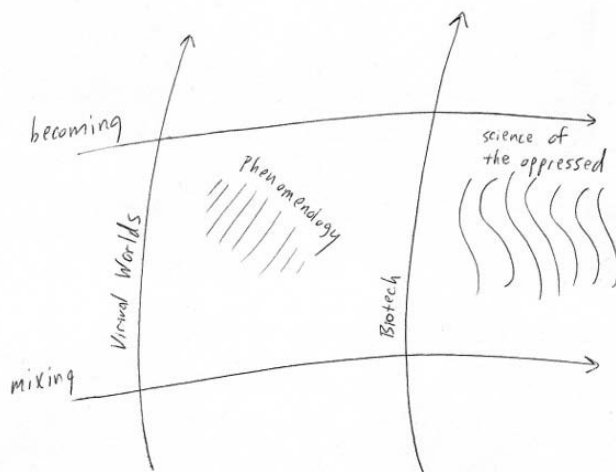
between the FUCK YOU and the KICK ME as incitements to assembly. "Culture" is usually understood in terms of the signifying modulations of the former. Power is thought to come from there: a confrontative frontality. Yet we end with the unconscious solicitations of the latter.

Why?

To call for a productive destabilization: the working of the ass-end of things. Or, as a popular dance tune would have it, to "shake that thing."

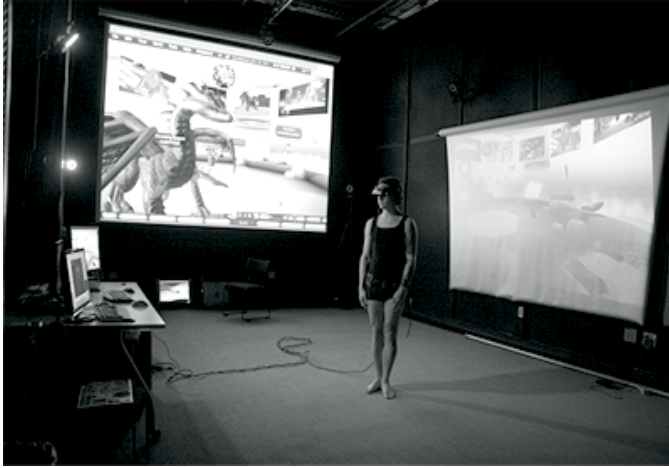
Becoming Dragon: A Transversal Technology Study

MICHA CÁRDENAS



Becoming Dragon is a mixed-reality performance that questions the one-year requirement of "Real Life Experience" that transgender people must fulfill in order to receive Gender Confirmation Surgery, and asks if this could be replaced by one year of "Second Life Experience" to lead to Species Reassignment Surgery. For the performance, I lived for 365 hours immersed in the online 3D environment of Second Life with a head mounted display, only seeing the physical world through a video-feed, and used a motion-capture system to map my movements into Second Life. The installation included a stereoscopic projection for the audience. A Puredata patch was used to process my voice to create a virtual dragon's voice. During the year of research and development of this project, I began my real life hormone replacement therapy and wrote

poetry and prose about the experience which was included in the *Becoming Dragon* performance. The project was realized through a collaboration between myself, Christopher Head, Elle Mehrmand, Kael Greco, Ben Lotan and Anna Storelli.



Becoming Dragon, Installation View

In "Epistemology of the Closet," Eve Kosofsky Sedgwick uses a queer analysis to introduce instability into the western episteme. Sedgwick suggests that

many of the major nodes of thought and knowledge in twentieth-century Western culture as a whole are structured -- indeed, fractured -- by a chronic, now endemic crisis of homo/heterosexual definition... that an understanding of virtually any aspect of modern Western culture must be, not merely incomplete, but damaged in its central substance to the degree that it does not incorporate a critical analysis of modern homo/heterosexual definition. [1]

Similarly, transsexual author and artist Sandy Stone makes a claim that the transsexual body and experience opens up

new possibilities for knowledge and experience as well; Stone says that "here on the gender borders at the close of the twentieth century, with the faltering of phallographic hegemony and the bumptious appearance of heteroglossic origin accounts, we find the epistemologies of white male medical practice, the rage of radical feminist theories and the chaos of lived gendered experience meeting on the battlefield of the transsexual body." [2] In this paper, I will chart two lines which drove *Becoming Dragon*, becoming and mixing, in order to understand how new genders and sexualities open up epistemological possibilities.

My approach for this paper was inspired in part by Deleuze's book *Two Regimes of Madness*. In *Two Regimes*, Deleuze states that "one of the principle goals of schizoanalysis would be to look in each one of us for the crossing lines that are those of desire itself: non-figurative abstract lines of escape, that is, deterritorialization." [3] The approach Deleuze describes is tied up with Felix Guattari's notion of the transversal, of finding lines of thought which cut across other abstract lines -- and idea that has been taken up by many contemporary thinkers, such as digital media theorist Anna Munster. Munster's book *Materializing New Media* "proposes and puts into motion the idea of transversal technology studies" as an alternative to "an interdisciplinary study launched from established disciplines such as media and cultural studies," in order to "understand digital culture itself as a series of diagrammatic lines" and their "intersections... and inflections." [4] From the place of interest and desire of my own transgender experience, I wish to apply transversal technology studies to find new lines of flight or quasi-causes which cross multiple strata of technology.

With *Becoming Dragon*, I sought to explore two distinct material strata of technology, virtual worlds and biotechnology, both of which can be seen as technologies of transformation. From this perspective, one can consider new similarities and progressions or unfoldings, distinct from historical, temporal analysis, or analysis that is centered on technological developments. Considering various components of becoming -- embodied experiences, social experiences, psychological

experiences, sexual experiences -- virtual worlds and biotechnology have both unique and shared resonances and forces.

Another line of analysis I wish to explore across and through these two strata of technology is a line tracing the operation of mixing. In the mixing of realities and the mixing of gendered physical attributes, such as hormones, frictions and harmonies also emerge, such as the resistance of the original body to change, the new possibilities for sexual expression and the dysfunctionality of the new arrangement in a system already presupposing clear distinctions.

Still, the quality of this knowledge must be examined. If the knowledge relies on a phenomenological approach, based on my own observations, then how is it decentered and disrupted by the subject in transition? If the transgender subject is one in constant transition, then what meaning does the statement "I see X" hold when the "I" has changed from the beginning of the statement to the end of it? And what other possibilities of knowing can such a transgender approach to technology studies or experimental media production be informed by? This paper will explore the Electronic Disturbance Theater's approach to generating new epistemological systems, which we [5] call "Science of the Oppressed," and which is dedicated to reconsidering how knowledge is produced and structured -- according to what value system and for whose interest.

The Trajectory of Becoming, Technologies of Transformation

The goal of this paper is not to claim that transgender is a privileged subject position that has access to unique knowledge. Instead, the goal is to look at how transgender desire, both individual and community desire, can serve as a useful factor in shaping epistemological inquiry and serve to reveal new insights through new organizations of data. One line of investigation which drove *Becoming Dragon* was the consideration of various technologies for their usefulness in a process of becoming. This thinking was motivated by my own desire to initiate a

transgender transformation in my own life and body. Following this desire, I began to explore the possibilities of experimentation that I had access to. I found that both virtual worlds and biotechnology, specifically medical technologies which are used for gender changes, such as surgery and hormones, offer a promise of becoming something else, of having a new body and a new life.

The epistemological topology of becoming is shaped by the radical unknowability of the future. Sedgwick discusses a similar topology, saying that "the suggested closeted Supreme Court clerk who struggles with the possibility of self-revelation... would have an imagination filled with possibilities beyond those foreseen by [the biblical] Esther in her moment of risk. It is these possibilities that mark the distinctive structures of the epistemology of the closet." [6] In the specific case of becoming, one can never fully grasp the reality of the being to come, its details and nuances, which only become apparent through lived experience. A decision to become something else, other than what one is in the present moment, can therefore only be based on the limited knowledge of informed speculation. For transsexuals and transgender people, this is particularly evident in the process of deciding to change one's gender or one's body. Still, one must make a decision as to how to act, what to become. [7]

Virtual Worlds as Rapid Prototyping

Virtual worlds such as Second Life offer a new epistemological possibility, not a bridging of what Sedgwick calls the "brute incommensurability" [8] of the unknowability of the future, but a kind of rapid prototyping, a limited knowledge. Prototyping opens a space of knowledge, creating a test version which provides some information about the thing being prototyped, but not a complete knowledge of it.

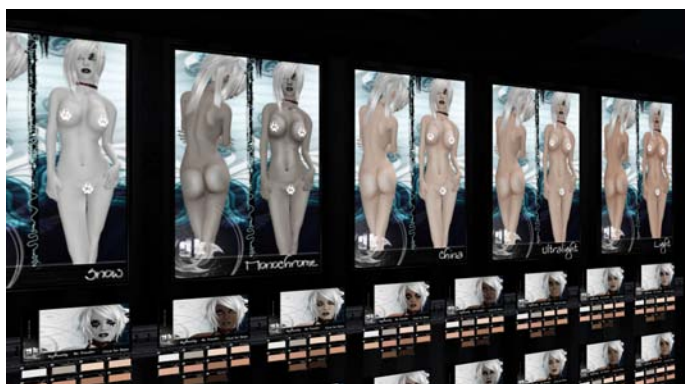


Prescription Bottles for Hormones and 3D ABS Plastic Fabrication of Dragon Avatar

In Multi-User Virtual Environments (MUVES), [9] one has the ability to test out a new body, a new kind of hair or a new gender in a social realm where one has a visual image of that new body. As with other kinds of rapid prototyping, such as three-dimensional printing or fabrication, the test version has limits. Clearly, while experimenting with a new gender or hair color or species in a MUVES, one is free of the social consequences and physical dangers of such experimentation in one's daily life. Yet there is still an effect that can be felt -- one can try out something in a MUVES and then find it easier to do in one's daily life. By gauging the social reactions of other users of the MUVES, one can get a small taste or idea of the social possibilities to be expected in the physical world. Yet perhaps this can illustrate yet another case of the sheer incommensurability of becoming, because even in MUVES, the knowledge being gained is only the knowledge of the test or the example. This is only a test. By the very definition of such experimentation, the reverberations throughout one's life, private and public, cannot be discovered.

The notion of prototyping is a value underlying broader phenomena, including Maker Culture and the DIY and Open Hardware movements. Massimo Banzi, one of the co-inventors of the popular Arduino electronics prototyping platform, writes that "the Arduino philosophy is based on making designs rather than

talking about them.... Prototyping is at the heart of the Arduino way." Perhaps we can update the notion of "building the world we want" by crossing out building, putting it under erasure, and replacing it with prototyping: "~~building~~ prototyping the world we want." In this way we can remember that while the goal is to build this new world, there is a great deal of testing and experimentation to be done in order to get there. A prototype is different than a model as it is a space between a model and an actual implementation; a prototype realizes some of the qualities of the actual object to be created. This strategy is better suited to the constantly changing conditions of postmodern global capitalism and also accounts for uncertainty. Maybe we don't know what the world we want looks like. If we consider Second Life as a space for prototyping a new world, we can ask, "what would people do if they had the total freedom to change their bodies in any way at any time?" In Second Life, we see part of the answer to that question in the sheer amount of commerce.



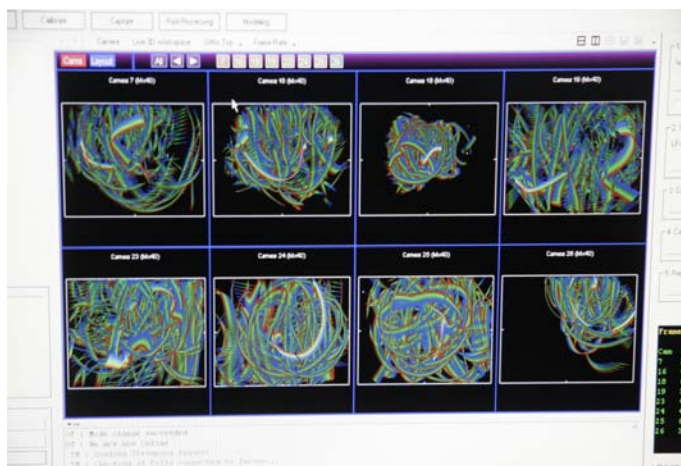
Shopping for a Skin at Deviant Kitties

Over one million US dollars change hands in Second Life every day, and in Second Life you can buy your hair, eyes, skin, genitals, even your body shape. While the possibility exists to do anything, many users simply replicate their fantasies as shaped by their present lives under post-contemporary global capitalism.

Calibrating the Prototype: The Limits of Virtual Becoming

Yet MUVES, as technologies of transformation, offer becomings unavailable through the physical world. As such, new potentials arise for situations which, although they are only visual and auditory fantasy, are nonetheless real and novel. Some users of these spaces are developing new bodies and new sexualities, beyond any reductive configurations of LGBT. Consider the Post 6 [10] series of photographs on the Alphaville Herald. In this series, the writer/photographer Bunny Brickworks finds "unique" Second Life avatars and photographs them in erotic poses. In this series, one can see cyborgs, nekos, furies, vampires and more.

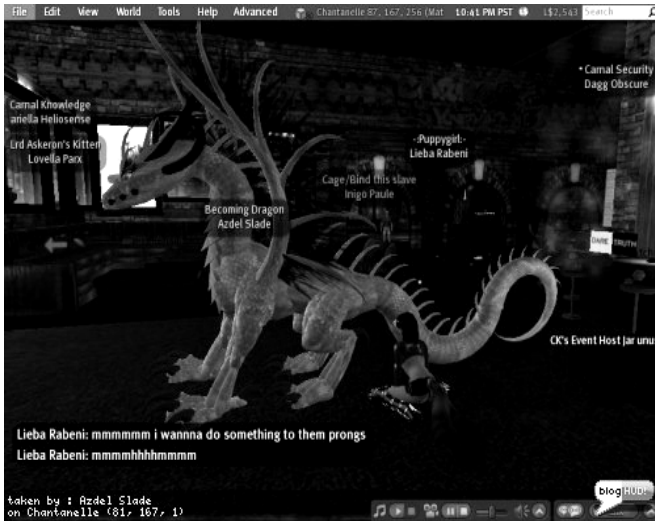
Yet here, the logic of prototyping helps understand these better, as most prototypes need a scheme for calibration and calibration data. For my performance, [11] the motion capture system had to be calibrated multiple times each day, in order for the software to understand the scale and direction of movement. Calibration involves inputting a known dataset into the system and calculating the degree to which the system differs in regards to the expected output. In the case of the motion capture system, it involves waving a wand with markers at a specified distance from each other (240mm) in a particular three-dimensional pattern, and allowing the motion capture software to calculate the location of the many cameras in the room based on this data. The degree to which the software got decalibrated in only a few hours, with the cameras being moved from where the software expected them to be, was unexpected and hard to explain.



Calibrating the Motion Capture System

Similarly, I printed a three-dimensional plastic version of my dragon avatar, using the Dimension printer, which produces ABS plastic models, to explore another technology that blurs or mixes the physical and the virtual. This printer is best suited for printing very small scale models and requires some changes of the three-dimensional model. One must make sure that all surfaces have thickness and are not just two dimensional, and the model must have a connected topography in order to print it in one piece. Similarly, we can think of what characteristics allow the Post 6 series to function, and one is that it plays to present heteronormative beauty standards. While there are a wide variety of bodies among Brickworks' photos, many of them are simply stylized female bodies with huge breasts and tiny waists, who also happen to have a rabbit head or a cyborg shell. The limits of experimentation become clearer with a little calibration.

During my performance, I was invited by a friend new to Second Life to a number of sex clubs and S&M dungeons in the virtual world. On one occasion, I visited one of these clubs and proceeded to explore with my friend.

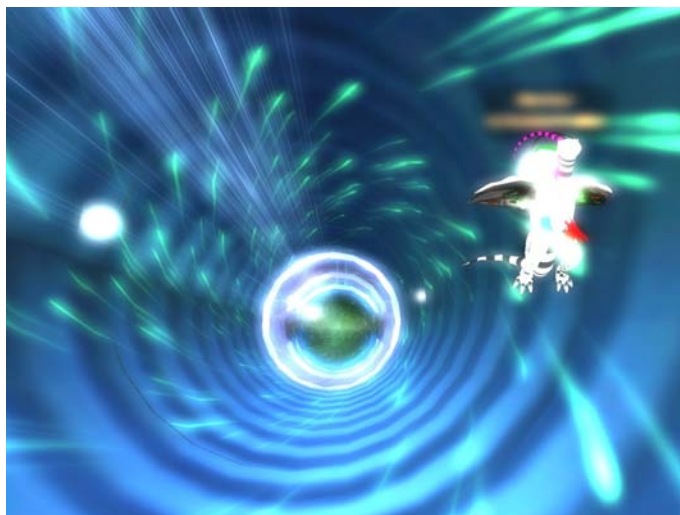


About to be ejected from an S&M Club

After only a few minutes, the bouncer warned me that I could stay, but only as long as I didn't cause any trouble. A few minutes later, a neko, a cat-woman hybrid, came growling and crawling around me, making sexual suggestions about what she would like to do with my horns. The bouncer warned me again. As I realized my stay would be short, I decided to push the limits a bit and took the liberty to pole dance on the available pole. After a few seconds of this gesture, the bouncer ejected me. The ejection unveils the limits of the logic of Second Life. There are many different, heterogeneous spaces in Second Life that are owned and operated by various people, and many have their own rules. Midian City, for example, is a cyberpunk role play area where dragons are not allowed because they are not plausible future identities. Similarly, dragons are not welcome in the sex club described above because they break the illusion, they distract from the arousing, ostensibly transgressive, scene. "Your world. Your imagination," [12] is the techno-utopic marketing slogan of Linden Labs, but this only applies if you own the land in question. And yet, if one does own the land in question, or can find unrestrictive areas suitable to one's desires, such as Desperation Andromeda, a space for sci-fi sexual fantasies such

Code Drift

as tentacle and alien sex, experiences beyond the physical limits of reality can be explored. Social, visual and embodied experimentation with these new configurations of gender and sexuality can open the mind up to new demands for everyday life in the physical world.



Echolalia / Elle Mehrmand in the Warp Tunnel in Desperation Andromeda

Yet one could feasibly use 3D rendering software, or even drawing and painting, to create images of an identity. Beyond the image, Second Life offers a social dimension to these constructed identities, in which one feels the moment of being "seen" by another. This is an essential part of becoming, the moment of social interaction and feedback when one's conception of one's self is affirmed and refied by others -- the moment of passing. Considering sexual interactions, this moment of recognition is made even more powerful, as the new constructed identity is not only acknowledged by another participant in this online social space, but the other expresses an emotional response to one's appearance, gestures or presentation.

The Intersection of Physical and Virtual becoming



Alynn Vixen and Yaochi introducing me to the idea of Otherkin

On the ninth night of my performance, a huge-tiger striped dragon and a small glowing fox with butterfly wings visited me and told me about the Otherkin community. Alynn Vixen considers herself to be truly a fox and helps to organize spaces for Otherkin people, such as social spaces and a resource library of texts on awakening as Otherkin, Vampirism and Therianism, similar to Lycanthropy. She told me that she has known since she was seven that she is a fox and that she has a phantom tail which causes her pain when she sits on it. For Alynn, Second Life is the only place where she can be her "true self" and she says that she would get species change surgery in a second if she could. Given the rapidly advancing pace of biotech and emerging do-it-yourself (DIY) practices like body hacking and more extreme forms of body modification, it would seem that possibilities such as fur and tails are not far away from our grasp. Recently, on the website Instructables.com, a website for sharing DIY technical information, an instructable was posted for how to surgically give yourself elf ears. This is one example of body hacking, and, given the massive popularity of body modification, it seems that this will only continue to unfold. As these physical

transformations become more possible, MUVes like Second Life can be seen more and more as a means of prototyping new identities.

Transreal Identities, an Intersection of Becoming and Mixing

Perhaps embodied interfaces are more important than appearance, which for human avatars in Second Life is something like a marionette, wax dummy or ventriloquist's doll. Further, the uncanny experience one has when viewing a wax doll has a great deal of resonance with Second Life. I propose the notion of *transreal* as having strong relevance with regards to the epistemology of transition with regards to both virtual worlds and biotech. When thinking of the uncanny, of viewing something that looks almost human, there is an experience of a shifting in and out of multiple simultaneous readings. Similarly, while not implying that trans people are less than human, but instead that dolls and avatars are perhaps closer to human than we admit, the experience of looking at a transgender person or at an avatar in Second Life often contains this characteristic. One looks at the person or avatar and, in the process of looking, multiple readings of the subject shift in and out of one's mind. I have felt this myself as well as seen people interacting with me, looking at me and displaying this kind of shifting or confusion, switching language, "ma'am, um, I mean, sir," or something similar. With a transgender person such as myself, the expression of *transreal* may arise from my identification as queer, as between two genders that most people think make up the ontological totality of expression. Often my gender expression is seen as impossible or outside of categories and so the viewer attempts to read my gender as male or female. For them, I am simultaneously multiple genders, which is impossible in a way, until they have resolved in their minds that I'm transgender, or queer, or gay or that my gender presentation is false, or less real than my biological makeup.



Scale model of performance space in Second Life, with live video feed of physical performance space

A transreal identity is an identity which has components which span multiple realities, multiple realms of expression, and often this is perceived as a rapid shifting or a shimmering, as in the case of a mirage, between multiple conflicting readings. Millions of people today have identities which have significant components which span multiple levels of reality, including Second Life avatars and other virtual worlds. For many, such as the Otherkin or trans-species community, they consider these virtual identities to be their "true selves," more significant than their physical bodies. Yet the notion of transreal can be a way to subvert the very idea of a true self, if one's self contains multiple parts which have different truth values or different kinds of realness. A study at the Virtual Human Interaction Laboratory at Harvard [13] has shown that after only thirty seconds with an "attractive" avatar, people's real world behavior changed. This is just one example of a real identity which has been shaped in part by a virtual world. Any identity in the process of becoming can be thought of as transreal, as it exists in the present but also as potential, in multiple states of reality.

From Baudrillard's statement, "neither real, nor unreal: *hyperreal*," [14] we can move to both real and unreal, existing in

multiple realities, mixing realities, transreal. Transreal identity destabilizes epistemological systems which would privilege real phenomena such as the body or real world social interactions, and extends the necessary field of investigation into virtual, digital and fantasy worlds. Further, perhaps transreal identities can serve to destabilize contemporary protocols of biopower by offering a space to develop ideas of possibilities which can enable new demands for everyday life that are incompatible with such protocols. *You see me standing here, but you also see my avatar, who exists in a world with different possibilities; you see the self I have created in a different world and the merging of those possibilities in my desire and agency.*

Perhaps this notion of the transreal has an even broader significance for understanding contemporary phenomena. For example, during my performance of *Becoming Dragon*, I used voice chat in *Second Life*. Visitors to the real space would see me turn my head when someone entered the virtual room and start talking to the virtual visitor. In this way, I was often engaged in two or more conversations at once, including text chat windows. Yet one could see this experience as a hyper-extension of the daily experience that people have when talking to someone face to face and texting on their cell phones, an experience of managing multiple identities and conversations at once across multiple realms of telematic space or multiple communicative strata.

The Trajectory of Mixing, In the Flesh

The notion of transreal is an example of the intersection of becoming and mixing, but I wish here to follow the trajectory of mixing further. The body with administered hormones, transgender or transsexual, can be another way of considering the transreal, that is, the body with virtual organs or unfolding organs. In my body, hormones are circulating which are molecularly identical to natural hormones, but which come from a pill. The results are physical changes in my growth, such as actual breasts, skin changes and fat distributions which could be called a female body. And yet, as I have a penis, perhaps my body

could not be called female. As the knowledge of my body increases, the decidability about my sex could seem to be more accessible, yet the mixing of male and female physical attributes troubles this distinction. If one is questioning whether I am a real male or female, or male or female in real life, IRL, as is sometimes asked of Second Life users, the answer to the question is not simple and could be described as multiple and simultaneous, a kind of transreal blurring of bodily borders.

Brian Massumi states, "when a body is in motion, it does not coincide with itself. It coincides with its own transition: its own variation," [15] but perhaps that is even more true of the body in transition. While transgender bodies are in transition due to willful efforts to change them, aren't all bodies in multiple transitions of aging, training, growth and consumption? An observation of intensive degrees is useful here and the involvement of agency in transition adds a dimension of desire into the multiplicity of the subject in transition. Yet all of these states of transition can benefit from the language I am hoping to contribute to.

Partially Formed Organs, Mixing Sexes

With respect to biotechnologies, specifically medical technologies which afford a degree of transformation today such as surgery, hormones, tattoos and more extreme body modifications, the decision to act is still based on limited knowledge and conjecture, but carries more weight and consequences.

Sandy Stone writes, "In the transsexual as text we may find the potential to map the refigured body onto conventional gender discourse and thereby disrupt it, to take advantage of the dissonances created by such a juxtaposition to fragment and reconstitute the elements of gender in new and unexpected geometries." [16] One way of considering ways of creating new genders through mixing is to imagine gender as an assemblage. Considering first biotechnologies such as synthetic hormones, one can imagine the gendered sexual characteristics of the body as resulting largely from the bodily levels of testosterone,

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estrogen and progesterone. As these hormones are chemical, perhaps the operation of mixing is the clearest here -- sexual alchemy. In my body, currently, I have a combination of estrogen, testosterone and progesterone. This is modulated through my daily intake of the drugs Estradiol, a form of estrogen, and Spironolactone, a testosterone blocker. The last time I spoke to my endocrinologist, she said that my levels of testosterone were still within the male range, but my levels of estrogen are not. As such, my physical sex could be considered as something other than male or female, if hormone levels were the main diagnostic characteristic. The effects of taking Estradiol include softening of the skin and redistribution of fat towards the thighs and hips, and increased breast growth.



*Public discussion with Sandy Stone, "Gender and Desire in Virtual Worlds", part of **Becoming Dragon***

To examine this operation of mixing that these biotechnologies enable, I would like to discuss the example of my breast, my right breast to be specific. Recently, my right breast has begun growing more than it ever has, and much more than my left breast. As a result, it is sore, highly sensitive and it has a new feeling of mass. As a result of this, I have new feelings and sensations which I have never had before, not only the physical sensations of pain and pleasure from my breast itself, but also new sensations of movement, such as the pain in my breast when running. While I have heard these things described before by women, there is an indescribable difference in having

the sensations myself. I could have asked many women before what the feeling was like and tried to understand it by collecting all of their various observations, but the actual sensation of the mass of flesh that is newly part of my body lies across an incommensurable gap from the words and sentences which might describe it. In addition to this, the resulting cascade of affects and ideas about my identity, my body and the potential for change all flow forth from this wordless experience of pain and pleasure in my nipple. While so much has been written about the partial object of the breast, the oral drive and the organ without a body, what of the partially formed organ, the new, growing, incomplete organ, which in my case may be a breast but could be something far more fantastical in other cases given the rapid pace of biotechnology? What do the recent recipients of the new face transplant technologies have to say about Levinas and faciality?



Public discussion with Stelarc, "The Body in Transmission/Transition, Learning to Live in Mixed Realms", part of Becoming Dragon

Further, my small, growing breasts are facilitating an unfolding of new sexual interactions between myself and my partner. She wants to touch them, to kiss them. She knows they are incredibly sensitive and wants to give me pleasure through them. Further, she has had almost exclusively heterosexual

relationships in the past, and so this desire is emerging within her as well. I am learning to enjoy the new pleasure, but this new pleasure is also a result of actual physical changes in my body. The interaction of these two elements is hard to distinguish: how much am I learning new affective states of reception and how much am I physically developing new interfaces for sexual interaction? How much can a pleasure be learned? Many of the LGBT rights movements are predicated on the notion that desire is innate, something we're born with, but this claim can undermine agency and the ability to consciously change one's body, reifying a privileged notion of "real" desire and "real" bodies.

Epistemological Concerns, Operations in the Field of Phenomenology

Much of the writing in this essay has consisted of my observations of sensory experiences and observations on those experiences. I would suggest that this is a phenomenological approach to extracting knowledge from my performative gestures and my daily experience. What might the limits of such knowledge be?

Looking to phenomenology, the writing of French philosopher Maurice Merleau-Ponty is very important in this context, as his work sought to overcome both the empiricism and idealism of Western philosophy, using the experience of the body as a way of overcoming dualisms. [17] Merleau-Ponty, in his book *Phenomenology of Perception*, makes a strong link between the body and phenomenological investigation, engaging in a kind of epistemology of the flesh. He states in the chapter on the problem of the body that "the constitution of our body as object... is a crucial moment in the genesis of the objective world." [18] As such, it would seem that the introduction of the virtual body, or the transreal subject with a distributed body which is both real and virtual, would invalidate phenomenology as a mode of knowledge. Yet I am inclined to not simply dismiss phenomenology, but to recognize that it is a horizon. Discussing

"The Body in its Sexual Being," Merleau-Ponty states, "there is in human existence a principle of indeterminacy... existence is indeterminate in itself, by reason of its fundamental structure, and in so far as it is the very process whereby the hitherto meaningless takes on meaning." [19] In this I read an opening of possibility for a body in transition, a body which is beyond our understanding in this reality, a body which finds itself to be the site of new emerging sexual desires.

Feminist writer and artist Bracha Ettinger's work also deals with sexuality and trans-subjectivity. Ettinger notes an opening in Merleau-Ponty's work as well when she writes, "Merleau-Ponty articulates a space of bursting and dehiscence in the Real prior to the bifurcation into subject and object, where the *ecart* between-two is a 'fragmentation of being' and a becoming or 'advent of the difference' in a 'virtual foyer,'" [20] pointing to the virtual as a space of potential that is embodied in intersubjective spaces such as her *matrixial borderspace*, the space of the womb where mother and child are undifferentiated. Perhaps the space of bodily becoming can be seen as a state which holds off the subject object distinction and allows for a play of definition. Yet perhaps a different set of tools other than phenomenology are better suited to a transgender artist seeking to prototype the world she wants to see.

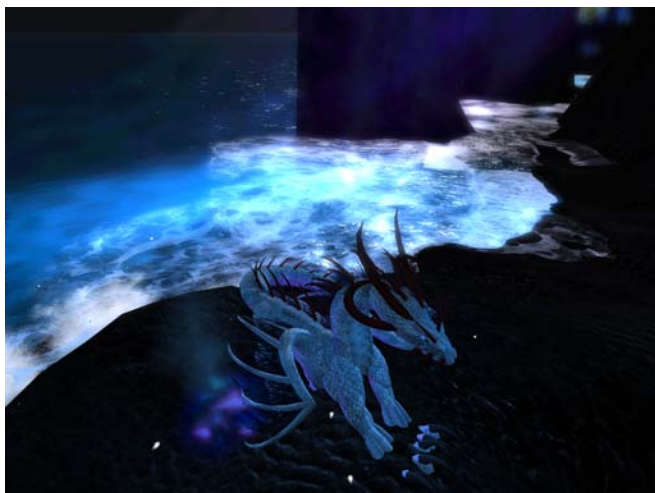
Science of the Oppressed

I am not proposing that knowledge of becoming and mixing is accessible only to certain subject positions, but that certain subject positions bring this knowledge to the forefront, allow it to be known, make a formerly marginalized set of experiences and the knowledge gained from them no longer marginalized. Electronic Disturbance Theater (EDT) has called this Science of the Oppressed:

We can imagine Augusto Boal's Theatre of the Oppressed, Chela Sandoval's Methodology of the Oppressed, Critical Art Ensemble's tactical

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science, Natalie Jeremijenko public experiments and what the Electronic Disturbance Theater has framed today as the "science of the oppressed".... Each gesture diagrams alternative social forms of life and art that fall between the known and unknown, between fiction and the real, between clean science and dirty science -- each a part of a long history of an epistemology of social production which privileges the standpoint of the proletariat, the multitude, the open hacks of the DIY moments, and of autonomous investigators who stage test zones of cognitive styles-as/and out of -- concrete practices as speculation and speculation as concrete practices -- at the speed of dreams. [21]



Relaxing by the waters of Relic on the Namless Isle

EDT seeks to reimagine knowledge production in the service of oppressed communities and social movements, and to bring such a knowledge production from below, *desde abajo*, to the status of a science. [22] Chela Sandoval's Methodology of the Oppressed is one very rigorously developed set of practices in EDT's list of inspirations, and one which serves an

epistemological approach well. Sandoval's methodology seems well suited to the multiplicity of queer relationalities developing through virtual worlds and biotech, as it escapes binary formations. She writes, "when the differential form of U.S. third world feminism is deployed these differences do not become opposed to each other... all tactical positionings are recognized." [23] Sandoval continues, saying that "the differential maneuvering required here is a sleight of consciousness that activates a new space: a *cyberspace*, where the transcultural, transgendered, transsexual, transnational leaps necessary to the play of effective stratagems of oppositional praxis can begin." [24] One can see virtual worlds and spaces of body hacking as part of the new space of possibility that Sandoval describes.

Sandoval writes of Donna Haraway's cyborg feminism to help explain her methodology, speaking of "a creature who lives in both 'social reality' and 'fiction' and who performs and speaks in a 'middle voice' that is forged in the amalgam of technology and biology -- a cyborg-poet." [25] Perhaps poetry is the most appropriate form of language to use for the new epistemological openings created by the new forms of relationality emerging in these new spaces, a language with ambiguity and uncertainty built-in. Sandoval links Haraway's cyborg feminism with her own methodology, which stems from US Third World Feminism, and writes, "these skills enable a coalitional consciousness that permits its practitioner to 'translate knowledges among very different -- and power-differentiated -- communities. They thus comprise the grounds for a different kind of 'objectivity' -- of science itself Haraway's science for the twenty-first century is one of 'interpretation, translation, stuttering and the partly understood.'" [26] Sandoval's take on Haraway is a useful articulation of the new multitudes of genders and sexualities I have spoken of in this paper; Sandoval says that "what we are talking about is a new form of 'antiracist' -- indeed even antigender -- feminism where there will be 'no place for women,'... only 'geometries of difference and contradiction crucial to women's cyborg identities.'" [27] The goal for Haraway is to

open "non-isomorphic subjects, agents, and territories to stories" that are "unimaginable from the vantage point of the cyclopic, self-satisfied eye of the master subject" [and] recognize[] that all innocent "identity" politics and epistemologies are impossible as strategies for seeing from the standpoints of the subjugated, [instead remaining] "committed" in the enactment of all its skills to "mobile positioning," "passionate detachment," and... "kinship". [28]

This paper has been an attempt at some of these practices, starting with situated demands and desires for transformation, translating knowledge from shifting and multiple communities such as the transgender community, body modification community and the community found in Second Life, in order to contribute to emerging practices of transversal technology studies and Science of the Oppressed.

In Donna Haraway's recent book on transspecies and interspecies relationality, *When Species Meet*, she says that the book is "about the cat's cradle games where those who are to be in the world are constituted in intra- and interaction." [30] As a theoretical approach, this involves holding multiple concepts close together, but still apart, and seeing their interactions like strings in a game of cat's cradle. Similarly, when proposing transversal technology studies, Anna Munster writes, "the transversal can be configured as a diagram rather than a map or territory: directional lines cross each other, forming intersections, combining their forces, deforming and reforming the entire field in the process." [29] These two inspirations describe well what I have attempted to do in this paper, looking at the lines of becoming and mixing across the lines of virtual worlds and biotechnology, finding their intersections and combinations in the transreal, transspecies, body hacking and prototyping. I have tried to create this diagram in order to consider the uncertainty of transition or transformation, to deform fields of epistemology and to reform fields of possibility.

Notes

- [1] Eve Kosofsky Sedgwick, *Epistemology of the closet*, Updated. (Berkeley, CA: University of California Press, 2008), 1.
- [2] Susan Stryker, and Stephen Whittle. *The transgender studies reader*, (New York: Routledge, 2006), 230.
- [3] Gilles Deleuze *Two regimes of madness : Texts and interviews 1975-1995*. ed. David Lapoujade Foreign agents series. [Selections.], (Los Angeles, CA; Cambridge, Mass.: Semiotexte; Distributed by MIT Press, 2006), 13.
- [4] Anna Munster, *Materializing new media : Embodiment in information aesthetics*, Interfaces, studies in visual culture. 1st ed. (Dartmouth, N.H.: Dartmouth College Press ; Published by University Press of New England, 2006), 24.
- [5] The Electronic Disturbance Theater was founded by Ricardo Dominguez, Brett Stalbaum and Carmin Karasic and Stefan Wray, and I have worked with them on a number of projects.
- [6] Sedgwick, 78
- [7] Both Donna Haraway and Avital Ronell have articulated visions of a feminist ethics of uncertainty. In *When Species Meet*, Haraway describes a feminist approach to political ethics which accepts our finitude, contingency and historical situatedness but doesn't forgo action. In Ronell's view, by deconstructing categories commonly thought to be understood, by introducing doubt into the definitions of topics such as technology, addiction and stupidity, the decision making apparatus of power may be slowed down or changed.
- [8] Sedgwick, 78
- [9] As other platforms such as World of Warcraft and Opensim offer similar networked, three-dimensional representations, as a group they are referred to as Multi User Virtual Environments (MUVes).
- [10] Bunny Brickworks, POST 6 GRRRL, <http://post6grrrl.blogspot.com/> (accessed on November 4, 2009).
- [11] In a way my performance was itself a prototype of a system for long-term immersion in mixed reality.
- [12] Linden Research, Inc., Virtual Worlds, Avatars, free 3D chat,

- online meetings - Second Life Official Site,
<http://www.secondlife.com> (accessed on November 4, 2009).
- [13] Dell, Kristina. "How Second Life Affects Real Life."
<http://www.time.com/time/health/article/0,8599,1739601,00.html>
(accessed on November 4, 2009).
- [14] Jean Baudrillard, *Simulacra and simulation* [Simulacres et simulation.], (Ann Arbor: University of Michigan Press, 2004), 125.
- [15] Brian Massumi, *Parables for the virtual: Movement, affect, sensation*. Post-contemporary interventions. (Durham, NC: Duke University Press, 2002), 4.
- [16] Stone, 231
- [17] European Graduate School, "Maurice Merleau-Ponty,"
<http://www.egs.edu/resources/ponty.html> (accessed on November 4, 2009)
- [18] Maurice Merleau-Ponty, *Phenomenology of perception* [Phénoménologie de la perception.], (London ; New York: Routledge, 1962), 72.
- [19] *Ibid.*, 169.
- [20] Brian Massumi, *A shock to thought : Expression after Deleuze and Guattari*. (London ; New York: Routledge, 2002), 222.
- [21] Ricard Dominguez, "nanoGeoPolitica/Poetica/Pelicula - fabricating with minor scales,"
<https://mail.cofa.unsw.edu.au/pipermail/empyre/2009-February/001216.html> (accessed on November 4, 2009)
- [22] Much like Merleau-Ponty's desires stated in the preface of *Phenomenology of Perception* to create a field of knowledge on par with that of science.
- [23] Chela Sandoval, *Methodology of the oppressed*. Theory out of bounds. Vol. 18. (Minneapolis: University of Minnesota Press, 2000), 59.
- [24] *Ibid.* p. 62
- [25] *Ibid.*
- [26] *Ibid.* p. 174
- [27] *Ibid.* p. 174
- [28] *Ibid.* p. 173
- [29] Munster, p. 24

[30] Donna Jeanne Haraway, *When Species Meet*.
Posthumanities. Vol. 3. (Minneapolis: University of Minnesota
Press, 2008), 2.

A Conversation with Spirits Inside the Simulation of a Coast Salish Longhouse

JACKSON 2BEARS



Inherent Rights, Vision Rights:

I am entering Yuxweluptun's virtual reality simulation of a Coast Salish longhouse to have a conversation with the spirits... .

I am traversing a long pathway toward the open doors of the spirit lodge, and the sound of drums and hypnotic chanting escape from inside... far in the distance a coyote howls, drawing my attention upwards to the crescent moon hung high in the infinite void of the evening sky.

I am beginning to hallucinate... the surreal and synaesthetic experience of this virtual environment drawing me deeper into its irresistibly seductive digital dreamscape... I pass

through the entrance of the lodge and I suddenly find myself a participant in a sacred ceremony, dancing and moving about in a frenzy to the dizzying sounds of powwow drums thundering and reverberating off the walls. I watch the smoke from the fire travel upwards and escape through an opening in the roof... and I begin to feel the piercing gaze of the many faces on the totem obelisks that stand against the caustic, bright-red walls of the room.

For the moment I am still aware that this is only an artificially produced trance enabled by my technological immersion in a computer-generated hologram... but this is an awareness of which I am becoming increasingly uncertain. Feeling the ground give way beneath my feet I begin to drift around the room... terrified, yet strangely calm, I have the uncanny sense that my body is disappearing... but at the same time I am hyper-aware of its fleshly presence.

Vanishing, and now almost invisible, I have the feeling that I have been possessed by some mystical and unnatural force... paralyzed by a momentary flash of panic, a crowd of indiscernible voices again fills the air and I am comforted and pacified by their spectral presence... and my urge to resist is subdued.

Then, suddenly, a cacophonous screech from the great eagle spirit causes the walls of the lodge to shudder... and I begin to feel nauseous as this ecstatic feeling of disembodied-embodiment awakens feelings in me of a kind of psychoexistential transformation that has about it the quality of some ancient initiation ritual. Confused and discombobulated, my entire sense of "self" has become distorted, dislocated and entirely uncertain... though this experience is definitely not of the transcendent nature. I don't have the feeling of leaving my body and the earthly plane... instead, I feel submerged in a kind of digital underworld, caught in a technologically enabled illusion, set adrift in a liminal zone with the feeling of being simultaneously inside and outside of my body....

The drumming intensifies and comes to a delirious crescendo, and I have now completely lost the ability to discern where one reality ends and the other begins... though this

question has now altogether lost its importance and urgency... I close my eyes, and take a deep breath... and I finally allow myself to be fully taken into the technological abyss.



Inherent Rights, Vision Rights is the title of a virtual-reality artwork created by Coast Salish artist Lawrence Paul Yuxweluptun in 1991-93 at the Banff Centre for New Media, Banff, AB. It is an interactive work that, in its first iteration, consisted of a VR helmet and a joystick that immersed a single participant and enabled their navigation in a 3D recreation of a Coast Salish Longhouse. In the artwork the user is invited to explore a sacred ceremony, interacting with computer-generated figures derived from Yuxweluptun's paintings while submerged in a surreal and meditative (simulated) audio/visual environment. Here, the story is not "written on the land," but instead in ones and zeros in the liquid architecture of a computer-generated environment, a sacred space populated by *spirit-simulations* that inhabit the digital code.

Throughout his artistic career, Yuxweluptun has made numerous artworks that in a general sense engage with questions of Indigenous identity, freedom and self-government from a perspective deeply affected by an oppressive colonial hegemony. In his paintings (for which he is more popularly known) he has

explored environmental, cultural, and sociological issues that are of concern to contemporary First Nations communities, particularly those in the West Coast. Often working on large-scale canvases, Yuxweluptun's visual imagery is often characterized by surreal landscapes populated with allegorically charged figures rendered in a mixture of different traditional and contemporary West Coast styles. In his work you can sense the artist's compassion and vehemence towards the devastation that colonialism and industrialization have had on Indigenous communities, and his resentment pours out in vibrant pigment in artworks such as *Clear Cut to the Last Tree*, *Scorched Earth*, and *Redman Watching Whiteman trying to Fix Hole in the Sky*.

Informing Yuxweluptun's work is his more than twenty years of experience as a "Blackface" dancer, having been initiated into the Sxwaixwe Coast Salish secret society at the age of fourteen. It was here that he was honored with the name Yuxweluptun, which translates as Man of Masks or Man of Many Masks. At the core of his art practice, one senses the artist's profound spiritual connection to his ancestral homelands, what some Indigenous philosophers have called a "psychology of place," or "a relationship with the natural world that could be called ensoulment... which for Native people represented the deepest level of psychological involvement with their land." [1] Ensoulment, generally speaking, entails maintaining a soulful, embodied and emotional connection with the natural environment, and is one way of describing how our ancestors viewed their connection with Mother Earth. Ensoulment is the belief "that the natural world is animate, that it generates powers to which humans can have access and that human use of the land is sanctioned by the appearance of spirits." [2] It is a core aspect of First Nations spirituality that is expressed, for example, in Coast Salish culture through the legend(s) of the Transformer (*Xeel's*) and his encounters with *Kwu Yuweenulh Hwulmuhw* (the first ancestors). *Xeel's* was a supernatural being who existed at the beginning of time and who traveled the earth turning animals and people into large stones, mountains or other elements of the natural environment. From these stories the Coast Salish people

believe their ancestral landscapes to be sacred, and they cultivate a participatory and internalizing bond with "place" wherein the natural environment becomes something they share a close kinship with. [3]

For Yuxweluptun, creating a virtual reality project like *Inherent Rights, Vision Rights* was about bringing together traditional First Nations spirituality with Western world experiences and technologies. It is an artwork about "[e]mploying technology that in the past has been used against native people," [4] and then repurposing it as a means to explore critical issues about our "inherent right" to spiritual, cultural and social freedom. He writes:

In it, the longhouse is a given space in time which I use to show a religious concept, to physically bring people into contact with a native worshiping aspect of life, praying Indians.... What it is like being in a possessed state, feeling rhythmic sounds in a longhouse, feeling sounds go through oneself, feeling a spirit inside you. [5]

In an essay by Cree/Métis theorist Loretta Todd entitled *Aboriginal Narratives in Cyberspace*, the author begins by posing a number of interesting questions that she afterwards reads through Yuxweluptun's *Inherent Rights* artwork: "What then does the territory called cyberspace [virtual reality] mean to Aboriginal people?" [6]; "Can our narratives, histories, languages and knowledge find meaning in cyberspace [simulated environments]?" [7]; and perhaps most importantly, "What if Aboriginal consciousness was fractalized, would cyberspace [virtuality/simulation] as articulated be part of our geometry of philosophy?" [8]

To begin, Todd argues that the invention of cyberspace/virtual reality is linked to three ideological perspectives that are uniquely Western, concepts not found within traditional Indigenous teachings. First, the "ontology of cyberspace" is inextricably linked to the notion of transcendence

-- the "hell of western thought"[9] -- which she argues fixates on the limitations of the "body and the senses" with the idea of moving beyond the flesh to find solace in the virtual. Second, a special condition for the development of cyberspace and virtuality involves a direct and profound fear of the natural, a fear especially expounded by the rising anxiety about environmental conditions that we are witnessing. Third, Todd argues that the conditions for an "ontology of cyberspace" are derived from a combination of the Cartesian tendency to "separate the body from the mind," [10] and religious (Christian) cosmologies invested in the myth of salvation. She says,

A fear of the body, aversion to nature, a desire for salvation and transcendence of the earthly plane has created a need for cyberspace. The wealth of the land almost plundered, the air dense with waste. The water sick with poisons, there has to be somewhere else to go. [11]

In essence, what Todd calls a Western "ontology of virtuality" is an ideological perspective that emerged in the early days of cybernetic research (of which cyberspace/virtual reality is a subset). As N. Katherine Hayles argues in her text *How We Became Post Human*, from the birth of the field of cybernetics in the 1940s, scientists have focused on developing theories of communication between human agents and machines that were synonymous with Cartesian Dualism, "a conceptualization that sees information (mind) and materiality as distinct entities." [12]

Hayles thesis is comprised of four propositions. First, the construction of the posthuman, following the trends of early cybernetic researchers, has come to value "information" over "material instantiation,"; embodiment is devalued and erased as an essential feature of existence. Second, through a critical examination of scientists Hans Moravec and Norbert Wiener, she proposes that human consciousness was mistakenly equated with information processing machines; our conceptualization of the posthuman, which regards consciousness as a mere

epiphenomenon, resulted from this mistake. Third, Hayles opposes the ideas of the early cybernetic researchers, who identified the body as the "first prosthesis," wherein the technological extension and replacement of the humanoid body became the focus of future scientific research. Fourth, Hayles objects to the configuration of the posthuman that ceases to recognise any specific difference between material embodiment and virtual/simulated reality. That is, after cybernetic researchers established the concepts of "information" over embodiment, consciousness as an epiphenomenon, and the body as a replaceable biological prosthetic, they envisioned a version of the posthuman that finally collapsed the boundaries between computer simulation and biological organisms. This is to say that the discourse of embodied physical presence in the context of virtuality is troubled by the contradiction of being both "inside" and "outside" the simulation simultaneously. This is what Loretta Todd meant when she spoke of the "fractalization" of consciousness, the pleasurable and seductive illusion of disembodied subjectivity "dispersed throughout the cybernetic circuit," and the disappearance of the body as the realization of Hans Moravec's apocalyptic prophecy of a post-biological future; she says that "if poetry requires the willing suspension of disbelief, then virtual reality/cyberspace requires the willing suspension of the flesh." [13]

But in Yuxweluptun's artwork *Inherent Rights, Vision Rights*, Todd experiences something quite different, and so she writes about a reversal of the usual modes of simulated experience and virtual hallucination. Rather than a feeling of distributed subjectivity and the transformation of the self into streams of data under the sign of *technological-transcendence*, in Yuxweluptun's work, for Todd, there is a return to the flesh in something similar to what N. Katherine Hayles would call "*embodied virtuality*" -- virtuality, that is, in which the myth of transcendence and disembodied immortality is demystified, and embodiment and material embeddedness are written back into our concept of posthuman subjectivity. What follows is an examination of the kinds of reversals, multiplicities and

paradoxes that exist within Yuxweluptun's work. Following Todd, I will argue that *Inherent Rights, Vision Rights* presents us with the possibility of recontextualizing the Western "ontology of the virtual," a transformation in which the focus becomes a return to the flesh as both an embodied and simulated experience under the sign of an *Indigenous Theory of Virtuality*.

In our culture you do not have all these fibre optic things and it is quite an interesting mask that virtual reality has produced. I come from a tradition that was passed down in the West Coast. At age fourteen, I was given a mask and it had responsibilities that go with the culture. As the carriers of the mask, we took responsibility for all the peoples who were in this room to dance. [14]

In an essay entitled *Inherent Rights, Vision Rights* that accompanied the piece, Lawrence Paul Yuxweluptun reflected on his experience creating a virtual reality artwork and speaks to the use of technology as a means to express Native "modernities" -- a neologism that references the intersection and hybridization of Western and Indigenous technology and aesthetics. At one point in the text he refers to the head-mounted computer display in the first incarnation of the piece as "a whiteman's mask," [15] a symbolic object about repurposing technology through the inversion of the dominant codes of a Western "ontology of virtual reality" -- a mask, therefore, as a technology of immersion that transports the participant into the simulation of a Coast Salish longhouse, an Indigenous space of worship and prayer where *spirit-simulations* begin to haunt the digital code. "I think this first mask will end up in museums just like other masks!" he says, "Very primitive, with numbers on them, and the date they were made." [16]



Masks in Indigenous cultures traditionally served myriad functions and were associated with a number of social activities, ceremonies and sacred rituals. In First Nations culture, masks were never seen as mere objects and were taken to be numinous as they were often associated with healing ceremonies in which they acted as a conduit to the realm of the spirits. In my culture (Haudenosaunee or Iroquois) the most important masks were those of the False Faces, which were only worn by members of the Society of Faces (False Face Society), inclusion and initiation into which depended on an individual being instructed to construct such a mask in a dream. [17] False Face Masks were always carved into a living tree with which the individual shared a spiritual connection. Although no two masks were identical, they were recognizable for the unique characteristic of a broken and crooked nose fashioned in the likeness of the one we call

Flint, or the Great World Rim Dweller. [18] The False Face masks were thought to be alive, possessing the spiritual essence of Flint, and were used in healing ceremonies to enable the conjuration of his spirit and request his aid. Our False Face masks were sacred artifacts, ancient technologies through which the spiritual realm may be accessed and drawn upon for the purpose of healing or guidance. [19]

The Coast Salish people traditionally made only one type of ceremonial mask, the Sxwaixwe, which only a limited number of families, like Yuxweluptun's, have hereditary rights to. Like the False Face masks, the Sxwaixwe were thought of as possessing supernatural properties, bestowing on their owners different healing powers that made him/her capable of curing certain diseases. [20] The Sxwaixwe mask is dichotomous -- not only was it able to cure, it was also known to cause illness, create earthquakes, storms and floods. Indeed, the power of the mask is thought to come from its contradictory nature, represented in its aesthetic appearance through a combination of opposites. Surrounded by a flat disk upon which sits two birds is a stylized human-like face characterized by protruding eyes, a bird shaped beak and a fish-like tongue. The bird-fish hybrid represents the merging of the sky and the sea, the aerial and aquatic realms, and thus it becomes a symbol of mediation between distant, conflicting and contradictory elements -- *night and day, death and life*. [21] Considering these masking traditions in Indigenous culture, what can we say about the head-mounted computer display ("the whiteman's mask") in Yuxweluptun's *Inherent Rights* artwork? Can we take it to be simply a technological apparatus, a glorified computer screen that functions only to produce sensorial hallucinations, or is it something more? Conceived of as a mask in the Indigenous context, could we attribute to it a numinous quality so that it becomes more than just an object of technological fascination and instead, like a False Face mask, acts as a conduit to another realm in which the digital code becomes the medium through which spirit-simulations begin to speak? Or can we think about Yuxweluptun's VR helmet as being analogous to the Sxwaixwe mask, a spiritual

mediator between the incommensurable, *death and life, embodiment and disembodiment, virtuality and flesh*? That is, considered as a reversal of the codes of simulation, can technology here become hauntological, where dreams and visions are synonymous with that of technological immersion at the site of the collapse between the boundaries of the virtual and biological organisms?

Martin Heidegger once remarked that what was truly uncanny was not the fate of humankind to become increasingly more technological, but rather our complete unpreparedness for this imminent transformation -- the impossibility that is, for humankind to really understand our own technological destiny. For Heidegger, the reason for this was that the "essence of technology" was in fact not technological, but instead one of being -- a mode of human existence. [22] Therefore, what Heidegger called the "mystery of technology" could never be understood technologically: while its manifest content was represented by the technical enframing of existence, the latent content of technology would always remain undefined and enigmatic to human understanding. Heidegger's meditations that followed on the question of technology considered not only its positive potential but also the dark side of technicity -- the possibility of the technological to increasingly de-humanize society and arrive fatefully at what he called the "darkening of the world," in which the technological comes to transform the way we think and will.

If we follow Heidegger we might (unexpectedly perhaps) turn to the psychoanalytic writings of Carl Jung as a way to begin to *think* technology as a mode of human consciousness. To this end, we might imagine the hidden (latent) side of the technological, that which always remains concealed beneath the surface and inaccessible to human thought. Even though his mind was not specifically directed to the question of technology when writing his theories of dreams and the unconscious, re-reading Jung today, against the backdrop of our technological present, one comes to a deeper understanding of the far reaching consequences of Heidegger's theorization -- that technology is, as

Arthur Kroker has said, "not an object which we can hold outside ourselves, but technique as *us*, as a grisly sign of the possession of body and mind." [23]

In the text *Man and his Symbols*, Carl Jung proposed that the tendency of contemporary society to over-emphasize rational/scientific modes of thinking had resulted in the fatal rupture of the "parallel" correlation of the unconscious and conscious realms of the psyche in the modern individual. This rupture was fatal because Jung believed that if these psychic realms were "split apart or disassociated" catastrophic psychological disturbance would follow. In his time Jung saw an individual haunted by the "implosion" or "turning in of the psyche," a troubling predicament in which the individual had placed itself at the mercy of the "psychic underworld," having lost his/her ability to consider "numinous symbols and ideas." [24] It is for this reason that Jung frequently chose to meditate on Indigenous (pre-modern in his own words) cultures, which in his estimation had maintained psychic balance despite comparable scientific/technological advance in their time. Jung's conclusion was that pre-modern cultures forged and maintained a deep "spiritual" connection with their dreams which was reflected in their cosmology, philosophy, science and technology; by contrast, modern Western society had "forgotten the age-old fact that [spirits] speak through dreams and visions." [25] When considering the question of technology, Jung concluded it to be wholly ephemeral and transcendent, symbolizing the erosion of the unconscious to a dangerous degree because it had become nihilistic and representative of a radical denial of embodied (lived) existence *within* the natural world. As science and technology have advanced, he argued, our world has increasingly become dehumanized because we have lost our emotional and "unconscious identity" with nature: [26]

How different was the former image of matter -- the Great Mother -- that could encompass the profound emotional meaning of Mother Earth. [Today] it has degenerated to the limited ego-

thoughts of man... and vanishes into the sand of an intellectual desert. [27]

In his research Jung discovered that dreams in "pre-modern" cultures were believed to be a conduit to the realm of the spirits and that accompanying this belief were complex methods of "dream interpretation" that in many ways were superior to those of modern psychology. Jung further proposed that a culture in which dreams and visions were a primary source for informing spiritual knowledge necessarily maintained a "psychic disposition" rooted in the ideal of "mystical participation," otherwise known as animism. For instance Jung argued that in the current age of Western science the concept of matter had become an entirely intellectual concept, an inhuman and purely abstract idea devoid of any "psychic significance." [28] By contrast, Indigenous cultures were "aware of these psychic properties [of nature, and they] endow animals, plants or stones with powers that we find strange and unacceptable." [29]

The concept of animism is one that is used by a number of contemporary Indigenous philosophers as a means of communicating *Onkwehonwea* (an Indigenous way of being), which consists of the idea that everything in the natural world -- not just humans, but also animals, plants, insects, mountains, rivers and all of the natural landscape -- is alive and filled with "spirit". [30] In his text *Native Science*, Tewa philosopher Gregory Cajete, like Jung, argues that ensoulment and a "psychology of place" is an inclusionary philosophy at the root of Indigenous spirituality, noting that in our traditional societies we had rituals that paid homage to the living spirit of the sky (*Atonwa ne' Karonya*), the rivers (*Atonwa ne kahyonhowanen*), and the mountains (*Atonwa ne' Ononta*). In brief, in traditional Indigenous cultures, people believed in an all-embracing "society of life" in which living creatures as well as natural phenomena were united and possess spirit, implying the existence of a mutual (equal) relationship between man, animals and nature. [31] As Cajete notes, in this belief system,

Everything is viewed as having energy and its own unique intelligence and creative process, not only obviously animate entities, such as plants, animals, and microorganisms, but also rocks, mountains, rivers, and places large and small... this is the Indigenous view of "animism". [32]

If the concept of animism, then, is taken to be a central feature of Indigenous spirituality in which everything in the universe including seemingly inanimate objects are thought to be alive and possess "spirit," then it follows that the same must be said about technology. That is to say, an Indigenous theory of virtuality would be about thinking technology animistically -- computer simulations come alive and begin to have for us what Jung referred to as a "psychic significance." Here, the technological does not become about what Jung foresaw as a radical denial of existence and the natural world, but rather simulations that return to embed themselves back into the material instantiation of the flesh and reinscribe an emotional and unconscious identity with biological organisms, spirits and other natural phenomenon. In Yuxweluptun's virtual reality artwork *Inherent Rights Vision Rights* the people who experience the work are not mere spectators but participants in the phenomenological hallucination of a sacred ritual -- they are users with agency who exercise free will while navigating a simulation of a Coast Salish longhouse. And here the participant enters into another kind of relationship, a relationship in which they become interconnected with the virtual, caught in a feedback loop in which Yuxweluptun's spirit-simulations move through the digital code and interface with the flesh. If we are to think virtual reality animistically in the context of *Inherent Rights, Vision Rights* -- where streams of information code penetrate epidermal surfaces and the digital sounds of sacred drums, the crackling of a virtual fire and masked avatars open a gateway through which spirit-simulations are allowed to pass -- then we are not talking about technological-transcendence, but rather about interconnected ontologies with the virtual in what Jung described as a co-

existing "psychic experience," a shared "unconscious identity..." [33] Jung says,

[In Indigenous cultures] the soul (or psyche) is not thought to be a distinct unit... Many assume that a man has a bush soul as well as his own, and that the bush soul is incarnate in a wild animal or tree, with which the human shares some kind of psychic identity. [34]

In the chapter "1730: Becoming-Intense, Becoming-Animal..." in their book *A Thousand Plateaus*, Deleuze and Guattari begin their thesis on transformation with a reflection on the works of Carl Jung. To begin let us remember that Jungian psychology holds that there is a three-tiered order of psychic realities: individual consciousness, the individual unconscious, and the collective unconscious. Here we are concerned with the third order, comprised of what Freud called "psychic remnants" and what Jung called "primordial images" or the "archetypal" series. Jung conceived the collective unconscious as being universal; just as the body is genetically encoded and inherits physical traits that are common to our species, so too the psyche is imprinted with "collective experiences" and layered with clusters of symbolic information. Or as Jung puts it, "Just as the human body represents a whole museum of organs, each with a long evolutionary history behind it, so we should expect to find that the mind is organized in a similar way.... [The mind] can no more be a product without history than is the body in which it exists." [35]

What Deleuze and Guattari draw from the Jungian perspective is the notion that the archetypal series in the collective unconscious need not be exclusively human in nature, but could also be of the plant or animal variety. From here Deleuze and Guattari propose that the individual is opened to all kinds of *becomings* with different elements in this series and can experience interconnected ontologies with different animal, or plant, archetypes. From Jung's work Deleuze and Guattari seek to bypass what had previously been a structural and symbolic ordering of the unconscious as a "correspondence of relations" between archetypes. Instead, Deleuze and Guattari prefer the

notion of *becoming*, which entails not a correspondence but rather an interlinking, a "line of flight" that does not consist merely of "playing" (imitating, resembling), but something more akin to the Jungian notion of "psychic co-existence." For instance, a *becoming-animal* operates in-between terms, it is a "verb with a consistency all its own; it does not reduce to, or lead back to, 'appearing', 'being', 'equaling', or 'producing'." [36] Becomings are not fixed states of existence, but instead are fluid transformations that imply something less differentiated. Moreover, the kinds of becomings we find that follow in Deleuze and Guattari's text do not exclusively occur between organic types (becoming-wolf, becoming-crab, becoming-horse) but also, taking the cue from Jung, occur between the biological and the non-biological (becoming-machine, becoming-sonorous, becoming-territorial). Here, becomings are about the formation of an assemblage *with* machines (technology, simulation, virtuality), which entails an interlinking of elements in a rhizomatic multiplicity. Beyond shared psychic-experiences between organic archetypes, and speaking within the context of thinking technology animistically, becomings can (and necessarily do) also occur between the organic and the technological, the biological and simulation. Moreover, in the context of Yuxweluptun's *Inherent Rights, Vision Rights* we might here propose the possibility of interconnected ontologies with non-living entities (becoming-ghost, becoming-phantom, becoming-undead), which entails the becoming-spectral of technology under the sign of *virtual-phantomality*.

What I mean by technology becoming-spectral and virtual-phantomality is taken here in the Derridian sense, and follows from the mythology of the Sxwaixwe. With regard to Hayles' fourth thesis, the collapse of the distinctions between computer simulation and biological organisms need not, necessarily, lead to the complete erasure of embodiment. Instead, like with the Sxwaixwe mask in Yuxweluptun's work, the VR helmet becomes a mediator between two seemingly incompatible realms -- the human psyche and the technological circuit, pattern (code) and presence (body), biological organism and computer

simulations. In this way *Inherent Rights*, *Vision Rights* is a reversal of Hayles' thesis; instead of trying to reestablish the boundaries between simulation and biological organism this is an artwork that operates within the contradiction of the collapse. Here, the "whiteman's mask" in Yuxweluptun's artwork, like the Sxwaixwe, functions as a binding of opposites, and like the Derridian notion of the specter, operates in-between binary distinctions -- *death and life*, *simulation and the real*. Here the postmodern subject is considered to be neither simulation nor flesh, embodied nor disembodied, "information" nor material "instantiation," and simultaneously all of these at once.

On the one hand the VR helmet acts as a technological prosthetic, and on the other hand it produces a technological hallucination in which simulations are simultaneously re-embodied in the subject attached to the device, interlinking and (following Deleuze and Guattari) forming an assemblage with the human sensorium. "Yuxweluptun does not want you to forget your body," [37] writes Todd, who in the artwork glimpses an alternate concept of the virtual, one that is "derived from storytelling and oral tradition" [38] in a way that "reflect[s] our interconnectedness" and which therefore unhinges *this* virtual reality from being "anchored to re-enactments of western cultural consciousness." [39]

Consider for a moment Donna Haraway, an author who re-envisioned Western narratives of humanism and technology as an interdependent matrix of machines and flesh under the sign of the cyborg. To read Donna Haraway's essay *A Cyborg Manifesto* is to enter into a world in which the distinctions between technology and biological organisms are completely dissolved, where bodies and machines become interconnected to such a degree that it becomes impossible to tell where one begins and the other ends. To begin we could think of the cyborg (a term coined by Manfred Clynes and Nathan Kline in the 1960s) to be the ultimate dream of the cybernetic researchers that were the focus of N. Katherine Hayles critique described earlier; the cyborg is emblematic of all the narratives: "Escape from the earth, from the body, from the limits of merely biological

evolution...." [40] In this way the Cyborgian man-machine hybrid is understood as the quintessential techno-humanist challenge, a new species formed through the symbiosis of flesh and machine, the first step in the evolutionary game-plan towards a post-biological future.

However for Haraway the cyborg is not our future, but rather our present. The hybrid creature of industrial production, science fiction, and cybernetic research counts today for our lived experience -- *it is our posthuman ontology*. In regards to the myth of the cyborg, Haraway sees the line between material reality and science fiction to itself be fictional (an "optical illusion"), the coupling of machine and organism (becoming-machine) being evident everywhere today in modern medicine, biology, sexuality, politics and lived social relations: "By the late twentieth century, our time, a mythic time, we are all chimeras, theorized and fabricated hybrids of machine and organism." [41]

The difference is that for Haraway the cyborg presents some interesting theoretical possibilities. Rather than attempt to reestablish the boundaries that once kept bodies and machines separate, she begins to write an alternate mythology from within the contradictions that the cyborgian hybrid produces. For Haraway the cyborg becomes a means to subvert the kinds of dualisms that exist in Western traditions, binary opposites (self/other, mind/body, male/female, truth/illusion) that in the past upheld "hierarchical dominations" and that in the present enable networks of power under the sign of the "informatics of domination." For Haraway the cyborg transgresses these problematic constructions precisely through its partial, ironic and contradictory nature -- like the Coast Salish Sxwaixwe mask, the cyborg is a mediator in the binding of opposites.

The cyborg disturbs the notion of continuity in its breaching of the boundaries between organism and machine and becomes a symbol for the ironic pleasures found in the collapse of binary distinctions. It stands for the power and the potential for those not afraid of symbiotic kinships, psychic-assemblages and ontological interlinkings with technology (what Deleuze and Guattari call *becoming* and what Jung called shared psychic

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experiences). The cyborg breaks with the understanding of the individual as a synthesized unit separate and distinct from the technologies and the environment in which it is immersed. And yet while the cyborg here originates from within techno-humanist logic, it simultaneously avoids narratives of disembodiment -- it exists "outside salvation history." [42] Instead it operates from within the collapse between machinic and biological organisms, precisely where the distinction between humans and machines, consciousness and computer simulations, is transgressed -- the cyborg is not a symbol for technological-transcendence, but is rather the becoming-spectral of virtuality. The cyborg, like the Sxwaixwe mask, is about the merger of partial and contradictory identities (the bird-fish or the human-machine hybrid) and therefore necessarily entails an "oppositional consciousness," becoming the enigmatic sign of the postmodern subject who is neither flesh nor code, real nor simulation, and all of these at once.



Like the Transformer in Coast Salish legend, *Inherent Rights*, *Vision Rights* is an artwork that operates in-between binary distinctions -- changing simulations into flesh like Xeel's turned bodies into stone, and changing virtual environments into sacred landscapes like transforming "the first ancestors" into

mountains, trees and rivers. It is not an artwork that affirms notions of technological-transcendence, but rather a work about engaging in shared, co-existing ontologies with the virtual in which the digital code becomes a medium for spirit-possession through the becoming-hauntological of virtuality. Here, the VR helmet, like the Sxwaixwe mask, is an interface, but this time not a conduit to the spirit world of our ancestors but a technology that places the body in a feedback loop with the virtual -- forming assemblages, multiplicities, rhizomatic networks and co-existing ontologies. Inside Yuxweluptun's simulation of a Coast Salish Longhouse a new participatory, embodied and internalizing bond is made in which the virtual is haunted by spirit-simulations and virtual-phantoms that emerge from within the enfolding of paradoxical components and the merging of opposites.

As Yuxweluptun writes in the accompanying text for the artwork, the piece was intended to bring participants into contact with a Native form of worship, being inside the meditative space of the longhouse, what it is like to have a "spirit inside you." Here, the VR helmet, reconceptualized in the context of Indigenous masking traditions, becomes an interface of immersive possibility which does not perform (to use the Jungian term) a nihilistic and transcendent function, but in which spirit-simulations become embodied and the hauntology of *virtual-phantomality* becomes a sacred ceremonial act. *Inherent Rights, Vision Rights* shows us a new concept of the virtual, one that does not rehearse the usual codes of disembodied immortality, and one in which our narratives and stories as Indigenous people find new meaning -- where ensoulment and an internalizing bond is formed, where an Indigenous "psychology of place" becomes also a "psychology of virtuality."

With the reversal of the codes of simulation, the "ontology of virtual reality" in Yuxweluptun's work becomes about the return to the flesh as both an embodied and virtual experience, in what might be the first experiment with the concept of an *Indigenous Theory of Virtuality*. The virtual, that is, envisioned as the recombinant inversion of the codes of simulated-bodies and telepresent flesh ("mechanical and

separate" [43]), and seeing technology now through a binding of opposites in the tradition of the Sxwaixwe and from the perspective of Native cosmology ("connected and immanent" [44]). And like the False Face and Sxwaixwe masks, in *Inherent Rights*, *Vision Rights*, technology becomes-spectral where the digital code becomes the medium through which Yuxweluptun's spirit-simulations begin to speak, expressing *Onkwehonwa* (a Native way of being) inside the simulation of a Coast Salish Longhouse, a sacred space of dance, worship, prayer and healing.



Notes

[1] Gregory Cajete, *Native Science: Natural Laws of Interdependence* (Santa FE, New Mexico: Clear Light Publishers, 2000), 186.

[2] Lawrence Paul (Yuxweluptun), "Inherent Rights, Vision Rights", *Immersed in Technology: Art and Virtual Environments*, ed. Marry Anne Moser (Cambridge, Massachusetts and London, England: The MIT Press, 1996), 316

[3] Franz Boas, *Indian Myths and Legends from the North Pacific Coast of America* (Vancouver: Talon Books, 1916), 161.

[4] Paul (Yuxweluptun), 316.

[5] Ibid

- [6] Loretta Todd, "Indians in Cyberspace", *Transference, Tradition, Technology*, ed. Dana Claxton and Steven Loft (Banff, Alberta: Walter Phillips Gallery Editions, 2006), 153.
- [7] Ibid
- [8] Ibid
- [9] Ibid, 155.
- [10] Ibid
- [11] Ibid
- [12] N. Katherine Hayles, *How We Became Posthuman* (Chicago and London: The University of Chicago Press, 1999), 12.
- [13] Todd, 160.
- [14] Lawrence Paul (Yuxweluptun), "Open Discussion -- day two", *Virtual Seminar on the Bioapparatus*, ed. Catherine Richards and Nell Tenhaaf (Banff, Alberta: Walter Phillips Gallery Editions, 1991), 110-111.
- [15] Paul (Yuxweluptun), 316.
- [16] Ibid, 317.
- [17] Lewis Morgan, *League of the Ho-De'-No-Sau-Nee Or Iroquois* (Cambridge: UP. John Wilson and Son, 1904), 220.
- [18] *Ibid*
- [19] Ibid
- [20] Ino Rossi, *The Logic of Culture: Advances in Structural Theory and Methods* (New York: J.F. Bergin Publishers, 1982), 157-160
- [21] Ibid
- [22] Martin Heidegger, *The Question Concerning Technology and Other Essays*, translated and with an introduction by William Lovitt (New York: Harper and Row, 1977), 109.
- [23] Arthur Kroker, *The Possessed Individual* (Montreal: New World Perspectives, 1992), 13.
- [24] Carl Jung, *Man and His Symbols* (New York: Dell Publishing CO, 1964), 84.
- [25] Ibid, 92.
- [26] Ibid, 7.
- [27] Ibid, 85.
- [28] Ibid, 84.
- [29] Ibid, 30.

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[30] Cajete, 186.

[31] Elisabeth Tooker, *An Iroquois Source Book Vol. 3: Medicine Society Rituals* (New York & London: Garland Publishing, Inc, 1985), 172.

[32] Cajete, 21.

[33] Jung, 7.

[34] Ibid, 8.

[35] Ibid 57.

[36] Gilles Deleuze and Felix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia* (Minneapolis: University of Minnesota Press, 1987), 239

[37] Todd, 160.

[38] Ibid, 161.

[39] Ibid, 162.

[40] Haraway, 149.

[41] Ibid, 8.

[42] Ibid, 150

[43] Todd, 160.

[44] Ibid

Illuminated Darkness: Nightmares, Blind Spots and Biofeedback

TED HIEBERT

This exploration would be best seen as the beginning of a story, a somewhat tenuous account of what might be called a manifest imagination. This is the story of how we are all already imaginary beings, entities not governed by the rules of science or truth or reason, but at least always in part governed by our imaginary participation in the formation of the world.

This is also the story of a digital imaginary: minds caught in the dynamic of user-generated content, bound by worldly context to something that would never have appeared to an analog mind—namely, the observation that reflection is no longer the governing sign of knowledge or understanding. We have passed through the mirror to the other side, and, on the other side, what we find is that the rules of the game have changed—bodies and minds flipped from side to side. The frame which housed reflections has disappeared, absorbed into the world of screen-based living.

Imaginary Beings

We have become imaginary technological beings, a situation that has been described by many, from Paul Virilio's assertion that technology makes phantom limbs of bodies and minds, to Arthur Kroker's insistence that technological citizens are “possessed individuals,” to Marshall McLuhan's suggestion that technological bodies are literally turned inside out. But there is another story that frames the situation more directly, “Fauna of

Mirrors” Jorge Luis Borges. In this story, the mirror people, once citizens of the same world as us, are banished to the other side of the mirror—the side without a frame, the side where the mirror lacks its reflective power, a one-way mirror that is also a screen. [1] Who jumps first, the mirror or its reflection? We give agency to ourselves but what if we, too, crossed to this other side? Wouldn't it be just the opposite? On the other side of the mirror we would no longer see ourselves in imitative gesture. Instead, we would see a self that mocks us, a master self staring vainly in our direction, definitely not staring back, not responding in passive obedience but compelling mimetic response.

In the land of the screen we jump second, our appearances always ahead of us at the speed of the half-distance traveled, the speed of light that only has to go half as far—the space of the light-beam **before it is reflected back**. This is a place of light caught in mid-stride between illumination and appearance—light in transit, not illumination proper but its unrealized potential. It is a distinction between reflected light and what photographers call **incident light**, direct light (such as that from the sun or a light bulb), light from which one measures fall-out—a location in space rather than an image, assessing in this instance the level of general illumination present. Incident light is light on its way to an object, the light of vectors rather than positions: light on its way somewhere, but not yet reflected back into the realm of appearances, not yet bound to the story of light but only to that of illuminated darkness.

And, just like in Borges' story, the mirror people, having understood their debt to the incident rather than reflection, have now slowly begun to re-infiltrate the world of flesh, threatening to reclaim in some way the imaginary agency stripped from them on the other side, re-emerging from the screen and re-infusing the material world with imaginary presences.

In this spirit, the story that I want to tell grows out of a meditation on the relationship between incident light and the lights of the imaginary: both are lights that do not reflect but project their images outwards, casting shadows, terrorizing established standards of illumination and exposure, morphing and

deforming existent relationships that we thought were representational, and, in so doing, burning their way with blinding intensity into real-world manifestation. This is a story of light that re-enters the world from the darkness and a story of three incidents: nightmares, blind spots, and biofeedback—three cases of the body as technological generator of illuminated darkness.

First Incident: The Case of Nightmares

A story such as this is only appropriately begun with a nightmare, a defiance of the impossibilities of daily living that forcibly infiltrates the minds of the dreamer. Spoken in a language that allows no denial, nightmares can be so terrifying only because they allow for no reciprocal engagement. Yet in this, in a strange and not-so-subtle way, one might conjecture that nightmares are proof of the power of imaginary being: night-time thoughts or fears that manifest with real world impact. And, because of this short-circuit of the question of volitional engagement, one might go further and propose that nightmares can be seen as a shortcut to the possibilities of the imagination, a shortcut because nightmares cut out the question of intentionality in favour of subjection: no reflection, only unwanted exposure. Nightmares are a familiar (if less than desirable) manifestation of that which is beyond rational control, but which nevertheless seems to happen. Whether we believe the medieval stories of Incubus possession, the psychoanalytic stories of unresolved life experience, or the scientific stories of random synaptic firing is not irrelevant, but does not effect the argument. Nightmares, even when dismissed as unimportant, have measurably real physiological effects. [2] Seen technologically, the effects are even more real than the nightmare—measurable and machine verifiable, even if their causality remains in the darkness of uncertainty. The effects of nightmares might be as simple as increased heart and respiration rates or as complex as waking with a bloody nose, screaming or in continued panic because, even though we realize we are already awake, we are never quite convinced that the imaginary hasn't somehow followed us back

into the waking world. By most accounts a large majority of us have had a nightmare or few of this sort—those dreams that plague the waking day, that refuse to relinquish their nighttime hold over a day that is no less real for its irrational contingent. [3]

Thought as Incantation

It is important to note this dark side, this relationship of the nightmare to both the literal darkness of dreams and the figurative darkness of cognitive anxiety, if for no other reason than to immediately insist that an imagination of this sort can have real effects, and not always of the happy creative type. There is an important connection to be made here between the nightmare as a cognitive and physiological manifestation and the type of metaphysical thinking described by Antonin Artaud as “active metaphysics,” thinking that insults itself, [4] that situates itself “in between gesture and thought,” “between dreams and events,” as a literal form of incantation. [5] The notion of thought as incantation is nothing if not a most literal description of nightmares, imagined encounters that nevertheless do not obey the boundaries between dreams and reality. This is to say not only that nightmares may have metaphysical importance, but also that they might provide an **access point** to the imagination through the power of metaphysical manifestation. In this spirit of Artaud's “active metaphysics,” one might call nightmares a form of thinking in reverse, a metaphysical reverse-engineering whose end-game is a flip of Nietzsche's declaration that we only remember what hurts [6], transformed into a mnemonic device, a nihilist pedagogy of one sort or another.

Artaud understood as well as anyone that the powers of incantation and dream are neither reflective nor even yet relational, and that the idea of allowing ourselves to be injured in a certain direction, as metaphysical strategy, ceases to lose its significance if such willful cooperation also dulls the effect. This task of understanding, in other words, is not by any means one whose aim is a domestication of nightmares, but, rather more strangely, a simple awareness of the unwilled immediacy of encounter—what Peter Sloterdijk calls a “critical proximity” as

opposed to a critical distance from the question. [7] And, one might suggest, this proximity is exactly half the distance between criticality and its reflective self-awareness—an incident that manifests in the tongue-speak of nighttime incantation, actively preventing reflective distance through a demand for immediate encounter.

Forced Suspension of Disbelief

Notably, this same strategy has a long history, albeit in a slightly different form: a form requested rather than demanded; a form in which proximity is a function of desire rather than forced encounter—the history of aesthetic discourse in which experiential proximity is the coveted modality of engagement. Whether the formulation is that of Aristotle's “plausible impossibilities,” Kant's “disinterested interest,” or Samuel Taylor Coleridge's “suspended disbelief,” what each has in common is precisely not a distancing tactic but a willful encounter grounded in the immediacy of imaginary engagement, without necessary regard to the reality or un-reality of the situation (which is not necessarily to say without critical awareness of the state of affairs). For each of these thinkers, Sloterdijk's “critical proximity” is central not only to the aesthetic experience, but builds on what Northrope Frye eloquently calls an “educated imagination,” a cultivated integration of the hybrid experience of reality and the imaginative. [8] Importantly, such integration begins not with sophisticated knowledge machines but always with a language of encounter in its most basic form: for literature, poetry; for science, mathematics; and, one might extrapolate, for dreams, nightmares—a proposition with which even some dream researchers concur. [9]

I raise these affinities to reinforce not only the manifest powers of nightmare encounter, but also to firmly connect nightmares with a history of imaginative engagement, and to connect aesthetics to a metaphysics of nightmares. The nightmare might even be seen as a form of meta-aesthetic, taking aesthetic strategy one step further into a suspension of reality, a form of the imaginary that dictates material proximity—in other words, **an**

unwilled aesthetic encounter. This makes sense because nightmares do not respect the boundaries of possibility, reality, or sense, but nevertheless impact upon the lived world. The nightmare's relationship to the suspension of disbelief is one that is explicitly forced—a forced suspension to which one might even attribute a sort of perverse yet living poetic. Consider some of the most common nightmares: those in which we are being hunted or chased but cannot escape; those in which we fall towards the ground on a crash course to daytime; those in which our teeth fall out of our mouths, one by one, sometimes in mid-speech. [10] Might these all not be seen as strangely aesthetic renderings—a poetic return to our own transgressed agency paradoxically spoken through the very rupture of will into lingering real world manifestation? One might not quite call this mind over matter, for it is difficult to assign the agency of such encounters to ourselves, but there is definitely a dynamic in play—a manifest context that cannot be ignored, burning awareness into experience, emerging from the screen of the imaginary backwards into the world of flesh.

Nightmares as imagination burns: a first instance of illuminated darkness.

Second Incident: The Case of Blind Spots

The grounding of this exposition in a cultivation of nightmares serves two purposes: first, it reinforces the proximity of encounter, frustrating the attempt to establish a rhetorical or critical distance; second, it provides a preliminary instance of our relationship to the manifest imaginary. The case of nightmares suggests that such a relationship is less something to develop (since it already exists) and more simply an imaginary fact of life—the problem being that the associated manifestations are typically imposed upon us unwillingly, according to a schedule not of our making.

Fortunately, a more accessible version of the phenomenon exists, a daytime nightmare of sorts that can go unnoticed because it also goes precisely **unseen**. Here, as a second instance of encounter, we might look at the blind spots of vision as a case

of the manifest imaginary intruding explicitly on the appearance of the world around us: a similar case of illuminated darkness but one that offers different critical possibilities because of both the perpetuity and pervasiveness of these visual ruptures. In the simplest explicative iteration, blind spots are those areas of the eye where the optic nerve penetrates the retina, areas in the eye where there is exactly no sight present. But these blind spots do not manifest as such. Interestingly, in those areas where we are deprived of sight, we nevertheless experience visual stimuli. The blindness is sutured, the void is imagined-in, the gap is filled. In some instances this is simple cross-pollination from one eye to the next, but even in instances where we see with only one eye, the mind refuses to leave that spot of sight un-filled. What would be darkness is lit up by the power of consciousness alone.

Blind spots, in other words, are areas of illuminated darkness, in a literal way: proof that part of what we see as real is explicitly made up, hallucinated into being. One might even say that the blind spot is not so much simply a physiological exception or defect as it is an **orifice**—that from which the imaginary is excreted into the world at large, preserving a seamless vision of reality by masking the fractured reality of vision. Suddenly, out the window goes the reliable basis of knowledge as that which can be observed and through observation verified and in its place remain only those fictions which reciprocally fade into appearance as the “false lights” of imaginary presence. It is not quite quixotic, not as simple as a completely delusional world at large. It is, instead, deceptively Cheshire: a blind spot grin smiling back at us from every angle, a ubiquitous aesthetic protrusion with such proximity as to render itself invisible to the human gaze.

Useless Functions

The irony of this formulation is that, technologically, the blind spot reveals that eyes have only ever been **partly** about seeing. This can be made clear with a simple reference to Paul Virilio's concept of the “vision machine,” which makes the compelling case that eyes have been rendered technologically

redundant, replaced by a digital gaze that sees more, better, and faster. [11] And this is also the eye rendered as what Jean Baudrillard calls the “useless function,” an eye replaced by its technological double that now forms the horizon of legitimate vision—human vision relegated to the status of second-class organic. In Baudrillard's words, “When the world, or reality, finds its artificial equivalent in the virtual, it becomes useless,” [12] a prophecy that fulfills Virilio's promise of machinic vision.

And yet, there are ghosts in this machine—that which remains to take aesthetic revenge when the full spectrum illumination of a digital gaze mistakes the world for a seamless visual entity. The eye seen technologically emphasizes the simple fact that what technology does not (and perhaps cannot) replace are exactly the defects of sight: those aspects of vision that have always been there but which we are only just beginning to see—in short, the part of the eye that is physiologically responsible not for the reflective rendering of an apparent and verifiable world, but for the guardianship of imaginary protrusion. Technology may render the eyes blind, but if so we are left with what amounts to a blind spot imperative of sight turned useless: the assertion that vision has always been a guardian of this imaginary function of useless practice. Interestingly, the eye seen technologically reclaims its physiological importance by exactly embracing a nightmare of blindness.

Cognitive Blind Spots

This is obviously, in part, a conceptual abstraction, but I want to abstract one step further. This dynamic is not limited to the eye but also has a cognitive equivalent. “Useless functions” are also those that, in Baudrillard's words, have somehow forgotten to die, left to aesthetically roam the world with a value added suspension of science and truth, returning to wreak an imaginary revenge on the world and its appearance. “The Real effaced by its double is a potentially dangerous ghost,” says Baudrillard, and under the sign of the useless function, the directionality of the blind spot begins to reverse—not merely a suturing of reality, nor simply an imaginary visions that fills in

sight where there was none before, but, strangely, one that also begins to replace certain aspects of apparent reality itself. [13] It's not as strange as it sounds. In a recent issue of *Scientific American*, neuro-psychologist V.S. Ramachandran speaks of a phenomenon called “inattentional blindness,” a case of not seeing things that are actually right in front of one's eyes. Ramachandran describes the study like this:

Pretend you are the member of an audience watching several people dribbling and passing a basketball among themselves. Your job is to count the number of times each player makes a pass to another person during a 60-second period. You find you need to concentrate, because the ball is flying so quickly. Then, someone dressed in a gorilla suit ambles across the floor. He walks through the players, turns to face the viewers, thumps his chest and leaves. Astonishingly... 50 percent of people fail to notice the gorilla. [14]

Interestingly, under conditions such as these it seems that the blind spot returns with a strange reversibility, not filling in a vacant spot of vision but explicitly **imagining away** the disruption—not the technological disabling of vision but the cognitive augmentation of appearances, a strategic displacement of reality **into** the blind spots of vision and cognition. This epiphany is, of course, an apophany, a false versioning of reality that is nevertheless faithful to the **human** tropes of vision, an imaginary particle stuck in the eye of the vision machine. And if there was any doubt that the blind spot might be seen as an orifice for the protrusion of the imaginary, this should at least cast some illuminated doubt on the question.

Blind spots as an orifice of the imaginary: a second instance of illuminated darkness.

Third Incident: The Case of Biofeedback

At the midway point between nightmares and blind spots, in the dialogic space between imagination burns and the revenge of the imaginary on the world of technological vision, a fissure begins to appear, one that speaks of feedback possibilities for a world imagined differently. It's a place where Pavlov's dog begins to chase the Cheshire Cat, a place of potential promises for imaginary conditions and imaginary conditioning. The game is one of cultivating nightmares and putting things in the blind spots of cognition—not idly but as a strategic response to the aesthetic proximity of the world.

The simple version of this third incident, the case of biofeedback, refers back to the technological status of contemporary bodies—what Virilio describes as phantom limbs of a world gone virtual. [15] At stake in this formulation is, first and foremost, its use of nightmare terminology to describe a human state: the traumatic immediacy of amputated bodies held out as the version of how we should all now self-conceive. And while there may be an injustice done to the question of real pain and violence in such a description, we might nevertheless conjecture that Virilio means this quite seriously as the current state of technological living—a system in which sensation is an artificial dry-heave of bodies rendered useless.

Phantom Sensation

Strangely, however, we are still compelled to reconcile this state of phantom sensation: physical or technological or both—registrations of injury in parts of our bodies that are simply no longer effectively present. No more eyes, now only the hallucinations of phantom vision; no more hands, now only the paradoxes of phantom touch; no more minds, now only the delirium of phantom logic. If we have become the phantom prostheses of a virtual world, what do we do with our residual phantom sensations? If we follow the model of the nightmare, we might begin by insisting that even though these sensations no longer belong to a phenomenal reality, they nevertheless continue to have phenomenal effects. If we follow the model of the blind

spot, we might continue and ask whether such sensations are not themselves symptoms of imaginary extrusion, suggesting not simply the ghostly lingering of bodies rendered useless, but the concomitant presence of a manifest imaginary of one sort or another.

Interestingly, the clinical assessment of phantom limbs corresponds very closely to both of these assertions, particularly in an experiment conducted by V.S. Ramachandran. According to Ramachandran, “after amputation of an arm, the vast majority of patients continue to feel vividly the presence of the missing arm,” a condition that sometimes includes feelings of phantom pain. To treat this pain, mirrors are used to present the image of a limb where there is none, effectively fooling the eye (and through the eye, fooling the mind as well) into a sympathetic response. It doesn't matter that the patient knows he or she is being fooled, the visual stimulus is sufficient in most cases to alleviate the pain, at least temporarily. In Ramachandran's words, “if information from vision and touch are incompatible, visual dominance may cause us to actually feel things differently than if we relied only on touch,” a sensory hierarchy that his experiments exploit for medical and psychological purposes. [16]

Imaginary Solutions

I want to suggest that this system is one of imaginary solutions, a term coined by Alfred Jarry when describing the science of “pataphysics.” [17] I want to make this attribution because what Ramachandran refers to as a process of tricking the mind into accepting the truth of the situation might just as easily be excerpted from this system of truth and looked at as a more general process for the reconfiguration of subjective awareness. In this instance, what I am suggesting is that outside of its clinical application, in which the process has a direct and articulated objective, there is a more general rule to be learned about refashioning cognition and the imaginary. Within the frame of this more general view, there is no good reason why the structure shouldn't also be reversible.

An important rhetorical question emerges: if we didn't have phantom sensations, could we make some up? Could we perhaps begin to imagine sensation itself into existence? Could we imagine pains and wonders and tragedy and drama when none of them existed before? By all accounts we may already do exactly this, if the cases of nightmares and blind spots are any indication or if Virilio's technological assertions are correct. And even if not, there are no shortage of other imaginary dramas in the world at large, whether it be reality TV or high-school cliques or mid-life crises. There are also more dangerous examples—from psychosomatic diseases, imagined into existence, to psychosomatic cures, sometimes placebo-induced, sometimes credited to the pure power of will. What are we to gain from this if not an indication that the manifest imaginary is potentially malleable in certain directions, or within certain parameters? The question, consequently, is not so much if one can cultivate such response, but how; this is where the field of biofeedback offers some interesting possibilities—phantom sensations conditioned into manifest reality.

Imagine, for instance, that thinking warm thoughts on a cold day might actually serve to improve finger and hand performance as you work outdoors. It's a benign example—not exactly a phantom limb, but a phantom glove on a limb that's already there, an imaginary overlay to an otherwise frigid reality. It's also a biofeedback conditioning study (one of many that might serve as further instances to explore) conducted by psychologist Allan Hayduk in the 1980s. In Hayduk's study, participants were placed in a sub-zero environment and asked to imagine themselves warmer. With practice, some classical Pavlovian-style conditioning, and a bit of studied instruction, participants were able to increase the temperature of their hands by up to 16%—a Cheshire difference, if not quite a full-blown incantation. [18] This is important not because it optimizes cold-weather performance but because it is symptomatic of an imaginary impact on real-world physiology—a daytime nightmare in which the physical sensation of coldness is strategically placed into the blind spot of cognition (and,

ironically, into the blind spot of the measuring machines as well). In Hayduk's study, the real-world cold is conditioned out of manifestation, supplanted by the imagined version of warmer weather activity—visualized into verifiable existence.

It is important that in Hayduk's study the imaginary begins to defy even the technological gaze, supplanting the technological solution with an imaginary reality—one that might be called delusional except that it plays explicitly by the rules of the technological game. This is an imagination machine—one perhaps still in its infancy, but one with the potential for a human hacking of the codes of reality. Even if we bide by the rules of a measured study such as this, we have the potential to be at least 16% imaginary, if not more once further conditioning is involved. In this imaginary percentile, one might wonder, what it is that the machines are actually measuring? It is certainly not reality any more, but its defiance—as if to suggest that in the end technology must side not with the real at all, but with imaginary practices (with nightmares and blind spots and a 16% biofeedback lifestyle) in whatever quixotic ways they can be cultivated.

Biofeedback as a cultivation of imaginary solutions: a third instance of illuminated darkness.

Conclusion

In the end, if we are to take the imagination seriously, it seems in fact that each of us lives no longer even in the story of Borges' mirror, but in that of another Argentinean writer, Adolfo Bioy Casares, whose story *The Invention of Morel* takes the tale of the mirror one step further. This is the story of a reality machine in which the central character confronts precisely a world of the same kind as that in which we live: a world in which machinic simulations walk and talk and set the dominant narratives of the everyday; a world in which the simulation dictates reality and any attempt to hold onto the paradox of a real simulation simply means confrontation with walls that were not there two minutes ago; and a world in which the imagination bleeds—not because of a sympathetic affect-response, but because it is made of flesh and blood, because it gets lonely when

not engaged. Rather than be ignored, Casares' protagonist embarks on an elaborate scheme to insert himself **into** the simulation—to be archived while still alive, his biologies fed-back to the imaginary systems that surround them. [19] In short, here in the shadows of Morel's invention, we find ourselves as generators of imagined realities that are strangely no less real for their imaginary debt.

For those who would pretend that the imagination serves reality, it must be insisted that, in reality, it is exactly the other way around. As with each of the examples invoked here, there is a more general rule that begins to congeal—a reversibility of terms that suggests that imaginary solutions are not bound in any necessary way to performance deliverables but only to the proximity of practiced interaction. The imagination is that which manifests—as nightmares and “thought as incantation;” as blind spots and “useless functions;” as biofeedback and “imaginary solutions.” And whatever one calls it, the imagination is not quite under our control, though it is not exempt from influence either. It is instead, in some ambiguous but potentially realizable way, relational: defying will but responding to a proximity of encounter; defying reflection but responding to incidents; defying the light of technological day but responding to engagement with illuminated darkness.

Notes

[1] Jorge Luis Borges, “Fauna of Mirrors,” in *The Book of Imaginary Beings*, Translated by Norman Thomas di Giovanni, (London: Vintage, 2002), 67-68.

[2] Ernest Jones, *On the Nightmare*. (New York: Liveright Publishing, 1931), 14-15.

[3] Robert Macnish, *The Philosophy of Sleep*. As cited in Jones, 74.

[4] Antonin Artaud, “An Actor You Can See,” in *Artaud Anthology*, edited by Jack Hirshman (San Francisco: City Lights Books, 1965), 34.

[5] See Antonin Artaud, *The Theatre and Its Double*, Translated by Victor Corti, (London: Calder Publications, 1970), 35-71.

[6] Friedrich Nietzsche, *On the Genealogy of Morals*, Translated by Walter Kaufmann and R.J. Hollingdale, (New York: Vintage, 1989), 61.

[7] Peter Sloterdijk, *Critique of Cynical Reason*, Michael Eldred, trans., (Minneapolis: University of Minnesota Press, 1987), xxxiii.

[8] See Northrope Frye, *The Educated Imagination*, (Toronto: House of Anansi Press, 1963).

[9] See Joanne Davis, *Treating Post-Trauma Nightmares: A Cognitive-Behavioral Approach*, (New York: Springer Publishing, 2009). Chapter 2, “Characterizing Nightmares,” is especially useful for its discussion of dominant and popular theories.

[10] See, for example, Charlotte Harding, “Five common nightmares and what they mean,” *Mail Online*, Available at: <http://www.dailymail.co.uk/health/article-52177/Five-common-nightmares--mean.html> (Accessed September 5, 2009).

[11] See Paul Virilio, *The Vision Machine*, Translated by Julie Rose, (Indianapolis: Indiana University Press, 1994)

[12] Jean Baudrillard, *Impossible Exchange*, Translated by Chris Turner, (London: Verso, 2001), 40.

[13] Baudrillard, 44.

[14] Vilayanur S. Ramachandran and Siane Rogers-Ramachandran, “How Blind Are We?: We have eyes, yet we do not see,” in *Scientific American Reports*, Vol. 18 No. 2 (2008): 16.

[15] See Paul Virilio, *Politics of the Very Worst: An Interview by Phillippe Petit*, Translated by Michale Cavaliere, (New York: Semiotext(e), 1999), 39-68.

[16] Vilayanur S. Ramachandran and Siane Rogers-Ramachandran, “Touching Illusions: Startling deceptions demonstrate how tactile information is processed in the brain,” in *Scientific American Reports*, Vol. 18 No. 2 (2008): 60.

[17] Alfred Jarry, *Exploits & Opinions of Dr. Faustroll, Pataphysician*, Translated by Simon Watson Taylor, (Boston: Exact Change, 1996), 22.

[18] Allan Hayduk, “Increasing Hand Efficiency at Cold Temperatures by Training Hand Vasodilation with a Classical

Conditioning-Biofeedback Overlap Design,” *Biofeedback and Self-Regulation*, Vol. 5 No. 3 (1980), 307-326.

[19] Adolfo Bioy Casares, *The Invention of Morel*, Translated by Ruth Simms (New York: NYRB, 1992).

Lenticular Galaxies: The Polyvalent Aesthetics of Data Visualization

SARA DIAMOND

1. Introduction

Aesthetics structure experiences in formal perceptual ways and provide interpretive tools, at times constructing meaning. Given that sensory expression -- most often visual, sometimes sonic or tactile -- is the only means to perceive many contemporary data sets, aesthetics are fundamental, not additive, to the emerging field of Data Visualization. Data comprise a set of organized measurements created by instruments that calibrate quantifiable qualities of an original source (natural, artificial or recombinant). "Data" are both an abstraction and mediation of actual phenomena. Whitelaw describes data as "a set of measurements extracted from the flux of the real [that] are abstract, blank, meaningless" [1] and become information only when they are placed into an interpretive context. This requires building algorithms that allow for selection, extraction, organization, analysis and presentation. [2] Visualizations allow the comparison of a set of values, the illustration of relationships between data points, the indication of the parts of a system and the relationship and interaction of these parts, the creation and interpretations of maps, the tracking of change over time and the analysis of text. [3] Designers (including programmers and animators) and artists create the interfaces that allow interaction with data. The resulting images create a bridge between the empirical world and the viewer, revealing patterns of the source data that evoke interpretation.

The growth of cloud computing, visual search engines, penetration of fast broadband and wireless networks have all created an ideal environment for an explosion of capacity in Data Visualization. Data Visualization is growing exponentially in scientific, social science and even humanities research, as well as in commercial applications such as social media. [4] Our expectations of the intelligibility and accessibility of data have shifted with the growth of databases and search technologies. This situation creates an expanding demand for tools and expressions that facilitate finding information and analysis. In the last decade, strict separations between scientific visualization and information visualization have eroded. Firstly, entire new practices that cross the boundaries of information and science, such as genomics and bioinformatics, have developed. These fields rely on Data Visualization to excavate structures in large-scale data sets. They have no photo-realist technologies to fall back on. Secondly, as Lev Manovich has remarked, Data Visualization allows representations to be mapped onto each other, to compare and overlay vastly different data sets, permitting the representation of infinite permutations and complexity. [5]

Data Visualizations make visible "features that exist across multiple dimensions.... [W]e discover unimagined effects, and we challenge imagined ones." [6] A successful visualization may cross multiple boundaries and provide different perspectives on the same data set. Data Visualization offers the possibility of fundamental new insights, a moment of understanding that reveals hidden processes or complex relationships, breaks through existing barriers and sharpens the focus on knowledge while providing visual pleasure. The field of Data Visualisation contains aesthetic practices that draw from art, design, computer and information science and the sciences. This may mean that the intentions of the maker, whether artist, designer, computer scientist or team, does not always align with the uses, interpretations or applications of Data Visualization. Humans use intentional tools in unanticipated ways .

2. What is at Stake?

A set of related questions are at play in considering the aesthetics of Data Visualization:

- Should Data Visualization represent the materiality behind the source data in as realistic a form as possible? How are visualizations tied back to Nature or vast systems like the Internet? Given the presence of the artist or designer in realizing the visualization, can such tools be objective? Should they be?
- How does cognitive science knowledge shape Data Visualization aesthetics? Do efficiency and simplicity trump beauty as the keys to insight, or can usability and beauty combine? Are Data Visualizations primarily utilities or can Data Visualization be both utilities and forms of expression?
- How do the aesthetics of interaction and immersion impact Data Visualization?
- How may aesthetic stances, embedded in visual culture and art, add value to Data Visualization? How do the design methodologies that artists and designers choose affect aesthetics?
- To what extent have common tropes emerged within the field of Data Visualization? What can we learn from the similarity of metaphors and aesthetic parallels found in the work of designers, artists and designer-built or computer scientist created visualization?

3. Return to Realism?

In an article titled "The Petabyte Age" (2008), *Wired Magazine* recently declared "The End of Science." [7] Editor Chris Anderson argued that scientists must end hypothesis and experimentation; instead, science must move entirely to data analysis derived from "big data" sets that lie beyond the natural

limits of human comprehension and require "dimensionally agnostic statistics." [8] The more scientists learn about physics and biology, the harder it becomes to create testable models. Instead, Anderson argues, researchers should search for patterns and relate these to the data's source in order to build a fresh analysis, working with pattern recognition and theorization from the abstract back to the material world. Anderson's view proposes big data as providing the means to rescue science from subjectivity and speculation, offering a twenty-first century version of realism and objectivity, in which data stands in for the real.

Anderson's imperative requires an assessment of the ways that even the most literal visualizations are tied to formal decisions of representation as well as other mediations. The indexical, at times illustrative, qualities of scientific visualizations are most apparent in representations of natural structures or phenomena that draw from or map onto photographic imagery. Figure 1 below illustrates a 3D model of a virus structure in which six different proteins are interacting in complex ways. The data was captured using electron microscopy. The visualization is built in Chimera, a C++ and Python software built to assist in molecular graphics. [9] Scientists had already discovered the symmetrical structure of the virus and had faint images of its form -- the visualization is built on top of the image that the microscope captures through 3D modeling. [10] The visualization extends scientific knowledge by allowing the user to manipulate the virus and thus understand how its multiple layers might interact and penetrate cell walls. Layering, colour and interaction experience were key aspects of the aesthetics that designers brought into play.

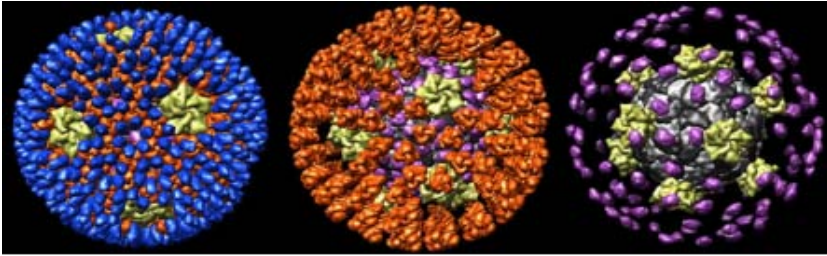


Figure 1: Interactive Protein Structure Visualization (Ferrin, 2010)

The images in Figure 2 represent 3D vector-field texture-based volumetric flow visualizations of tornados. [11] While the application is specific to storms, the algorithm, data structure and metaphor are of value to multiple disciplines that study flow, such as mechanics, physics, meteorology, medicine and geology. [12] Advances in texture-mapping graphics capabilities make these images possible and combine with depth sorting, illumination, haloing and colour attenuation to enhance perception and depth. [13] The images are aesthetically compelling -- drawn by the computer from the data points and able to capture the dynamics of a storm.

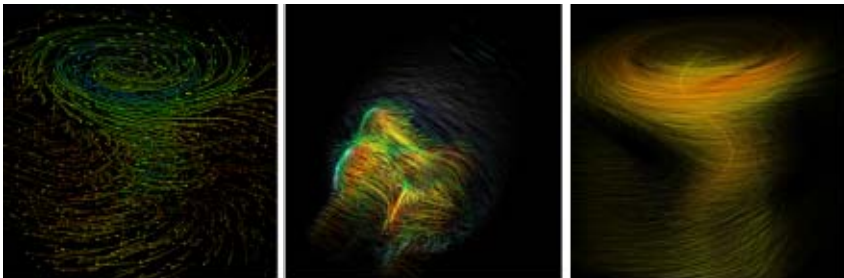


Figure 2: Dense geometric flow visualization applied to steady flow tornado data set (Sung, Park, Budge, Linsen, Hamann & Kenneth, 2005)

Figure 3 is a 3D visualization of a solar storm that occurred on Halloween 2003. NASA's visualization laboratory created the image by combining a model of the earth with "daily-averaged particle flux data from the SAMPEX satellite by propagating the particle flux values along field lines of a simple magnetic dipole." [14] By making flux and field lines visible, it is

meant to illustrate the ways that energy particles from the solar storm transformed the structure of the Earth's radiation belts. [15] Design decisions are apparent in this quote, "The color-scale on the cross section is violet for low flux and white for high flux. The translucent gray arcs represent the field lines of the Earth's dipole field." [16]

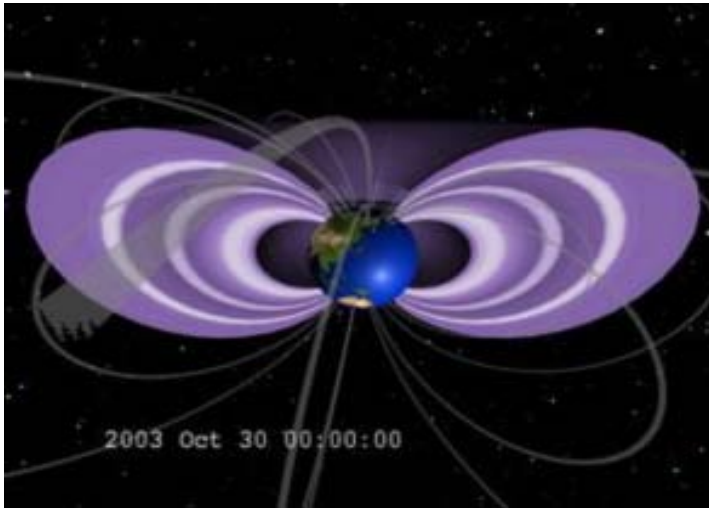


Figure 3: Halloween 2003 Solar Storm: Earth's Radiation Belts Tremble under the Impact of an Electrical Storm (Brigman, Williams, Shirah; Baker, Kanekal, 2004)

The visualizations above bear close resemblance with what science has previously discovered or represented through photographic media, yet each seeks to extend that knowledge in speculative ways through adding animated visualizations built from data. Each image requires design decisions that move the image into a field of visual analysis. These images operate within a tradition of scientific description as tools for deductive reasoning. Still, data are not the same as their source, even when data represent the empirical world. It is clear that the interpretation of data introduces another level of mediation. This condition creates limits and opportunities. There are degrees of possible aesthetic relationships between the source of the data, their structure and visual expression. Other examples in this essay will indicate the ways in which the naturalism of scientific

visualization becomes an aesthetic source of metaphors -- that artists and designers mobilize within information visualization. This appropriation may represent neo-realist practices when nature and the Internet are conflated.

What point of view are we seeing in these examples? Is it that of the phenomena studied, the scientist, the algorithm or the designer? The tenets of scientific realism propose that there is a universal shared world of perception that makes up common sense, and discovery manifests this world through shared understanding. [17] The aim of science is to accurately describe reality. The empirical world, including its invisible dimensions and its description through analysis, thus becomes of paramount importance. The rationalist roots of scientific realism suggest that perception leads directly to action, and presupposes the alignment of reality and image. Scientists such as Pierre Boulanger et al. argue that it is necessary to keep the metaphor close to the look (whether observed or photographic) of the data's source. [18] Visualization then becomes the means to make the invisible visible. Yet the aesthetics of scientific realism may create limits to imagination, tying visualization too tightly to "analytic reasoning" [19], which could fail to deploy the transformative power of visual experience. A further challenge to realism occurs when the source cannot be seen, only measured and then imagined.

Debates regarding scientific realism have included some recognition that the observer -- whether an instrument or a human -- has an impact on the means of expressing the data for an experiment. Barad, a physicist and a philosopher of science, observes in *Meeting the Universe Halfway* that there is not a one-to-one relationship between the ontology of the world and its discovery, as is claimed by "the traditional realist." [20] The "common-sense" view of Nature is continually entangled in the theoretical and experimental practices that mark its description, as is human society. [21] Yet science still makes meaning of the sometimes-invisible material world, and we must pay equal attention to empirical research, as it produces ontological knowledge. These observations are equally true when considering

large-scale information systems that are hybrid forms of physics, engineering, human and machine interaction.

The field of Data Visualization is compelling because it carries the traces of the empirical world and its instruments of measurement and representation. Case studies of visualizations -- some with the same data set -- underscore how data sets are shaped by prior decisions, such as the instruments chosen to collect the data, the structure of the database, source and sampling methods and software choices. [22] These are elements that implicate data and put a mediating frame around notions of objectivity. [23] The use of literal metaphors in Data Visualization may suggest a level of accuracy that is impossible to achieve. After all, a visualization of an Internet packet is many degrees of separation away from the conditions of production of that packet and of its producers.

Data Visualizations carry with them the aesthetics and assumptions of their contributing technologies. They are discoveries in their own right, creating new kinds of experiences. Data Visualization technologies absorb aesthetics of 2D and 3D graphics and animation systems, with their formal styles and malleability. In the past decade a new set of graphics tools -- some viable for online visualization, others only available through super computer networks or in the laboratory -- have become available, as either open source (such as Processing) [24] or proprietary software. [25] The more finished the tool, the more that styles and capacities are embedded. Artists, designers and computer scientists continue to build and adapt tools to their specific needs. Mash-up techniques and technologies originating in the DJ, alternative music and VJ (video disc jockey) worlds transcode data from more than one source within single integrated tools and search engines allow the ability to mix what were once discrete structural approaches to data types. [26] Each new source of data adds its aesthetic properties and limits. GPS, Bluetooth, geo-tagging, localization and personalization capacities in smart mobile devices permit a rapid growth of data from business, social and advertizing applications, with layering techniques emerging, particularly with the growth of augmented

reality. [27] Whitelaw dubs these practices "data-bending" [28] as they layer contexts and can allow for the emergence of new imagery or meanings. This observation is fundamental to the ways that Data Visualizations can be used as instruments to permit new insights.

In this world of multi-variant data sets metaphors need not be literally tied to data structures to be meaningful, as the variable interpretations of Internet traffic below illustrate. Each speaks differently to the nature of Internet flow, with its packets and protocols at work. Lisa Jevbratt built generative algorithms in which chance intervened in the gathering of Internet data sets to produce unexpected, abstract and beautiful forms of expression, seeking the disclosure of hidden patterns in the Internet. The early project *1:1* is meant to collect and display "the addresses of every Web site in the world and interfaces through which to view and use the database." [29] The title suggests the elusiveness of 1:1 within the vastness of the Internet. Jevbratt paints with pixels, a common sampling mechanism. In this case the samples return as images of network topologies that, once flattened, appear as abstract paintings. [30] Five interfaces (*Migration, Hierarchical, Every, Random, Excursion*) visualize the databases and provide a means to navigate the Web, aiming to instill a sense of the Web as an entity. Using the pictorial frame, she places sequences of frames (queries) around data points, as illustrated in the interface shown in Figure 4. The piece is simultaneously deconstructive and expressive.

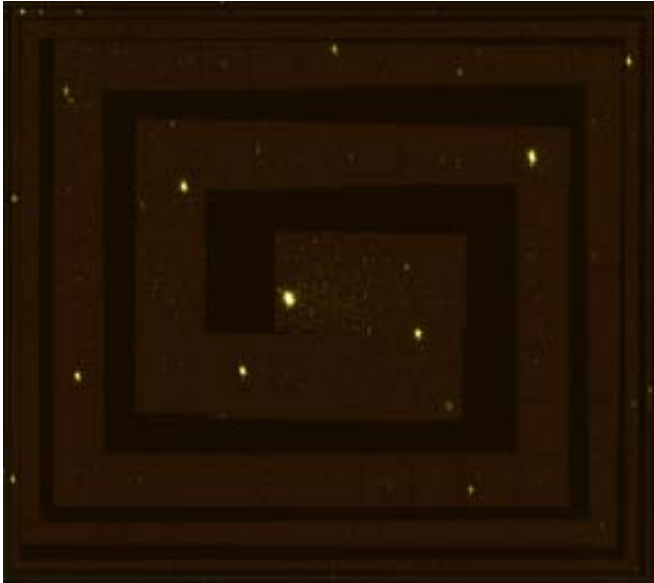


Figure 4: 1:1 (Jevbratt, 1999-2002)

The resulting *Infome* software deploys web crawlers that automatically trawl web sites, collecting data and building visualizations. *Infome* was meant to illustrate the ways that the Internet is integrated into human activity, or, "the DNA of contemporary behaviour." [31] Artists in exhibitions such as *LifeLike* were commissioned to create settings for the crawlers' behaviours, define their sources and choose the forms the visualization would take -- pixels, lines, or other mappings their crawlers would use. Jevbratt states, "The data set resulting from many revisits will have repetitions talking about the structure of the sites, revealing its topology." [32] *Data Beautiful*, in Figure 5, makes use of *Infome* to build such a map of Internet traffic.

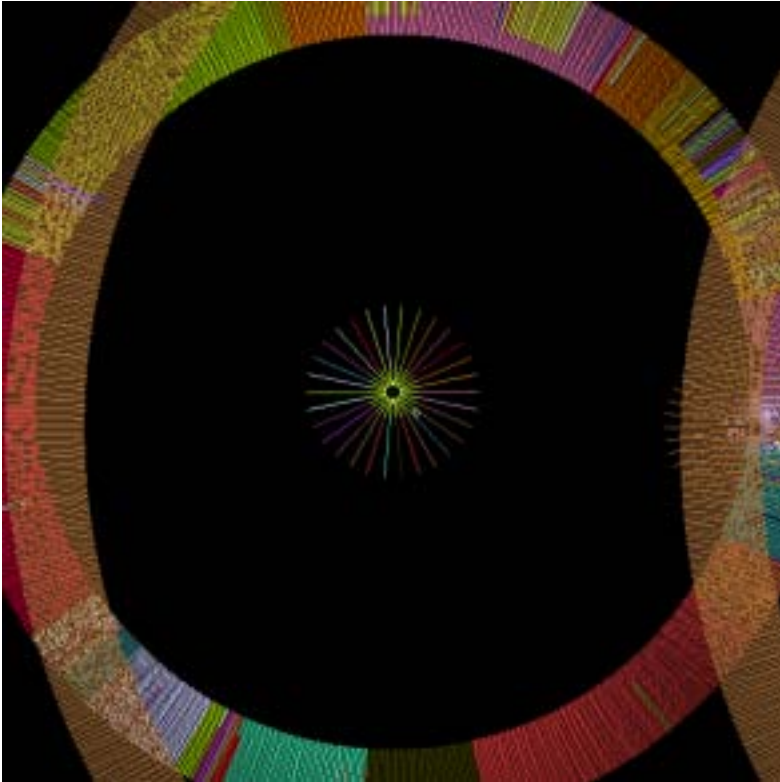


Figure 5: Data Beautiful (Manovich, 2005)

In his artist's statement, Lev Manovich enthuses: "Information tools and information interfaces are the future of aesthetics," expressing the underlying infrastructure of thousands of "gaussian curves," "packets," and "matrices." [33] *Infome* combines the underlying structure of the Internet and its technologies with human patterns of use to provide data sets that result in radically different visual forms. Arijana Kajfes' *Search? q=fool* and *Search?=Moon*, also created using *Infome*, are made up of twenty-two cards that contain colour values taken from "each visited link of 1000 requested links for each of the major arcane of the Tarot" as an "endless beckoning to a possibility." [34] Kajfes ties human online activity back to an ancient metaphor, as shown in Figure 6.



Figure 6: *Search? q=fool* and *Search?=Moon* (Kajfes, 2005)

Calling on the tropes of scientific visualization, other designers and artists have relied upon cosmological or biological imagery to depict the Internet. *Opte* is an interactive site that bridges an Internet analysis tool, art and popular culture. It was created to,

...make a visual representation of a space that is very much one-dimensional, a metaphysical universe. The data represented and collected here serves a multitude of purposes: Modeling the Internet, analyzing wasted IP space, IP space distribution, detecting the result of natural disasters, weather, war, and aesthetics/art. [35]

It allowed users to create maps of Internet usage. By measuring the geography of deployment, *Opte* was capable of producing maps of the Internet with as many as five million edges on a daily basis, representing "Class A allocation of IP space to different registrars in the world." [36] Barrett Lyon's *Opte* provided a socio-economic mapping of the Internet with infinite layers. It is depicted in Figure 7.



Figure 7: *Opte map* (Lyon, 2005)

Julian Oliver, the *Select Parks* games designer, created *Packet Garden*, illustrated in Figure 8, a commission by Arnolfini Gallery. [37] It has a luscious organic feel. It monitors users' Internet usage, the servers they visit, their upload and download practices and the protocols that their usage requires. It functions as a "network diary" [38], growing an automatic garden that the user unconsciously cultivates.

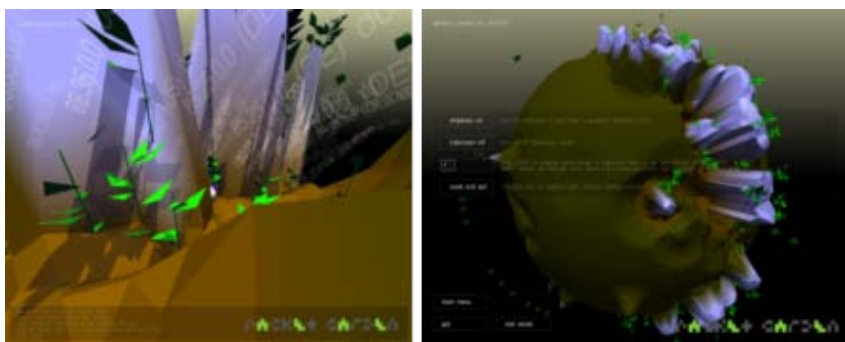


Figure 8: *Packet Garden* (Oliver, 2006)

Formal strategies and metaphors differ in these five examples -- from painterly abstraction, to pixilation, to the light rays of a constellation, to gardening with seed packets, each providing the viewer with discrete readings yet representing the underlying structures of the Internet. Each offer different models of interactivity, whether passive viewing, building one's own visualizations, adding one's own data or flowing data through the metaphor. Gordon Kindlemann proposes that the very power of Data Visualization is that objective and subjective views cohere, inspiring new insights. [39] These works prove that very point.

Science itself contains variant views of reality and its analysis is contradictory and chaotic, with different worlds -- episteme and ontology -- side by side. New trends in science acknowledge phenomenology, complexity theory and emergence. There is recognition that complex systems are difficult to predict and represent, as scientists such as Kaye Mason, Jorg Denzinger and Sheelagh Carpendale argue. [40] The strength, not the weakness, of Data Visualization is its ability to use algorithms to present emergent properties and different points of view. Realist, static notions of common sense fail to comprehend the value that even disciplinary difference brings, driving rather towards homogenization and "group-think," an end-game defined by John N. Bray et al., with consequent reduction in problem-solving capabilities. [41] These contradictory views within science allow elasticity in aesthetics and provide fertile ground for artists and designers who choose to collaborate with scientists.

4. Utility and Beauty in Data Visualization

Given that Data Visualization can assist fundamental discovery, or influence social policy and economics, it is no surprise that in the past the application of Data Visualization has been motivated primarily by teleological analyses (willful thinking and predictable outcomes), with regard to both the goals of human activity and the ways that machines or tools can serve these. Visualizations are understood as utilities, translating data into meaningful communication that can represent reality. Edward Tufte proposes that Data Visualizations are "complex

ideas communicated with clarity, precision and efficiency." [42] Perceptions about realism, common sense and the ways discovery and insight occur have a direct impact on notions of beauty in Data Visualization. Despite examples of aesthetically demanding yet instrumental work, a belief in realism and objectivity leads some scientists to suggest that attractiveness is equal to subjectivity or illegibility. [43] Ben Mathews assigns aesthetics to functionality and ease of interface use. Rapid comprehension is then the goal of this design aesthetic. [44] Simplicity is closely aligned to Occam's razor or *lex parsimoniae* -- the mathematical and scientific view that the simplest solution is the best and most common-sense one. Aesthetics are biased towards the symmetrical and highly legible, with a spare Modernist look.

The acceptance of beauty in scientific and informatics imagery differs between generations and types of science and designers. As visualizations of the truly imperceptible nanotechnology world proceeds, image-making becomes generous. The publication *SEED: the Future of Science* represents theoretical and applied science and often features material drawn from art and science (ArtSci) collaboration. [45] *SEED* foregrounds vivid illustrations and commissions breath-taking visualizations. Andrew Vande Moere's argument should put to rest calls to segregate beauty and utility. He maintains the blog *infosthetics.com*, one of the key sites for debates about the practice of Data Visualization. He argues for lush images: "The best works are those where the aesthetics help people understand the data, where they're almost telling a story." [46] Beautiful visualizations compel not only experts, but also the public. Vande Moere is convinced that consumers shown an effective visualization of energy wastage data will adopt energy-efficient practices. [47] Legibility, instrumentality and beauty need not be discordant.

Currents of thought in art and design argue for the Data Visualization practices of both fields to be separated. Caroline Ziemkiewicz and Robert Kosara propose differentiation between "pragmatic" Data Visualization that allows efficient reading of data, and "artistic" Data Visualization that uses data in abstract or

metaphorical ways. [48] Kosara feels that creative interpretations can "hurt perception" when fast analysis is needed yet can result in "sublime" or "contemplative" experiences at other times. [49] Mitchell Whitelaw argues that artists should not allow their Data Visualizations to become designs, that is, an "aestheticized (and perhaps functionally impaired) form of scientific Data Visualization." [50] These positions are unfortunate because they legislate a separation between a teleological use-value and an intrinsic aesthetic value. Extracting meaning and insight from these representations of data requires powerful aesthetics that balance emotion (such as awe), contemplation and deep analysis. [51]

Ben Fry creates Data Visualizations that double as utilities that enable scientific investigation and art works. *Genome Valence*, in Figure 9, visualizes biological data and builds structures and relationships. [52] The software makes use of the algorithm BLAST, used most frequently for genome searches. It draws the genome sequence with a ribbon of text that moves through the sequence selecting its correct letters. It was exhibited in the Whitney Biennial.



Figure 9: *Genome Valence* (Fry, 2002)

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In the 2007 project *Aligning Humans and Animals*, Data Visualizations created from the Mammalian Genome Project at the Broad Institute, sequences of human and other mammalian DNA are aligned across a browser that indicates the evolutionary distance from the animal to the human. [53] It is illustrated in Figure 10 below and was printed in *SEED Magazine*.



Figure 10: Aligning Humans and Mammals (Fry, 2009)

These examples suggest that the context impacts the ways that Data Visualizations are used and read as much as the image itself. The material functions of context and situatedness are core understandings in the field of visual and new media art.

Studies such as those of HCI (human computer interaction) scholars Noam Tractinsky, A. S. Katz and D. Ikar demonstrate that users pay greater attention to beautiful images and that usability and beauty are viable companions. [54] For example, Jane Prophet's 2002 work *Cell* [55] was created with mathematician Mark d'Inverno, adult stem-cell geneticist Neil Theise, computer scientist Rob Saunders and curator Peter Ride. A still is illustrated in Figure 11.

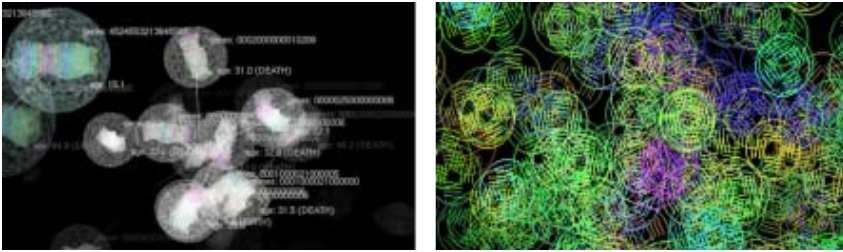


Figure 11: *Cell* (Prophet, 2003)

Cell is visually arresting software built to facilitate Theise's breakthrough research, demonstrate relationships between previously invisible phenomena, test a series of mathematical and programming challenges and result in an art work. [56] Prophet notes the ways that collaboration was premised on the notion, "that artists can 'imagine' scientific and mathematical theories and thereby influence the development of scientific, mathematical, and computer science research and their associated aesthetics." [57] Theise's results "revised understandings of human liver microanatomy which, in turn, led directly to identification of possible liver stem cell niches and the marrow-to-liver regeneration pathway." His collaboration with Prophet, and her revealing visualizations, led Theise to a new interest in theoretical biology and complexity theory. [58] At the same time, Prophet, who is a visual artist, continually reminded the team and her audiences of the value that beauty brought to this discovery process.

Prophet's work segues into aesthetic discourses about the sublime and the uncanny. Art and literature define the sublime -- whether nature or immense artificial systems -- as the threatening unknown that cannot be fully grasped by human understanding. Sublime imagery seeks transcendence, elevating the everyday to godliness. "Raw" data stand in for nature (red in tooth and claw) and nature is extended to the vast information web that constitutes the Internet and digital information. Data can be perceived as primary material -- not produced -- concrete and objective, rather than contingent and relational.

Some artists, such as Lisa Jevbratt [59] or Barrett Lyon, shown earlier, describe emergent properties and systems as an evolutionary living force. Jevbratt argues that genetic code melded with computer code signals a new sublime or unknowable, uncanny beauty. [60] Jevbratt intertwines the materiality of data with programming (coding) as a material and conjuring practice. She says,

To write code is to create reality. It could be likened with the production of artificial DNA, of oligonucleotides -- a process where life is written. Or it could be seen as a more obviously physical act of generating and moving around material, an act that has dimensionality, which is nonlinear. [61]

Coding does act as a means of bringing a virtual world into being through the manipulation of mathematics (and its aesthetics) as manifested through data points and computation. [62] The study of data as a material with distinct properties (mathematical and indexical) must not throw away the constructivist wisdom that has allowed an analysis of the intertwined relationship between knowledge and its mode of production. While human intervention is required to produce meaning from the originating data (e.g. weather patterns, plant growth or mobile phone use), the transformation process should not return to romantic notions of alchemy, affected only by a cognoscenti of programmers, (artists) and designers. The notion of an unconscious and shared "natural" aesthetic is a problematic construction, as any survey of contemporary international art practice quickly suggests, as art is bound by differentiation. In this view perception is relational and contextual, constructed through the complex intertwining of object, maker and viewer. [63] These arguments require a located maker and viewer and militate against totalizing notions of beauty. Historical references to "nature," its relationship to culture and various past expressions, whether domestic chic or formalism, can serve as a

double entendre, reminding us of the tension between the ontological and epistemic.

For some artists, an attraction to Data Visualization stems from the challenge of excavating hidden patterns and structures and emerging beauty from the obliqueness of a data set, at times reconnecting these with the social or political conditions of their production. In his 2002 "Data Visualization as New Abstraction and Anti-Sublime," Lev Manovich argues that visualizations of data by artists may create synthetic meaning rather than support mystification. [64] Manovich indicates links between early Modernist abstraction and contemporary artists' Data Visualization. However, the complexity and form of the structures that artists disclose have changed since the Modernist era, as have the conditions of belief -- skepticism characterizes art, not early twentieth century optimism and essentialism. The formal properties of the database are lateral and associative. It privileges the paradigm (perception of the structure or theorisation) over a narrative hierarchy.

Understandings of how to treat data as a material play out in the making of visualizations. Two distinct approaches to design arise, representing bottom up/top down processes. Edward Tufte argues that Data Visualization requires choosing data sets that are of value to the researcher, mining the data, creating a structure for the data, analyzing that data set to find meaningful ways to represent it, analyzing patterns, translating the analysis through aesthetic representation, refining the representation to better communicate, and creating means of manipulating the data. [65] In Tufte's view, data enunciate their own structures. There is no base case with data; it is inductive reasoning that pulls out knowledge. Through this process they find form, and sometimes also find metaphor or narrative. This may be viewed as data naturalism, structuralism, bearing a truth to materials approach or, in working with large-scale data sets, representing phenomena that cannot be viewed, data-driven design.

Ben Fry proposes a procedure that begins with narrative or story form. [66] He argues that the designer must start not with the data set but with the empirical question asked by the

researcher. Fry then works his way back to data. He considers the nature of the data to be obtained, finds data to fit the question and parses them to provide a structural fit for their meaning, then orders them into categories and filters out all but the data of interest. This approach maintains the role of the scientist in producing theory (a base case), illustrating, testing and deducing. It also offers an opportunity for metaphor, design variation and the recognition of multiple interpretations of the same data set by different disciplines. Both approaches need comparative testing to see how each impacts discovery in the fields where they are applied. In both instances a challenge for artists and designers is to sustain a constructivist understanding of imagery while openly exploring the indexical properties of data.

5. Context and Cognitive Science

Cognitive Science and Data Visualization have a closely linked history (now emerging into a new field of visual analytics). There are a set of challenges and contributions in the application of cognitive science to Data Visualization. Cognitive science brings tools to the understanding of cognition and the function of the brain, and further to the mediation between brain and machine that evokes visualizations. Cognitive science analyzes the differences and similarities in visual and textual cognition. It divides over the bearing that cultural difference may bring to universal tools or to specific visualizations. Cognitive science may need to grapple with the move to collaborative subjectivities and away from individual consciousness.

Data Visualization requires both the awareness of cognitive aspects of human visual apprehension, such as colour theory, and the need to make the visualization meaningful to a user's context. In a much-quoted statement, Edward Tufte describes graphical excellence as "that which gives the viewer the greatest numbers of ideas in the shortest time with the least ink in the smallest space." [67] Ware proposes that Data Visualization is the scientific study of "distributed cognition" [68] between pattern mechanisms in the human brain and the algorithms that map data to the computer [69], connecting human cognition,

computer memory and its related algorithms and the physical actions of the user. [70] Indeed successful design requires attention to the physiology of brain, hand and eye. However, these formulae describe a mechanism at work in the perception of visualizations but are bereft of understanding the ways that human experience differs from machine, encompassing the non-linear as well as inductive processes at work. Unfortunately, because of the focus on treating Data Visualizations primarily as utilities, much cognitive science research in the field studies techniques of performance enhancement, that is, legibility and speed rather than breakthrough discovery or the play of poetics or insight. [71]

Ideas about nature, reality, culture and common sense play out in the field of Cognitive Science. Like scientific realism Cognitive Science has gravitated towards a Kantian notion of "common sense," which encompasses logic, morality and aesthetics. [72] Immanuel Kant promotes logic, equating it with purposefulness and demotes aesthetic judgment as mere taste. Given how important the facilitation of insight through data visualisation is, the simplification of imagination to efficient perception is a problem. Of more value may be Kant's proposal that aesthetics are a transaction between the artist, the object and the audience, suggesting that the viewer completes the image. This is a process wherein an embodied subject is in constant formation, in a state of "momentariness" akin to Gilles Deleuze's notion of becoming and allowing insight and awe. [73]

Valuable lessons from Cognitive Science can help designers and artists understand the differences between reading and viewing, and the ways that visuals can allow pattern recognition and text can act to lock down meaning and context in visualizations. These lie in parallel to current theories about the image that reside within visual culture studies, locating aspects of cognition outside of conscious grasp. Ware provides useful signposts by distinguishing linguistic expression as conditioned by the "'ifs,' 'ands' and 'buts' of natural language," from visual language which is relational and conditioned by pattern analysis, "'connected,' 'inside,' 'outside, or 'part of.'" [74] A cautionary note

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is required here as well, for poetics makes use of language to create patterns and graphic fonts such as Forte or Bauhaus 93 or Matura indicate that stylistic signifiers overcome the content they may contain. These boundaries further dissolve in the popular field of text visualization, where semantic and social networking relationships are discovered through visual and textual patterns. An example is *Chat Circles*. [75] Users choose a colour when logging on and their name is placed next to their circle. Individual activity is shown by changes in the size, intensity and colour of users on the screen with text appearing in a bubble and conversation trees showing the topical and subject line history of a chat. Participants' circles are bright when they post, with intensity fading from non-active users or lurkers. Using the metaphor of sound, where proximity brings focus to hearing, the participant approaches a topic in order to enter it. A series of screens from *Chat Circles* are shown in Figure 12 below.

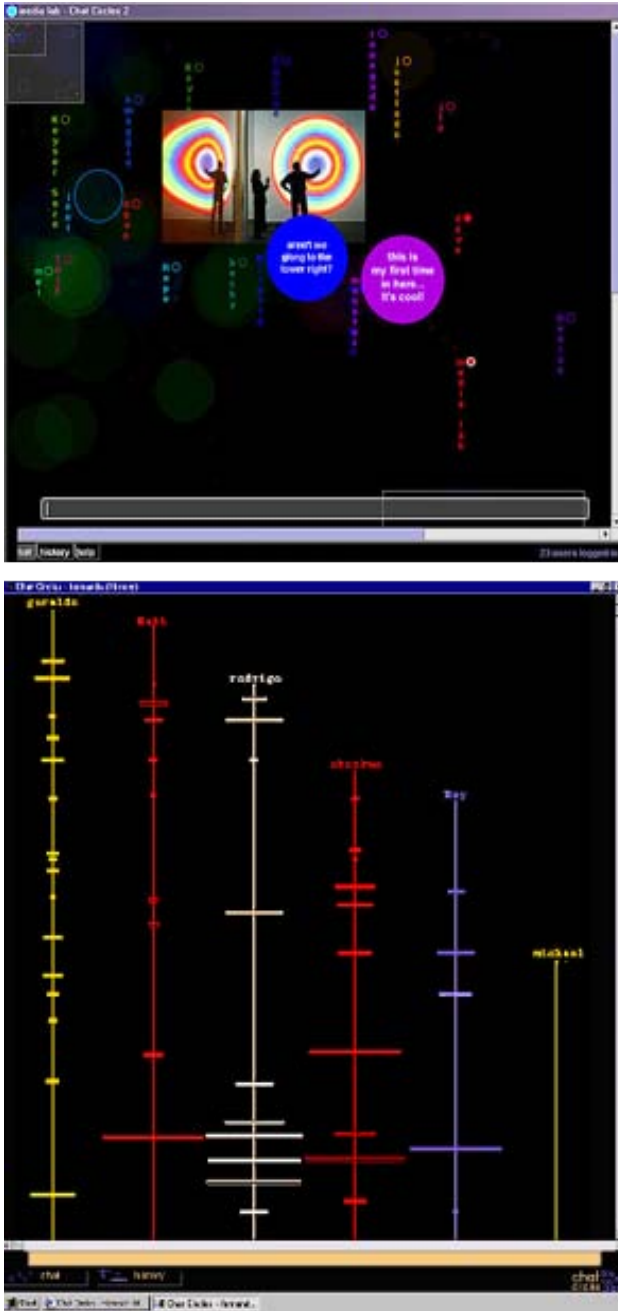


Figure 12: *Chat Circles* (Donath and Viégas, 2002)

Chat Circles provides a model for a highly interactive and visually appealing space.

Equally problematic is the tendency of many twentieth-century Cognitive Scientists to universalize perception and cognition. Contrary research from other strains of cognitive science suggests that context and culture effects perception, and that viewers have different experiences in relation to what makes the same Data Visualization effective. Rather than a normative notion of cognition, Francisco J. Varela, Evan Thompson and Eleanor Rosch draw on evolutionary biology to reject notions of fitness and optimal adaptation. They adopt a "proscriptive model" in which diversity is "woven into the basic constraint of maintaining a continuous lineage" and "the evolutionary process both shapes and is shaped by the coupling with the environment." [76]

Learning and difference play key roles. Varela, Thompson and Rosch show that because understandings are culturally learned, categories, such as colour perception, are not assumed to be objective; hence, "lexical classifications of colour can affect subjective judgments of similarity." [77] This formulation links perception and aesthetic categories together. Such an approach to cognitive science requires a mix of intrinsic and extrinsic factors in understanding the mind and allows a better understanding of cultural diversity. Sensory cognition remains of critical importance in forming judgments, aligning with the need for aesthetics in the field of Data Visualization that take these processes into account. Providing different users with varied metaphors, even shifting colour templates in the interface, can allow perception and analysis of the visualization.

Even when taking diversity into account, cognitive science primarily focuses on individual perception, rather than the emergence of hybrid-group experiences and collective identities as result of the new sociality produced by Internet communication. Warren Sack states that "aesthetics for the Internet needs to concentrate on producing the means for visualizing and understanding how social and semantic relationships intertwine and communities and common sense

emerge." [78] He observes that new identities overcome cultural difference, although difference is the starting point. Perhaps it is more accurate to state that rather than a new universality, new particular and contingent identities form.

Visualization systems that represent collaborative efforts or discourses require an aesthetic that allows the emergence of common and collectively constructed experiences and identities. It is logical that designs with high degrees of interactivity would facilitate the creation of new identities or "intersubjectivities" [79], a term coined by Vilem Flusser, for conjunctures in which identities conjoin productively. Figure 13 provides two prototypes from *CodeZebraOS*, an interactive conversation visualization tool. A neural network extracts and averages behaviors within and between texts. [80] Graphics show relationships between topical chat postings, using graphics to assign an emotional tone to each thread and topic.

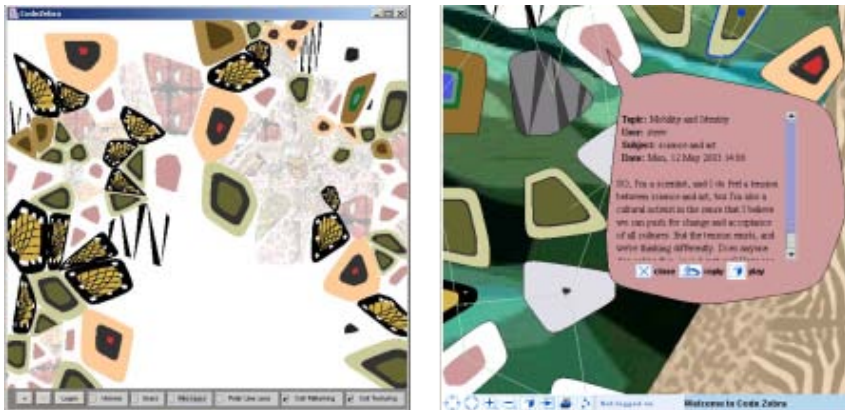


Figure 13: *CodeZebraOS* (Diamond, 2002-5)

6. Interactivity and Immersion

Earlier examples have demonstrated degrees of interactivity in Data Visualizations. Interactivity appears to be an important part of cognitive processes, of learning by doing, of engaging the body through navigation. The third space that Bruno Latour describes between subject, object and technology is the site of "interactivity, intelligence and creativity." [81] Ron

Burnett offers the explanation that part of the power of the "third space" of technology-mediated experience for the participant is the opportunity to gain agency by learning the system and aggregating knowledge through play. The same may be true of gaining visual understanding while navigating data sets. This leads to an aesthetics that allows users to exert agency through learning a system and even to adapt and change outcomes.

There are different levels of interactivity within digital media and within Data Visualizations. Some Data Visualizations simply provide navigation capacity such as the ability to click on or mouse over material that the user chooses. For example *They Rule* allows the viewer to choose the specific sub-set of data that will be visualized. [82] It indicates connections between individuals on corporate boards in America and responds to additional data added by participants. Other designs offer the ability to interact with others while viewing or navigating. Yet other forms of interactivity privilege the impact of the information flowing through the site; in this instance data acts as an agent -- interactivity is the flow of data issuing from a stock market feed, a geological phenomenon or a conversation.

Interactivity and related cognitive processes imply a time-based experience. Navigating 2D and 3D visualizations often requires rapt attention. Building on Deleuze's writings on cinema, Hansen argues for an aesthetics that is appropriate to the temporal experiences of digital media. [83] Digital media create opportunities for humans to experience time and space in ways that stretch and extend their existing physical apparatus. [84] Data Visualizations of large and multi-dimensional data files occur on 3D screens and at times in 3D CAVE environments. These are full body experiences in which the user navigates data in real time, performing discovery simultaneously or with retrospective thought. Aesthetics is mediated between the body and its object in a continual flow or "becoming." [85]

Data Visualization can also occur as an illustrative sidebar to highly interactive social media activity. Social media companies commission visualizations to allow users to catalogue their resources and better understand and organize their

relationships with others. Social media by definition favours user generated content, sometimes integrating it with various media assets. *Fidg't* is shown in Figure 14 below. [86]

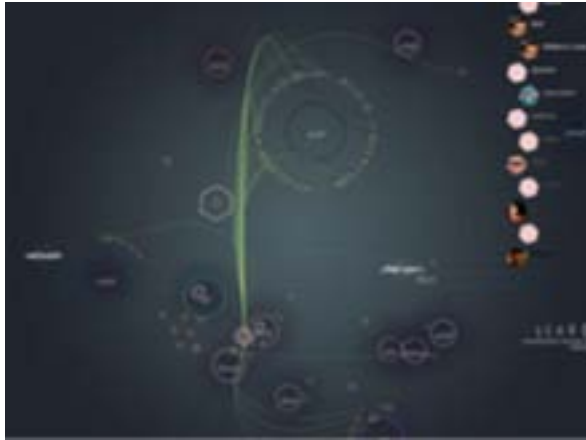


Figure 14: *Fidg't* (Sciammarella, 2007)

The *Fidg't* interface grows Alife-style floral clusters of metadata tags into a bubble map. *Last Forward* [87], shown in Figure 15 below, lets users create tag-maps of *Last.fm* and their networks of relationships and choices. Its structure is similar to *Fidg't*, but has a literal and indexical aesthetic, hence is less visually pleasing. Both of these tools help users to share their assets and preferences with their social network.

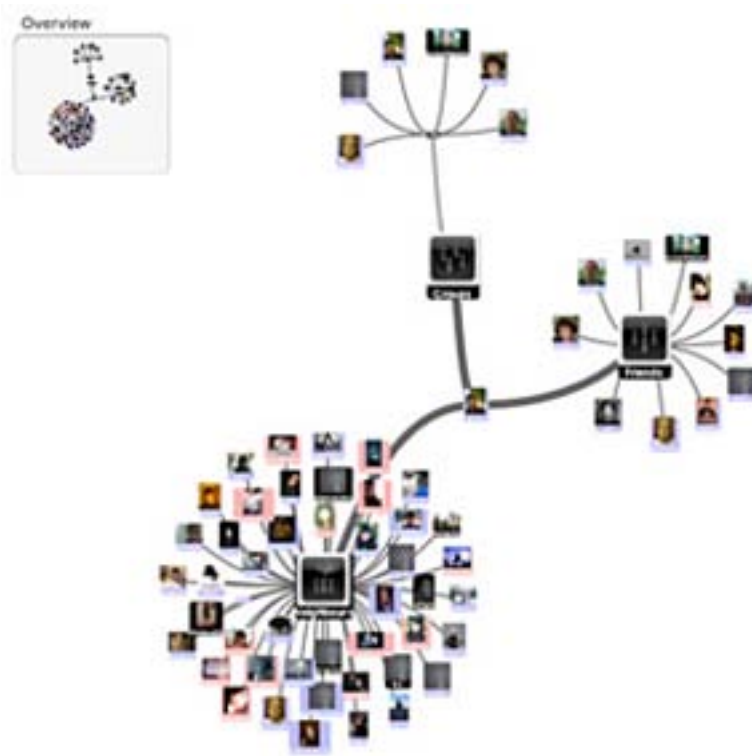


Figure 15: *Last Forward* (Knoll & Endlich, 2007)

Fernanda B. Viégas and Martin Wattenberg created *Many Eyes* [88] in 2006 in order to popularize the use of Data Visualization and provide a tool-kit for building visualizations. They hoped for at least three uses of Data Visualization: to interpret textual data, to analyze complex objects and to use visualizations to initiate "social data exploration." [89] *Many Eyes* is a highly interactive site where participants can add their own data and they or other participants create visualizations from that data using a set of given templates. Users then export their visualizations to their social media sites.

Mitchell Whitelaw observes that Data Visualization "turns towards immersion and sensation; it emphasizes openness and intuition, rather than the extraction of value or meaning." [90] This suggests the segregation of discovery from experiences of

the body. As Data Visualization tools develop and as big data sets are produced and accessible, an aesthetic that favors highly interactive and even immersive applications that engage body and mind is emerging -- one that allows rational analysis, predicated on affective experience.

7. Artists' Data Visualization

There are a number of analyses and practices that artists have brought to Data Visualization, such as structuralism (including in relation to language and technology), context creation and context specificity, data deconstruction, artists' software and tool-making and narrative and abstraction. The notion of context as an aesthetic frame is relevant here. In *Context Providers*, Margot Lovejoy, Christiane Paul and Victoria Vesna designate the ways that artists define their practice as creating the context or structure (such as tools) for others to add content to. [91] Data Visualization tools can be understood as contexts that allow users to input their own data. Digital design strategies often derive from the context of use rather than from a data set, with data chosen to fit the researcher's needs and the interface designed for their culture of use. Such context variability reinforces the subjective and mediated nature of Data Visualization practices.

Some artists, seeking the "essence" of nature, materials and social practices, have chosen to create structuralist art and technology works that disclose and analyze their source materials. There is a thorough line in traditions of minimalist sculpture and structuralist filmmaking, video art and graphics art. In the digital age, when software is often the technology underlying works of art, the truth-to-materials strategy can also lead to the creation of tools or combinations of tools, software, platforms and systems by artists. [92] These practices link to an aesthetics of abstraction, as illustrated earlier in Lisa Jevbratt's work and in recent visualizations by Martin Wattenberg and Fernanda B. Viegas [93], shown in Figure 16, that use an algorithm to extract "peak" colour patterns, in this instance from

luxury brand magazine fashion and design spreads, illustrating principles of colour, placement and focus in graphic design.



Figure 16: (Viegas & Wattenberg, 2009) <http://hint.fm/projects/luscious/>

Bruno Latour [94] and John Law and John Hassard [95] describe technologies as invisible non-human actors, affecting the performance of a social network or process. Early new-media art works favoured deconstructive interventions such as cracking or breaking technologies, or building broken interfaces, deploying Bertolt Brecht's notion of "alienation effects." [96] Visualization is an alternative, compelling strategy for some artists, a means to excavate technological structures that hold hidden hierarchies of power. [97] In Data Visualization formalism and politicized deconstruction merge by creating visualizations that reveal socio-political relationships within the data. Other artists become tool makers in order to get close to the materiality of data. Others offer critiques of the aesthetic norms of scientific and information visualization.

Simon Pope and Matthew Fuller (1995) created *Web Stalker*, one of the first tools to crawl the Web and build a visual diagram of hidden relationships between domains and their hierarchical ordering, discrediting any notion of search engine

neutrality. [98] Its form is now common to many Data Visualization tools in social media. The *Web Stalker* is illustrated in Figure 17.

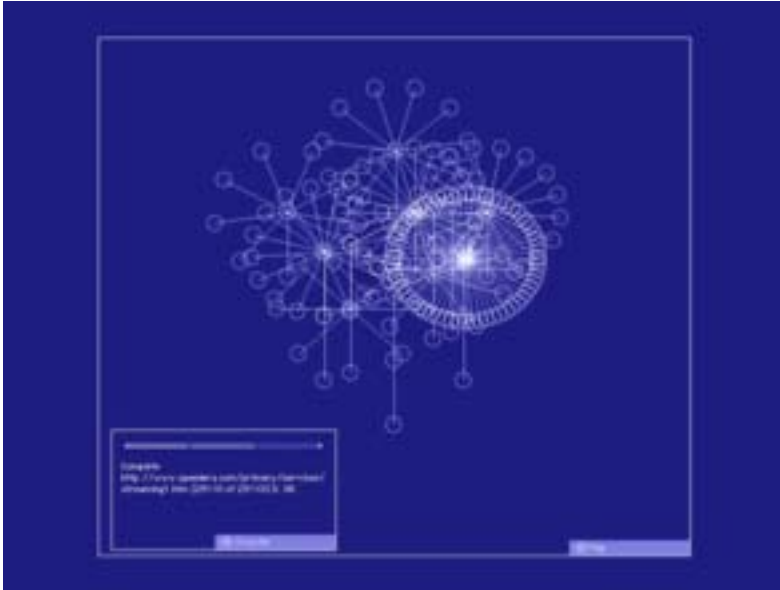


Figure 17: *Web Stalker* (Pope & Fuller, 1995)

In *The Secret Lives of Numbers* (2002, 2008), shown in Figure 18, Golan Levin and his collaborators Jonathan Feinberg, Shelly Wynecoop and Martin Wattenberg, seek an understanding of which numbers reoccur more than others "in order to determine the relative popularity of every integer between 0 and one million" [99], and to consider why this takes place -- finding links to the functioning of human memory, social rituals and the structure of commerce. In the face of our society's belief in the objectivity and power of mathematics, Levin instead argues for the subjectivity of numbers -- and by implication -- data, stating,

Humanity's fascination with numbers is ancient and complex. Our present relationship with numbers reveals both a highly developed tool and a highly developed user, working together to measure, create, and predict both ourselves and the world around us. But like every symbiotic couple, the tool we

Code Drift

would like to believe is separate from us (and thus objective) is actually an intricate reflection of our thoughts, interests, and capabilities. [100]

Levin and his collaborators draw on Edward Tufte (2001) and Colin Ware's (2004) rules of simplicity of display to comment on the aesthetics and practices of scientific visualization, and at the same time develop a malleable, beautiful and interactive visualization made up of data sets pulled from a wide range of search engines over a five-year period.



Figure 18: *The Secret Lives of Numbers* (Levin et al., 2002-2007)

Else/Where Mapping New Cartographies of Networks and Territories, a compilation by Janet Abrams and Peter Hall, includes an anthology of artists' geographic mapping projects. [101] There are many artists' projects that map corporate and military power relationships. *They Rule* provides a node-and-link graphical overview of corporate links, members of boards of directors and their social networks. [102] *A Thousand Points of Light*, a visualization by Naeem Mohaiemen in *The Disappeared in America Project* by the Visible Collective/Dan-Bergman, is an animated map of mass detentions that occurred in the United States after September 11, 2001, providing information about the detainees and their countries of origin. [103] Viewers can update

the map with their own data. Such attempts to enforce transparency onto techno-culture and offer an overt critique of power relationships may be described as data deconstruction.

Stock market feeds have been a fecund source for projects such as Joshua Portway and Lise Autogena's *Stock Market Planetarium* depicted in Figure 19. [104] This elegant and ironic installation plays off the scientific trope and information metaphor of cosmology visualizations, suggesting a new astrological universe of corporations and their stocks, as artificial life creatures that mutate, propagate and die in the market, feeding off of its movements and making graphical transitions, clumping and influencing the weight of the depicted universe.

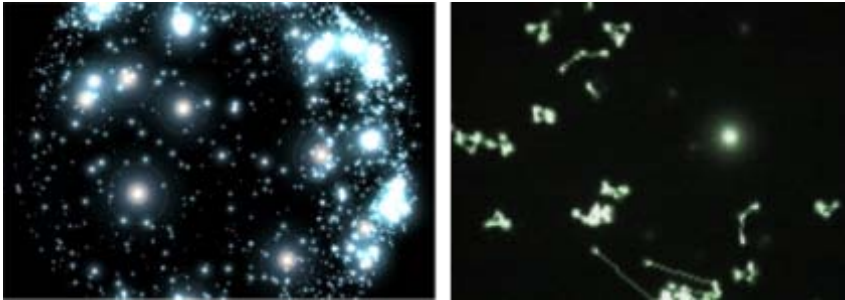


Figure 19: *Stock Market Planetarium* (Portway & Autogena, 2002)

One of the most dynamic growth areas of Data Visualization is text visualization, whether the massive quantities of scientific texts, social media output, chat, or descriptive metadata. As they did with other media, visual artists began to treat language and text as material in the twentieth century, continuing nineteenth-century artists' fascination with literature. [105] In the 1980s, artists applied structural semiotic tools to the visual image, a set of practices that are mirrored in data-mining text analysis tools. Artists with an interest in linguistics and conceptualism now turn to Data Visualization as a digital trajectory to linguistic intervention, semiotics and conceptualism.

Temporal structures define how text-based relationships emerge in the Internet, with synchronous and asynchronous

experiences providing very different feelings, intimacies and forms of consciousness. These pile on top of each other in layers, allowing social relationships and expressions to feel like a thick texture of condensed time. Some participatory works by artists pin down and focus this endless movement. Mary Flanagan (2004) created applets, such as *Phage*, that users download onto their computer. [106] *Phage* psychoanalyzes the user's hard drive over the course of a week, revealing the user's obsessions and encouraging awareness of how subjects are constructed through their data. Victoria Vesna's *NoTime* screensaver builds an aesthetic around the search for information on the Internet. [107] It is a contributory work in which multiple participants create and compare profiles with human and non-human agents. Vesna makes use of agent-based technologies to create emergent behaviours that feed on the user's identity. This bot redraws patterns for each participant as transactions occur in their Internet accounts. The relative autonomy of each agent reveals the routes and relationships of transactions, normally invisible to users.

We Feel Fine, by Jonathan Harris and Sep Kamvar, bears an interest in affective expression and uses the measurement of text data to find it. [108] *We Feel Fine* builds emotional portraits of specific online populations by extracting expressions of feelings from Weblogs. The project provides six movements (like a symphony), driven by statistical analysis and data aggregation, and then reshaped by users' paths through the data. Feelings accumulate in mounds on the screen, quivering when the mouse-cursor passes over. The site is poignant and amusing. It is shown in Figure 20.



Figure 20: *We Feel Fine, Mounds; Mobs: Weather* (Harris & Kamvar, 2008)

Other artists are drawn beyond structural analysis to poetics.

Data Visualization becomes a means to write concrete poetry. Brad Paley (2003) created *Textarc*, a tool that allows text to be processed. [109] Key words are quantified and brought to the foreground. It has been applied to literature, bodies of conference data, calendars and other corpus. Stephanie Posavec explores differences "in writing style between authors of modern classics" through her project *Writing without Words*. [110] An example is shown in Figure 21.

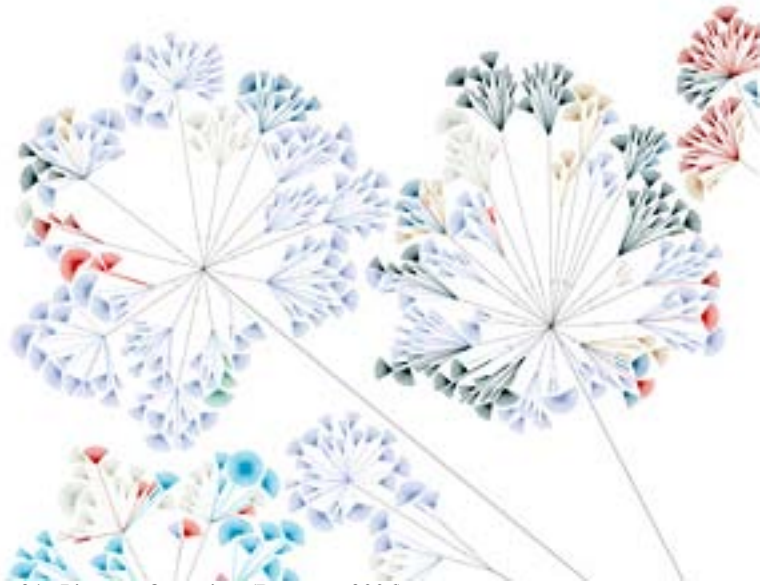


Figure 21: *Literary Organism* (Posavec, 2006)

Posavec parses text in an expressive and poetic manner to create works such as *Sentence Drawings* and *Sentence Length* as part of her series.

As Fernanda B. Viégas and Martin Wattenberg have done for social media, artists have created tools that permit individuals and groups to input their own data to visualize with highly

interactive tools, building a sense of agency by discovering patterns within data sets and aligning them to other data subjects. Alexander Galloway developed Data Visualization tools [111] in keeping with his belief that "software art" and open-source activities provide examples of "counter protocol practices." [112] With the Radical Software Group, he created *CarnivorePE*, inspired by the FBI's surveillance of the Internet with Carnivore, or DCS1000. [113] Galloway reverse-engineered the FBI software and created a Data Visualization capability for "artistic" users, with "new functionality including: artist-made diagnostic clients, remote access, full subject targeting, full data targeting, volume buffering, and transport-protocol filtering." [114] The surveillance tool called CarnivorePE is "a software application that listens to all Internet traffic (email, Web surfing, etc.) on a specific local network." [115]

For artists, a critique from the sidelines is not adequate. The perspectives that artists bring to Data Visualization may permit new realizations about the original phenomena that are being represented. Despite some artists' intentions to the contrary, there appears to be a potential for instrumentalist interpretations even in Data Visualizations that are expressive abstractions of data. Artists have challenged formal strategies and tropes (graphs, charts, simple tree maps) as they emerge, bringing composite imagery, natural references, references to art-historical practices and strong aesthetic cues into play. Rather than step away from cognitive science and studies, artists bring training in aesthetics. They may push back against reductionist formal assumptions while successfully using visual skills with roots in aesthetic debates and practices. Artists work with data as a material -- looking for underlying patterns and finding an expression, or looking at context and imposing narrative or form to their structure. Given artists' precociousness with language and context analysis, their cross-disciplinary collaborations should result in enhanced visual literacy with the field of Data Visualization.

8. The Emergence of Conventions

As the Data Visualization field developed, a set of formal techniques and conventions emerged linking data structures and metaphors. [116] Even to arrive at the first stage of Data Visualization requires decisions about data extraction structures and metaphor. Correlations between art, design and computer science (programmer created) metaphors and styles can be seen in examples in this article. Many Data Visualizations effectively mobilized visual language and form or used gamesmanship or play, hence appealing to pleasure or a sense of beauty. Many artists and designers created utilities, whether to make a point about the politics of a data source or to assist in understanding a scientific phenomenon. Not all are effective in combining pleasure and utility, perhaps driven by an aversion to beauty found in some branches of science, or underscoring an artist's decision to focus on the deconstructive goals of a project and forsake beauty, or some lack visual knowledge.

Most examples of Data Visualization in this article provide a clear context for the source of the data, either directly within the Data Visualization, through labelling, or by facilitating a user's upload of their own data. Nearly half were literal, that is, used imagery and navigation strategies that were evidently tied to the data's structure or used metaphors or images that clearly showed a lineage. There is a clear link between data structures and the metaphors or representational strategies deployed. Node-and-link structures lend themselves to manipulation into abstract form -- flowers or other plant-like images, or cosmologies. Tag clouds and bubble charts may become plant-like or cell-like images, solar systems or word montages. Map structures are shown as maps. Stack maps become blocks. Swarms may become explosions, cells or creatures. Block histograms may become bull's eyes, other block forms, or mazes. As with metaphors and characteristics, there were multiple kinds of Data Visualizations overlaid or adjacent in some projects. What is perhaps surprising is the frequency, or perhaps redundancy, of five metaphors: networks, cosmologies, plants, explosions and maps.

Nature was invoked frequently. The use of natural metaphors (tree-like, floral, etc.) occurred in artist, designer and programmer-created works, regardless of whether the source of the data was natural or artificial. The prominence of natural metaphors may indicate the merging of scientific and information visualization; it may represent mystification -- the correlation of sublime nature and sublime data -- or an ironic stance towards mystification; it may suggest a growing sense of concern about the biological world, its extraction into data and the need for an ethos of responsibility towards the empirical world. It is in the interaction of computer code and genetic code that new forms, virtual and physical, come into being. Rather than eliciting a fear of the unknown, in which data are sublime or become a simple deconstruction, the summoning of a new hybrid world could be placed within a sense of responsibility to both human and non-human life. Issues of aesthetics and ethics are present, if not visible, in the tools we build and use.

9. Conclusions

Data Visualizations are indexical, ultimately tied to the source of the data, whether material or artificial, yet mediated; they are not the source. Data Visualizations have a genuine role in disclosing patterns, relationships and processes that are impossible to reveal without extraction, analysis and visualization. Data Visualizations are designed or authored by humans, hence capturing both a subjective view and objective scientific analysis. They bridge a materialist and constructivist practice. Data must not be treated as a new unknowable and threatening-yet-beautiful sublime essence, replacing the Nature that it represents. This is particularly true because visualizations and the data that they make meaningful also function within a world of science and social politics, helping to make convincing arguments through the metaphors that they enjoy.

Data Visualization aesthetics are always contextual, depending on the data source and, equally, are read in context, whether by scientist, social media user or art audience member. Data do not exist in themselves, and data risk mystification.

Many of the sources of data are already structured. The assumptions of these structures, the material impacts of underlying technologies and particular software and the pervasive presence of tropes and metaphors need continual unraveling.

Cognitive science has a key role to play in developing visualization aesthetics that privilege pattern recognition. Viewing complex 3D images and navigating through these requires eye-hand coordination and focused perception. Designing to facilitate or at times disrupt cognition requires that artists or designers draw from this body of knowledge. At the same time, cognitive science needs to recognize that visual expression carries with it the aesthetics and aesthetic traditions of its source technologies and the subjectivity of visual images at the most fundamental level.

Data Visualization approaches derived from the art world are of value in their own right, producing compelling works of art, and valuable as a means to raise new questions and approaches to data. For example, the formalism of abstraction can result in breath-taking beauty or be applied to discovery. Structuralism can tell us about the nature of the source data. Despite the emergence of common structures and metaphors, this is an emerging practice. Art's deconstructive tendencies are helpful in unfolding assumptions that are built into data collection and structure. There is a need for tools that provoke new insights in the fields where Data Visualizations are applied. Experimental, abstract, multi-dimensional, highly interactive works can be immersive and provocative, perhaps more so than simplified visualizations that illustrate pre-figured assumptions. Aesthetics that can evoke and provoke others disciplines yet draw from the formal and critical values of art are the most promising, and the most difficult to attain. This is a field in which art and design practices can engage in multiple layers of discovery -- of new forms of expression and of new realizations in the fields that are aligned with the source data, be these genomics, physics, economics, or information theory.

Notes

[1] M. Whitelaw, "Art Against Information: Case Studies in Data Practice," *Proceedings, Fibreculture*, ed. A. Murphy, (Perth: Digital Arts and Culture Conference, 2006): 2, <http://journal.fibreculture.org/issue11/issue11whitelaw.html> (accessed March, 2010).

[2] See K. Glance, *Raw Data* (2008), http://searchdatamanagement.techtarget.com/sDefinition/0,sid91_gci878172,00.html Needham, MA: Search DataManagement.com (accessed March, 2010). For a minority of writers, "information" is a specific type of data that derives from communications systems using information technology, such as the Internet.

[3] This list builds on categories created by F. B. Viegas and M. Wattenberg (2007),

http://manyeyes.alphaworks.ibm.com/manyeyes/page/Visualization_Options.html (accessed March, 2010).

[4] Social media encompass all forms of media that allow participatory communication within the Internet, the vast array of "places, tools, services allowing individuals to express themselves...in order to meet, to publish, share and socialize." (F. Cavazzo, *Social Media Landscape*, (2008): 3, <http://fredcarvazzo.net/2008/06/09/social-media-landscape> (accessed December, 2009)).

[5] See L. Manovich, "The Database as Symbolic Form," *Database Aesthetics: Art in the Age of Information Overload*, ed. V. Vesna (Minneapolis: University of Minnesota Press, 2007): 39-60. The quality and quantity of data influences the nature of a visualization and its ability to be a valuable tool for interpretation.

[6] B. Fry, *Collected Works*, (2008): 2, <http://benfry.com> (accessed December, 2009).

[7] In evaluating their fifteen years of existence, *Wired* editors noted their own anxious tendency to declare endings rather than evolutions. For example, Anderson (1998) dramatically announced the End of Television, rather than its disintermediation and reconstitution in YouTube by Harley & Chen (2007) C.

- Hurley & S. Chen (2007) youtube.com [Internet].
<http://www.youtube.com/> [Accessed March, 2010]. and the like.
See C. Anderson, "The Petabyte Age: The Power of Big Data,"
Wired (July, 2008): 141-3.
- [8] C. Anderson, "The Petabyte Age: The Power of Big Data,"
Wired (July, 2008): 143.
- [9] E. Pettersen, T. Goddard, C.C. Huang, G.S. Couch, D.M.
Greenblatt, S. Mange and T.E. Ferrin, "UCSF Chimera -- A
Visualization System for Exploratory Research and Analysis,"
Wiley InterScience (6 May 2004), www.interscience.wiley.com
(accessed March, 2010).
- [10] T. Ferrin (2010),
<http://www.apple.com/science/insidetheimage/ferrin/> (accessed
March, 2010).
- [11] S. W. Park, B. Budge, L. Linsen, B. Hamann, & K. I. Joy,
"Dense Geometric Flow Visualization," *Eurographics -- IEEE
VGTC Symposium on Visualization*, eds. K.W. Brodie, D.J. Duke,
K.I. Joy (2005): 1-8.
- [12] *Ibid*
- [13] *Ibid*
- [14] T. Brigman, J.W. Williams, and G. Shirah (animators), D.
Baker, and S.G. Kanekal (scientists), *Earth's Radiation Belts
Tremble Under the Impact of an Electrical Storm: Halloween
2003 Solar Storm*, (2004) <http://svs.gsfc.nasa.gov/> (accessed
March, 2010).
- [15] These can have dramatic impacts on space vehicles.
- [16] Brigman, et al.
- [17] See P. Godfrey-Smith, *Theory and Reality: An introduction
to the philosophy of science* (Chicago: Chicago University Press,
2003) for a thorough overview of the history of scientific
philosophy.
- [18] P. Boulanger, S. Diamond, and T. Erickson, "A Boom with a
View" (keynote lecture at Powering Innovation Conference,
Toronto: ORION/CANARIE, 2008).
- [19] F.B. Viegas and M. Wattenberg, *Artistic Data Visualization:
Beyond Visual Analysis*, (Unpublished paper available from

Cambridge, Massachusetts: Visual Communication Lab, IBM Research, 2005): 2.

[20] K. Barad, *Meeting the Universe half Way: Quantum Physics and the Entanglement of Matter and Meaning*, (Durham and London: Duke University Press, 2007): 41.

[21] See S. Kember, *Cyberfeminism and Artificial Life*, (London: Routledge, 2003) for a closely related discussion of artificial life, gender constructs and concepts of nature.

[22] The case studies were presented at SIGGRAPH and IEEE panels as well as several Banff New Media Institute summits. See S. Diamond et al. "Visualization, Semantics and Aesthetics," (Conference Proceedings SIGGRAPH, 2001)

<http://www.siggraph.org/s2001/conference/panels/panels6.html> (accessed January, 2007); S. Diamond and S. Kennard, *Banff New Media Institute Web Archives*, (Banff: Banff New Media Institute, 1993-2009)

<http://www.siggraph.org/s2001/conference/panels/panels6.html> (accessed March, 2010).

[23] Evaluations of Data Visualizations should raise concerns about the quality of "source" or "raw" data, and challenge the assumption that once the data have been "cooked," that is, digitized and standardized, they guarantee accuracy.

[24] C. Reas and B. Fry, *Processing: A Programming Handbook for Visual Designers and Artists* (Cambridge, Massachusetts: MIT Press, 2007).

[25] A visualization laboratory might have the following systems and languages: the artist-friendly open source Processing, Side Effects, IBM Cognos, Virtools, Quest 3D, Unity 3D, the Autodesk Entertainment Bundle including Maya, Virtual Director with VMaya (extended by NCSA), Adobe Tool Kit including Action Script, Flex, Flex Builder, Flash, Action Script, Max/MSP/Jitter, Java, C++, NetVR, a 3D network visualization tool.

[26] See S. Diamond, ed., "Remix," *Horizonzero.ca* Issue 8 (April/May 2003) www.horizonzero.ca (accessed December, 2008) for an overview of the history of remix culture, and P.D. Miller aka DJ Spooky That Subliminal Kid, *Rhythm Science*

(Cambridge: MIT Press, 2004); P.D. Miller aka DJ Spooky That Subliminal Kid, *Sound Unbound: Sampling Digital Music and Culture* (Cambridge: MIT Press, 2008) for history, technology and cultural studies on the impacts of remix.

[27] For current research and commercial applications for such location-based tools see M. Longford and S. Diamond, *Mobile Digital Commons Network* (2004-2007)

<http://www.mobilenation.ca/mdcn/> (accessed March 2010);

Diamond et al. in M. Ladly and P. Beesley eds., *Mobile Nation*, (Waterloo: Riverside Architectural Press, 2010); *The Mobile Experience Innovation Centre* (2010) <http://www.meic.ocad.ca/>

(accessed March, 2010); Gardner and Shea, *Portage* (2006)

<http://www.mobilelab.ca/portage/> (accessed December, 2009).

[28] See M. Whitelaw, "Art Against Information: Case Studies in Data Practice," *Proceedings, Fibreculture*, ed. A Murphy (Perth: Digital Arts and Culture Conference, 2006): 12,

<http://journal.fibreculture.org/issue11/issue11whitelaw.html> (accessed March 2010).

[29] See *The Infome*, (1999-2002): 4,

http://128.111.69.4/~jevbratt/1_to_1/index_ng.html (accessed March, 2010).

[30] Whitelaw (*Ibid. endnote xxviii*) points out that these works continue twentieth-century art practice that is engaged with rethinking the frame.

[31] See L. Jevbratt, "The Infome -- The ontology and expression of code and protocols," (presentation, *Crash*, London, 2005): 1,

http://journal.fibreculture.org/issue11/issue11_whitelaw.html (accessed December, 2009).

[32] *Ibid*, 4.

[33] L. Manovich, "Data Beautiful," *The Infome* (2005): 5,

http://128.111.69.4/~jevbratt/1_to_1/index_ng.html (accessed December, 2009).

[34] See S. Kafje, "*Search? q=fool and Search?=Moon*," *The Infome* (2005)

http://128.111.69.4/~jevbratt/1_to_1/index_ng.html (accessed December, 2009).

[35] B. Lyon, *Opte* (2005): 1, <http://www.opte.org/maps/> (accessed December, 2009), p.3.

[36] Somewhat ironically, the last communication from *Opte* was a note from Lyon stating that he had received a request from his service provider to create an image of a "distributed denial of service attack" (*Ibid*).

[37] See J. Oliver, *Packet Garden* (Bristol: Arnolfini, 2006) <http://packetgarden.com/> (accessed December, 2009).

[38] *Ibid*, 3.

[39] See G. Kindlemann, "Is There Science in Visualization?" *IEEE Compendium IEEE Visualization*, In T.J. Jankun-Kelly, R. Kosara, G. Kindlemann, C. North, C. Ware, and E.W. Bethel (transcript, London, IEEE, October, 2006): 4, <http://www.cse.msstate.edu/~tjk/> (accessed December, 2009).

[40] Debates regarding realism and the subjective role of the designer arise in discussions of how to represent multidimensional data sets in humanities or social science. See K. Mason, J. Denzinger and M.S.T Carpendale, "Negotiating Gestalt: Artistic expression and coalition formation in multi-agent systems," *Proceedings of AAAMA, July 2004* (New York: ACM, 2004): 1350-1351 for valuable insights. E. Tufte, *Beautiful Evidence* (Cheshire, CT: Graphic Press, 2006): 138 acknowledges that analyses of human behaviour are "often so distant from any kind of law like understanding" that there are "multivariate uncertainties about causality." However, he argues that representations of causality, comparison and multivariate complexity prevail in social science as well as science; hence Data Visualization must provide uniform methods for all disciplines. B. Fry (2008) *Visualizing Data* (North Sebastopol, CA: O'Reilly) believes that Tufte simplifies the challenge of manipulating complex data. He posits that designers constantly make choices about which dimensions to show while also facing technical difficulties with multivariate data.

[41] J.N. Bray, J. Less, L. Smith, and L. Yorks, *Collaborative Inquiry in Practice* (Thousand Oaks: Sage, 2000): 105.

[42] *The Visual Display of Quantitative Information*, 2nd ed. (Cheshire, CT: Graphics Press, 2001): 51.

[43] Expert cosmology and climate change visualization designers such as Gloria Simmons-Brown, Jay Anne English and Donna Cox are Data Visualization professionals. They report that their collaborators from the sciences have rejected visually engaging imagery for fear that the results would be refused by committees reviewing for publication. Tensions between information visualization designers who call on aesthetics and metaphor and scientific visualization designers who are pressed towards realism are evident at conferences such as Information Visualization. An excellent discussion of this occurs in J. English, "Cosmos versus Canvas: Tensions between art and science in astronomy image. The art and science of Data Visualization," *Horizonzero.ca*, no. 6 (2002) www.HorizonZero.ca (accessed March, 2010).

[44] B. Matthews, *When stakeholders represent others in design conversations* (paper presented at Nordscope Seminar, Lyngby, Denmark, April 28-30, 2004).

[45] See A. Bly, ed, SEED (2010) <http://seedmagazine.com/> (accessed March, 2010); see also print version.

[46] A.V. Moere, *Information Aesthetics Weblog* (2008): 3 <http://infosthetics.com/> (accessed December, 2009).

[47] *Ibid*, 52.

[48] See C. Ziemkiewicz and R. Kosara, "The Shaping of Information by Visual Metaphors," *Transactions on Visualization and Computer Graphics* 14, no. 16 (New York: IEEE, November/December, 2008): 1269-1276.

[49] R. Kosara, "Visualization Criticism -- The Missing Link Between Information Visualization and Art," *Proceedings of the 11th International Conference on Information Visualization* (North Carolina: IV, 2007): 631-636, 634.

[50] M. Whitelaw, "Art Against Information: Case Studies in Data Practice," *Proceedings, Fibreculture*, ed. A. Murphy, (Perth: Digital Arts and Culture Conference, 2006): 13, <http://journal.fibreculture.org/issue11/issue11whitelaw.html> (accessed December, 2009).

[51] For example, Tracktinsky & Zmiri prove through their research on users' use of skinning technologies that aesthetic

judgment, including visual and emotional pleasure, is as critical as functionality in visual understanding. See N. Tractinsky and D. Zmiri, "Exploring Attributes of Skins as Potential Antecedents of Emotion in HCI," *Aesthetic Computing*, ed. P. Fishwick (Cambridge, MA: MIT Press, 2005): 1-28.

[52] See B. Fry, *Collected Works* (2008) <http://benfry.com> (accessed December, 2009).

[53] *Ibid*

[54] See N. Tractinsky, A.S. Katz, and D. Ikar, "What is beautiful is usable. Interacting with Computers," *Human Computer Interaction* 13, no. 2 (2000): 127-145. Also see later work that analyses discomfort with beauty in computer science and tracks changing attitudes and evidence-based studies, N. Tractinsky, "A Few Short Notes on the Study of Beauty in HCI," *Human-Computer Interaction* 19, no. 4, (2004): 351-357.

[55] J. Prophet, *Cell* (2002) <http://www.janepropheet.com/CellApplet02/CellApplet100.html> (accessed March, 2010).

[56] See N.D. Theise, *Biography* (2008) <http://www.neiltheise.com/cv.php> (accessed March, 2010).

[57] P. Fishwick, S. Diehl, J. Prophet and J. Lowgren, "Perspective on Aesthetic Computing," *Leonardo* 38 (2005): 133-141, 136.

[58] See N.D. Theise, *Biography* (2008): 2, <http://www.neiltheise.com/cv.php> (accessed March, 2010).

[59] As well as previously cited works see L. Jevbratt, *Interspecies Collaboration* (2009) <http://jevbratt.com/> (accessed February, 2009); and L. Jevbratt, *22: Search and Thou Shall Find* (2008) <http://128.111.69.4/~jevbratt/lifelike/artists/kajfes/index.html> (accessed March, 2010).

[60] The uncanny adds elements of discomfort or grotesqueness to images to startle viewers. Most recently Jevbratt has moved on to build emulators for the sensory apparatus of animal species.

[61] L. Jevbratt, "The Infome -- The ontology and expressions of code and protocols," (presentation at Crash, London, 2005): 1,

http://journal.fibreculture.org/issue11/issue11_whitelaw.html
(accessed March, 2010).

[62] The alignment of code and graphics with mathematics, rather than text, is a point made by both R. Burnett, *How Images Think* (Cambridge, MA: MIT Press, 2005); and L. Manovich, "The Database as Symbolic Form," *Database Aesthetics: Art in the Age of Information Overload*, ed. V. Vesna (Minneapolis, MN: University of Minnesota Press, 2007): 39-60.

[63] Indeed Hegel postulated the need for a qualitative understanding of beauty, rather than a quantitative one, challenging some aspects of scientific realism or essentialism. See G.W.F. Hegel, *Aesthetics. Lectures on Fine Art*, trans. T.M. Knox, 2 vols. (Oxford: Clarendon Press, 1975).

[64] See L. Manovich, *Data Visualization as New Abstraction and Anti-Sublime* (Berlin, 2002) <http://www.manovich.net/>
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Toward a Theory of Critical Computing: The Case of Social Identity Representation in Digital Media Applications

FOX HARRELL

1. Introduction

"Why should the computer scientist read African-American poets? What does information science have to do with race-critical or feminist methods and metaphysics? The collective wisdom in those domains is one of the richest places from which to understand these core problems in information systems design: how to preserve the integrity of information without a priori standardization and its often attendant violence. In turn, if those lessons can be taken seriously within the emerging cyberworld, there may yet be a chance to strengthen its democratic ethical aspects." [1]

In everyday life our identities constantly shift. Identities are formed through enactment: developing innovative algorithmic solutions makes one a Computer Scientist. Speaking to a confidant makes one a Friend, while speaking to a co-worker makes one a Colleague. Identities are formed through social infrastructure: checking a certain box on an application renders one an Asian/Pacific-Islander, checking another makes one a Female. Identities are formed through imagination: the *Los Angeles Times* newspaper has described immigrants metaphorically as "a sea of brown faces," [2] and in 1952 Ralph Ellison conceived of the racial condition of the African-American metaphorically as that of the *Invisible Man*. [3] And now,

identities are formed through computation: in video games and social networking systems users navigate through virtual environments as avatars, and users are reduced to information profiles as their preferences are recorded, unnoticed, by Google or Amazon.

These identities become convoluted in practice. Wrong words can change a Friend to an Adversary. In South Africa, people of Chinese descent have been reclassified as black so that that they receive economic benefits of post-Apartheid reforms. [4] The United States Constitution imaginatively counted enslaved people as three-fifths of a Person. Popular current games such as *Elder Scrolls IV: Oblivion* and *World of Warcraft* computationally implement and amplify many disempowering social identity constructions; in *Oblivion* females of some races are more intelligent than their male counterparts, and individuals of the ostensibly French "race" (Bretons) are twenty points more intelligent than their ostensibly Norwegian (Nords) counterparts, regardless of gender. [5]

Everyday computing activities require users to construct computational identities. Computational identities are not mediated only by social interaction, but by the particular implementations used to instantiate them. This means that a great deal is at stake when these technologies are developed. If they are developed without mindfulness of the limitations of folk or everyday models of identity, then prejudice, stereotyping, static classifications, and inequitable access to resources will be perpetuated in computational applications and environments. Yet, how many computer scientists developing social networking, e-commerce, gaming, or educational applications consider the latest theories of social classification from sociology or theories of conceptual stereotyping from cognitive science? The quotation by sociologists Geoffrey Bowker and Susan Leigh Star beginning this section suggests that, looking outside of the field of computer science, there exists rich information and identity construction strategies developed by individuals who have had to navigate the shifts, convolutions, and problems of social identity. The reliance of computer scientists on intuitive understandings of identity,

rather than nuanced theories that view identity as enacted, infrastructural, and imaginative, has resulted in software that at best ignores opportunities for empowerment, and at worst results in perpetuating longstanding social ills of discrimination and disenfranchisement. We can do better.

Improving upon this situation is not a technical issue alone. Using the case of computational identity representation as an in-depth motivating example, because it is laden with social and technical complexities, as elaborated above, this paper is meant to demonstrate a developing type of practice called *critical computing* argued for in my article "Toward a Theory of Phantasmal Media." [6] The next subsection describes the meaning of the critical computing concept and explains how the concerns about social identity as mediated by computing technology raised above are an excellent case with which to exemplify the idea. Section 2 of this paper describes a theoretical framework for analysis and design of computational identity systems. Section 3 uses this theoretical framework as a basis for analyzing computational identity in several gaming applications. Section 4 describes ongoing research under the rubric of the Advanced Identity Representation (AIR) project that I have pursued. Section 5 provides concluding remarks.

1.1 Critical Computing

Critical computing refers to the potential for using algorithmic processing and data structuring as a basis for expressing commentary about, and making impactful change upon, the real world -- especially to engage disempowering hegemonic norms and socio-technical conditions. It relates, in part, to *critical technical practices*, a concept introduced by Philip Agre that represents a union between technical research and development and critical theory. [7] His work has great alignment with other philosophical and critical commentaries upon AI [8], however with the difference that, rather than abandoning the field, Agre seeks to reform it. His approach also has a far-reaching impact in technological fields beyond AI -- for example, Phoebe Sengers's research applies Agre's ideas to highly

original approaches to Human-Computer Interaction (HCI) designs using computing within everyday experiences and environments. [9] In other related work, Brian K. Smith led the "Explanation Architecture" research group at the MIT Media Lab, an endeavor that used the term "critical computing" earlier, though in a different way as Smith's focus was on designing "tools that help people engage in critical reflection around their attitudes, beliefs, and behaviors." [10] Recently, theorists and artists including Arthur and Marilouise Kroker and many others have coalesced into an international community pursuing cultural readings of, and interventions through, computational technologies under the banner of *Critical Digital Studies*. [11] Critical awareness in my conception in this paper is directed both externally toward the world and internally toward technology itself, rather than focusing only on self-critical approaches to computing and information sciences.

The critical computing concept helps technologists to move beyond issues of utilitarian and productivity-oriented applications and to think about issues such as social identity, power relationships, and political configurations. In areas such as user-interface design, computer-supported cooperative work, and social networking, issues of users' knowledge and experience bases, social groupings, and facility for social interaction, are all intrinsic to the technology. Though occasionally relying upon sociological or anthropological methods, rich areas of social critique and insight from marginalized peoples and humanistic discourses are often overlooked in computer science.

One initial area in which a critical computing approach would enable significant advancement over the current state-of-the-art is that of social identity computing technologies, in light of the issues raised in the introductory paragraphs above. Social ills such as racial discrimination, gender-based inequity, and cultural stereotyping exist in computational media in ways that both perpetuate old media models and construct new problems of social disempowerment. In the face of this challenge, this paper asserts that a powerful new possibility exists to develop transformative and ethically and critically engaged models of

social identity (including race, gender, ability, profession, relationships, style, etc.) using techniques from computer science and cognitive science. Crucially, however, self-representation in gaming and social computing technologies involves not only computational and cognitive issues, even as bolstered by humanities-based concerns. It also involves art, aesthetics, and style. The aesthetics of transformative and empowering social identity is that of polymorphic poetics -- an expressive set of possibilities centered upon the contingency and imaginative nature of even the most entrenched social identities, such as those of gender and race.

1.2 The Advanced Identity Representation (AIR) Project

As an example of a critical computing project with concerns for polymorphic poetics at its core, the AIR Project is a five-year National Science Foundation supported endeavor that develops new models and technology to enable empowering user self-representations for deployment in social networking, computer supported cooperative work, computational media arts and games, recommendation/preference systems, and educational technologies. These user-representations may be dynamic, integrated, sensitive to social context, empowering for diverse and underrepresented groups, and ethically engaged. Broad applicability of the models and technologies is enabled by (1) methods that invoke the shared cognitive mechanisms for categorization that undergird human construal of socio-cultural identity classifications, and (2) computer science approaches to multimedia semantics that address algorithmic and data-structural reciprocities between the two dominant models of computational self-representation: avatars (mediating proxies for action in computational environments) and user profiles (informational surrogates in computational applications).

The new AIR Project models also apply to artificial intelligence (AI) identity representations such as software agents and characters. The following section provides a theoretical framework that has been developed to inform the AIR Project specifically and that more generally exemplifies one modest and

developing critical computing approach that is grounded in several influential cognitive science, computer science, and humanities/social-sciences approaches and results.

2. A Critical Computing Theoretical Framework for Identity

Accounting for computational identity representations requires new approaches. In recent years there has been an explosion of research converging from a range of disciplines addressing the problem of identity in virtual worlds, games, social networking, and related technologies, as I have outlined in my article "Computational and Cognitive Infrastructures of Stigma." [12] All of this work points to the need for infrastructure for identity representation suited to the dynamic contingency of real life experience. Addressing this need, the below presents the AIR theoretical framework. This framework consists of two pillars: one grounded in computing and the other in cognitive science. A summary of insights arising from this body of work and the AIR Project aims to address them is presented in **Figure 1**.

Common Current Limitations of Popular Systems		
Computer Games	Social Networking	Virtual Worlds
<ul style="list-style-type: none"> • Attributes are reduced to statistics • Social categories are reduced to graphical models and skins plus statistics • Character changes and narrative progress are often driven by: <ul style="list-style-type: none"> -Combat -Spatial Exploration -Object Acquisition 	<ul style="list-style-type: none"> • User categories are predefined • Social data structures are hierarchical • Community membership is a binary model (opt-in/opt out) • Identity is only individually defined • Little facility exists to mediate between communities • Identities are largely informational, not imaginative 	<ul style="list-style-type: none"> • Identity customization is not based on meaningful in-world action • Semantics for reasoning and making inferences about identity are absent • Affective disposition is largely ignored • Identity representations do not express becoming or mixing • Diversity of cultural models is limited
Transformative AIR Project Systems		
<ul style="list-style-type: none"> • Implement identity models that dynamically change based on user action and social context • Implement models of identity categorization based on user action and imagination • Function across diverse applications (e.g., games, social networks, virtual worlds) • Ground identity models in results of cognitive science results in social categorization • Empower users to construct customized identity models, communities, and experiences • Avoid reifying social stigma, bias, and prejudice in computational infrastructure 		

Figure 1: AIR Project Research Aims

2.1 Shared Technical Underpinnings of Computational Identity Applications

Various computational identity applications, such as social networking sites, avatars/characters in computational environments, and online accounts for services such as e-commerce, are implemented using a limited and often overlapping set of components. There are two important motivations for describing these components: (1) to identify an appropriate level of abstraction for analyzing the technical side of computational representations comparatively across different types of applications, and (2) to identify components that can be analyzed both in terms of how they appear visually and how they are implemented algorithmically and data-structurally. For example, numerical statistics appear in both accounts for online auction sellers and characters in computer role-playing games -- both are clearly represented as interface components (often framed in a subwindow on the screen) and in terms of back-end data. **Figure 2** describes the six components that comprise the majority of widely-used computational identity technologies [13].

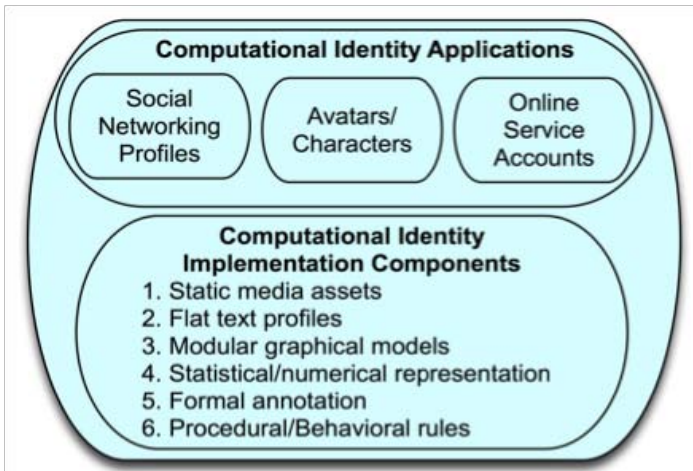


Figure 2: Computational elements of a *Sociodata Ecology*: *Shared Technical Underpinnings of Computational Identity Applications*

It is important to point out that these technical underpinnings exist in what could be called a *sociodata ecology*, in which technical infrastructure, specific data-structures and algorithms, and specific code is looked at as it relates to issues such as embodied experiences, subjective interpretation, power relationships, and cultural values. The goal is not to reduce socio-cultural issues to technical ones, but rather to be able to clearly describe how specific technical features bear upon human experience. I highlight computational components because the many brilliant insights of cultural theorists and critics often fail to address the specificities of how systems are engineered; in short, I am attempting to fill a gap. This is important for those of us who want to build, and empower diverse groups to build, new technologies customized to their epistemologies and values. This type of research compliments study of the many practices that users engage in that nonetheless treat computing applications as landscapes upon which to operate rather than as technologies that users can produce and alter. Manipulating these computational aspects, especially the relationship between formal semantic annotation and modular graphical models, can enable dynamic and context-sensitive models of social identity in computational environments. The following uses examples from computer gaming, online communication, and social networking to explicate this model. The examples are presented to simultaneously reveal not only the influences and affordances of their technical bases, but also to highlight the complicated ways that they interact with social practices in a sociodata ecology.

Avatars, in their simplest forms, are often nothing more than graphical images, such as jpeg files, that are presented next to user names. For example, many online forums allow users to select images to display next to their postings, such as the comic book images in **Figure 3**.

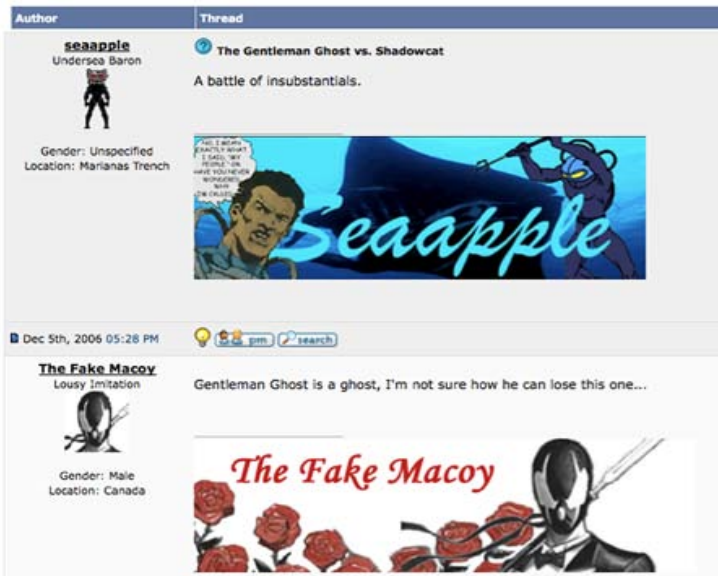


Figure 3: Static image avatars on a forum, here the signature images also comprise static image avatars [14]

These avatars, though rather simplistic technically, afford a range of self-representations. The images in the context of the forum above integrate variations of common idioms, normative data such as gender and location, remediated pop-cultural characters, and sophisticated montage. Furthermore, they are deployed in communities of exchange -- individuals create such images for one another, and communal evaluation -- there is a discussion thread in which people rank the signature image of the previous poster on a scale of one to ten. There are technical limitations regarding file size, resolution, image size, image placement, and more, yet creative practices abound in ways that slightly more complex technologies such as modular avatar creation systems (e.g., *zwinky.com*) may not allow.

Most avatar systems feature modular graphical models rendered with variable skins that offer the illusion of acting as transparent proxies for our real selves to act within games and virtual worlds.



Figure 4: A user-customized avatar in *Second Life*

However, users are limited to the set of multimodal signs and communication mechanisms (e.g. chat windows, emote commands) developed by the system's designer. Our natural discourse production and performances are then filtered through a constrained set of possibilities. This is a fascinating duality -- one achieves the ability to create representations that may be far removed graphically from real worlds identities, yet one loses everyday communicative abilities. Furthermore, as we shall see later, users cannot avoid mapping real world social identity concepts onto even the most abstract avatar.

The affordances provided by our characters to complete diegetic (storyworld) actions are often implemented via sets of statistical/numerical values. For example, **Figure 5** depicts the initial attribute values for characters in the computer game *Elder Scrolls IV: Oblivion*.

Attribute	Altmer		Argonian		Bosmer		Breton		Dunmer		Imperial		Khajiit		Nord		Orc		Redguard	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Agility	40	40	50	40	50	50	30	30	40	40	30	30	50	50	40	40	35	35	40	40
Endurance	40	30	30	30	40	30	30	30	40	30	40	40	30	40	50	40	50	50	50	50
Intelligence	50	50	40	50	40	40	50	50	40	40	40	40	40	40	30	30	30	40	30	30
Luck	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Personality	40	40	30	30	30	40	40	40	30	40	50	50	40	40	30	30	25	30	40	
Speed	30	40	50	40	50	50	30	40	50	50	40	30	40	40	40	40	30	30	40	40
Strength	30	30	40	40	30	30	40	30	40	40	40	40	40	30	50	50	45	45	50	40
Willpower	40	40	30	40	30	30	50	50	30	30	30	40	30	30	30	40	50	45	30	30

Figure 5: Initial character attribute values in *Elder Scrolls IV: Oblivion*; columns indicate race and gender while rows indicate attributes [15]

Note that several interesting initial identity characteristics are hard-coded. Female Orcs and Argonians are ten points more intelligent than their male counterparts, and the human Imperials are twenty points more intelligent than human Redguards of either gender. Hence, choice of race and gender results in essential characteristics reified within the gameworld (a phenomenon usually reserved for human/non-human distinctions).



Imperial

Star of the West once a day;
Voice of the Emperor once a day.

+5 to Blade, Blunt, Hand-to-Hand, Heavy Armor
+10 to Mercantile, Speechcraft

Two weak spells, one absorbing Fatigue and the second functioning as Charm - in other words, nothing special.

Figure 6: A gaming website's chart of the racial attributes of the "Imperial" race [16]

Furthermore, higher attribute values, along with skill bonuses, have the effect enhancing performance of particular actions, e.g. bonuses to mercantile and speechcraft skills granted to the Imperial race result in commerce-related advantages. The Imperial race also features provocatively titled special abilities such as "Star of the West" and "Voice of the Emperor." [17]

A hallmark of an older gaming form of role-playing, the text-only Multi-User-Dungeon (MUD), is the player's ability to describe her or his player character in text files. These files are considered "flat" because they are unstructured and do not influence game mechanics; they must be enacted by the player as projected identities. For example, the MUD *Armageddon* features

a race called "Muls," described as "sterile crossbreeds of dwarves and men, bred almost solely by Templar slavers and nobles for combat in the Arenas of Allanak as well as those of Tuluk." [18]

Players provide their own descriptions such as:

the heavy, beady-eyed female half-giant

This enormous woman is extremely pudgy, rolls hanging in her skin. She has obese, round legs that jiggle slightly with any movement. Her enormous stomach is rounded and protrudes from the rest of her body by a noticeable amount. She has two thick, corpulent arms that hang almost lifelessly at her sides at most times, and large hands adorned with chubby fingers. Above her adipose neck is a huge double chin, the false one nearly the size of the real one. She has enormous lips, a small amount of spit always gathering at the corners. Around her stubby nose are her fleshy cheeks, slightly rosy in color against her lightly tanned skin. As a result of her build, she has extremely deep eye-sockets, in which can be seen two beady brown eyes. She has greasy black hair, which falls freely down the back of her neck. [19]

The main feature of such flat files is that, while they allow players complete textual freedom within length constraints, their effects are not regulated algorithmically. Hence, MUD informational sites often provide written descriptions of how to perform identity categories such as race or sexual orientation; for example, Muls are provided the following personality guidance for appropriate role-playing: "being sterile, and thus outside of the typical chain of reproduction, muls often suffer from a sense of meaninglessness." [20] This suggests that ancillary media should be investigated to see how rules and social practices emerge in systematized ways in conjunction with the underlying data representations -- humans mitigate identities when presenting themselves and understanding each other, whether

Code Drift

through code or communal practices.

In conjunction with numerical statistics, other information about virtual identity is formalized and represented using abstract data structures identified with the character/avatar/profile. For example, the modular graphical elements are linked to strings that indicate which files should be displayed currently. Such representations are often tokens to be evaluated during execution to trigger particular effects, for example the dynamic depiction of blood color as it varies by creature type or race.

NAME	String	programmer label
RACE	String	If <i>MODELTYPE</i> is not "P", then this is the ResRef of the MDL file to use for the creature model. If <i>MODELTYPE</i> is "P", then this is the player model letter used in constructing the complete creature model. For example, if <i>RACE</i> is "D", then chest part 3 for a normal-phenotype male creature is <i>prnd0_chest003</i> .
ENVMAP	String	"default": use the default environment map for the current area's tileset, as specified in the <i>.SET</i> file's <i>[General] EnvMap</i> property. ****: use no environment map on the creature model Interpret any other value as the ResRef of the TGA file to use as the environment map for the creature.
BLOODCOLOR	String	R = red G = green W = white Y = yellow N = none

Figure 7: Data types for player characters in *Neverwinter Nights* [21]

Finally, some aspects of character performance of actions can occur algorithmically, without input by the user, or only with high-level guidance by the user. For example, many games include physics-based models that determine effects in animation, such as collision or fluid motion, or even behavioral models that determine and/or constrain character actions. For example, a simple form of behavior was implemented for player characters in Sega's *Sonic the Hedgehog* series. When the character remained idle too long the sprite would "grow impatient" and reveal a series of images to construct an animation including foot-tapping or growing tired.



Figure 8: A sprite of the character "Tails" growing tired in response to user inaction [22]

These six components that commonly form the basis for users' character construction have been used in nascently expressive ways to implement characters with identities that transform in response to user actions, context, or just the passage of time. Such examples are revealing in the technical facility for transformative identity they implement, the conventional metaphors they enact, and the constrained set of computational approaches upon which they are based. The AIR project suggests that we can also use computational models to represent critical perspectives on complex models of social identities themselves. Though each of the six components used to implement computational identities are not present in every application, an observation underlying the AIR Project is that parallels in these components, particularly at the level of formal annotation, can allow diverse applications to be integrated. Furthermore, within individual applications we can favor dynamic data-structures that are informed by conceptual models of cognitive science. Conceptual models that define social relationships, preferences, metaphors, and values could be used to add salience to computational experiences. The following section describes how this project utilizes cognitive linguistics insights as a scientific basis for how computational modeling can enable dynamic, contingent, and multivalent models of social identity in computational environments.

2.2 Cognitively Grounded Model of Computational Identity

The notion of an identity-related sociodata ecology, as illustrated by the AIR cognitively grounded model of computational identity, is summarized in **Figure 9**. [23] Since cognitive science now addresses the embodied and situated nature of cognition, such a model need not be reductive or

technologically deterministic. Human imaginative cognitive processes for creating categories are fundamental, and cognitive science results are more easily reconciled with cultural theoretic insights because recent cognitive science engages issues of artifact use, embodiment, social situations, and communication. My AIR model emphasizes how technical artifacts (ranging from specific code deployments in role-playing games to broad infrastructures for classification like national census data structures) and performed/constructed social identities are based on imaginative cognition -- an idea commensurate with many constructive approaches to identity. As well as imaginative cognition process (specified below), we look at how the human ability to map concepts onto artifacts and interactions enables diverse computational identity phenomena.

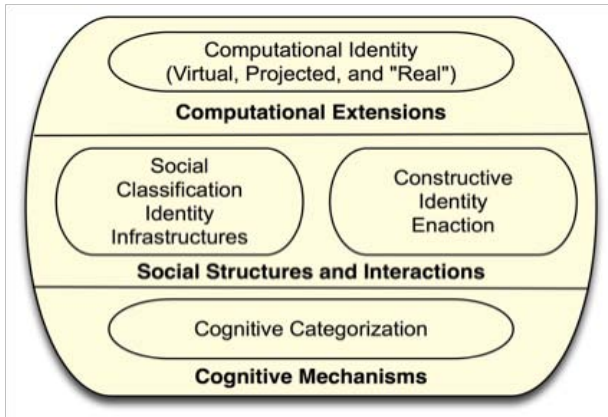


Figure 9: A Sociodata Ecology: The AIR Cognitively Grounded View of Computational Identity

The AIR Project approach begins with the basic cognitive building blocks of identity (discussed in Section 2.2.1), upon which all social identity categories are built. Cognitive scientists have proposed that human conceptual categories form "idealized cognitive models" (ICMs) upon which categories of objects in the world are built. [24] These ICMs are akin to what are known as ontologies in database and artificial intelligence (AI) research. Yet, most user categorization is not done using AI knowledge

representation techniques. Social networking sites group users into categories called "friends," while games may group users into categories called elves or half-orcs. Technical infrastructures implement and reify (often incorrect) stigmatizing identity classification models [25]; indeed, some games feature data-structures instantiated with values in which some races/genders are less intelligent than others. [26] Cognitive science theory is presented in Section 2.2.1 below to provide more robust models. These models can explain how users project their identities into their computational surrogates/proxies. [27] This model is new in that it integrates computational, cognitive, and sociocultural analyses, and in that it applies recent cognitive science ideas to areas that they have not been used to explicate previously. Toward this end, a brief account of these underlying ideas follows.

2.2.1 Cognitive Categorization

The AIR approach to identity is influenced by the prototype theory of the psychologist Eleanor Rosch, and especially by work in categorization by the cognitive scientist George Lakoff. [28] Lakoff's work in this area over two decades ago is well known and influential, yet it is a thread that has been seldom applied to issues of social identity (an exciting exception being the work of the linguist Otto Santa Ana on conceptual metaphoric based bias in *Brown Tide Rising* [29]). Furthermore, this approach has not been applied elsewhere to computational identity.

Traditional theories or "folk" views of categorization define categories by the common objective properties of their members. In contrast to folk theories of categorization, Lakoff asserts that categorization is a matter of both human experience and imagination.[30] Lakoff cites research from the fields of psychology, computer science, neuroscience, anthropology, and other disciplines to reveal a convergence of evidence disputing the traditional theory. Important observations from this convergence of evidence include arguments that:

There is not a single, well defined collection of common properties shared by all objects in some categories

- Categories can be extended by new kinds of object
- There can be more or less central (exemplary) members of a category
- Categories can include fuzzy degrees of membership (e.g., defining partial membership between 0 and 1)
- Objects in categories can have many names and among all of the possible names one often has a superior status
- Categorizations seem like achievements of imagination [31]

Important for the purposes here, Lakoff describes a metonymy/metaphor-based account of how imaginative extensions of "prototype effects" result in several phenomena of social identity categorization that have proven useful for the AIR Project:

- Representatives (prototypes): The "best example" members of categories
- Stereotypes:
 - These may be used to motivate and define contrasting subcategories (e.g., gender stereotypes such as housewife-mother, working mother)
 - They define normal, but often misleading, expectations: (e.g., under gender stereotypical interpretations individuals define normative expectations for language use: Normal: "She is a mother, but she isn't a housewife", Strange: "She is a mother, but she is a housewife")

- Ideals:
 - These define cultural values regarding categories even if not typically encountered (e.g., note the difference between an ideal and stereotype in the following: Ideal husband = good provider, faithful, strong, respected, attractive; Stereotypical husband = bumbling, dull, beer-bellied)
 - Cultural knowledge about ideals leads to prototype effects (deviation or adherence to ideals defines perceived centrality to categories)
- Paragons:
 - These refer to defining categories in terms of individual members who represent either an ideal or its opposite (e.g., "he is no Turing when it comes to computer science," "that is the Taj Mahal of houses in the neighborhood")
 - People use paragons as models to base their actions on (e.g., going to movies that win an Oscar, visiting the seven wonders of the world, etc.)
 - People expect best attitudes from paragons and will be shocked if they act in contrast to this
- Generators:
 - Members of one category are defined/created by the central members plus some general rules (e.g. single digit numbers are central members of the category "natural numbers." They can be used to generate the entire category.)
- Sub-models:
 - People sometimes use members of a certain sub-models as cognitive reference points (e.g., 98 is ~100 sounds better than 100 is ~98)
- Salient Examples:
 - People use memorable examples to understand/create categories (e.g., an individual may experience an earthquake in California,

subsequently she may never wish to travel to California, even from a place with a higher incidence of natural disaster.)

Since the AIR Project technology involves techniques to formalize and implement ICMs as computational data-structures, identity phenomena become amenable to algorithmic manipulation and experimentation. The AIR Project entails computationally modeling phenomena that define normative expectations and stigma (stereotypes, ideals, salient examples, etc.) within computational identity applications and enabling more nuanced and expressive representations for social analysis and user empowerment.

2.2.2 Sociology of Classification Infrastructures

The AIR Project is influenced by accounts of classification from sociology. In *Sorting Things Out*, Geoffrey Bowker and Susan Leigh Star argue that classification systems are necessary for information exchange and communication. [32] Bowker and Star call attention to the concepts of *membership* and *naturalization*. *Membership* is the experience of encountering objects and interactions native to particular communities and increasingly engaging in naturalized relationships with them. *Naturalization* refers to deepening familiarity with use and enactment involving such objects and interactions. The problem with enforced naturalization is that it always creates problems of *marginalization*. "Marginal persons" are those who either exist outside of communities or are less "prototypical" members of communities. *Marginalization* can occur through exclusion or through multiple memberships in communities where an individual must switch frequently between interaction and object use protocols within each community, often with varying degrees of success. Typically, when discussing marginalization it refers to exclusion or difference from normative behaviors (*stigma*) and/or dominant, privileged, and/or hegemonic communities. The concept of *category markedness* indicates that unlike normative categories, marginal categories are linguistically demarcated.

Identity *torque* describes a situation in which self-classification of individuals differs from how broader society classifies them.

2.2.3 Sociology of Stigma

An important early theory of identity construction can be found in Erving Goffman's work. [33] In *Stigma*, Goffman grossly describes three types of stigma. These are differences of (1) the physical body, (2) individual character, or (3) "tribal" classes of "race, nation, and religion." Goffman describes each of these categories as deviance from "those who do not depart negatively from the particular expectations at issue" that he calls the "*normals*." [34] The postulation here is that the experience of stigma largely rests in the human cognitive ability to map characteristics of the second type of stigma, that of character, moral value, will, belief, and passion, onto physical characteristics and attendant categorization into socially recognized races, nationalities, and other so-called tribal classes (which may be described using theories of conceptual metaphor and blending). Also, these mappings are reinforced and reified in social classification infrastructures, including computational infrastructures.

2.3 Blended and Double-Scope Identities: Elaborating the Virtual and the Real Identity Nexus

Learning scientist James Gee's concepts of the real, virtual, and projective identities provide a useful starting point for thinking about how embodied identity experiences and values in the real world intersect with the affordances and semiotic values of computational representations. [35] Gee's descriptions of player identities as mediated through characters in games in this triumvirate of personae, which, while eliding the complex mappings we invoke to cognitively construct virtual senses of self, highlight that discussing only "real life" or only technology is not enough. For Gee, player-representations as projective identities, the most novel construct in his triad, manifest the ways that real player values are reconciled with values understood as being associated with avatars. I propose going further and

considering how avatar values are expressed and mediated through the in-game affordances such as graphical models and skins, along with the cognitive processes that accompany deploying them.

Gee's constructs raise significant unanswered questions. Is the real identity an individual psychological construct, a social construct, an objective and material reality, or some combination of those? We can ask the same questions of the virtual identity. For example, Gee discussed the virtual identity Bead-Bead, a half-elf character in the game *Arcanum*. [36] At first glance, it is easy to say that this is a fictitious character in a fictionalized gameworld. However, this does not go far enough because the gameworld does not exist separately from an individual's cognitive understanding of that world. The individual's understanding is mediated by social context, historical experience, the artifact implementing the world, and more. One person's understanding of "half-elf" may recall a part-human (default everyday category) and part otherworldly aesthete being. Another person might see a half-elf as cynically referring to an outmoded concept of miscegenation. Another person might see a half-elf in purely game-mechanical terms: it entails possessing a 30% resistance to sleep, charm spells, and 60' of infravision (seeing in the dark).

However, game studies researcher Zach Waggoner discusses Gee's constructs as describing the virtual identity as "the avatar that exists in the fictionalized world." [37] So, the actual implementation for half-elves in a game might not support all of those interpretations equally, in fact it may exclude some. The virtual identity, then, is a merger of a computational representation with a meaningful interpretation of that representation. In that sense, both the virtual and the real identity are comprised cognitively (which for us includes context and embodiment) and materially (through code and hardware). It is impossible to look at virtual identity as a purely conceptual construct that is not somehow embodied. The concept of an *identity sociodata ecology* is meant to emphasize computational infrastructure at many levels -- material, conceptual, social -- and

to aid in precise theorization of concepts like real and virtual identities.

The AIR Project approach emphasizes projective (here "projected") identity. Jill Walker Rettberg has discussed this type of identity as ontological fusion. [38] Using terminology from the cognitive science theory above, this can be seen as metaphorically mapping ICMs (mental spaces) that humans have of themselves onto characters, or to use terminology from Gillies Fauconnier and Mark Turner's conceptual blending theory [39], as *selectively projecting* aspects from conceptualizations of both a real identity and a virtual identity into a *blended identity*. Since this entails integrating concepts from quite different, even clashing, conceptual frames, this would be called a *double-scope identity*. [40] Notice that blending a real and virtual self means something quite dynamic. The projected, or blended, self at one moment may be different from the next. One person's projected identity will be different from another's.

Conceptual blending theory is not currently a predictive theory that can forecast exactly how humans combine ideas. [41] Rather, it describes constraints on the process of combining concepts -- what makes one way of blending concepts more optimal than others -- and provides a systematic way to talk about integrating concepts. One person might project a relation such as (written logically) "morally-righteous (self)" onto the avatar (let's say a vampire character) and another might not. This would result in the former person finding a clash of values in the projective identity, while the latter does not find the clash to be the case. The blended identity is quite fluid. In practice, we always uses systems at the level of the blended identity -- a more precise account would describe precisely how this blend is constructed, what its constituents are, and how it changes dynamically.

Because of the focus on stigma and prejudice here, it is important to distinguish identity theory from identity politics (narrowly construed). In the end all social identities are political because we cannot escape them and they affect our everyday lives and potentials. [42] What should be emphasized is that studying perspectives on identity is not a matter of issues such as

determining which group is most marginalized, which has been most oppressed, etc. Rather, everyone has an identity (or identities), everyone constructs categories, and our identities are already integrated with digital media through communication, commercial and financial databases (at the very least), and our identities' impacts on our environments, as discussed by Eric Kabisch. [43] It is possible, however, to look at how institutions, infrastructures, technologies, and more relate to issues of social change, power, justice, equity, etc., and assess what relationships exist.

The novel theoretical framework presented in Section 2, synthesized in the concept of a *sociodata ecology* applied to the case of identity in the AIR Project, ranging from accounts of computational identity representations to a theory of stigma from seminal work in sociology, assists in providing insight into user identity self-representations across media as diverse as forum profiles, virtual worlds, and computer games.

3. Critical Computing: The Case of Computational Identity Representation

Current user representations in computational media are inadequate for capturing complex phenomena and subjective experience of social identity. The case of racial representations in computer gaming can illustrate this phenomenon. In light of the theory presented above, we can continue examining popular current games such as *Elder Scrolls IV: Oblivion* and *World of Warcraft*, which implement existing social identity constructions. For example, the ostensibly African-featured "Redguard" characters in *Oblivion* are often described in terms of the essentialist stereotype of the black athlete: they are "the most naturally talented warriors in Tamriel" born to battle, though their pride and fierce independence of spirit makes them more suitable as scouts or skirmishers. In addition to their cultural affinities for many weapon and armor styles, Redguards are also physically blessed with hardy constitutions and quickness of foot." [44] The bull-like Tauren race in *World of Warcraft* live in teepee-like structures replete with totem-poles where, "despite

their enormous size and brute strength, the remarkably peaceful Tauren cultivate a quiet, tribal society," thus embodying an exploitive cultural stereotype of the innocent savage and exemplifying Goffman's third type of stigma. [45] Since Tauren are a part of the Horde category in the game, comprised primarily of monsters with negative moral implications, as discussed in Gee's *What Video Games Have To Teach Us About Learning and Literacy* [46], Tauren represent a good example of mapping Goffman's second type of stigma onto his third within a computational system.



Figure 10: Racial stereotypes in popular computer games

Such games, we have seen, hardcode racial stereotypes into their infrastructures and fail to ask even obvious questions, such as: What is the effect of racial profiling upon exploration in the storyworld? How can race be represented as more than a set of numerical variables? And how can we examine the subjective experience of social oppression or privilege as opposed to cosmetic changes to avatar appearance?

Computational identity representations have currently been used in only modest ways to implement characters with identities that transform in response to character actions, context, or just the passage of time. The most common type of transformation implemented in popular computer gaming represents a moral binary in which the "Life is a Journey" basic metaphor is mapped onto a quest involving the corruptibility of the protagonist. [47] Occasionally, this has been used to subtle and striking effect; for example, in the game *Shadow of the Colossus*, the player is forced into a projected identity in which the standard "save the female victim" narrative (in this case she is a glowing phantasmal white being that has already seemingly died) requires the player to slay colossal, monstrous, but innocent, beings. [48] Despite its innovative technique of increasing affective expressivity by constraining player agency at the level of the virtual identity -- a fateful melancholy arises as the player's agency is restricted to the local level of spatial exploration and battle while global moral decision-making is not possible -- the virtual identity's transformation is relatively straightforward. The protagonist's face and clothing become streaked and stained in a clear parable for moral degradation.



Figure 11: Character transformation over time in *Shadow of the Colossus* [49]

The Microsoft Xbox game *Fable* is notorious for a similar, if less elegantly executed, effect. Rather than pitting the projected and virtual identities at odds with one another, and thereby manipulating the player's sense of agency as an expressive resource, *Fable* transparently reflects the game's moral order through the transformation of the virtual identity. [50] Consumption of alcohol or other "immoral" actions result in conventional demonic attributes such as red eyes and horns, while a "noble" path results in the virtual identity representation's transformation to an august being who is showered in praise from bystanders and beloved by children non-player characters.



Figure 12: "Noble" and "Corrupt" eventualities for the player character in *Fable* [51]

The independent art game *Passage* utilizes an abstracted retro-graphics style (it was developed for a contest, under the constraint that all games be displayed in 256 pixels or less) in order to effect identity transformation at the graphical level to express the conventional "Life is a Journey" metaphor mentioned earlier. [52] In this game, the player's virtual identity representation transitions from being statically located on the left of the narrow screen to the right while exploring an abstracted and pixilated space through a blond, male virtual identity. He

accumulates meaningless treasures, and perhaps a life partner, and eventually goes bald, grows old, loses his partner, and dies.



Figure 13: Three screenshots taken at different stages of life in *Passage*

Such examples are revealing in the technical facility for transformative identity they suggest, the conventional metaphors they enact, and the constrained set of computational approaches upon which they are based. These examples display the technical possibility for evocative transformation within gaming. They are based on conventional metaphors such as "Time as Space" [53] or on moral identity based again in binary opposition and discrete sets of attributes arranged hierarchically, and are implemented based upon the characteristics described above (modular graphical systems, numerically and formally encoding subjective qualities such as "goodness" or "evil"), and algorithmic representations of metaphorical phenomena such as moral descent. We can also use computational or mathematical models to represent critical perspectives on complex models of social identity themselves. Mathematical modeling of identity need not reproduce disempowering identity representations as in *Oblivion*, nor need they represent simplistic ethical choices. Questioning the limitations of current identity representations in games does not require the production of didactic games that eschew the fantasy inherent in the medium; the call here is not for diversity training games. Indeed, *Shadow of the Colossus* and *Passage* in particular represent poignant affective possibilities for character transformation. Yet, toward the aim of critical reflection on identity, we can go further.

4. Examples of Critical Computing Systems Addressing Computational Identity

We are modeling attitudes, objects, and various aspects of a relation between them; to do this job, we are using, among a large group of things and relations, various of those things and relations to stand for the objects, attitudes, and relations we wish to model.

Ordinary, informal, nonrigorous language overcomes all these problems, however, with a bravura, panache and elegance that leave the formal logician panting and applauding. [54]

The epigraphs above hint at the relative powers of both mathematical logic and imaginative language for capturing subjective, nuanced, and contextually contingent concepts. My own work comprises an interdisciplinary computational approach that can attempt to leverage human subjective expression with the polymorphic possibilities of computational data-structuring and algorithmic manipulation. One outcome of my research has been an expressive form called polymorphic poetry or *polypoems*, which combine prose poetry, dynamically reconfigurable data-structures, and forms culturally grounded in African diasporic oral traditions of signification, with the use of algebraic techniques to construct imaginative metaphors on the fly. [55]

As an example of applying such a system, "The Girl with Skin of Haints and Seraphs" is a polypoem implemented in the GRIOT system for developing computational narratives. [56] It works by establishing a set of stereotyped theme domains such as skin, angels, demons, old Europe, and old Africa, composed of sets of axioms. During the execution, each time the user enters a term it is scanned for relevance to the domains and a response is produced as output to the screen. The system constructs conceptual spaces, using the algebraic semiotic framework, and blends these to construct metaphors using a conceptual blending

algorithm. These are then combined with narrative templates, in the case of "The Girl with Skin of Haints and Seraphs," these are based on a model from socio-linguistics research, a formalization of William Labov's structure of narratives of personal experience. This narrative template is integrated with metaphors generated on-the-fly.

This polypoem implemented with the GRIOT system actualizes the winding together of the separate cords of computational and mathematical modeling, social identity, and imaginative metaphor in fiction in a cultural artifact. The output could be said to construct a precursor to a polymorphic persona that is composed of text-based stereotyped binary opposition that can be thrown into new conjunctions each time -- oppositions that are thematically related but ultimately incompatible and untenable: at one moment the protagonist is "raising imperialist, cherub children" and at the next she "is [a] melaninated and impoverished-elder." Example output can be found in my article "Algebra of Identity." [57]

The GRIOT system has also been used for composing graphical images to create a type of visual poetry that also addressed identity. This technology enables the GRIOT system to be used to construct graphical and textual character representations for games, social networking sites, and educational software. In this manner, we have also experimented with changing iconic human representations based upon context in computational environments, as illustrated in an image from a system called Generative Visual Renku in **Figure 14**. [58]



Figure 14: A looping walking (or riding) animated human figure in each square shaped tile is represented differently depending upon its context based upon artifacts appropriate to the location

Kenny Chow and I have defined a set of combinatorial, recursive, and procedural rules to allow such transformations to take place. This is, however, just an early step toward the types of applications envisioned in the AIR Project.

4.1. Pilot Work: AIR Project Case Study Systems

The following are examples of systems that demonstrate polymorphic poetics via mutable character or profile representations. The systems have been described elsewhere; however, the following descriptions elaborate the particular ways in which their development engages with and was driven by the theoretical framework outlined above in Section 2.

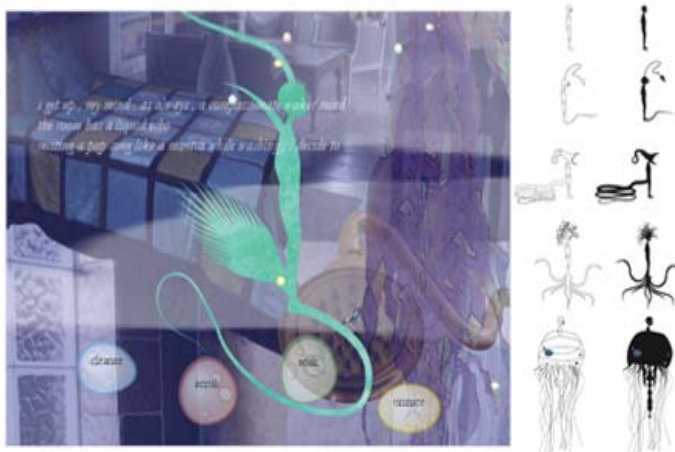


Figure 15: A screenshot of *Loss, Undersea*



Figure 16: Screenshots of *Chamelonia: Shadow Play*

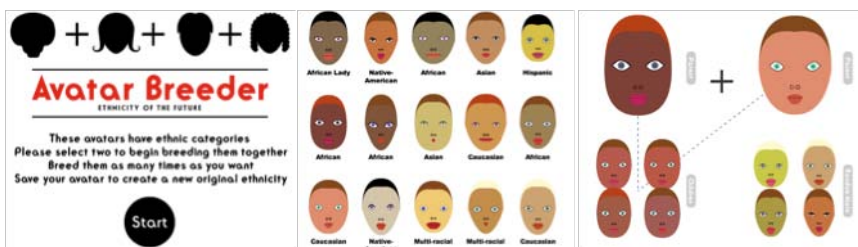


Figure 17: Three screenshots from *Avatar Breeder*

transform, along with the cinematic presentation of the scene, based on player-selected gestures and the current location. *Chameleonia* implements naturalization phenomena as well. One of the major ways in which humans naturalize within communities is by displaying contextually appropriate gestures. It also implements the concept of torqued identity. The player character represents the user's view of herself, while the shadow represents the socially constructed self.

Avatar Breeder is a generative satirical artwork constructed by Daniel Upton and Jisun An in a graduate level course I taught. It serves to undermine the essentialist nature of normative categories of identity encountered on bureaucratic forms. *Avatar Breeder* allows users to breed avatars together to create new ethnic categories, then labeled by users. A user is provided with an initial pool of avatars labeled with ethnicities from a Georgia Tech form. The user selects two parents, which genetically combine to create four potential children. Subsequent generations can be created by selecting a child and a random mate to "breed." Users can continue to genetically combine avatars, generating a family tree. The system implements metonymic categories including stereotyping and salient examples. As user-generated content grows, the normative categories are eventually marginalized.

IdentityShare, a social networking site for "non-friends," and Daniel Upton's MS thesis project in Digital Media, was also developed under the umbrella of the AIR project. [60] The system provides users with facilities to construct profiles, follow web-browsing trails of others, and comment upon other users, exploring both similar and different profiles. *IdentityShare* offers a dynamic means of self-representation based on open-ended categories and tags. Standard profile models that include normative categories such as name, age, gender, location, and race are bolstered by a customizable database of user-created fields, with design features to ensure database consistency. Users can select which categories are most important to them using checkboxes. The system also implements category centrality. [26] A user's profile, as a collection of categories that define a user, is

no longer viewed as just a set of static characteristics that are true about this user, but rather as a set of characteristics in which some may be more definitional to the user's self-conception. A future implementation could offer a ranking system for each category, not only providing centrality, but centrality gradience since "members (or sub-categories) which are within the category boundaries may be more or less central." [61]

DefineMe: *Chimera* is a social networking application (like Facebook) in which users define metaphorical profiles and avatars for each other rather than solely specifying their own representations. *DefineMe* implements metonymic ICMs for categorization to allow users to communally co-construct other peoples' avatars. [62] The *DefineMe* database, the same as in *IdentityShare*, relies on tags to create additional descriptors for each member. For instance, one user could describe a friend as a "lion" because she "is" "strong" (the tag). Another user could add an additional tag, stating that she is a "lion" because she "tends to be" "carnivorous." These tags can comprise vertical parent-child links (e.g., a "lion" is an "animal") or horizontal implicit links (e.g., in another user's profile a "lion" is an "Ethiopian symbol," yet the system may still create a category linked by the concept 'lion'). The initial content domain consists of animal types (constructing chimeras) because they are potent and entrenched metaphors for human personality [63], however the model extends to more everyday social categories such as scenes or fashions. The system implements identity torque when the avatars differ from users' self-conceptions.

4.2 Polymorphic Poetics

The pilot work discussed above is intended to have transformative effects in part through expressive use of media, in other words, the domain of poetics. Now performing feminine displays of muscle-bound preening, now daughter of colonialist demonized separatists, now imbibing the nectar of negritude to spew lyrically, rhythmically onto the page, now checking the census box for multiple ethnic memberships -- our identities are in flux, constructed cognitively through our abilities to map from

one concept to another as conceptual metaphors, and to blend concepts to form new ones. Accounting for ways in which the structure of computational media enables expression of dynamic content comprises a type of poetics. Recall Roman Jakobson's description of poetics within linguistics:

Poetics deals with problems of verbal structure, just as the analysis of painting is concerned with pictorial structure. Since linguistics is the global science of verbal structure, poetics may be regarded as an integral part of linguistics. [64]

Contemporary cognitive linguistics sees issues of concept generation, metaphor, and narrative as pre-verbal phenomena, hence cognitive poetics must account for meaning-making at large, including in computational media. The notion of *polymorphic poetics* holds at its center a concern for the dynamic nature of computational media representations as they are acted upon by algorithmic procedures and given computationally amenable form by abstract data structures. Social identity representations are a clear case through which to discuss polymorphic poetics.

With most current computational social identity technologies (such as computer games), our self-representations inherit none of the fluidity of our personae in our embodied, situated, and imaginative lives. Even in computer games that allow for the greatest degree of character customization and flux, we find that real world characteristics are reduced to a restricted range of representations, implementing player characters' attributes as numerical variable sets, modular computer graphics models, and related techniques.

In contrast to approaches that have inevitably served to duplicate the status-quo, in which identities are comprised of discrete sets of characteristics resulting in classifications (often in hierarchical binary oppositions, as criticized in my "Algebra of Identity" [65]), technologies imbued with the aesthetics of the polymorphic exploit the mutability of computational data-

structures as a mechanism for critiquing our real life social identities. These are self-representations with the following characteristics:

1. generativity (dynamically constructed and elaborated)
2. semantics-based interaction (built upon formalized subjective representations of social knowledge)
3. reconfigurable discourse structure (expressed differently based upon user interaction)
4. strong socio-cognitive grounding (acknowledging the limitations of computational/mathematical representations to capture our embodied, situated, and technologically and socially distributed selves).

These characteristics emerged from previous research developing theory and technology for interactive and generative narratives and poetry based upon an interdisciplinary theoretical framework of computer science, cognitive science, and cross-cultural discourse models [66]. As seen in the pilot work and other projects I have worked on, outcomes based on this framework have included polymorphic poetry (texts that are generated to vary in semantic content, such as metaphorical exposition and affective tone, in response to user-input on each iteration) and polymorphic personae (graphical characters bolstered by semantic back-end data to enable them to visually transform depending on context and user actions). The notion of polymorphic poetics generalizes these results in order to articulate a prescriptive and analytical account of computational media aesthetics applicable to other domains, including the realm of social identity, as discussed here. However, this generalization does not arise simply, since clearly text-based works of poetry are quite different from avatars or social networking profiles, and

future work must be done.

4.3 AIR Models and Future Work

Computational models of cognitive categorization and social classification drove the development of the systems above, however development of future systems based on this framework can be pursued in a more systematic way. It would even be desirable for diverse types of systems to be developed using a shared programming toolkit or application programming interface (API), a proposed outcome of the AIR Project. Extensions to the models to be developed as a part of the AIR Project consist of developing and refining formalizations and techniques to implement a small subset of cognitive and social identity phenomena in software, initially addressing torque, metonymic category models, marginalization, markedness, naturalization, and category gradience. These are summarized in **Figure 20**.

Torque	<p>Implementation: user profiles/avatars have multiple representations</p> <p>Importance for Social Empowerment: users often deploy different identities for different applications and purposes, e.g. multiple characters in a game or allowing the community to label dishonest sellers in commercial sites</p> <p>Importance for Social Analysis: one user representation is aligned with self perception, another is aligned with potentially stigmatizing societal perception, identity is not only self-defined in practice, it is socially constructed</p>
Metonymic Categories	<p>Implementation: one category or category subset (and its associated semantic relations) replaces those of another broader category</p> <p>Importance for Social Empowerment: exemplary categories can be represented, e.g. models of learners and doers for STEM education</p> <p>Importance for Social Analysis: stereotyping, a key stigmatizing phenomenon, is a type of metonymic mapping</p>
Marginalization	<p>Implementation: peripheral membership in categories is implemented through enabling degrees of membership</p> <p>Importance for Social Empowerment: recognition of intentionally marginal membership can be useful, for example customizing applications for beginners/newcomers</p> <p>Importance for Social Analysis: stigmatized groups are excluded from participation from normative categories, and the empowering access they entail</p>
Markedness	<p>Implementation: category labels and semantics relations can vary in visibility</p> <p>Importance for Social Empowerment: visibility of users is crucial for many cooperative applications, e.g. in a work environment it may be important to know the abilities of colleagues</p> <p>Importance for Social Analysis: stigmatized groups are demarcated visually and linguistically, normative groups are often unnamed, unmarked categories render normative privileges as implicitly assumed and not open for evaluation</p>
Naturalization	<p>Implementation: user actions and attributes that reinforce category semantic relations result in a higher degree of membership</p> <p>Importance for Social Empowerment: users may be granted additional privileges and abilities with increasing participation in a community</p> <p>Importance for Social Analysis: stigmatized identities can become accepted or normative categories or stigmatized identities can be integrated into normative categories by engaging normative objects and actions</p>
Centrality Gradience	<p>Implementation: category semantic relations can be ranked according to how constitutive they are of the category</p> <p>Importance for Social Empowerment: users can rate relative importance of category relations, e.g. users could rank whether symptoms or diagnoses are more important for identifying others for communication about an ailment</p> <p>Importance for Social Analysis: not all members of categories are stigmatized equally</p>

AIR Models for Use Across Identity Applications

Figure 20: AIR Models for Use Across Integrated Applications

Such AIR project technologies would enable subjective meanings to be incorporated into user representations along with graphical images. This means that in addition to graphical models, semantic information about users will be formalized and represented in data structures representing characters. Such technologies could enable possibilities such as: a user seeing other avatars differently than the users' controlling those avatars do based upon cognitive models of stereotyping, virtual artifacts such as clothing or characteristics such as identity-in-context (a

"gangster" in a rich area) can affect an avatar's possible actions and environmental responses to those actions, or both avatars' physical appearances and possibilities for social interaction could change depending on a history of discourse interactions such as typed conversation or gesturing. For a simple example of racial profiling in a computer game, if one wanted to cause all non-player characters of a particular type to respond suspiciously to a user, the ontology (knowledge specification structure) should entail that metadata indicating characteristics that are prototypical for a given race are negatively attributed. Similarly, such knowledge structures can inform how a given user-representation should be presented, or can even enable a user to have multiple representations (e.g., in the case of torque).

To enable dynamic profiles/identity-meaning generation system, procedures need to be constructed that allow underlying representations of characters to change on the fly. A clarifying example to illustrate how this could aid in constructing more critically aware games follows. In games, character actions performed by functions with names such as "cast_prayer" (associated with a priest character in a role-playing game) in "practice_painting" (associated with an artist in a suburban life simulation game) have effects that belie their names. Rather than enabling the actual actions, they merely manage numerical statistics, altering the values of hit (health) points or points on a career trajectory respectively. In contrast, distinctions between ethical or unethical actions could change the character's semantic information about morality. Such meaningful functions are the type that the AIR Project enables.

5. Conclusion

At the beginning of this paper we were motivated by Geoffrey Bowker and Leigh Star's questions: "Why should the computer scientist read African-American poets? What does information science have to do with race-critical or feminist methods and metaphysics?" Toward answering these questions, this paper has raised a broader call for a type of computing practice that engages the best of what cultural theorists, cognitive

scientists, and social scientist have to offer to account for social phenomena as encountered in lived human experience. The case of social identity representation in computational media provides an excellent example, showing that social sciences and humanities insights are necessary for identity technologies that enable critically awareness. The preceding has described specific examples of how my current and future work attempts to do this.

Our interlocking perceptions and conceptualizations of the social worlds we inhabit are mitigated through imaginative cognition processes by which our identities are constructed in a manner far more complex than allowed by haunting checkboxes strung in arbitrary conjunctions -- such as, Caucasian or Near-Eastern, Asian or Pacific Islander, Black non-Latin. Even the rich mathematical language of computational data structuring and algorithmic processing can only grossly begin to approximate the complex possibility spaces of projected selves. This article has presented a case for, and example of, an iconoclastic approach to computing. This approach materializes concern for the human condition by using data-structuring and algorithmic manipulation to illustrate real world complexity via subjective metaphor, not to reify it in monolithic infrastructures. The work presented here has embodied an approach to developing theoretical models for analysis, design, and implementation that emphasize an aesthetics of polymorphic poetics and an approach that has been termed *critical computing*. The overriding hope is that the path hewn, speculating about phantom shapeshifting personae in a world of unstable social play, can critically spook those past poltergeists of essential identities enough to disturb them from their easy resting places in our computational media machines and perhaps cast their odd glows in a more illuminating way.

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Moving Across the Internet: Code-Bodies, Code-Corpses, and Network Architecture

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Internet Service Providers (ISPs) are uniquely situated to survey data traffic because all traffic to and from the Internet must pass through their networks. Using contemporary data traffic management technologies, these companies can investigate and capture the content of unencrypted digital communications (e.g. MSN messages and e-mail) in real-time; pervasive application- and content-level surveillance is rapidly becoming a routine element of online life. [1] Surveillance of this nature entails “the focused, systematic and routine attention of personal details for purposes of influence, management, protection or direction.” [2] While surveillance is not a new phenomenon—Alan Westin’s work demonstrates that while norms of privacy and surveillance may fluctuate, they have persistently existed across human cultures [3]—innovations in technology facilitate expanded, widespread, automated monitoring of digital systems and the actions that happen in them.

With ISPs as its gatekeepers, Cyberspace rests atop the technical structure of the Internet. Mediated by data packets, orcs in Blizzard’s *World of Warcraft* swing their swords, personal communications race between lovers, and (seemingly) anonymous identities aplenty flourish. Rather than functioning as separate environments, the Internet and Cyberspace bleed into one another; ISPs supply technical services so that consumers can access online social environments while reserving rights to modify data flows to those services in real-time. Such modifications can deeply affect how social environments are presented to the consumer; interaction speeds can be enhanced or

degraded depending on ISPs' decisions. The question of how ISPs can and should modify data flows is the focus of network neutrality debates, wherein regulatory bodies, civil advocates, and ISPs gauge what constitutes "harmful" modification of individuals' data traffic and what are appropriate network management practices.

In effect, the Internet's underlying hardware, which is owned by dominant ISPs, can impact how code-bodies are developed and realized, just as the motions made and words uttered through code-bodies impact how consumers perceive Internet services themselves. "Code-bodies," the composite presences that individuals project across the Internet, are composed of the binary stuff that manifests as organs (underlying protocols that act as digital circulatory systems), orifices (applications on computers that "eat" and "excrete" data for "meat" body perceptions), and meanings (the truths/values that are made manifest through the interaction of organs and orifices). In their digital manifestation, bodies disintegrate into fragments of data as they scatter across the Internet to reform at ultimate destination points, but each fragmentary element must pass through ISP-governed gateways. While the bilinear relationship between the hardware of the Internet and manifestations of the code-body is not new, ISPs have recently integrated new networking technologies called Deep Packet Inspection (DPI) appliances into their network architectures that threaten to substantially reshape the transfer of data packets across the Internet. Such appliances may massively transform the constitution of the code-body, the identities that it carries, and the possibilities presented to it.

Across the Internet, an arms race between agents supporting and opposing network-based surveillance techniques has quietly unfolded over the past two decades. Whereas the 1990s might be characterized as hosting the first round of the encryption wars, [4] this paper focuses on the contemporary battlescape. Specifically, I consider how ISPs "secure" and "manage" their digital networks using contemporary DPI appliances and the ramifications that these appliances may have

on the development, and our understanding of, the code-body. DPI networking appliances operate as surveillance devices that render the digital subject constituted by data packets bare to heuristic analyses, but, despite the ingenuity of these devices, some encryption techniques successfully harden otherwise soft digital flesh and render it opaque. Drawing on Kant and Derrida, I suggest that ISPs' understanding of the Internet as one of packets arguably corresponds with a Kantian notion of reality-as-such and offers a limited and problematic conception of the code-body. Turning to Derrida, we move beyond protocol alone to consider the specters that are always before, and always after, the code-body; Derrida provides a way of thinking beyond Kantian conceptions of space and time and the reality-as-such code-body and lets us consider the holistic identity of the code-being. Further, Derrida lets us interrogate the nature of DPI networking appliances and see that they resemble thrashing zombie-like code-corpses that always try, but perpetually fail, to become fully self-animated. While Derridean insights suggest that ISPs are unlikely to be successful in wholly understanding or shaping code-bodies, these corporate juggernauts do incite identity transformations that are inculcated in cauldrons of risk and fear. Not even Derridean specters can prevent the rending of digital flesh or act as a total antidote to ISPs' shaping of consumers' packet-based bodily identity.

Data Packets and Deep Packet Inspection

Let us begin by outlining these new DPI networking appliances that ISPs are integrating with their communications infrastructures, which entails describing how data packets are jettisoned across the Internet's circulatory system and how DPI appliances survey the packets and packet flows that are subjected to computational analyses.

When an email message is sent, its contents are broken into a series of data packets. These packets can, at a general level, be understood as being composed of two parts: the header and the payload/content—the epidermis and body of the packet. The header information includes the recipient's Internet Protocol (IP)

address, a number that is used to reassemble packets in the correct order when recompiling the messages and that is used to deliver the packet to its destination through the switches, hubs, and nodes composing the Internet's circulatory system. At a more granular level, the information used to route packets is derived from the physical, data link, network, and transport layers of the packet. The payload, or content, of the packet includes information about what application is sending the data, whether the packet's contents are encrypted, and what the precise content of the packet is (e.g. the actual text of an email). [5] Again, more granularly, the payload can be understood as being composed of the session layer, presentation layer, and application layer of the packet.

These granular divisions of packets' header and payload are derived from the Open Systems Interconnect (OSI) model (Figure 1). This theoretical model was developed by the International Standards Organization (ISO) in 1984 to standardize how networking technologies were generally conceptualized. Broadly, the closer an inspection technology gets to surveying the application layer of the payload, the more the technology can learn about the packet passing through an inspection device; the deeper these surveillance appliances penetrate the body of a packet, the more detailed the information they can extract about the composition of the code-body.

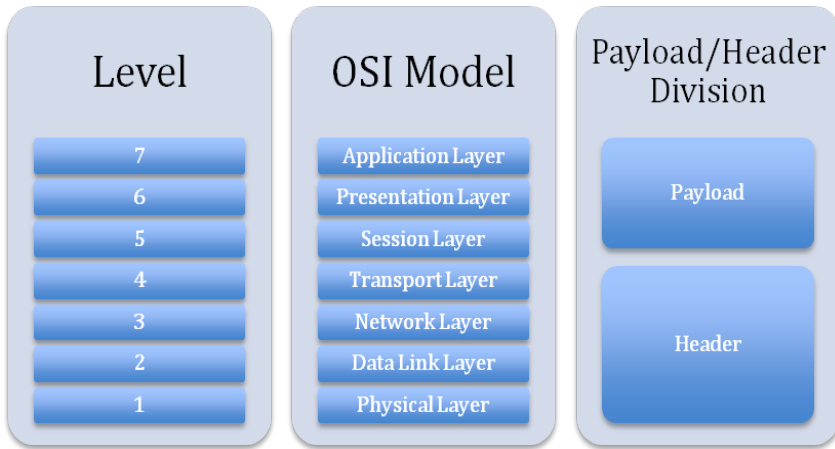


Figure 1: Levels in the OSI Packet Model

Before data is transmitted to the Internet at large, it must pass through the user’s ISP network. Operating as a gatekeeper, this means that ISPs can deeply inspect packets, which can entail classifying the application (e.g. the Vuze BitTorrent program) or application-type (e.g. BitTorrent programs more generally) that is sending/receiving packets. ISPs can sometimes go as deep as examining the contents of the packet (e.g. letters of an email carried in a packet). Deep Packet Inspection networking appliances offer ISPs this newfound “opportunity” on a massive, real-time, scale.

DPI technologies aim to precisely identify the origin, destination, and content of each packet of data passing through ISPs’ networking hubs; these technologies aim not only to totally perceive and understand each atom/digital packet of the code-body as they pass through DPI machines, but also to understand their molecular composition (i.e. the application, application-type, or content stretching across sets of packets). These devices can “look inside all traffic from a specific IP address, pick out the HTTP traffic, then drill even further down to capture traffic headed to and from Gmail, and can then reassemble e-mails as they are typed out by the user.” [6] DPI devices are designed to determine what programs generate packets and the content those

applications embed in payloads, in real-time, for sometimes hundreds of thousands of transactions each second.

In some cases, these appliances use Deep Flow Capture (DFC) to collect fragments of each packet and evaluate the characteristics of the packet stream against sets of known applications and their corresponding data stream patterns, identifying the origin of the packet stream. We can think of this metaphorically; it is as though the device is collecting pieces of the code-body and then reassembling them to create a complete image of the body-part under investigation. To perform this operation, the network appliance temporarily stores the fragments of hundreds or thousands of packets in the device's memory until it has enough information to appropriately match the packets against the device's list(s) of known packets. [7] Once the device can match the previously ambiguous packets against its list of known packets based on algorithmic predictions, it knows what application (or application-type) is generating and sending the packet; in other words, after developing a comprehensive image of the part of the code-body under investigation, the network appliance can identify the application or application-type responsible for generating the packet stream.

When a DPI device cannot identify the application responsible for sending packets by examining packets' contents, it examines how they are being transmitted between the computers that are exchanging packets to establish a partial image of the code-body. The device evaluates the spikes and bursts of traffic that occur as an unknown application sends and receives data to and from the Internet, and the device correlates the traffic patterns against known protocols that particular programs use to exchange data. This is analogous to examining secret handshakes; if you have a list of handshakes and their meaning, when you observe a handshake you can understand what is motivating the handshake (e.g. the application sending/receiving data packets) and (perhaps) what information is actually being exchanged between the parties. Given these broad capacities for surveillance, we can say that DPI lets network administrators inspect the totality of data exchanges flowing

across their network in real time and lets them stop or manipulate packets before they even leave the originating network or arrive at a recipient within that network. By interrogating packets with DPI devices, system administrators gain greater control over every facet of their network operations.

Digital Principles and the Early Internet

While we might be inclined to see DPI appliances as particularly hostile—insofar as they challenge and survey every data packet that courses through them—it is important that we keep in mind that the Internet was born of war. ARPANet, the progenitor of the contemporary Internet, was a redundant network communications system designed to facilitate military communications should a nuclear attack be launched against America. From the 1970s to the early 1990s, government and major research institutions were the predominant members of the Internet community; it was only in the early 1990s that the 'net was opened up to commercial uses. [8] While government monies fueled the development of the Internet, one can argue that governments were not fully cognizant of what they were paying for. [9]

The government money that was spent in developing the Internet was pouring into research labs of academics and computer researchers who, in effect, “built strains of American libertarianism, and even 1960s idealism, into the universal language of the Internet.” [10] The very DNA of the Internet, its underlying protocols, are governed by the following principles:

1. **Openness:** any computer or network can join the universe of networks constituting ‘the Internet’.
2. **Minimalism:** few computers need to join the Internet for it to function.
3. **Neutrality:** data transfer protocols do not discriminate bandwidth allocations on the basis of applications generating and receiving data traffic. [11]

As a result of these principles, data packets that were transferred across the 'net were “naked,” insofar as neither data security nor protection was embedded into the basic principles of the 'net.

Network redundancy was possible because routers simply found new pathways to push packets across when nodes went offline. This principle of routing around damage led John Gilmore to state that, “The Internet interprets censorship as damage and routes around it.” Where packets are prevented from moving through routing devices, typically because the device is configured to limit or stop particular packet transmissions, alternate pathways are discovered and exploited: information wants to be free, and the 'net's engineering principles are intended to guarantee that while information may be obscure, it is incredibly hard to censor. [12]

In terms of code-bodies, the early Internet operated as a space of relative freedom, insofar as these bodies developed and moved in digital spaces without fearing that virtual roadblocks would or could stop its development. With the turn to the contemporary digital environment, the code body matures and hardens itself with the rise of surveilling gazes.

Digital Voyeurism and Encrypted Carapaces

Whereas in the early Internet, code-bodies coursed through Internet gateways with little fear that their Being would (or could) be examined in real-time, this has changed in recent years. With the development of technologies that can fully inspect packets, such as (DPI), the digital body can be rendered fully visible. Organs can be mapped, and orifices identified and limited in their abilities to “eat” and “transmit” data packets, with the consequence that meanings are modified or censored with the intent of increasing revenue streams (such as by injecting advertising into web sessions, or mapping every digital transaction to develop a consumer profile to be sold to third-party advertisers), or bodies are limited from accessing particular content sites on the basis that some sites place strain on ISPs' networks (e.g. high-bandwidth steaming sites, such as YouTube

Code Drift

or Hulu, might have their packets delayed on the basis that the high density of packets generated from video-streaming causes congestion on an ISP's network, which is the equivalent of causing a traffic jam in the network). [13] Whereas insects develop bio-chemical shells to protect themselves from hostile environments, digital bodies have adapted to threats by being shrouded in carapaces constituted by encryption algorithms. This is demonstrated in the rising use of the Transport Layer Security (TLS) protocol by major commercial institutions to prevent eavesdropping, content tampering, and message forgery, [14] as well as other protocols that are similarly aimed at preventing unauthorized voyeurs from perceiving anything more significant than packets' routing information (and even this is sometimes obfuscated). Just as we try to limit who knows our most intimate secrets in the space we physically occupy, we strive to retain similar capacities for intimacy and privacy in the digital spaces that we inhabit, and which increasingly blur divisions between mind and matter spaces. [15]

In the effort to retain a semblance of personal privacy or, put another way, a modicum of control over who watches and records what we do and say, code-bodies have grown exoskeletons of encryption. These exoskeletons are constantly probed for weaknesses—new heuristics are developed and injected into DPI appliances to identify what encryption algorithms are being used, to determine what applications are generating data based on data transfer patterns, and to ascertain packet contents based on their size and header characteristics. [16] While our code-bodies may resist being penetrated, they unintentionally reveal the colonies that they are associated with. Once a packet is encrypted, it is often flagged by American intelligence services, which identify the packet's point of origin and destination and store this information in intelligence databases. [17] As a result, in securing the body the community becomes subject to intense military-grade surveillance; securing one's personal privacy from corporate eyes comes at the expense of the larger community that the code-body moves amongst being mapped by the public military complex. In this sense, voyeurism

becomes *socially*, as opposed to just *individually*, invasive.

Data that is collected from these packet transfers can be correlated with surrounding information-sets; IP addresses can be traced to geographical locations and the names of Internet subscribers, and patterns of digital movement can be used to develop composite identities (e.g. programs commonly used and bandwidth consumed, commonly accessed websites for behavioral tracking, etc.). [18] Digital correlation practices do not require knowledge of particular individuals to constitute useful datasets, as affirmed by Diffie and Landau when they write that “[t]raffic analysis reveals an organization’s structure, its membership, and even the roles of its members.” [19] Further, Bell Canada has implied that they classify consumers’ digital bodies in a Canadian Radio-television and Telecommunications Commission (CRTC) filing, where they posit why wholesale customers consume a disproportionate amount of bandwidth:

1. These consumers use HTTP for content sharing to greater extents (on average) than non-wholesale customers.
2. This consumer group is behaviorally disposed to consuming greater amounts of bandwidth, and are actively courted by retail wholesalers of Bell’s broadband network. [20]

Bell’s association of the code-body to the physically instantiated body demonstrates the capacity and willingness of major ISPs to link code-bodies with human colonies and groups. Further, by engaging in network-level surveillance, Bell was able (and willing) to categorize particular users according to corporate norms and logics, and Bell has drawn on this data to argue that the corporation has a right to throttle, or delay, data packets that rely on particular file-transfer protocols. Based on the application and application-type, as identified by DPI appliances, data packets are given priority over one another. Bell continues to use DPI appliances to delay the data traffic of their own and third-party ISPs’ users; they continue to assert their power as digital

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gatekeepers to dictate what are more and less appropriate uses of the Internet (e.g. web browsing is an appropriate use of networking resources and thus is not delayed, whereas P2P file sharing is less appropriate and so the packets P2P programs generate and receive are regularly throttled).

Just as physical surveillance technologies totally invade the body from a distance [21] and are deployed to map social movements, [22] digital surveillance apparatuses can now similarly penetrate the code-body and map its relationships. Surveillance has become hyper-real, insofar as it has made the leap to digital spaces and normalized them according to the logics of penetrating the physically embodied self. A radical change in surveillance, however, has been the near-total replacement of human agency in the digital surveillance process—“the watching gaze has long since ceased to be that of the artist or even the scientist, but belongs to the instruments of technological investigation, to the combined industrialization of perception and information.” [23] Confirming David Lyon’s worries, this transition has been described as the endocolonization of the world that causes the world to become alien, [24] to become a world in which all data is linked to particular identities [25] and the commonly proposed “solution” is a heightened transparency of data flows, instead of demanding that some of these flows be terminated. [26]

Given the seeming inability to prevent or stop the surveillance of our digital bodies, regardless of whether we develop code-carapaces or not, we might be inclined to throw up our hands and surrender to the Little Brothers surrounding us. Prior to abandoning all hope, let’s turn to and leverage Kant to “decode” how ISPs might understand the code-body. From there, we will attend to Derrida to critique the current processes of securitizing the code-body through surveillance, and to explore the conditions of perpetually evading DPI surveillance apparatuses.

Reasonable Publicity

Kant approaches the world through his metaphysics, which he initially develops in the *Critique of Pure Reason*. In this text, he recognizes that time and space are pure *a priori* intuitions required for all other scientific endeavors. These intuitions require a subject, for

if we remove our own subject or even only the subjective constitution of the sense in general, then all constitution, all relations of objects in space and time, indeed space and time themselves would disappear, and as appearances they cannot exist in themselves, but only in us. [27]

This account of subjectivity is individualistic, insofar as engagements with the world are experienced by the particular subject on his or her terms, as structured and ordered by concepts. The same faculty of reason that orients individuals in the world by structuring their experiences enables critical engagements with the world that are monological, insofar as individuals are self-responsible for exercising their faculties in accordance with their duties. With maturity, subjects develop this faculty and “extend” their freedom as they more completely understand the rational duties that they ought to perform in conformity with their moral obligations. Individuals are free because of their rational faculty and express their freedom whilst performing rationally universalized actions.

Kant’s theoretical structure presumes that the faculty of reason can capture freedom’s total cognizable possibilities by working from the *a priori* concepts of space and time. His time is linear, and it corresponds with mechanized time that is built into the procession of computer processors’ cycles. As such, there is a sequence of times passed by, a lone moment that is, and hosts that are yet to come. Each temporal instant is necessarily experienced by a subject, assuming they exist during a moment’s particular temporal Being (as distinguished from a moment’s Being-Past and Coming-to-Be), and these instants are characterized by space

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functioning as either a site that is filled or as one devoid of being filled. [28]

In terms of ISPs' DPI appliances, these appliances navigate packet streams as they are temporally encountered; as packets pass through the devices, they are inspected and evaluated against existing rule sets or predefined heuristics. Where there are delays between packets, the *absence* of packets in "space" at a particular time is drawn into the computations of algorithms being applied to the packets. Absences themselves assist in identifying the application or application-type that is generating and receiving packets, especially when packets have been rendered opaque from direct surveillance through encryption. Perhaps most importantly, DPI appliances take as given that what can be, and is, evaluated corresponds with the spatial-temporal dimensions of modernity launched by Kantian metaphysics.

While Kant offers an understanding of the presence of the DPI/packet relationship, what are we to make of what always precedes and rests behind the packet: what are we to make of the specters of packets? The difficulty, of course, is that Kant's temporal-spatial structure is problematized by the possibility of times that are always coming, and always simultaneously past, but can never be realized, as well as by spaces that are always filled, and never filled, or those that the subject/DPI appliance is forever prevented from directly experiencing. A Kantian account of a code-body situates it in time and space, as an individuated subject, whereas data flows are multiple, mass, asynchronous and transactions are experienced as social rather than individual. Derrida, as we will find, lets us address the code-soul that is implicated in the code-body's very existence. Enter the Derridean specter.

The (In)Visible Constituents of Being

There are times, places, and objects that we sense as being somehow *different*; this differentness is not *frightening* so much as *uncanny*. In Turkle's words, the uncanny is that which "seems close, but 'off,' distorted enough to be creepy. [The uncanny]

marks a complex boundary that both draws us in and repels....” [29] For Derrida, specters are experienced as uncanny; [30] we only perceive them as frightening when they jeopardize cherished norms and hegemonic principles and, at these moments, we transmute them from specters to ghosts. Let us unpack what the specter is to exemplify—why it challenges modes of mass surveillance (such as DPI) that implicitly agree with Kantian notions of time—and then proceed to think through how the specter can problematize the notion that “ubiquitous” digital surveillance techniques can fully penetrate the code-body.

Derrida’s specter is a persistently disturbing present that lingers “in the coming-and-going, *between* what *goes* and what *comes*, in the middle of what leaves and what arrives, at the articulation between what absents itself and what presents itself.” [31] It is out of joint with time, insofar as it forever stands before and after a moment of experience; it is never realized in the Now save for as a shadow or whisper of what has, or will, come to pass. Given this, specters are never actualized in reality—they are ontologically incapable of actualizing themselves in any manner other than haunting. A specter “haunts... without residing, without ever confining itself to the numerous versions of this passage,” [32] and, given its disturbing, we (the embodied, the real, the actualized) perform elaborate exercises to find where the specter “resides” so that we can exorcise it.

Exorcisms are meant to drive away that which has never, and always might, Become. Exorcism “pretends to declare death only in order to put to death ... it certifies the death but here it is not in order to inflict it.” [33] As agents that typically perceive themselves in a modern temporal-spatial existence, [34] we work to imbue the specter with a Being that it does not, cannot, actually possess; in a mockery of death, we pretend to kill that which cannot be killed and declare the execution successful. We impose an ontological structure that corresponds with our own perceptions of Being-in-the-World in an effort to temporalize and spatialize the specter. Having attributed these characteristics to the specter, we find its haunts and sanctify them to “deny” it a space to reside—we humanize it, and end its existence as we

would a human's. Ultimately, however, our task is a fool's errand (not even Sisyphean!): uncanniness remains even after the formal "vanquishing" of the specter. The haunting continues....

Hyper-Phenomenology and Justice

What would it mean to find or vanquish the uncanny, to put an end to being haunted? For our purposes, what would it mean for a DPI appliance to be successful in a specter-hunt? What would be the consequences of ending the hyper-phenomenology that is always-never embedded in our experiences?

To banish specters we would first need to stand in clear relation to them. This would demand a process that was stridently different from a Hegelian thesis/antithesis/synthesis relationship; the relationship between specters and us is one between Being and Being-without-ever-Being. Banishing a specter by drawing a Hegelian division would confirm our own actualized Being: we have bodies, and we operate in time—Kant's conception of space-time would necessarily be certified. Such a division would assume that we are "normal" and demand a normalization of the uncanny by situating it in relation to ourselves without admitting the possibilities of non-spatio-temporal ontological existences that defy our phenomenological orientations in the world. To avoid getting wrapped up in a Hegelian dialectic and actually "banish" the hyper-phenomenological, it is critical to try to address the specter according to its own "existence"; ontologically, this requires understanding oneself as *outside* or *beyond* space and time. Should a piece of network machinery strive to understand itself in this manner, the machinery would need to recognize *itself*, not just the specter, as out of joint.

In considering being out of joint, let us focus on the implications of out-of-jointedness for justice. In a hyper-phenomenological situation, justice would be transformed from a universal normative guide to something that is forever yet to come, and always beyond Being. Instead of a Kantian regulative ideal of justice against which we could normatively evaluate our actualized understandings of justice, justice becomes something

that can never be—moral-judicial norms do not capture justice, and as such law necessarily commits violence instead of justice. Understood hyper-phenomenologically, justice must permanently stand before and behind law. In this sense, to a phenomenological being, justice can only be recognized in moments of exceptionality that are perceptible on the basis of their uncanniness. On this basis, the “justice” administered towards packets by DPI appliances necessarily does violence to the atoms of the code-body, where each packet is understood as composing the digitized molecular structures of the code-body itself.

Given that there is simultaneously a drawing towards and repulsion from the uncanny, our relationship with justice is such that (like moths to a flame) we are prevented from genuinely experiencing anything more than an apparition of the hyper-phenomenologically understood concept. Justice must haunt us. While we can approach the hyper-phenomenological, we cannot transcend the realm of experience. The condition for banishing or “killing” the hyper-phenomenological demands an ending of phenomenological biases; such an ending would require passing into the flame of the hyper and burning just as a moth does when caressed by flame. Barring an end to our Being-Towards-Death, we are left with the uncanny, and are perpetually haunted by its open-ended possibilities, which can never be substantively actualized in time and space. Justice becomes impossible to realize, but it is always something that simultaneously attracts and repels us.

Such an impossible-possibility suggests that any assertion of a formal injunctive proposition meant to condition phenomenal behavior is necessarily limited, conditioned, and (likely) engaged in violence against justice as a hyper-phenomenon. Since any attempt to banish the specter (and thus justice) is doomed to fail, we are left with the question of whether a condition of publicity could ever meaningfully mediate the intrusions of digital eyes into our code-bodies. While Kant’s transcendental and affirmative principle of public right correlates judicial legitimacy with legal publicity, [35] such juridical understandings are based within the confines of human subjective experiences grounded squarely in

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time and space. Publicity alone, the commonly touted antidote for legal legitimacy, cannot capture the hyper-phenomenology of justice.

Kantian-inspired emphases on space and time, as adopted by DPI appliances, can speak to facets of the code-body's presence but cannot say much about the code-*spirit* that haunts the body and generates meaning. Such appliances are incapable of transcending their own ontological existences; thus, if we can assert that a code-*spirit/specter* exists, a mass-surveillance system dependent on Kantian notions of space-time (such as DPI) cannot capture or identify the Being of the code-*being*. Effectively, if DPI appliances have limited understandings of the constituent elements of the code-body itself, the essence of the code-body *cannot* be entirely captured by the gaze of these surveillance apparatuses; elements of play and flight are necessarily concealed from the surveillant gaze and maw of the code-corpse. While a code-body's finger might be gnawed on (e.g. a particular data protocol might be throttled, manipulated, or blocked), the meaning of the finger in relation to the greater essence of the code-body remains hidden to the corpse; the motivation for using the program, the relationship between that motivation and other digital actions, and so forth, remain unknown to the DPI appliance.

Code-Bodies and Digital Bugs

The code-body is manifest through its organs, orifices, and meanings in a manner similar to the physically represented body. How might we understand the specters that haunt this digital body, and what spaces does this provide for our discussion of surveillance appliances that penetrate the depths of code?

Code-bodies are developed according to the (supposedly) rigorous protocols and data equipment that shuttle packets across the 'net. In turning to HTTP, FTP, and STMP protocols, JPEG, MPEG, MOV, and HTML data formats, and TCP/IP, IPX, and ATM routing information, we think that these bodies can be mapped. Analyzing router hops and understanding the Time To Live (TTL) let us identify distances that packets can move, and

watching for routers that refuse to pass along packets reveals the Internet's "closed" doors. Whereas physically situated bodies navigate *code-bodies*, when non-living machines animate digital-bodies their non-living bodies move through networks in a programmatically fixed, zombie-like fashion as *code-corpses*. Code-corpses, computers that operate without being motivated by direct human agency and that are limited in demonstrating only fixed movements and actions, mobilize throughout digital networks beside their "living" counterparts but with a deeply limited set of responses to the phenomena they experience. Automated email resolution messages (such as those from the seemingly ubiquitous Postmaster), heuristic surveillance analysis protocols, and self-healing digital frameworks are all demonstrations of the limited self-agency that is embedded into digital networks. As a step beyond how this code is meant to be "played out," however, there is always a danger that something "weird" happens: a router stops forwarding packets from a particular address based on an unpredicted heuristic analysis, the Postmaster begins sending unintelligible or incorrect messages, or a self-healing framework gets locked into perpetual healing cycles when it perceives a fatal flaw that is intrinsic to the design of the network. [36]

In each of these situations, human agents say that a "bug" has been found and needs to be "fixed." Developers who prepare projects routinely engage in bug-hunts, where they aim to "cleanse" code of imperfections. Operating with a regulative notion of "normal," software and hardware jockeys always aim to approximate the ideal. These hunts are more effective when good practices and processes have been followed in the development process. "Good" here means that transparency pervades the development cycle; all changes to the codebase/system are documented and made available to anyone who wants to look at the code. In this sense, good code doesn't just run: it also has clear comments beside the lines so that other developers can read what the code is doing or is supposed to be doing. In terms of DPI appliances, this means that their bodies must be rendered transparent, and they are programmed to similarly render

transparent code-bodies. What, however, are we to do about these code-corpses' souls?

Haunting the Code-Body and DPI

What does a code-corpsse find uncanny? To put it another way, what is it that draws and repels a DPI appliance; what haunts the technology (at the level of code, rather than the level of politics)?

The code-body is haunted by expectations/hopes of controlling or mediating the voyeuristic leering of surveillance apparatuses, being simultaneously drawn to them (as it moves across digital networks and almost “touches” the routing equipment) and repelled from them (as it is jettisoned away from the equipment and projected towards another point on the network). In the process of moving, the data packets composing the carapaced code-body are drawn to reveal themselves to routing equipment (by providing packet header information to direct the packet to its destination), while repelling themselves from divulging their inner being (by encrypting packet payloads to prevent undesired surveillance). What is the equivalent set of relations for DPI appliances?

Whereas the carapaced code-body is caught in a relationship of revealing/hiding its body from the voyeuristic gaze of the DPI appliance's heuristics, the DPI device is haunted by the drive to totally penetrate the code-body without ever being able to do so. Even streams of non-encrypted data packets cannot be perfectly identified using heuristic analyses. [37] Further, where “soft” (i.e. non-encrypted) data packets stream through the DPI routing device, the appliance can identify the code-body's organs (underlying protocols that acted as digital circulatory systems) and orifices (applications on computers “eat” and “expel” data for “meat” perceptions), but cannot determine the *meaning* of the relationship between these organs. A DPI appliance's capacity to fully investigate the meaning of a code-body's movements is crippled because it cannot simultaneously view or understand the relationship between digital data packets and the physically embodied self's relationship to their digital

flesh. While DPI appliances can assume that particular packet exchanges can be correlated with meaning that follows from how the physically situated body values its digital self-embodiment, that correlation is always predictive. The appliance's location in network hubs, instead of in the minds of consumers' bodies *and* networking data centers, means that heuristics can only approximate possible meanings from the relationships of organs and orifices; perfect accuracy is denied and the project of totalized transparency is foiled. The appliance is always haunted by the possibility of penetrating the code-body to realize meaning, but it is unable to capture meaning through its heuristically driven relational processes.

The consequence of the "encryption wars" is that the DPI appliance is always close to, but never fully upon, the carapaced code-body for similar reasons as with the non-carapaced, or larval, code-body. With the encrypted body, organs, orifices, *and* meaning are cast into even more deeply confused relationships. Why is the data encrypted? Does the DPI device even *recognize* the data as being encrypted, or is the body masked in a way that totally fools the appliance's analysis? Given the possibility of packet forging and the chance that the appliance cannot detect the forgery, does encryption not further problematize the derivation of meanings from organ/orifice relationships? In effect, does encryption fully frustrate an understanding of particular code-bodies?

DPI, Code-Bodies, and Bodily Identity

The Internet is a space of intense conflict between those who seek total packet transparency and those who seek shelter from surveying gazes. Whereas DPI devices function as code-corpses that, zombie-like, persistently attempt to digest the code-bodies that must fall into their maw, they are incapable of *understanding* the bodies that must pass through them; total digestion of the code-body is impossible. Even when applying heuristics, checking for digital fingerprints, and engaging Deep Flow Capture techniques, the absolute meaning of what drives the code-body eludes the appliance's cybernetic processors.

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While we might, on this basis, be tempted to claim that the body thus eludes the corpse insofar as elements of it persistently stand before and after moments of DPI-driven surveillance, we should recognize that the corpse's digestive fluids scar the code-body.

We began this paper with the worry that efforts to shield individual code-bodies came at the expense of increasing military oversight, and while we can understand through Derrida why DPI appliances are incapable of totally rendering the constitutive elements of binary flesh, we need to reflect on the limitations of the specter. When we thought about what haunted DPI appliances themselves, we found that their inability to precisely identify the meaning of organ/orifice relationships meant that the ontological drive of these routers to fully *see* is forever frustrated. Unlike a regulative ideal, this paper suggests that meaning can *never* be precisely/perfectly known; at best, statistical degrees of accuracy are possible, and such statistical interpretations necessarily impose an ontological understanding of what meaning *is* on the code-body, rather than engaging the body on its own terms. Thus, the total penetration of a packet is frustrated, just as a moth is frustrated from touching the candle's flame; DPI identification techniques can only understand the code-body in the DPI device's terms, and never in terms of a holistic understanding of the code-body itself.

What does this mean for the constitution of one's identity in Cyberspace? How might we read the impacts of code-corpses on the fertility of Cyberspace, where identity generation and realization is often seen as fluid and playful? How is the code-body scarred?

I would tentatively suggest that while we have discovered the equivalent of an ethic of flight in Derrida, this ethic does not prevent an actual rendering of the flesh. While this ethic limits the *depth* of voyeur-imposed wounds, trading critical injuries for flesh wounds, it still risks scarring the body. We might go so far as to assert that the carapace functions as a piece of scar tissue; as the body has been cut by various online surveillance techniques, including those originating from Internet routing devices, encryption was necessitated. Further, while the code-body

shrouded in a carapace may limit its exposure to the gaze of DPI appliances', its scarred body immediately draws the attention of network surveillance to the colony of other code-bodies that it interacts with and amongst. [38] As a result, we can state that the typical consequence of shrouding oneself from deeply penetrating surveillance is that the society the individual swims within is brought into focus. In effect, one's capacity to form an identity through independently motivated action is (at least partially) shaped by these appliances, regardless of whether one develops a carapace or not. While the most significant mode of resistance entails the encryption of the code-body to maximally prevent an understanding of the essence of the body's actions, some understanding of the code-body is necessarily realized in the process of being inserted into the code-corpse's maw; encryption does not function in a liminal zone nor does it allow a sidestepping of the logic of surveillance.

Given that contemporary network appliances can be integrated with customer service databases, DPI network appliances threaten to bring about a massive coalescence of our physical and digital lives. What is telling, however, is that the Derridean ethic of non-presence limits a holistic understanding of an individual from taking place; the individual's identity can be posited, but it can never be entirely confirmed. The act of positing an identity can have severe repercussions on the movements available to a body (e.g. throttling particular protocols can be correlated with a forced amputation of a code-limb), but while such an identity-shaping event *can occur*, it in no way removes actual agency from the individual in question. The very act of flailing about can be used to assert or refute tenets, principles, and expectations that intelligent appliances develop about individuals. While scarring, or even amputation, can befall the code-body via DPI appliances, such injuries modulate how performances can be performed and thus *transforms* the field of identity-formation rather than *obliterating* the possibilities of identity-formation entirely.

The Internet was birthed of war, and battles continue to rage between the providers of the 'net's infrastructure and those

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who want to transcend bare protocol. Neither the 'net nor Cyberspace operate in isolation; they are instead involved in a bidirectional relationship. As such, while modifications to the governing software and hardware affect how Cyberspace's plasticity is realized in the course of identity-formation, such plasticity and fluidity finds new crevices to seep into (new avenues that are not subject to harsh surveying gazes) and persistently rearticulates itself, even in the face of seemingly staunch phenomenological assertions of what is, was, and can be. Even in the face of sometimes extreme war wounds, orcs can kill elves in another video game environment and broken conversations can be had via VoIP. Fluid identity transformation has not ended with the introduction of DPI appliances, the Little Brothers have not taken over the totality of our worlds, but we are obligated to think through what transformations are necessitated by, and prevented by, the situation of ravenous corpse-like intelligence within ISPs' networks.

Notes

[1] "Application-level" surveillance examines the computer programs (e.g. Souseek, Windows Mail, Internet Explorer) that are transmitting data across a network. "Content-level" surveillance examines the data that computer programs are transmitting to the network (e.g. music and video files transmitted using Souseek, email messages sent through Windows Mail, and WebPages reached using Internet Explorer).

[2] David Lyon. *Surveillance Studies: An Overview* (Malden, MA: Polity, 2007), 14.

[3] Alan Westin. *Privacy and Freedom* (New York: Atheneum, 1967).

[4] Whitfield Diffie and Susan Landau. *Privacy on the Line: The Politics of Wiretapping and Encryption (Updated and Expanded Edition)* (Cambridge, Massachusetts: The MIT Press, 2007).

[5] Nate Anderson. "Deep packet inspection meets 'Net neutrality, CALEA," *Ars Technica*, <http://arstechnica.com/hardware/news/2007/07/Deep-packet->

[inspection-meets-net-neutrality.ars](#) (accessed 28 June 2009).

[6] *Ibid.*

[7] Allot Communications Ltd. “Digging Deeper into Deep Packet Inspection,”

http://www.getadvanced.net/learning/whitepapers/networkmanagement/Deep%20Packet%20Inspection_White_Paper.pdf

(accessed 25 July 2009). Allot uses the metaphor of “fingerprints” for their explanation of DPI appliances; I have slightly modified the metaphor to remain consistent with the text while maintaining the metaphor’s target concept.

[8] Jonathan Nuechterlain and Philip J. Weiser. *Digital Crossroads: American Telecommunications Policy in the Internet Age* (Cambridge, Mass.: MIT Press, 2006), 129-131.

[9] This was, in part, demonstrated in 1998 when civilian researcher Jon Postel took control of the central Dynamic Name System (DNS) servers that resolve web addresses with Internet Protocol (IP) addresses. Had the American government fully recognized the potential damage that could be done by this seizure of control of the ‘net, one would imagine that it would have enacted measures to avoid such take-overs.

[10] Jack Goldsmith and Tim Wu. *Who Controls the Internet? Illusions of a Borderless World* (Toronto: Oxford University Press, 2006), 23.

[11] *Ibid.* When conceiving of a digital network, there are key nodes that data must pass through (e.g. ISPs) in order for data to reach the edges of the network (e.g. individuals’ personal computers, Internet enabled phones, etc.). In order to establish an open platform for digital innovation, it is critical that all applications are equally able to receive and transmit data; it is impermissible to prevent Skype from transmitting and receiving data content where an ISP’s own Voice over Internet Protocol service is able to transmit and receive data. This spirit of network neutrality has led to uses of the Internet that were unthinkable to its creators—the Internet was not designed with e-commerce, voice/video communications, or iPhones in mind. Maintaining network neutrality means keeping to the principles of openness, minimalism, and neutrality. As has been evidenced by AT&T’s

past efforts to dominate its telephone network and prevent innovative uses of their network, situating ISPs as non-neutral gatekeepers threatens to undermine the capacity for developers to provide compelling, useful, and innovative products. For more on the stagnating effects of letting telecommunications companies discriminate against particular uses of their networks, I refer you to chapter two of Nuechterlein's and Weiser's *Digital Crossroads: American Telecommunications Policy in the Internet Age* and chapter ten of Lessig's *The Future of Ideas*.

[12] Chris Anderson. *Free: The Future Of A Radical Price* (New York: Hyperion, 2009). Anderson's discussion of offering information products "for free" corresponds with his larger argument that information businesses need to adopt "freemium" business strategies that provide most products for free and aim to have only a handful of consumers pay for the information product provided. He regularly argues that attempting to prevent the flow of information and getting into contests of control with a user/consumer base are detrimental to business interests and run counter to the architecture of the Internet. In his text *Protocol*, Galloway recognizes that while principles of freedom may be *normatively* realized in digital networks (and especially realized in what I have termed the "early Internet"), control is actually the basic operating principle more generally of protocological environments such as the Internet.

[13] For a discussion of the censoring practices that occur in Canada by major ISPs using DPI equipment see the section "Injecting Content with DPI – Rogers as a Case Model" in the Public Comments offered by Christopher Parsons for CRTC Interrogatory Public Notice 2008-19 at <http://tinyurl.com/d3arc5/>

[14] The Pirate Bay, a large Bit Torrent Peer-to-Peer website, has recently announced that their contribution of the encryption wars will be to provide easily accessible, easily used, Virtual Private Network (VPN) service for €5/month. This service will fully encrypt all data traffic and is meant to prevent media corporations from identifying whether individuals are transmitting or receiving data packets holding copywritten data. Organs, orifices, and meanings are all shielded from the gaze of security.

[15] The blurring of online and offline is clearly seen in scholarship examining the effects of increasingly anthropomorphic user interfaces in online environments. See: Ryan M. Calo. "People Can Be So Fake: A New Dimension To Privacy And Technology Scholarship," http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1458637 (accessed 20 August 2009).

[16] Christopher Parsons. "(Working Paper) Deep Packet Inspection in Perspective: Tracing its lineage and surveillance potentials," The New Transparency Project. http://www.surveillanceproject.org/files/WP_Deep_Packet_Inspection_Parsons_Jan_2008.pdf (accessed July 25, 2009).

[17] Whitfield Diffie and Susan Landau. *Privacy on the Line: The Politics of Wiretapping and Encryption (Updated and Expanded Edition)* (Cambridge, Massachusetts: The MIT Press, 2007).

[18] Even where data is "anonymized," such anonymizations have a tendency to be insufficient to secure an individual's privacy. See: Paul Ohm. "Broken Promises of Privacy: Responding to the Surprising Failure of Anonymization," University of Colorado Law Legal Studies Research Paper. <http://ssrn.com/abstract=1450006> (accessed 20 August 2009).

[19] Whitfield Diffie and Susan Landau. *Privacy on the Line: The Politics of Wiretapping and Encryption (Updated and Expanded Edition)* (Cambridge, Massachusetts: The MIT Press, 2007), 309.

[20] Bell Aliant/Bell Canada (Bell). "Telecom Public Notice CRTC 2008-19, Review of Internet management practices of Internet providers (PN 2008-19) – Comments," filed to CRTC February 23, 2009. http://www.crtc.gc.ca/public/partvii/2008/8646/c12_200815400/1029804.zip (accessed 28 June 2009). Only two of Bell's three reasons are offered, because one was filed in confidence to the CRTC.

[21] An example of "total invasion" of the body would be the body scanners that are being deployed in Western airports and are designed to see through one's clothes to give security examiners a

view of the body underneath. The body is laid bare, subject to the voyeuristic gaze of security. For more on body scanners, see EPIC's archive on the subject at

<http://epic.org/privacy/airtravel/backscatter/#profiling>

[22] The New York/Manhattan "ring of steel" security zone, as an example, aims to fully identify and track individuals that enter sensitive areas in Manhattan. This zone is being massively outfitted with surveillance cameras, with the stated aim of better securing Manhattan from future terror attacks.

[23] Paul Virilio. *The Information Bomb* (New York: Verso, 2005), 57.

[24] *Ibid.*

[25] Daniel J. Solove. *The Digital Person: Technology and Privacy in the Information Age* (New York: New York University Press, 2004).

[26] David Lyon. *Surveillance Studies: An Overview* (Malden, MA: Polity, 2007), 181-2.

[27] Immanuel Kant. *Critique of Pure Reason*, ed. Paul Guyer and Allen W. Wood (New York: Cambridge University Press, 1998), 185.

[28] For more far-ranging discussions of the "emptying" of time see Giddens' *The Consequences of Modernity*, Latour's *We Have Never Been Modern*, and Habermas's *Philosophical Discourses of Modernity*.

[29] Sherry Turkle. *Evocative Objects: Things We Think With* (Cambridge, Mass.: The MIT Press, 2007), 8.

[30] Jacques Derrida. *Specters of Marx*, ed. Peggy Kamuf (New York: Routledge Classics, 1994), 125.

[31] *Ibid.*, 29.

[32] *Ibid.*, 21.

[33] *Ibid.*, 59.

[34] While Latour insists that we actually reside within networks as non-moderns, there is an ideological or perceptive difficulty that must be overcome by moderns to recognize their non-modernity. As such, I suggest that the dominant *perception*, if not *reality*, of spatio-temporality is conceived of as aligning with the metaphysics of time born of figures such as Immanuel Kant. For

more, see Latour's *We Have Never Been Modern*.

[35] Immanuel Kant. *Political Writings*, ed. H. S. Reiss (New York: Cambridge University Press, 2002), 130.

[36] Contemporary Computer Processing Units (CPUs) are designed to limit and prevent fork bombs that are caused by bugs in code and viral attacks. Fork bombs ceaselessly create clones of pieces of code until the computer runs out of memory, in the hope that this will create a memory addressing error and cause a network/computer crash. In a well-known case, CPUs from hardware company AMD attempted to resolve fork bombs that didn't actually exist; their efforts to heal the system actually provoked computer crashes. The only solution (for that generation of processors) was to turn off that element of the CPUs' agency.

[37] Comparative tests of DPI appliances have demonstrated that even when operating in controlled networking environments, DPI appliances are unable to correctly identify and mediate all the unencrypted packets that pass through them. These results are best shown in Carsten Rossenhovel's "Peer-to-Peer Filters: Ready for Internet Prime Time?" *Internet Evolution*.

http://www.internetevolution.com/document.asp?doc_id=148803&page_number=1 (accessed October 8, 2008).

[38] While one might be tempted to respond that packet forgery, which lets individuals generate false points of origin for data broadcasts to inhibit the correlation of their encrypted actions to a single origin, would evade DPI surveillance and analysis (the equivalent of plastic surgery that lets the horrifically scarred walk around "normally" beautiful people without eliciting derisive reactions/surveillance), few people can implement this technical feat that is limited to the broadcasting, rather than receiving, of data transmissions.

Code and the Technical Provenance of Nihilism

BRADLEY BRYAN

An Invitation to Nihilism

The death of God is not obvious. It is the un-heeded event that Nietzsche claimed present in our every act of knowledge from now on, a hidden death known only to those who have come to witness it in the most unlikely of places: libraries, conferences, classrooms, bureaucracies, laboratories. Nihilism, the destiny of thought that captures this event, is not an illusion or something that comes to pass to only a few people and not others; nihilism is not black leather and believing in nothing. Nihilism is something: everything comes to nothing, in a word. And one particular word to witness the becoming-nothing of everything in the life-blood of today's human is "code." The code is the ground of the living being, and the task of what follows is to see the death of God in it.

The task of today's laboratories is to make plain and clear to sight what goes on inside the living being or molecule. The laboratory is an apparatus of technology, which is simply the *logos* of *techne* – the truth regarding technique. The technical provenance of nihilism is not found, or not only found, in the gadgets of technology, as this would give us the illusion that we stand in a relation to the gadgets that we use in an instrumental manner. Martin Heidegger's now classic meditation on technology rooted the technological in *technique* – a word that makes all attempts to come to terms with technology much more difficult, if only because the very notion of a technique seems present in every activity one might imagine. [1] The dedication to refining one's tennis technique, for example, occurs under the same sway as the striving to decode and illuminate the human

genome. To grasp the technical provenance of the code, of our “knowledge activities” in relation to the codification of the body, is also to understand the relation between nihilism and technology today. It is to see the death of God in the concerned orientation towards one’s technique, and in the anxious search for genomic codes. It is also to gather the way Heidegger properly appropriates the task of explicating nihilism from Nietzsche by sighting the flight of the gods in the halls of knowledge.

Biotechnology eschews mystery, proceeding and moving with the conviction that all things can, in principle, be explained. But this spirit, this *ethos* and vocation, needs to be embraced, soaked up, breathed, such that the *lack of clarity* to it and the entities of this world, to our very selves, becomes painfully and joyously apparent. So the “we” here is an ambiguous we – because sometimes we are the ones set upon by them, the scientists, at their disposal to be marked. Other times we are the ones who are seeking the code, our complicity in the vengeful products of biotechnology unavoidable (and even our avoidance itself can be willful). In reading Nietzsche and Heidegger, one may notice that nihilism and technique do not countenance despair, which may seem odd given that Nietzsche and Heidegger both decry the death of God as the fundamental event of Western history. To see why the appropriate response is neither hand-clapping secular giddiness nor downcast black-leather sullenness requires close attention to the way this uncanny death is manifest in the world around us. It does not take work to see why such poses are laughable; what is harder, and will take more effort, is to see what is laughable in what carries itself with such seriousness. If the code is itself nihilistic, we must attend to how, and why, and see why the code, while “true” and “real,” remains deserving of our scorn. In what follows I hope to generate some excitement about nihilism *for us*, and to do so by attending closely to just what a genetic code is – which is really only ever to ask who we are that could feasibly imagine and utter phrases about it such that we might transform ourselves in the very asking. [2] From the ordinary may spring the remarkable if we allow ourselves to travel on a journey of foreignness, and to then

come home to see how strange our home is: the advent of the strange and *unheimlich* is foreign in the sense that our own home can come to seem like a strange land to us only when we have tarried away awhile. We may never come home, but might, if we are careful and serious, find ourselves sufficiently *schadenfroh*, and even enjoy it.

Code and Legality

The code has a legal provenance. In every sense it is: a rule, a law, a command, an argument, a claim, an ethic, a creed, a protocol, a standard. It is the generalizable statement, the “what is” that lays down a girder for the building of world, as Heidegger continually noted, most presciently in the seminars he gave later in his life. [3] It is the bridge to the transcendent in the literal sense of trans- and –scend: to “step across” into a world, to bridge the human to its world. The syllogism is the operation that allows the particular, me, to imagine myself as part of the universal, the world: the way an “I” becomes present as something that acts upon the world, and is acted upon as “me.” The separation between “I” and “me” is the temporal opening accomplished by code as law (*Gesetz*) – by the encoded command that differentiates the moment of commanding and the moment of suffering the command. It will be remarked that we can distinguish kinds of rules and standards and codes and laws, that each “acts” in a different way in different settings – but this misses the point of grasping the legality that sits at the base of code: the code is the command of the not-yet, and it exists in every entelechy of code. The very idea of the digital relies on the opening of time accomplished by code: the code is thought of as real in the sense of being a *res* or thing of the world (and as such a being it manifests a presence that endures, that “has” time).

The code harbours this moment of leaving the mind and entering the world, approaching the body, comprehending the body as something that is not subject to my thoughts. As Ian Hacking has perceptively queried, it is interesting, even funny, that despite the demise of the mind-body distinction, it has had such a successful run in computer programming since the

differentiation of software from hardware instantiates the very notion of the thinking thing in the Cartesian sense. [4] Artificial Intelligence (AI) fulfills the dream of modernity not because it is human-made intelligence but because it is ostensibly a thinking thing that is the ground of its own thoughts precisely because its self-legislating ground is in a readable code, a *principle of sufficient reason*. And yet it is claimed that AI is not aiming at system autonomy in the sense of being self-originating, but rather autonomy in the sense of a receptivity that can ground its reactivity to the conditions of world: the AI-being “transcends” and “makes a difference.” Its execution of protocols and commands, the being of artificial intelligence, is legislating and in this sense is already something other than the human.

The rhetorical analysis contemplated here, of what the words / commands / symbols themselves “are” in what they “do,” of what happens in this speaking, is a kind of linguistic phenomenology, if one permits that speaking words is language (an admitted leap). In what follows I begin by wondering at the kind of being that would be hailed by the phrases and commands of biotechnology’s codes, to look and listen closely to the legality that belongs to the code, to lay out its temporal orientation and the vengeful origins it harbours, and to see how the vengeful heritage of the code belongs to what Heidegger calls “the sway of technique.” The hailing of the code is nihilistic precisely because of its legal heritage, of the grounding of the code as an expression of the will to power, a will that exhausts itself in a rage against time. Nihilism’s presence can be shown in more than simply the disenchantment that the code (as *Gesetz*) holds, as prophesied by Nietzsche; it can be shown to reside in the way all beings in the world stand to be revealed as available to cognition, fungible and exchangeable in their identity, and ready to be put at the disposal of the human. That the world of things stands ready to be revealed as encoded tells us that the sway of technique is always already at work: technique is now the way the real is revealed, as “enframing,” *Ge-stell*, requires that the being of all beings is thinkable as stock, as *Bestand*.

Code is a metaphor in all the ways that Orwell loves

metaphors – it is not just *catachresis* (as in “the tongue of the shoe”), or abuse (as in “the kiss of conscience”). It is a metaphor that lacks a referent, but is itself somehow *more* telling than the thing to which it refers, and remains truly telling only if we hold its metaphorical status clearly in view. Nietzsche reminds us to not worry about metaphor and its referents because all language comes to pass through metaphor. [5] If we focus on referents we forget the experience, the event, that the word itself holds and must be (which, he shows by way of *The Genealogy of Morals*, is not to posit an origin, but to bring to light a condition of the word’s possibility). The import of the code’s metaphorical status is that all codes are *prima facie sayings*, and in the saying, they are a doing – or, at least, this is the self-understanding of science and knowledge about codes: they do by saying.

The idea that a “saying is a doing” predates J.L. Austin, and can in some sense be traced to Hobbesian nominalism, that the act of naming is itself the Sovereign moment. But it is also a Kantian moment, in that all saying is a *pre*-disposing of the will. That is, every time the will wills it does so by orienting itself by way of a possible maxim; every act has a maxim for Kant, and this maxim is coterminous with the will itself. For Kant, the will actually only ever wills itself in all willing, since, true to his Lutheran roots, he held that the will can not be said to effect that which it desires to effect. And so when the will wills, it only ever wills itself as the kind of being that would do what it claims. For example, were I to lift a cup of coffee to have a sip, I do not in fact will it in the sense of producing the event. I aim to do so only by ensuring that I am the kind of person that could do something, and as such *bring myself into being as that will*. The principle of autonomy, that I am a self-legislating being, assures that I am also limited by my very self-causing in that I cannot cause anything else. I lie before me as the kind of being revealed by the maxims I propound – or I do so as Kant would have it. This trajectory of “bringing into being” through a maxim is reincarnated in Habermas’s grounding of the ideal speech situation (the foundation of his “discourse ethics” of later years) in the notion that speech only occurs when something remains to be said. [6]

That we seek agreement, that we aspire to an ideal situation, is possible *only* if we presume that all saying proceeds because it needs to be said – is called forth into the world to make itself heard, as it were. Consistent with every understanding of truth and justice in the West since Antiquity, justice is only ever brought into being at the behest of the spoken. The transformative power of the saying is what underlies Gregory Bateson's social ecology. Bateson's challenge to cybernetics occurs at the very level of information as "news of a difference": that information is only ever information insofar as it brings with it some "news" that is in some way not identical with everything that has come before. [7] It turns up as information only because we notice it as differing and in some way required. In each of these, from Hobbes to Bateson, the saying that a code could be is marked by a movement from non-being into being by way of a saying. Saying is a doing, and it is a doing that brings something into being, that accomplishes something. But this shows temporality: the very idea that every saying must also presume some consequence as problem that supervenes upon saying as such is plagued by the *ressentiment* and rage against time that Nietzsche prophesied as belonging to codes as such. And so we see that the problem of nihilism can properly reside with the code only because the latter holds the particular temporal orientation grounded at its core by a saying that is also a willing. This temporal orientation of code holds us to "world".

Nietzsche demurs, knowing how hard it is to say anything at all, anything worth saying, or anything *new*. But Nietzsche's own novelty stems from being the first to see that our sayings of beings were all doings, and that they are doings that *project* a temporal orientation that seeks to redeem the present from the suffering it occasions. Nietzsche is the first to see that the problem of existence is the problem of enduring through time – and here Heidegger is in his debt. *Ressentiment* is the rage against time, the drive to discover being and the being of freedom so that we can hold someone (or something) to account for the vicissitudes of time. Indeed, Nietzsche's diagnosis of Kantian freedom as vengeful was not an act of refutation but simply a

frank demand that we be honest about what our philosophical queries about freedom entail. He notes that we seek freedom not because we wonder why or if we are free, but simply to be able to hold someone responsible for suffering, as though it were caused or occasioned by an agent. This “finding” of Kant’s is knowingly put forth by Kant himself as a practical but incomprehensible necessity: we cannot understand freedom itself but can understand the practical necessity of it, since we could have nothing like morality without it. Nietzsche agrees (though demanding that we confront the question of morality’s purpose). And so freedom, the being of the self-legislating agent in its very moments of maxim production, is posited so that we can stand in a relation of judgment with respect to the things that befall us in existence. The power of judgment is contained in simple saying. [8]

An easy notion to imagine psychologically, tougher existentially: *ressentiment*. It names “resentment,” and its manifestation is in the act it imagines: getting even. Revenge only occurs because of resentment, but the human, as human, is not-yet-human until its resentment turns into revenge: it is revenge that brings the beast to humanity, and makes it human. We must not imagine resentment and revenge as distinct emotions or parts of the life of the human; rather, they are constitutive: they are found in every moment of thinking and willing. It is inconceivable for Nietzsche to imagine the human *without* revenge. The great crime, even the great treason, of the human is to exact revenge on the masters, to subdue them by *holding them accountable for the suffering they occasion*. Only a free human can be responsible through time for what it does; to be free is to stake one’s very being as security for its actions in time, punishment and its exaction make no sense otherwise (“... to breed an animal with the right to make promises...”). Indeed, the realm of the true is not possible without the sublime revenge that is carried out at the birth of the human. The birth of the human is the great crime, and it presupposes a law – which the human subsequently erects. In order to make sense of suffering, the slave (the human), whom we all are, posits an unchanging

world over-against the world of flux, and it posits a will that can separate itself in time – separate its own commands and obediences: the birth of language, of code, of semiotic exchange. To say, and then to do, requires a will that separates in time, *that is time*. [9] *Ressentiment's* revenge is the rage against time, is the veritable attempt to bend time to our will. Nietzsche diagnoses Kantian freedom as the very way we carry this out: the will that must understand itself as standing behind all of our reasons – that it is reason itself, co-terminous with freedom. The transcendental apperception, the “I think that I think,” is nothing other than the principle of sufficient reason, the code of all codes.

But with nihilism, the code of codes becomes cynical in itself, yet cunning – and so it departs the mind and moves into the body. The code goes cellular. And we nihilists become suspicious of codification.

Meanwhile... the Event of Epistemology

The active thinking subject is something achieved with perhaps the most tremendous Earth-shaking event of modernity: the advent of Epistemology: the presumption that all things are cognizable in principle. This both underlies and is the being of the code (the sense of “both underlies and is” should become clear shortly, for “where” is the code?). To say that this is an event at all, however, is to name the transformation of the beings of the world into beings of knowledge, beings articulable for knowing. The very being of a code is as this in-between moment – of the translation of the truth of a being (the *logos* of *ontos*) into a truth of knowledge (the *logos* of *episteme*). But the transformation is not simply this act of translation: it is the presumption that the truth of knowledge is prior to and is what grounds the truth of a being. “All beings are in principle cognizable,” that is to say that all beings are in principle reducible to the coded articulation that allows their being to be grasped as it is. The rise of positivism does not change this basic orientation. And even though the critique of epistemology began shortly after Kant in Marburg and Jena, it has not changed the radical sense of the event of knowledge. When Kant noticed that

the subject must (if there is to be reflexive understanding at all) be presumed in all thinking, epistemology's priority was assured. [10] This is true despite whether Kant was aiming at an epistemological or metaphysical account, or whether he was engaged in a critical or foundational exercise – for it is the point of necessity (“must”) that secured the position of the subject. Thus, while Heidegger carefully shows how Kant's critique is a metaphysical and not epistemological exercise, it does not change the fact that what is shown in Kant's metaphysics allows for the security of the knowing subject, a transformation all the more ironic when Kant's Lutheran Pietist heritage would suggest that there is very little that a rational being can “know.”

The code itself, then, marks the shift from ontology to epistemology, that is the question of being becomes the question of how we know (“what” becomes “how”). The radical import of Cartesian doubt becomes apparent only when we allow that nothing can be the case unless the thinking subject can know it, which is to say can be certain of it – or free from doubt. It is the moment of Cartesian certainty, coupled with Kant's qualification of what belongs to the understanding (or “intellect,” as Arendt would translate *Verstand*), that accomplishes the shift from beings to knowledge, and in so doing makes impossible a return to ontology. It also leads, seemingly inevitably, to a couple of other events: to the transformation of time that Kant accomplishes, and to an eradication of the possibility of a ground apart from the will that can assure itself of such a ground. (Recall that with Kant time becomes a condition of the possibility of the thinking subject and not an Aristotelian feature of the universe.) So what is the code? The commanding grounding, the code is the “making-cognizable” of anything in particular and everything in principle. [11] The megalomania and insipidity of this stance – underlying *all* thinking in biotechnology – should invited derision.

And yet, how is the code implicated in this story of stories? What is happening when we *seek* codes, when we say *there is* a code, when we *speak* the code, or let it “be read and executed”? The code is something that the human must impose

by “finding” its necessity at every moment: it thus materializes from the darkness of our revenge (a darkness present not because of anything foreboding or frightening but present simply by dint of what is unseen). Here too we are told of the ambiguous transformation of the numinous into data as mathematical abstractions: it is said that mathematics serves to render the formless and unintelligible ready and apparent; or it is said that mathematics serves to make present abstractions of mind. Either way, the proposed realism of mathematical objects becomes entirely irrelevant because it begs the question, again, of why the search for such objects and the rules that condition their “reality” are sought. But in this mathematics can be seen simply as the search for conditions, descriptions, rules – or, codes in the wide sense suggested here. The code is the moment of information, of something new, as that which makes a difference for us, and as such is an opening of time. And as we find this opening of time, the nihilistic heritage of code becomes more apparent, easier to see in the ordinary fetishism of code. We might ask why we ever imagined that our encounters could make “more sense” because of the comprehension of the code, the law. But this takes the code to be more illusory than its presence suggest. We are not “duped” into “believing” in a code that “is not there.” To think of it this way is to fall into the problem of belief, or of a mistaken epistemological procedure – such that we might repair our orientation to such “objects.” Let us follow Husserl in approaching the code as a way to unravel how nihilism and technique continue to haunt us through the inevitable appearance of the code. In what way does the code “appear” when we speak it? How is it that the code seems to “be there”? Where is this code that everyone is talking about? There are four particular moments, from the most recent to those that come before. These moments are implicit in the way the code comes to presence in the beings around us, and the way their conditions of intelligibility are immanently bound to their presence: (i) the interpretation of the physical structure as “bearing” its code; (ii) the prior moment of sighting and naming of the code from its physical structure; (iii) the prior moment of divining presence in

an intense measure of variability; and first and perhaps foremost (iv) the anonymous profile that renders the search for code sensible in the first place.

i. Physical Structure

The genetic code is often “seen” in its physical structure, that is in its actual double helix moment, as though something to be sought and found as a physical code, as the raw data waiting to be marshaled into and expressed as information. It sits, latent, until called upon, unzipped, specified and enacted. In this sense the mechanistic aspect of the code is apparent, much like parts in a switch, a machine, or device; much like a part of a carburetor in a car – doing what it is called upon to do when gasoline and air cross it, coming forth and carrying out what their physical structure portends. DNA, as code, does not command like the commander, but rather is simply the command itself that awaits being executed, much like the statutes in a book of legislation going to work in the breach of a law. [12] The genetic command thus is thought to exist as the encoded physical structure that emerges both from and with its physicality from a moment of perceived latency. It comes to presence when called forth into the moment of visibility, from which one divines its prior existence as the latent yet existent code inscribed into, and identical with, the very physical structure of the molecule. Its latency is, must be, presumed if the living being could be said to unfold in its particularly encoded way.

And so Hegel’s question of the presence of *Geist* is the same question regarding the position of code: “Where is the law?” Like positive law, the law that prohibits murder is present in each room, at every moment, despite no murder taking place; and yet the law itself only goes to work, becomes what it is, in the breach of it – when crime itself takes place. But where is it? It cannot be seen or touched, even if we simply utter it. Hegel notes that the law only goes to work in its breach or abrogation, which is to say that the law itself is never properly present until the situation that calls it forth is manifest. But what “is” the situation that becomes manifest? How “is” this situation one that “calls

forth” the law, or evidences or shows the law? What is shown in the showing of the law? DNA sits in its latency and is called forth because the exigencies of a situation have made this moment necessary, the moment when DNA will unzip and begin to instruct the process of protein production – “the building blocks of life”. The juridical tenor of these metaphors will not go unnoticed, and yet they are challenging precisely because it is not clear to what they refer. This ambiguity thus demands a solicitude and sorrow for language as it comes to us in speech, in the moment in which something is simultaneously sighted and named. But our sorrow falters and alters if it becomes despair or melancholic, finding no way out (“What have we to do with refutation!”). Our sorrow finds its true wings in mockery, just as Hegel once thought tragedy was resolved in comedy.

ii. Sighting and Naming

To Hobbes and other nominalists, the moment of being is the moment in which something is named: nominalism describes the radical act of ordering by setting valences, an ordering that presumes to require, and thus includes, a prior moment of “sighting” accomplished in some sense with every naming. In setting a valence we *see as*: we see the physical structure *as* a code, and in seeing it as a code can understand the being of the physical structure as something other than its code, can indeed imagine it. With what might be more appropriately called “genetic interpretation,” the “marks” or “bumps” of a physical structure are approached and seen as “factors,” as actual “moments” in the transformation of a being from one state through to the next – in a way that allows us to assign responsibility for change through time, or for continuity, by describing the code that makes such change real by being understandable (epistemology as prior to ontology). In this seemingly backward activity of naming and sighting, the reason why something became and is *as* it is also becomes apparent: *ressentiment*. But let us be clear about how the genetic code uncouples sighting and naming as though they are separate acts not joined in an inescapable hermeneutic circle; let us sight and

name this sighting and naming.

In much science, the way genetic codes are spoken of is in the form of *the primer*. The primer reports on knowledge. The report – that which brings sighting and naming, the way of *seeing as* – contains a number of literal things; if we can train our eye and ear, we will see that *primers are everywhere*. Notice what is said to happen (and what happens to us) in this primer given by Susan Aldridge:

Take a large onion and chop finely. Place the pieces in a medium-sized casserole dish. Now mix ten tablespoons of washing-up liquid with a tablespoon of salt, and make up to two pints with water. Add about a quarter of this mixture to the onion and cook in a bain-marie in a very cool oven for five minutes, stirring frequently, and liquidize at high speed for just five seconds. Now strain the mixture and add a few drops of fresh pineapple juice to the strained liquid, mixing well. Pour into a long chilled glass and finish off by dribbling ice-cold alcohol (vodka will do) down the side so that it floats on top of the mixture. Wait a few minutes and watch cloudiness form where the two layers meet. Now lower a swizzle stick into the cocktail and carefully hook up the cloudy material. It should collapse into a web of fibres that you can pull out of the glass. This is DNA (short for deoxyribonucleic acid). DNA is the stuff that genes are made of... DNA is just a chemical – not a more complex entity like a chromosome or a cell – and it is only in a biological context that it acquires its status as the molecular signature of an organism. [13]

We become subjects who respond to the code that lies “in there.” A simple recipe, a series of motions of our hand among the things that lie ready to our grasp – *et voilà*: DNA! We might marvel at

the simplicity of this, but also notice the key moment where “a web of fibres” is sighted / named, and we are told to see it *as* DNA. “This is DNA.”

The statistical activities that underlie the identification of beings reported on in the primer lay hidden, and the veritable creation of the subject happens in its words (as Althusser would call it, the way we become apparent *as subjects* in the very hailing of biotechnology). The sighting and naming given is a simple report on the “way of the world.” It is a saying that presumes something remains to be said; it is news of a difference: the report on knowledge presents a disjuncture of history while also presaging its continuity. The something that is said in the primer, that remains to be said, has been made manifest, says that now things are different, even if it simply confirms everything. But its confirmation places us in a new place, a different one. In biotechnology’s primer one finds a reporting that tells us of a physical proximity, of scouring the physical structure for signs: the realities of aspects of the living being are *physically approached* by someone. They are “labeled,” “marked,” and “manipulated” – and these notions of physically approaching are to provide a moment when the underlying (hitherto invisible) structure can be *seen*, and in being seen, interpreted as visible by the signs that point to “what’s there.” Notice how the same manner of speaking in the primer just cited is also present in the following description taken from a more sophisticated textbook in molecular biology, the text most cited as the touchstone reference for how DNA molecules in fact work.

Two procedures are widely used to label isolated DNA molecules. In the first method a DNA polymerase copies the DNA in the presence of nucleotides that are either radioactive (usually labeled with ^{32}P) or chemically tagged. In this way “DNA probes” containing many labeled nucleotides can be produced for nucleic acid hybridization reactions. The second procedure uses the bacteriophage enzyme polynucleotide

kinase to transfer a single ^{32}P -labeled phosphate from ATP to the 5' end of each DNA chain. Because only one ^{32}P atom is incorporated by the kinase into each DNA strand, the DNA molecules labeled in this way are often not radioactive enough to be used as DNA probes; because they are labeled at only one end, however, they have been invaluable for other applications including DNA footprinting, as we will shortly see. [14]

This text would be studied by undergraduate science students in their third or fourth year, and thus serves different purposes than Aldridge's recipe. Still, the description itself concerns how to spot and identify DNA molecules: it tells us what is known by others and invites us to sight / name as well, to share in a moment of vengeful causality-seeking. Again, the task here is not to assess these as claims, but to look at the manner of discourse. *This manner* is itself the mode of reporting what has been "found." The act of reporting, of *needing – positively needing – to say what is seen* marks a critical moment in shifting from what beings are to how they are known (a fleshy reaction to time). Notice that when we look at the other reports on knowledge by researchers, non-primers as it were, we are taken not into reporting as though an event was witnessed, but of a method carried out and executed – *one that still must collapse sighting and naming into the singular act of reporting*. The method involves the statistical probability of carrying out the activity of "marking" bumps, fissures, boxes, setting these valences for markings, and sighting what is marked *as* what is named. The non-primer daylight its statistical method as the way the being can be found / named as what it is. This shows both the epistemological moment, but also holds its resentful longing – in the idea that the world's bodies *must* disclose the sort of coded pattern one aims to find.

iii. Variance and Measure

But how does a statistical apparatus "find" what it finds?

What kind of speaking, sighting and naming is carried out in the statistical statement? And what does it purport to find? The radicalism of Darwin is apparent here: we replace the differentiation of types and kinds in the natural world with a variation among each discrete being. That is, with Darwin, the living world becomes continuous and differs according to traits not species, which themselves differ according to the situations that would call them forth. The notion of statistic relies on being able to approach variation, not difference, with measure (which is what Mendel brings with factorial analysis). But this idea of measure is simply the statistical interpretation of what is probable stated in terms of degrees of belief, i.e. the transformation of the being of difference in the world into a being of knowledge. Let us look at how statistical analysis is linked to the being of the code, becoming an epistemological moment of sighting and naming.

Statistical thinking relies on the Kantian shift to the subject – without which probability in the modern sense would be impossible. Laplace, that staunch Kantian, recognized that the principle of probability was not simply “games of chance” or a world of chaos and unfolding, of change. The principle of probability, following in the wake of the re-placing of time, lay as a condition of the knowing subject, and God no longer a necessary hypothesis. The notion of the overturning of time, of the subject that makes sense of time as a condition of itself, while happening with Kant, is made manifest with Laplace’s work on probability and indifference. The “indifference principle” sets out a remarkable argument for thinking about truthfulness in probability not in terms of objectivity but rather in *indifference* – which underlies “degrees of confidence” or “degrees of belief” in statistical analysis. The way that statistical inferences work to produce regularities seems to involve no precise moment of discovery, nor does it seem to have the trappings of bare creation precisely because its organizing principle, Laplace’s indifference principle, sets the human as the source of valuing claims. That is, the degree of likelihood of an event (of the appearance of a coded being, for instance) is characterized in the degree to which one can be assured of the probability of its occurrence. The event’s

occurrence is contingent upon the grasp of its likelihood – whether it is *believable*, whether one could, or should, assure oneself of this likelihood and accept it: “and with that we are on moral ground!” [15]

Statistical inferences in genetics are attributed in two distinct ways, mapping on to the two ways these inferences are often understood. Probabilistic inferences express both a relative frequency and the degree of belief of the occurrence of an event. Rates of coin tossing are said to be expressions of the former; wagers or expressions of likelihood *based on* statistical probabilities reflect degrees of belief. [16] It might seem that the statistical probability of an event’s occurrence, rather than degree of belief, is more quantifiable and hence reliable, but genetics uses both statistical probabilities and various forms for testing confidence (as degrees of belief) at the same time in generating its “facts.”[17] While formally it seems easy to separate the objective likelihood of an event and the degree of belief one might have with regard to its occurrence, it is less clear to grasp how a statement of “fact” (e.g. the percentage chance of precipitation, the chance of tossing ten heads in a row) is not also at the same time reducible to a subjective state (e.g. a 60% chance of precipitation is also saying I am 60% sure that it will rain). [18]

The discrepancy between objective and subjective statements of probability is usually managed by focusing on the structure of the elements of an “objective” situation like tossing a coin. Because a coin has two sides, the chance of tossing heads is $\frac{1}{2}$, or 50%. That is to say, the probability of heads (as against tails) is equal in the likelihood that it will occur. *But it is clear that only one of those events will occur* – and with perfect knowledge we would say that its likelihood is 100%. Of course only one of the two events will occur – and will definitely occur. It will not occur with *certainty*, however. That is, I cannot *be* certain it will. And thus to say that something has an equal chance of occurring, while seemingly an accurate portrayal of the likelihood of an event, actually only gives us a statement about the certainty with which one of the two probabilities will occur,

only a degree of possible belief. Laplace formulated this as what came to be known as the indifference principle. [19] A theory of chance will reduce “all the events of the same kind to a certain number of cases equally possible, that is to say, to such as *we may be equally undecided* about in regard to their existence, and in determining the number of cases favorable to the event whose probability is sought.”[20] With the indifference principle we are not relying upon the “true features” of reality in order to come up with a relation that somehow exists there, but rather have a way of structuring the kinds of expectations generated regarding a future event. Indeed, “indifference” tells us that our expectations have been signaled and equalized, that we could not (or ought not to) care less about the actual structure of the universe, and in fact are setting valences to grasp the possibilities we divine. The main reason there is any debate at all over the objective and subjective features of these situations is because there are those who would like to maintain that it is an objective feature of the temporal structure of world that there exists a $\frac{1}{2}$ chance of throwing a heads, or a $\frac{1}{2}$ chance of a baby being a boy – and with that we come to understand that perhaps there is much more involved in the question than objectivity or subjectivity, perhaps something involving the deep desire to see chance tamed in an expression of probable outcomes. [21] It marks an important shift in temporality, and it occurs in the shift from ontology to epistemology that belongs to nihilism: it presents the shift from Aristotelian time to Kantian time, such that time becomes a condition of the possibility of the subject, and in so becoming “reduces” events to the human understanding of those events *qua* one’s relative expectations and certainties about them. If it is the case that the code’s expression is a statistical expression of the likelihood of what is expected rather than any actual, physical code that sits in each of us like a legal command – how exactly does the statistical apparatus go to work in assigning the valences it finds?

If what we say here is appropriate, then the code is nothing other than our own latent slide to subjectivism, to embody the notion that the human is the measure of all things.

The slide to subjectivism can be seen in the formation of genetic profiles, assemblages of information that build limited personas. Witnessing this slide in the specifically statistical way that profiles are formed, the critical and in a sense foundational role of the profile brings us full circle to the emptiness of the liberal subject, to the haunting absence at the core of contemporary life, to the death of God and the increasing gadgetization of the human under the sway of technique. While the code is sought using statistical techniques, it is the profile that actually generates code, and yet this profile is not grounded in any particular real being at all.

iv. The Code that fits the Profile

Baudrillard's edifying work should not be lost on us here: there is nothing beyond these codes, these signs and symbols, and our experience of these codes is of a simulated existence, not of any deeper reality. [22] Thus the code's existence is not simply found like an object (it is, in this restricted way, not "real"), but exists in relation to every other code, is read according to every other code. The profile simulates the human, thus instantiating it through its genomic codes. Indeed, the articulation and figuring of the code involves both intensive correlation with events, as well as cross-correlating with other genetic strands. The compilation of the "genome" occurs through a correlation that is not "read" against any "original" code or genomic information. The question "where is the code?" turns out to be a good one. The structure cannot be "read" on its own, and so needs a Rosetta stone of sorts – some kind of transcription device that allows for code segments to be "read" and "interpreted." This profile, this empty human subject at the core of the Human Genome Project, is assembled in much the same way as the liberal subject described by Wendy Brown in her incisive *States of Injury*. [23] Let us look at what is "human" about the Human Genome Project.

When the original researchers sought to "assemble" the Human Genome, the key problem, the only real problem statistically speaking, involved representation: how could "we"

be sure that the resultant genome would be sufficiently representative of what is called “human”? The first few builds of the human genome (build 1.0 and 1.1 – as though no different from software) attracted the very criticism the folks at the Human Genome Project (HGP) sought to avoid: the Human Diversity Genome Project (HDGP) posed its main task as demonstrating the way the HGP was necessarily insufficient because it did not adequately reflect the wide diversity of humanity. This criticism turned out to be vital to the project itself, in that it increased the statistical relevance of “diverse” inputs. The project was further besotted with its dream of pure representation when it learned that one of the primary leaders of the project, Craig Venter, had put some of his own DNA into the sample material. Beyond the bad taste that it seems to show (“Craig Venter dreams of his immortality in the Human Genome itself”), the challenge it poses goes to the heart of representation: the human genome, when sequenced, could only be said to be fully representative, if the sample size itself was sufficiently broad such that it would not matter whose DNA is “put in.” More poignantly, if the human genome, when sequenced, could meet the challenge posed by the HDGP, *then the human genome could properly be said to represent no particular human too closely, and thus represent every single human.* While the sample size can always grow, can always in principle “accept more,” the ideal of pure representation is equally unachievable in principle. And yet the point of the profile is to generalize “sufficiently” away from our particularities, but in a manner that would allow us to approach our particularities. The power of the human genome lays in precisely the fact that it represents no one in particular, while claiming that every single human being stands in relation to it in principle by being “human.”

The human genome reference sequences do not represent any one person’s genome. Rather, they serve as a starting point for broad comparisons across humanity. The knowledge obtained is applicable to everyone because all humans share

the same basic set of genes and genomic regulatory regions that control the development and maintenance of their biological structures and processes. In the international public-sector Human Genome Project (HGP), researchers collected blood (female) or sperm (male) samples from a large number of donors. Only a few of many collected samples were processed as DNA resources. Thus the donor identities were protected so neither donors nor scientists could know whose DNA was sequenced. DNA clones from many different libraries were used in the overall project... In the Celera Genomics private-sector project, DNAs from a few different genomes were mixed up and processed for sequencing. The DNA resources used for these studies came from anonymous donors of European, African, American (North, Central, South), and Asian ancestry. The lead scientist of Celera Genomics at that time, Craig Venter, has since acknowledged that his DNA was one of those in the pool. [24]

There is a difficult tension at the heart of this. The DNA represents “no one” and yet was taken from particular individuals – ostensibly in a way that allows the human beings to be representative, for any “human” to be an example of all others. But as soon as we ask the question of representation as though it were mere repetition, we are mired in the difficulty of what it means to demand that a single source of DNA, as with a single human being, be “representative.” In some sense, it is demanded that the human must be representative, since particular individuals are canvassed for sample material for this formative profile. In the case of “blending” the DNA with others to achieve a kind of representative – then we move closer to attempting an “average,” and the question of sample becomes relevant. Here, the way the sample is rendered representative is *by anonymizing* the data. That Craig Venter’s DNA was used can only be an

argument against the representativeness of the specific sample only if a sample is, in principle, itself sufficient for the formation of representative profiles. But this begs the question of inclusion and of how to decide whom to include. And what if the sample somehow included everyone – it is still no one in particular, as with Borges' mythological map that is exactly to scale yet remains still a map. [25] And yet we take our bearings from the profile and not from everyone. (It is thus not interesting but telling that the question of ensuring comprehensiveness of sample was sought along lines of continental ancestry.)

This new profile, the human genome, takes us beyond the Platonic *idea* and *eidos* of the human: it is assembled with reference to every single possibility for being human as “found” in the genome itself. Now when it is said to be “found” in the genome, there emerges the obvious problem of “reading” the genome in absence of an understanding of the “language” it houses. Because there is no Rosetta stone that would allow transcription, *the biotechnologist must also design the device for transcribing the information that genes hold*. To do this, the biotechnologist turns to the alternative language that we already hold, the language that Mendel began with in inferring (with induction) the possibilities present in phenotypes – in the observable traits – and these are drawn from experience itself. The biotechnologist will look to “biomarkers”: the little boxes on the forms given to those who supply DNA, boxes with names like “gender,” “race,” and “ethnicity.” The possibilities for these biomarkers are as endless as experience itself, and the value we set upon as a biomarker that will disclose the gene as its cause is caught up in the activity of evaluating itself – a circle that pretends to be a ground – the very nihilistic exercise of resentment with which we began. Thus the quest for the gene that *causes* colon cancer, for example, begins with the biomarker and ends with the correlated gene only if we admit of the original temporal orientation towards the beings of this world as ordered and knowable in a particular way in advance. By so deigning, the human discloses itself as working out its nihilistic heritage towards and through the sway that the technical has over our

mental workings.

We do not design these truths, but are caught in seeing the real as revealed to us this way, such that the movement to and away from code cannot simply be laid at biotechnology's door, for it is liberalism's heritage as well. Wendy Brown's deep critique of the liberal self shows us that *the self at the core of liberalism is the same empty being as the human genome-build*. As Brown shows, the liberal state works against the possibility of harm or injury insofar as it attracts to who we are rather than simply what we do: if I suffer injury on the basis of my identity as a woman or person of colour, then the liberal state will work to vacate that which causes the injury because who I am has no basis for what I do. The liberal state's devotion to toleration is the same devotion that the HGP has to pure representation: if any particular state action discriminates against or favours one segment of our diverse population, then it cannot be said to have been open, equal, and "representative" (in Mill's sense). Thus the liberal self is an empty self that cannot in principle represent any one person or group too closely or it attracts the criticism of those who do not see themselves in it. This drive to inclusion, Brown shows, rests in the resentful drive to hold something and someone accountable – and in being so held the liberal state draws its power. The scientific projection of code manifest in the human genome derives power from every single one of us in the same way.

To Conclude: Turning away from the code...

... is not possible. For this is the way we are called upon to speak now, to think of these codes as somehow in us, constituting us, and at our disposal. What sense could our refusal to speak the vocabularies of code possibly have, specifically when the "truths" of code come to appearance in the hailings such as cancer, mortality rates, and longevity? The moment of completed nihilism for Nietzsche is when a "transvaluation" becomes possible; but as nihilism's consequences draw us to them, we see not the possibility of a "transvaluation" but of the implication of our willfulness into the very way what is revealed

to us stands there in the way that it seems to: as stock (*Bestand*) for our liberalized dreams. The technical is only ever a way of revealing, but it is a way of revealing that makes all others seem “untrue” or, worse, contingent upon a “worldview” or “perspective” (taking us into nihilism once more). The technical heritage of nihilism requires that the intense willfulness that lies at the base of our thinking – of the epistemological overturning of ontology – is *not* at our disposal to “revalue.” And so the turn from the code is not possible (at least not willfully), even though we may seek to live in an age of technique without letting all things slip into its mode of revealing. But such “letting” sounds personal, panic-stricken, isolated, and idiosyncratic – not that we crave a system. *The exciting moment is now*: we can see the tense difficulty of living in an age of genetic code, of “accepting” the way it is put to us and even believing it, while recognizing we have no grounds for doing so, that being caught in an age of technique and nihilism allows, authorizes, even encourages us to see the ultra-serious moneyed genomes as *farcical*, vain, short-sighted, distracted, and not wise enough to be melancholic. The exciting time for nihilism is when our thinking about the technical provenance of the code, such as it seems to be present to our thinking continually, *invites our mockery*. “For what have we to do with refutation!”

Notes

[1] It is important to note the consistent mistranslation of *technik* in the English versions of Heidegger’s essay: he clearly distinguishes technology as simply belonging to the technical and what presences under the sway of technique. Nowhere does he actually speak of technology as such. The import of this mistranslation is that we make the challenge of thinking through technology easier by imagining it as a sub-field akin to applied science, rather than as a focus of everything from basketball to baking. The essay itself, <<Die Frage Nach dem Technik>> is known in English as “The Question Concerning Technology,” *The Question Concerning Technology and Other Essays*, trans.

William Lovitt (San Francisco: Harper Collins, 1977). Hereafter I translate *technik* as “technique” and *technische* as “technical” rather than “technology” and “technological” as Lovitt has.

[2] A similar sentiment is voiced by Gianni Vattimo in his exceedingly clear “An Apology for Nihilism” *The End of Modernity*, trans. J. Snyder (Baltimore: Johns Hopkins University Press, 1992).

[3] Martin Heidegger, *Zollikon Seminars*, trans. F. Mayr and R. Askay (Chicago: Northwestern University Press, 2001), 36ff.

[4] Ian Hacking, “The Cartesian Vision Fulfilled: Analogue Bodies and Digital Minds” *Interdisciplinary Science Reviews* 30 (2005), 153-66.

[5] Friedrich Nietzsche, “Truth and Lie in an Extra-Moral Sense” *The Portable Nietzsche*, trans. W. Kaufmann (New York: Viking, 1976).

[6] See Jürgen Habermas, *Legitimation Crisis*, trans. T. McCarthy (Boston: Beacon Press, 1971), 107-08.

[7] Gregory Bateson, *Steps to an Ecology of Mind* (Chicago: University of Chicago Press, 2000), 460.

[8] Philippe Nonet, “Judgement” (1995) 48 *Vand. L. Rev.* 987.

[9] This is Kant’s formulation of the will: see the final paragraph of Kant’s *The Groundwork of the Metaphysics of Morals*, trans. M. Gregor (Cambridge: Cambridge University Press, 1998); and Nietzsche’s clarification in *Beyond Good and Evil*, trans. W. Kaufmann (New York: Random House, 1966), s. 11.

[10] See Martin Heidegger, *Kant and the Problem of Metaphysics*, trans. R. Taft (Bloomington, IN: Indiana University Press, 1990); and Gadamer’s careful historical discussion of what happened after Kant in “Kant and the Hermeneutical Turn” in *Heidegger’s Ways*, trans. J.W. Stanley (New York: SUNY Press, 1994), 49-60; and Charles Taylor, “Overcoming Epistemology” *Philosophical Arguments* (Cambridge, MA: Harvard University Press, 1995).

[11] This Deleuze and Guattari helpfully note how coding, overcoding, and decoding are implicated within each other: Gilles Deleuze and Felix Guattari, *Anti-Oedipus: Capitalism and Schizophrenia*. R. Hurley, M. Seem, H.R. Lane trans.

(Minneapolis, MN: University of Minnesota Press, 1983), 240ff.

[12] Hegel understood the being of law in this way, i.e. in its going-to-work (*Wirklichkeit*) in the breach: G.W.F. Hegel, *Elements of the Philosophy of Right*, trans. Allen Wood (Cambridge: Cambridge University Press, 1991), s. 94-96.

[13] Susan Aldridge, "DNA is life's blueprint" *The Thread of Life: The Story of Genes and Genetic Engineering* (Cambridge: Cambridge University Press, 1996), 3.

[14] Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, and Peter Walter, *The Molecular Biology of the Cell*, 4th ed. (New York: Garland Science, 2002), 491.

[15] F. Nietzsche, *The Gay Science*, trans. W. Kaufmann (New York: Vintage, 1974), s. 344.

[16] M.G. Bulmer, *Principles of Statistics* (New York: Dover, 1979 [1967]), 6-7.

[17] The difference between frequencies and beliefs comes to the fore to solve the "jury problem." That is, there is a clear distinction between the probability of something occurring (its chance) and the reason we have for thinking the event did or will take place. The "jury problem" concerned how to design a jury that took account of the possible variations of conviction rates given juries of differing sizes. Cf. Ian Hacking, *Taming of Chance* (Cambridge: Cambridge University Press, 1981), 98.

[18] Ian Hacking, *The Logic of Statistical Inference* (Cambridge: Cambridge University Press, 1965), ch. 5; J.R. Lucas, *The Concept of Probability* (Oxford: Clarendon Press, 1970), 13-21; M.G. Bulmer, *Principles of Statistics*, 5-11; Richard von Mises, *Probability, Statistics, and Truth* (New York: Dover, 1981 [1957]), 75-6. Compare the foundationalist moves made, more generally, in Rudolf Carnap, *The Logical Foundations of Probability* (Chicago: University of Chicago Press, 1962), and the attempt at the qualification of this in E.A. Burt, *The Metaphysical Foundations of the Modern Physical Sciences*. (Atlantic Highlands, NJ: Humanities Press, 1980).

[19] Pierre Simon, Marquis de Laplace, *A Philosophical Essay on Probabilities*, trans. F.W. Truscott and F.L. Emory (New York: Dover, 1951).

[20] *Ibid*, 6.

[21] The main objections to the indifference principle regard (i) the difficulty of easily separating out outcomes in a manner that can produce indifference in the absence of some other knowledge of their likelihood, or (ii) the paradoxes that result from a strict application of it. See M.G. Bulmer, *Principles of Statistics*, 8-9. Though no statistician, I fail to see how Ramsey's abandonment of the principle in favor of a method of "bets" secures any more grounded or objective understanding of the position of the subject in relation to probable outcomes. Set out in F.P. Ramsey, *Foundations of Mathematics and Other Logical Essays* (London: Routledge and Kegan Paul, 1931).

[22] Jean Baudrillard, *The Consumer Society* (London: Sage, 1998), 79-80; Baudrillard, *Simulations*, trans. P. Foss, P. Patton, and P. Beitchman (Semiotext(e), 1983).

[23] Wendy Brown, *States of Injury* (Princeton: Princeton University Press, 1995).

[24] U.S. Department of Energy Office, "Facts about Genome Sequencing" *Human Genome Project Information*, http://www.ornl.gov/sci/techresources/Human_Genome/faq/seqfacts.shtml (accessed on August 1, 2009).

[25] Jorge Luis Borges, "On Exactitude in Science" in *Collected Fictions*, trans. A. Hurley (Penguin, 1999).

Creative Destruction Versus Restrictive Practices: Deleuze, Schumpeter and Capitalism's Uneasy Relationship with Technical Innovation

SIMON GLEZOS

That capitalist enterprises are driven to innovation is a concept firmly established in both political and economic common sense. It is this drive, perhaps more than anything else, that is supposed to be capitalism's great merit—that unlike past social formations which remained hopelessly tied to tradition, capitalism encourages constant innovation and progress. It is a fact equally acknowledged by capitalism's detractors (Marx's "All that is solid melts into air...") as by its most fervent cheerleaders. Says Joseph Schumpeter,

As a matter of fact, capitalist economy is not and cannot be stationary. Nor is it merely expanding in a steady manner. It is incessantly being revolutionized *from within* by new enterprise, i.e., by the intrusion of new commodities or new methods of production or new commercial opportunities into the industrial structure as it exists at any moment. Any existing structure and all the conditions of doing business are always in a process of change. Every situation is being upset before it has had time to work itself out. Economic progress, in capitalist society, means turmoil...[1]

This innovative drive within capitalism is what leads Deleuze and Guattari to describe the capitalist axiomatic as a machine for the

deterritorialization of flows, as capitalist enterprises constantly seek out new technical innovations as a means to free up flows of labour, knowledge, resources, energy and commodities.

This presumed relationship between capitalism and technological innovation cuts both ways. On the one hand, capitalism *is* innovative, driven by the profit principle to constantly seek out cheaper, quicker and more efficient methods of production. On the other hand, innovation *is* capitalist, as new innovations further cement and empower the real subsumption of productive practices under the capitalist axiomatic.

Understanding the relationship between capitalism and innovation in such a way creates a problem for those of us on the left who, on the one hand, wish to challenge the exploitation and violence of the capitalist axiomatic while, on the other, feel attracted to the power and promise that new technologies provide. We find ourselves wondering if capitalism is necessary to bring about this technological progress or, even worse, if the technological fruits of capitalism are fundamentally tainted by their lineage. By using the technology of advanced capitalism, are we necessarily forced to capitulate or deform ourselves to the requirements of the capitalist axiomatic?

This dilemma, however, changes radically if we challenge this essential, almost ontological, connection between capitalism and innovation—not by arguing that capitalism doesn't possess an innovative drive, but by arguing that this drive is paralleled by an equally strong conservative drive. As much as capitalist enterprises are driven by market forces to introduce technological innovations, they are equally driven to limit, and frequently inhibit, technological innovation in ways which are necessary for them to maintain their control over the various processes of production, delivery, and consumption. This is why Deleuze and Guattari argue that, at the same time as the capitalist axiomatic is a deterritorializing machine, it is also an apparatus of capture which, though it deterritorializes various flows, always then “maintains the energy of the flows in a bound state on the body of capital.” [2]

This essay will attempt to complicate the seemingly essential relationship between capitalism and innovation. In doing so it will be fighting a war on two fronts. Against those boosters of capitalism who see in it only innovation and progress, I will argue that because of the potential danger that innovation can pose to capitalism's coherence and control, it is frequently pressed to inhibit that innovation—to channel, decelerate and in some cases reverse it. Conversely, to those critics who see in technological innovation only the further perfection of capitalist exploitation, [3] I argue that, because of this uneasy tension, new technologies (specifically new digital technologies) present potential sites of resistance and possibility which can be deployed against key capitalist axioms.

I will begin by investigating the question of technological innovation through the work of Joseph Schumpeter. Here I will note how we see, even in Schumpeter, that prophet of innovation and entrepreneurship, the outline of capitalism's conservative tendencies. I will then model this opposition through Deleuze and Guattari's conceptions of the capitalist axiomatic as both a machine for the deterritorialization of flows and an apparatus of capture. Finally, I will investigate this model through the specific case-study of advanced digital information technologies.

Capitalism and Innovation

Innovation and Entrepreneurship

We start with Joseph Schumpeter as the theorist of capitalist dynamism *par excellence*. He is the great thinker of technical innovation in capitalism, through the figure of “creative destruction.” However, for our purposes, what is most useful about Schumpeter is that he also theorizes what he terms “restrictive practices,” which function within capitalist production to constrain, channel and decelerate innovation. However, before we get to these restrictive practices, an analysis of Schumpeter's account of innovation is necessary.

Technical innovation, for Schumpeter, takes place against the backdrop of the day-to-day capitalist production that occurs in a relatively stable, static and circular fashion. [4] In day-to-day

production, the processes of production and exchange maintain a relatively steady equilibrium that is produced through market pressures according to basic laws of supply and demand. [5] This is not to say that change doesn't take place. But change is either steady and incremental or a result of exogenous upheavals (such as wars or natural disasters) which will eventually be adapted to. Within this "accustomed circular flow,"

every individual can act promptly and rationally because he is sure of his ground and is supported by the conduct, as adjusted to this circular flow, of all other individuals, who in turn expect the accustomed activity from him.... While in the accustomed channels his own ability and experience suffice for the normal individual... [6]

As a result, rational prediction and planning can take place, and the future can (barring exogenous change) be projected from the present.

However, opposed to this process of circular flows, Schumpeter then directs our attention to a collection of processes which produce "a change in the channels of economic routine or a spontaneous change in the economic data arising from within the system." [7] That is to say, Schumpeter identifies moments of innovation [8] which produce spontaneous, yet endogenous, [9] change in the production process and create upheavals in the established equilibrium.

When these innovations end up working, economic life is thrown out of equilibrium: new rules have to be invented, and economic laws have to reassert themselves. Old practices, processes and technologies which are less efficient or profitable than those which innovation brings, as well as those firms which are unable to adapt, are replaced. [10] It is this process which produces that "perennial gale of creative destruction" [11] that is at the heart of Schumpeter's analysis of capitalism. Capitalism's unique qualities as an economic formation are expressed through creative destruction. It encourages innovation and ensures that

old ways of doing things, however comfortable and traditional, are discarded when they are shown to be inefficient. In so doing, the human potential for production and achievement expands and accelerates, seemingly without limit.

Restrictive Practices

Many accounts of Schumpeter (and of capitalism in general) end here—with a description of the steady and circular flow of economic life, slowly expanding due to demographic shifts, occasionally radically accelerating due to technical innovations. This gives the impression of a healthy equilibrium alternating between times of static/circular flow and times of rapid, discontinuous change. However, this is to miss the way in which these two moments are in tension. Indeed, the only equilibrium is to be found *within* the circular flow of economic life, which innovation, in the Schumpeterian sense, shatters, destroying old certainties and forcing a new equilibrium to be painfully and erratically (re)composed. Schumpeter is well aware of how upsetting the upheavals of innovation can be within economic life. Indeed, just the *possibility* of such innovations diminishes the ability to act rationally and plan effectively in economic life:

[T]he impact of new things—new technologies for instance—on the existing structure of an industry considerably reduces the long-run scope and importance of practices that aim, through restricting output, at conserving established positions and at maximizing the profits accruing from them. [12]

Schumpeter goes on to draw out how the “perennial gale of creative destruction” can affect the day-to-day functioning and decision making processes of economic production:

Practically any investment entails, as a necessary complement of entrepreneurial action, certain

safeguarding activities such as insuring or hedging. Long-range investing under rapidly changing conditions, especially under conditions that change or may change at any moment under the impact of new commodities and technologies, is like shooting at a target that is not only indistinct but moving—and moving jerkily at that. [13]

The “destruction” of creative destruction is not just leveled against older forms of economic activity. It is the destruction of all the certainties of the economic system, which actors use to make decisions, plan, and organize production. Actors within the capitalist system thus have a vested interest in the maintenance of the system as it is and “will cling as tightly as possible to habitual economic methods and only submit to the pressure of circumstances as it becomes necessary.” [14]

This conservative element within capitalism is, however, not just expressed through a baseline intransigence to novelty. In addition to this passive resistance, capitalist production is marked by a collection of what Schumpeter terms “restrictive practices,” practices that exist for the purpose, express or not, of decreasing the rate and velocity of technological innovation, as well as for channeling it in systemically acceptable ways. These restrictive practices include, first, “patents or temporary secrecy of processes or, in some cases, long-period contracts secured in advance” [15] and, second, what Schumpeter calls “monopolistic practices”, [16] whereby a firm, corporation or industry uses economic power to control or ward off technical innovation, despite it being useful/profitable, as a way of decreasing the shocks and destabilizations that innovation can bring to the economy. We will discuss each of these sets of practices in more detail shortly. For now it is useful for us to realize that

restrictive practices of this kind, as far as they are effective, acquire a new significance in the perennial gale of creative destruction, a significance which they would not have in a

stationary state or in a state of slow and balanced growth. In either of these cases restrictive strategy would produce no result other than an increase in profits at the expense of buyers.... But in the process of creative destruction, restrictive practices may do much to steady the ship and to alleviate temporal difficulties. [17]

This is to say, these restrictive practices are not temporary failures or distortions of the market. Rather they serve a necessary and central function in the reproduction of the capitalist system. We will now look at these arrangements in detail.

Patents

It is somewhat odd at first that Schumpeter identifies patents as one of his restrictive practices that inhibits technical innovation since, in principle, the purpose of patents is to encourage the development of new technologies. [18] Of course, in a very narrow sense, patents are essentially restrictive since they serve to put legal limits on the use of a practice or technology. As Christopher May and Susan Sell describe,

Intellectual property [of which patents are one form] constructs a scarce resource from knowledge or information that is not formally scarce. Unlike material things, knowledge and information are not necessarily rivalrous, and therefore coincident usage seldom detracts from social utility. Whereas two prospective users must compete to use a material resource (And this competition may be mediated through markets and the setting of a price), two or more users of any particular item of knowledge or information can use it simultaneously without competing. [19]

The logic of this restriction is that, by creating an artificial monopoly around a form of knowledge, the law ensures that the

creator will be able to make money selling it (or at least more money than they would if they had competition). By doing this, the law provides an increased incentive to create and innovate. Alternately, if “information is not property, the incentives to create it will be lacking. Patents and copyrights are social innovations designed to create artificial scarcities where none exist naturally.... These scarcities are intended to create the needed incentives for acquiring knowledge.” [20]

Why then identify patents as a restrictive practice if, in theory, they serve instead to encourage innovation and change? At the very least, for Schumpeter, patents serve as a restrictive practice since they give the company introducing the innovation a level of certainty and stability through their property in the innovation in question, allowing them to determine how and to what extent the innovation will be introduced, rather than having to react to the competitive pressures of the market as a whole. This can frequently mean that the innovation will be introduced and utilized in a suboptimal manner. May and Sell describe James Watt’s refusal to license his steam engine patent, requiring that all engine construction and sales go through him: “By doing so he may have ‘held back the development of the metalworking industry for over a generation’. Had his monopoly expired in 1783, England might have had an extensive railway system much sooner.” [21] If a single patent can have this kind of effect on the progress of technical innovation, it is not surprising that businesses frequently look at the acquisition of patents as a way of controlling the market. [22] More than this, the legal structure of patents creates a potential barrier to entry as the cost of defending them tends to discriminate against smaller and weaker entrepreneurs, in favour of stronger interests.

This function of patents as a way of inhibiting, rather than encouraging, technical innovation becomes even more acute as contemporary post-industrial economies become more dependent on intellectual property as a source of value. With the rising value of intellectual properties, we increasingly see what Arti Rai and Rebecca Eisenberg term “upstream patenting,” which is to say patenting not just “end products” but also “fundamental

discoveries that provide the knowledge base for future product development.” [23] Scientific and technological progress has always depended on a certain amount of openness and free exchange of ideas, especially in the realm of pure research. New patenting strategies, however, seek to close off this openness, because of the developer’s fear of losing control of the potential value of a discovery. This is dangerous because “[u]pstream patents may also hinder subsequent research if they give a single entity monopoly control of basic research discoveries that enable subsequent investigation across a broad scientific territory.” [24] The open space of scientific discussion and debate has been replaced by a “patent thicket” in which researchers are frequently incapable of affording access to necessary forms of knowledge, and are afraid to act because of the threat of legal ramifications. This leads some writers to speak of the creation of an “anti-commons” [25] in which the collective knowledge of human effort is increasingly parceled off to individual ownership.

Software development constitutes another area (and a particularly crucial one in the context of the contemporary information economy) in which patents can serve to inhibit innovation. Patent laws in the US allow developers to patent not just entire applications, but any component part of the program, including tools, algorithms, or even a particular combination of existing technologies or ideas. As all the individual building blocks of computer code begin to be patented, it becomes almost impossible to write a computer program that doesn’t infringe on one patent or another. [26] For the large corporations this isn’t a problem, as they each tend to possess large patent portfolios, which they can then cross-license against one another, ensuring that they are able to make software unobstructed. For smaller developers, however, the choice is to either pay the license, which can frequently make the software unprofitable, or work around the patent, which is time-consuming and might not even be possible. The effect of patents on software development is therefore much the same as the effect of “upstream patenting” on scientific research: the existence of a monopoly over the *tools* for the production of new knowledge.

In patents we thus see an instrument which fits nicely with capitalism's ambiguous relationship with technological innovation. Patent law provides a legal structure for the ownership of knowledge, a way of encouraging innovation, while in turn that same structure provides a measure of control over that knowledge. Patent law turns what is potentially a public good into private property, making scarce what is not by nature. It turns the unruly progression of human knowledge into another commodity to be privately held, controlled and deployed for profit.

Monopolistic Practices

In addition to patents, Schumpeter identifies another mechanism of control, what he terms monopolistic practices, which refers to the economic powers that a large-scale concern is able to wield over the market. In Schumpeterian language, a firm need not be a full monopoly, which is to say in complete control of a particular commodity or market, to employ monopolistic practices. It must simply be able to exert a certain amount of autonomous control over the market, either alone or in concert with a few other concerns (it might be more accurate to call these practices oligopolistic but for the time being we will stick with Schumpeter's terms). Patents and monopolistic practices are not entirely unrelated, as patents confer a sort of monopoly and large corporations are able to more effectively acquire, enforce and contest patents. Large-scale concerns are able to use their power to inhibit technological innovation where it might threaten the existing forms of production. Thus, says Schumpeter,

Progress entails, as we have seen, destruction of capital values in the strata with which the new commodity or method of production competes. In perfect competition the old investments must be adapted at a sacrifice or abandoned; but when there is no perfect competition and when each industrial field is controlled by a few big concerns, these can in various ways fight the threatening

attack on their capital structure and try to avoid losses on their capital accounts; that is to say, they can and will fight progress itself. [27]

Where the innovation is the result of the firm's own research, it can be introduced slowly, after current fixed capital investments have already been written off. [28] If the innovation comes from a smaller competitor, the concern can use patents and legal challenges to delay the introduction, or simply buy out the competitor and shelve the innovation.

Though large corporations are capable of delaying technical innovation in the short term, Schumpeter is not concerned about their ability to substantially diminish or block progress: "The power to exploit at pleasure a given pattern of demand—or one that changes independently of the monopolist's action and of the reactions it provokes—can under the conditions of intact capitalism hardly persist for periods long enough to matter for the analysis of total output." [29] Monopolistic practices thus serve as a way of slowing down or smoothing out the abrupt and destructive consequences that technical innovation can have. This is useful not just for the individual concerns, says Schumpeter, but for the market in general, which can potentially be thrown out of equilibrium, or drop into a depression, through the destruction of capital attendant to technical innovation:

'Restraint of trade' of the cartel type as well as those which merely consist in tacit understandings about price competition may be effective remedies under conditions of depression. As far as they are, they may in the end produce not only steadier but also greater expansion of total output than could be secured by an entirely uncontrolled onward rush that cannot fail to be studded with catastrophes. [30]

Though Schumpeter may be relatively unconcerned with the effect of monopolistic practices, later theorists argue that this is

because he was writing before the true ascendancy of the large scale concern or corporation and had yet to see what real monopolistic practices could be deployed in the market. [31]

According to Baran and Sweezy, in Schumpeter's time there were still enough small scale economic firms to ensure that new technical innovations would eventually, if slowly, work their way into the market. However, with the rise of what they term "monopoly capitalism," which is to say the rise of the market being primarily dominated by large corporations which are able to express monopoly-like control (and which relate to one another according to principles of "corespectivity," rather than traditional economic competition), there is no longer the same competitive pressure to innovate, or to take account of innovations produced by others. Once the "largest-scale unit of control" has taken over, "the new commodity, the new technology, the new source of supply, the new type of organization" all tend to be monopolized by a handful of giant corporations. [32]

As a result of this, innovations are typically introduced (or soon taken over) by giant corporations which act not under the compulsion of competitive pressures but in accordance with careful calculations of the profit-maximizing course. Whereas in the competitive case no one, not even the innovating firms themselves, can control the rate at which new technologies are generally adopted, this ceases to be true in the monopolistic case. It is clear that the giant corporation will be guided not by the profitability of the new method considered in isolation, but by the net effect of the new method on the overall profitability of the firm. And this means that in general there will be a slower rate of introduction of innovations than under competitive criteria. Baran and Sweezy argue that "this means that Schumpeter's perennial gale of creative destruction has subsided into an occasional mild breeze." [33]

The ability of large corporations to exert monopoly-like economic power in the market affects both the pace and direction of technical change. In the most basic sense, this can mean the general production of sub-optimal technology (sub-optimal both

in terms of what is available according to existing technologies and in terms of inadequate research and development). One example of this is what's commonly known as planned obsolescence. [34]

However, this capitalist reticence towards technical innovations need not be based solely on fear of competition or being supplanted in the market. New technical innovation, even when not in conflict with existing productive processes, and when developed by one of the large concerns, might still be deemed undesirable due to the way that they subvert the existing principles of capitalist organization and private property regimes.

Take, for example the development of certain information and communication technologies. New communication technologies allow for a more fluid and decentralized distribution of information and decision making, thus making numerous processes within production and exchange potentially more efficient. As Peter Meiksins describes,

One of the potential consequences of the new technologies is to create a technological basis for alternative ways of organizing economic activity, for pushing further some of the embryonic efforts to decentralize economic activity.... Since these technologies facilitate rapid communication over long distances, it now is possible for widely separated enterprises to coordinate their activities. Moreover, since they are also able to provide individuals and/or enterprises with sophisticated, up-to-date information about markets, the behavior of other actors within the technological network and other relevant matter, those individuals and/or enterprises no longer need to be confined within rigid, prescriptive plans and procedures set well in advance. Instead, with an understanding of what is expected of them, they can react autonomously and creatively to the

information provided through the technological link. [35]

The trouble is, however, that decentralizing information and allowing for autonomous and creative decision making accelerates and exacerbates elements of uncertainty and unpredictability that we have described as being uncomfortable for capitalist enterprises, as well as subverting hierarchies of control present in most corporations. As such, moments of autonomy and creativity are to be kept to a minimum. Frequently, rather than taking advantage of these opportunities, capitalist enterprises will instead use these new information technologies as a way of surveilling and controlling more completely the actions of workers and consumers—even when this is less efficient, and less desirable to the consuming public.

The individual capitalist is thus torn between two separate drives: the first the drive to innovate, to make things more flexible and efficient, the second the drive to conserve, to maintain stability, control and capture. Meiksins shows how the banking sector provides a key example of this tension:

In the case of banking, the contradictions are... obvious. Systems are installed with the explicit purpose of reducing teller discretion, replacing middle level management, and increasing centralized control over information flow and the behaviour of employees. Yet, at the same time, under pressure from external markets to extend the range of banking services available to customers, banks are forced to “upgrade” tellers; the new technology is used to provide tellers with information and abilities that they can use to sell a wider variety of banking services and products to customers. Banks are clearly uncomfortable with this contradiction, and do whatever they can to limit and “program” away teller discretion. Nevertheless, the underlying contradiction does

not disappear and the possibilities of the new technology cannot be entirely suppressed. [36]

Tensions

This tension between technical innovation and established interests, between creative destruction and restrictive practices, between progress and control, lies at the heart of the capitalist assemblage. Deleuze and Guattari map this tension theoretically in the image of capitalism as both a machine for the decoding and deterritorialization of flows and as an apparatus of capture. By pursuing this tension through Deleuze and Guattari's analysis, however, we can go beyond the duality of Schumpeter's account, uncovering a more volatile and multifarious capitalism than even the prophet of creative destruction imagined.

The capitalist axiomatic is marked by two drives: the accelerative and the conservative. On the one hand, it decodes and deterritorializes flows, freeing up stocks of goods, people, knowledge, money, etc. that might be immobilized by tradition or insufficient technological advances. The capitalist axiomatic, as Marx tells us, drives to break every barrier and loose every fetter. In this regard, it must reject the sovereign overcodings which necessarily territorialize and block these flows.

And yet, just as this deterritorializing movement pushes towards the "infinite," [37] towards an absolute deterritorialization, the capitalist axiomatic must function as an apparatus of capture and reterritorialize these flows back "on the full body of capital," [38] which is to say immanently reintegrate them into the orderly process of capitalist production (which, as we saw above, is willing to tolerate surprisingly little in the way of novelty, disorder and dynamism).

Thus, in contrast to the image we saw in the introduction, capitalism is not synonymous with innovation and progress, is not defined purely by an inherent dynamism, because it only ever effects "*relative* breaks, because it ... maintains the energy of the flows in a bound state on the body of capital as a socius that is deterritorialized, but also a socius that is even more pitiless than

any other.” [39] At the same time as it has a tendency to overcome limits, “capitalism only functions on condition that it inhibit this tendency, or that it push back or displace this limit, by substituting for it its own *immanent* relative limits, which it continually reproduces on a widened scale. It axiomatizes with one hand what it decodes with the other.” [40] Even as capitalism is driven to innovate for the purposes of efficiency, it needs to ensure that this innovation does not require the supplanting of core capitalist axioms of control and coherence over the productive processes (the case of the banking industry’s struggle with the trade off between flexibility and control is instructive here).

Deleuze describes this conservative drive in terms of the creation of blocks of antiproduction which stop production and innovation from “getting away from” the capitalist axiomatic and running roughshod over the calm and orderly process of production. Thus, the axiomatics of antiproduction “double the capital and the flow of knowledge with a capital and an equivalent flow of *stupidity* that also effects an absorption and a realization that ensures the integration of groups and individuals into the system. Not only lack amid overabundance, but stupidity in the midst of knowledge and science.” [41]

What we have then is a tension between two opposing forces, one innovative and deterritorializing and the other conservative and reterritorializing. However, let us not make the mistake of conceiving of this duality of forces as some manner of dialectical contradiction which will be resolved in a future synthesis. This duality of forces is constitutive of capitalism, and therefore cannot be resolved. The best that can be hoped for is the contingent and aleatory stabilization of the conflict somewhere between the two ideal poles of creativity and control. This is one of the roots of the sheer multiplicity of forms of capitalism we see in the world. Different capitalisms—and different sectors within different capitalisms—produce and are produced by different negotiations between these warring forces. Where the balance between these opposing forces will be established is the result of multiple factors within the capitalist assemblage in

which they take place, including cultural practices, legal structures, political formations, business and management cultures, material conditions, etc., all of which are themselves the aggregate results of countless micro-level decisions. [42] Thus on the one hand we might see a manufacturing sector which inclines towards conservatism, even in the face of a declining rate of profit, [43] while on the other hand we might see a financial sector which inclines towards greater risk and innovation in pursuit of new investment opportunities (for example, the development of increasingly esoteric credit instruments which lie at the heart of the current economic crisis).

The stabilizations achieved between these various conflicting forces are always contingent, contingent both because they are the result of complex and innumerable decisions made at a variety of levels (and hence not the result of an immutable economic or technological logic unfolding in teleological time), but also contingent since they do not fundamentally resolve the contradiction between these opposing forces; they merely negotiate between them and produce a temporary equilibrium. As time progresses, these opposing forces will require new negotiations in response to new dangers. If a particular market cleaves too closely to the conservative pole, we will potentially see its collapse (the failure of the “big three” automakers in America, for example). Conversely, we are currently seeing what happens when the creative impulse in capital markets is pushed beyond the capitalist axiomatic’s limit of coherence and control. In this regard we see how deterritorialized flows which escape reterritorialization can potentially become unreterritorializable “lines of death.” [44]

Deleuze and Guattari remind us, however, that there is another possibility for the deterritorialized flows that capitalism is so driven to produce. In addition to spiraling off into nothingness, or being relatively reterritorialized onto the body of capital, there is also the possibility that they might be absolutely reterritorialized onto another plane of immanence. Deterritorialized flows might become lines of flight, leading to potentially non-capitalist spaces. This is of interest to those of us

who see in technological innovation at least the potential of a challenge to capitalism. We might look to the possibility of taking advantage of those deterritorialized flows which capitalism produces and turning them against it, exacerbating them, using them as lines of flight and escape that might lead us to new and different worlds.

As an example of how technological innovations can turn against the capitalist axiomatic, in the next section we will turn to the specific case-study of the development of new information technologies. Here we will see a line of deterritorialization that the capitalist axiomatic is unable to comfortably reterritorialize relatively, and which has the potential to turn into a line of flight that might be absolutely reterritorialized on a whole different plane of immanence. This is to say that we see how a deterritorialized flow might, if pushed beyond the comfort level of the capitalist axiomatic, produce a non-capitalist regime or practice.

Information Technology and Intellectual Property Rights

We can start by looking at one particular aspect of information technology, the drive for the increased digitalization of information: “Digitalization has removed the quality/copy trade-off, by allowing generational copies to be, for all intents and purposes, exact copies of the original digital artifact... a 'frictionless environment' for content, where successive copies do not degrade...” [45] There are countless ways in which this digitalization has been useful to business, both in terms of production and day-to-day operations. From the ability to speed up internal communication, to making production and delivery of music, books and film cheaper and more efficient, digitalization perfectly serves capitalism’s internal drive to decrease production and circulation time and accelerate capital as value-in-motion.

The problem however is that, as digitalization produces a “frictionless environment,” producers are increasingly incapable of maintaining control over content. Digitalization “immediately raises the potential threat that once a digital good is distributed,

unauthorized copies can compete throughout its market for consumer use.” [46]

Once the digitalization of content combined with widespread access to high-bandwidth networks (as well as increasingly cheap memory) it became feasible to share digital content with people anywhere in the world. This ability led to the rise of Peer-to-Peer software (P2P) such as Soulseek or BitTorrent, which allowed individuals to search the collections of all other users on the network and download from them. The potential to freely distribute information was seen as a deep threat to the ability of corporations to control their products. According to the Recording Industry Association of America [RIAA], “estimate[s] for worldwide losses in 1994 was \$2.245 Billion,” [47] and the Business Software Alliance claims that “losses to the worldwide software industry caused by the use of unlicensed software were said to amount to US\$10.97 billion in 2001.” [48]

In response to the loss of control over content brought about by these new technologies, the content owners have sought to employ the restrictive practices with which we are now familiar. In the first instance, the media concerns sought to use legal power against illegal copying. The RIAA, for example, in 2003 began a campaign of tracking down and suing music downloaders for copyright violations. [49] In concert with this increased enforcement has been a push for an increased scope and power of copyright laws. For example, “[o]ne of the more notorious measures is the Digital Millennium Copyright Act (DMCA), an act of US congress...whose purpose is to update US copyright laws for the digital age.” [50] The DMCA allows for quicker enforcement of copyright law through the use of “take-down notices” which need not go through the courts.

This deployment of legal power was then backed-up by a deployment of economic power to decrease the speed and flexibility of information technology. One way this was done was through the introduction of what are termed Digital Rights Management (DRM) technologies, the introduction of code into digital content and players that limits their ability to be used for piracy purposes. What is important to understand is that the use

of DRM technology exists solely for the purpose of increasing the ability of copyright holders to control their content and necessarily results in the production of sub-optimal technology. DRM decreases the speed, ease and flexibility of information technology, making interoperability more difficult, and even disabling the ability to use it in non-infringing, but also non-authorized ways (such as Fair Use, or using digital technology to produce and play independent media created and distributed for free). Indeed, DRM technology frequently makes digital technology less functional than the non-electronic equivalent, inhibiting the ability to do such things as make back-up copies, use small portions for personal use, or even lend it to a friend. DRM necessarily makes information technology worse. It attempts to reverse the effects of the “frictionless environment” that digitalization introduced. Here, we can think back to Deleuze and Guattari’s reference to doubling the flow of information with a flow stupidity.

This is particularly important in the context of a culture in which media consumers are frequently also becoming media producers. Remixing, mash-ups, self-publishing, micro-low-budget filmmaking: all of these new forms of independent media production are aided by the increasing fluidity of digital media. Technologies such as DRM make it more difficult for independent producers to use new media technologies, and hence potentially ensure the monopoly of large media concerns over content production.

In response to this purposeful sub-optimization of digital technology, individual users all over the world have taken to trying to overturn DRM technology. Hackers figure out how to break encryption technology on DVD’s, strip DRM out of music files, crack software and open up music and video players for unrestricted use. In response to this, media conglomerates have returned to legal powers as way of protecting their sub-optimal technology. Another, and perhaps more disturbing, aspect of the DMCA is that it “prohibits circumvention of any technological protection against copying and prevents the production of any

device or provision of any service designed to defeat protection mechanisms.” [51]

This tension between the potential of information technologies and the attempts to control them, both through legal and economic means, has led to a struggle between producers and users. As media corporations try to close Pandora’s box and reacquire the control over information that they lost with the development of digital technology, users have become increasingly enchanted with the possibilities that these technologies provide, and frustrated with attempts to block their use and development. The work hackers have done is just one element of a more generalized push to take advantage of the speed and flexibility of digital technologies, and take control of the possibilities that they offer. Indeed, these individual acts of technological subversion, frequently undertaken for self-interested reasons (not that that makes them illegitimate), have begun to percolate into broader social and political positions. As people see how digital technologies allow for information to be easily shared and re-mixed, used and combined, they begin to question the current structure of intellectual property and the types of control it seeks to exercise. As a result certain groups have begun to develop new ways to think about intellectual property.

One example of the attempt to develop a new intellectual property regime is seen in the “Creative Commons” license:

The Creative Commons is a non-profit corporation established in Massachusetts, but with its home at Stanford University. Its aim is to build a layer of *reasonable* copyright on top of the extremes that now reign. It does this by making it easy for people to build upon other people’s work, by making it simple for creators to express the freedom for others to take and build upon their work. Simple tags, tied to human-readable descriptions, tied to bulletproof licenses, make this possible. [52]

Creative commons licensing allows creators to give away, up front, the right to use their work in specific ways.

The most interesting thing about the use of Creative Commons licensing for our purposes is the way in which it begins not from the primacy of the singular author as the agent of creativity but instead from the commons. As knowledge producers (whether in the arts or sciences) become aware of the ease with which communications technologies can facilitate collaboration, and as users become increasingly used to forms of knowledge production based on the explicit use and repurposing of old knowledge objects (everything from software development to music remixing), the idea of creativity as the gift of a sole agent begins to wane in favour of an image of a vibrant commons of intellectual labour. [53] The creative commons license is not “anti-capitalist” *per se*. What it does do is re-introduce the notion of the commons as a central figure in the innovation of human knowledge.

A similar set of challenges to the maximalist form of intellectual property rights comes from the Free Software foundation and the idea of Free Software/Open-Source Software (FS/OSS): “FS/OSS is software whose source code is shared. Anyone can download the technology that makes a FS/OSS program run. And anyone eager to learn how a particular bit of FS/OSS technology works can tinker with the code.” [54] To call it “free” software does not mean that it is given away for no charge. What it does mean is that the software is free of any copyright rules or restrictions which would inhibit your ability to use, change, or even share the program. Free Software is distributed on a special copyright license that producers call “copyleft::

Copyleft uses copyright law, but flips it over to serve the opposite of its usual purpose: instead of a means of privatizing software, it becomes a means of keeping software free. The central idea of copyleft is that we give everyone permission to

run the program, copy the program, modify the program, and distribute modified versions—but not permission to add restrictions of their own. Thus, the crucial freedoms that define “free software” are guaranteed to everyone who has a copy; they become inalienable rights. [55]

The use of copyleft turns copyright against itself. Copyleft not only releases information into the public domain, but ensures that anyone who wants to use that information will also have to contribute to the public domain. It is thus an engine for growing the intellectual commons.

The FS/OSS movement, though constrained to a narrow (though increasingly important) sector of production, challenges the current property regimes and seeks to encourage a mode of production based on ethical and intellectual beliefs in collaboration and community.

In addition to those actively trying to promote alternative intellectual property regimes, there are multiple groups trying to affect the functioning of the current regime, such as the Electronic Freedom Foundation and The Association for Progressive Communication, both of which “attempt to influence the global communications policy agenda from a civil society perspective.” [56] In addition to these specific organization “[m]ajor Foundations, such as the Ford Foundation, Markle Foundation, and George Soros’ Open Society Institute, have supplied critical funding and encouragement to bring civil society actors interested in information and communication technologies together.” [57] Thus we see how the development of technological lines of deterritorialization can become lines of flight, leading from the capitalist axiomatic to new organizations of law, right, politics and economics (not to mention artistic and scientific innovation).

It’s true that none of these organizations or movements are explicitly “anti-capitalist.” However, all advance ideas which begin to challenge the current intellectual property regime, and also challenge central axioms of capitalist production,

consumption, labour and organization. In the case of the alternate intellectual property regimes we discussed, though they do not separate themselves from the capitalist market (indeed, they build on the current existing intellectual property regime), they do challenge it by opening up new spaces, showing new possibilities for production (the essential nature of the Creative Commons is to give away your property rights, to allow others access to that which is supposedly yours). Indeed, we should not conceive of the idea of absolute reterritorialization as the complete rejection of all capitalist principles (and even less as a revolutionary overthrowing of the capitalist regime), nor should we conceive of a non-capitalist plane of immanence as one that is completely separate from the capitalist axiomatic. Such binary duality between the capitalist and the non-capitalist is unnecessary. For a line of flight to be absolutely reterritorialized on a new, non-capitalist plane of immanence, it need only function in such a way as to challenge one or more of capitalism's central axioms and open up a space for alternative production or consumption. It may continue to enter into assemblage with the capitalist axiomatic (indeed, given the capitalist axiomatic's scope and intensity in late modernity, it would be almost impossible for it not to). However, in doing so, it forces a change in the territory of the capitalist assemblage, expanding its borders and challenging its axioms.

In this case, we see a collection of actors and organizations that advance the idea that innovation and progress are better served and encouraged through some element of common ownership of human knowledge, rather than exclusive private property. Note that this is a fairly radical claim. It is one thing in this day and age to challenge the justice and equity of capitalism. But to charge it with inefficiency and conservatism is to strike where it is supposedly strongest. These organizations have seen the opportunities that new information and communications technologies provide, how much easier they make collaboration and cooperation, how they make possible the leveraging of mass collective action for problem solving and production.

The purpose of this account is not to suggest that digital technologies are the gateway to a glorious post-capitalist utopia. Nor is it to argue that if we manage to overcome DRM technology capitalism will have been defeated. [58] Rather, it is to point out that, in the face of all of the discussions about the wonders of post-industrial info-capitalism, capitalism and digital technologies do not fit together perfectly, but rather exist in an uneasy tension. By looking out for fault-lines between particular innovations and particular capitalist axioms we can see and develop potential sites of resistance. And by having an open and experimental attitude towards economic and technological practices, [59] we can potentially take advantage of new technologies and push them into new, unexplored spaces—spaces of imagination, innovation, community and equality.

Notes

[1] Joseph A. Schumpeter, *Capitalism, Socialism and Democracy* (New York: Harper Perennial, 1950) 31-32.

[2] Gilles Deleuze and Felix Guattari, *Anti-Oedipus* Trans. Robert Hurley, Mark Seem and Helen R. Lane (Minneapolis: U of Minnesota P: 1983) 246.

[3] See, for example, the discussion of the Frankfurt school's account of technology in Moishe Postone's *Time, Labor and Social Domination* (Cambridge: Cambridge U P, 2003).

[4] Schumpeter, *A Theory of Economic Development* ch. 1.

[5] *Ibid.* 11.

[6] *Ibid.* 79.

[7] *Ibid.* 82-83.

[8] For Schumpeter, innovation can include a number of different phenomena, including 1) "the introduction of a new good...or a new quality of a good"; 2) "The introduction of a new method of production"; 3) "The opening of a new market, that is a market into which a the particular branch of a manufacture of the country in question has not previously entered"; 4) "The conquest of a new source of supply of raw materials or half-manufactures goods"; 5) "The carrying out of the new organization of any industry." See Joseph A. Schumpeter *The Theory of Economic*

Development Trans. John E. Elliot (New Brunswick: Transaction Publishers, 2002) 66.

[9] Please note that the invocation of “spontaneous” and “endogenous,” is not meant to suggest either the primacy, or conceptual distinctness, of the economic sphere. It’s merely meant to identify technical innovations as something which serves a purpose within economic production, and therefore something sought after by capitalist enterprises.

[10] *Ibid.* 66.

[11] Schumpeter, *Capitalism, Socialism and Democracy* 84.

[12] *Ibid.* 87.

[13] *Ibid.* 88.

[14] Schumpeter, *A Theory of Economic Development* 9.

[15] Schumpeter, *Capitalism, Socialism and Democracy* 88.

[16] *Ibid.* 102.

[17] *Ibid.* 87.

[18] James Boyle, *Shamans, Software and Spleens: Law and the Construction of the Information Society* (Cambridge: Harvard U P, 1996) 43.

[19] Christopher May and Susan K. Sell, *Intellectual Property Rights: A Critical History* (Colorado: Lynne Rienner Publishers, 2006) 5.

[20] Kenneth Arrow in *Ibid.* 22.

[21] May and Sell, *Intellectual Property Rights* 38.

[22] May and Sell make a convincing argument that the real genius of famed inventor Thomas Edison lay primarily in his ability manipulate patents. *Ibid.* 122.

[23] Arti K. Rai, and Rebecca S. Eisenberg, “Bayh-Dole Reform and the Progress of Biomedicine” *Law and Contemporary Problems* 66, Nos. 1 and 2 289.

[24] *Ibid.* 296.

[25] See Keith E. Maskus and Jerome H. Reichman, “The Globalisation of Private Knowledge Goods and the Privatisation of Global Public Goods” *Journal of International Economic Law* (June 2004) 3.

[26] “This is why software patents tend to obstruct the progress of software—the work of software development. If it were ‘one

patent, one product,' then these patents wouldn't obstruct the development of products because if you develop a new product, it wouldn't be patented by somebody else already. But when one product corresponds to many different ideas combined, it gets very likely your new product (either part or all of your product) is going to be patented by somebody else already.” Richard K. Stallman, *Free Software, Free Society* Ed. Joshua Gay (Boston: Free Software Foundation, 2002) 105-106.

[27] Schumpeter, *Capitalism, Socialism and Democracy* 96..

[28] Ibid. 98.

[29] Ibid. 99.

[30] Ibid. 91.

[31] Paul A. Baran, and Paul M. Sweezy, *Monopoly Capital: An essay on the American economic and social order* (New York: Monthly Review P, 1966) 6.

[32] Ibid. 74.

[33] Ibid. 94-95.

[34] Ibid. 74.

[35] “Monopolists generally have an incentive to produce goods with inefficiently short useful lives.” Jeremy Bulow, “An Economic Theory of Planned Obsolescence” *The Quarterly Journal of Economics* November 1986 746 .

Indeed, more than just this matter of the quality of goods, monopolistic actors can control the type of innovation, channeling research and development into sub-optimal directions. Thus “a monopolist might consciously forego development of a socially desirable technology in order to develop and utilize a socially undesirable alternative. In so doing, he effectively prevents development of the socially desirable technology.” William James Adams and David Encaoua, “Distorting the direction of technological change” *European Economic Review* 38 (1994) 664.

[36] Peter Meiksins, “Work, New Technology, And Capitalism” *Monthly Review* 48, no. 3 (July/Aug96) 99, 3.

[37] Ibid. 5.

[38] Karl Marx, *Grundrisse* Trans. Martin Nicolaus (London: Penguin Classics, 1973) 334.

- [39] Deleuze, *Anti-Oedipus* 255.
- [40] Ibid. 246.
- [41] Ibid. 246.
- [42] Ibid. 236.
- [43] The implication of this form of analysis is a fundamental rejection of either economic or technological determinism, arguing that technological effects can only be understood in the context of a much broader social assemblage.
- [44] Gilles Deleuze and Felix Guattari, *A Thousand Plateaus* (Minneapolis U of Minnesota 1987) 229-231.
- [45] May and Sell, *Intellectual Property Rights* 183.
- [46] Ibid.
- [47] Boyle, *Shamans, Spleens and Software* 121.
- [48] Ronald J. Deibert, "Black Code: Censorship, Surveillance and the Militarisation of Cyberspace" *Millennium: Journal of International Studies* 32, no. 3 (2003) 506-507.
- [49] Electronic Frontier Foundation *RIAA v. The People: Four Years Later* http://w2.eff.org/IP/P2P/riaa_at_four.pdf
- [50] Deibert, "Dark Code" 507-508.
- [51] May and Sell, *Intellectual Property Rights* 181.
- [52] Lawrence Lessig, *Free Culture: The Nature and Future of Creativity* (New York: Penguin Books, 2004) 282.
- [53] Indeed, some authors go so far as to note that "an authored-centered regime can actually *slow down* scientific progress, *diminish* the opportunities for creativity, and *curtail* the availability of new products."
- Boyle, *Shamans, Spleens and Software* 119.
- [54] Lessig, *Free Culture* 46.
- [55] Stallman, *Free Software, Free Society* 20.
- [56] Deibert, "Black Code" 525.
- [57] Ibid.
- [58] Indeed, we're increasingly seeing major media companies giving up on DRM based strategies and moving to other avenues for protecting content.
- [59] For a discussion of the importance of experimentation in economic theory and practice see J.K Gibson-Graham, *A Postcapitalist Politics* (Minneapolis: U of Minnesota P, 2006)

Atmospheric Alienation, Carbon Tracking and Geo-Techno Agency

ANITA GIRVAN

Climate change has forcefully emerged as *the* central planetary challenge for contemporary humanity. [1] As a quintessentially hybrid natural-cultural phenomenon, this emergent struggle exposes the limits to many current practices and institutions that seem debilitated in the face of unprecedented complexity. The urgency of the matter dictates that we clearly cannot do *nothing*; however, the opposite extreme -- *that we have to do something, anything* -- may be equally fraught, when considered through genealogies of technology, power and domination that haunt 'solutions' conceived and implemented in the twentieth century. Prevailing scientific approaches to climate change involve the modeling of a certain degree of complexity within bio-material feedback loops; however, the bio-physical apprehension of 'facts', has thus far been unable to permit a reflection on a full spectrum of loops of natural-cultural complexity within this phenomenon. Without critical reflection on ambivalent forms of technological, 'human' and biophysical entanglement, techno-solutions created in the name of climate change may not only exacerbate political tensions, but they may also produce new forms of planetary degradation.

I offer "atmospheric alienation" as one way of thinking through and flagging emerging concerns within the phenomenon of climate change. The hypothesis of atmospheric alienation builds on Hannah Arendt's notion of *Earth alienation*, which explicitly interrogates genealogies of 'modern science', uncovering the ways in which practices in science, cultural thought, and biophysical materiality enter into recursive feedback loops with political (and planetary) consequences. [2] Arendt's

timely intervention in political thought during the mid-twentieth century insists on a politics of reflexive thinking and deliberative dialogue, against a seemingly inevitable techno-scientific determinism in which technology is recognized to have outpaced a human capacity for understanding. Her imperative to "think what we are doing" [3] is of the utmost importance in the emerging high stakes politics of climate change.

Like Arendt, I use the notion of alienation not to signal a loss of originary "wholeness", nor to posit a permanent Earthly *homeostasis*, but to reflect on forms of estrangement that present novel rifts (or intensify pre-existing ones) in a constantly shifting socio-political-material fabric. To slow down and think about forms of estrangement that are intensifying or newly emerging and even to anticipate, with humility, how our recombinant techno-solutions to climate change create the conditions of possibility for future losses, seem essential to an always incomplete politics attuned to (atmospheric) alienation. In forwarding this notion, I do not claim that no losses will occur; according to paleo-climatological records, we are currently experiencing the sixth major extinction period in the life of the Earth [4]. A utopian or Edenic narrative of abundant biodiversity on Earth is precluded if we believe in these paleoclimatic stories of loss; however, attending to contemporary losses and creating reflexive participatory institutions to prioritize action may open the space for new forms of politics. This perspective does not reject an important role for science and technology in grappling with climate change. Crucially, technology enables us to apprehend this phenomenon as a planetary 'crisis'; further, as a node of joint kinship between 'human', 'machine' and 'nature', technology offers the promise of recombinant forms of averting the crisis. This joint kinship however, also appears to have constituted the crisis of anthropogenic climate change itself; thus, Arendtian-inspired reflexivity and participatory politics are necessary constitutive elements in the consideration of technological engagements. In order to illustrate such paradoxes, I will suggest two emerging trends of techno-engagement justified under the urgent banner of climate change solutions:

carbon tracking and *geo-techno agency*. These trends demonstrate the need to keep proximal reflexive ways of thinking through frames of action to address climate change; it is in this spirit that I offer the notion of atmospheric alienation as one potential interpretive frame. [5]

Earth Alienation

In *The Human Condition*, Hannah Arendt, contemplates the conditions of existence for humans in the middle of the twentieth century when the first satellite was sent to "move in the proximity of the heavenly bodies as though it had been admitted tentatively to their sublime company" [6] she notes in modern science-driven moments of satellite launches, airplane travel, the test-tube production of humans, eugenic practices, and the attempts to prolong human life-span, a desire to escape from the confines of Earth-given existence. This desire for transcendence, or "Earth alienation" as diagnosed by Arendt, defines the contours of modern science at the middle of the twentieth century. Earth alienation features both techno-material and cultural-epistemological transformations; for Arendt, these transformations lead to losses within the life of politics, an activity that depends on an actively engaged citizenry of *plural* people in the world, rather than on a universalized and transcendent perspective of 'man' in the singular.

Earth alienation as the 'hallmark of modern science' [7] describes a set of interrelated features that condition life in the twentieth century. The first features a dominant drive to escape 'naturally-given' conditions/limitations of life. This drive has led to a privileging of the 'man-made', in everything from the test tube creation of life to the creation of the 'heavenly bodies' in satellite technology. Whereas, *homo faber* has always been a maker of human artefacts, the modern version of *homo faber*, with rapidly proliferating tools of technology and continuous processes of automated labour has expanded a repertoire of making that includes channeling forces of nature at ever larger scales. [8] This endeavor has been achieved through the centrality of 'modern science' and its prime mode of expression,

mathematics, which "frees man from the shackles of experience & sensory perception." [9] No longer must we rely on the all-too-human subjective embodied senses to apprehend the world, rather numbers render an objective world with increasingly detailed grids of knowledge. The dual conditions of man-as-creator and the privileging of a mathematically-founded scientific approach have led to the domination of the *experiment* as a key logic under Earth alienation. The experiment sets the stage for a human orchestration of apprehending objective truth, which leads to the human capability to play Cosmic-Creator. As Arendt notes, the object-orientation of the experiment as scientifically determined presents no necessary built-in ethical imperative or self-reflective principles that engage critical dialogue; the absence of dialogue and reflection in the constitution of modern science is the final and most problematic element of Earth alienation. A combination of scientific knowledge and authority, unprecedented experimentation with 'cosmic forces' such as atomic energy, and the lack of thought and deliberative dialogue about such experimentation threatens planetary life itself. A detached Archimedean perspective of the Earth central to modern science removes both the specificity of Earthly metabolism and the plurality of its inhabitants.

For Arendt, Earth alienation also mapped onto cultural and epistemological coordinates; an Archimedean perspective similarly plagued the metaphysics of Western philosophy with its enduring attempts to locate 'man' in a singular and universal way; Arendt particularly critiques Descartes' quest for an objective metaphysics of man and his mathematical mapping endeavors that have contributed to a transcendent psycho- and geo-graphical cartography. Along with Galileo's confirmation of Copernican theory, Cartesian philosophy has posited an Archimedean point that can be located both extra-terrestrially and within man as transcendent human doubting subject. [10]

What is most crucially at stake for Arendt in her description of Earth alienation is the loss to the worldly activity of politics. Transcendent grids of knowing remove the particularities of individuals and their active participation in the

world, which are the conditions necessary for political life. Arendt, writing after witnessing the magnitude of losses under Stalinist and Nazi totalitarian regimes, appropriately flagged this loss to political life.

A half century later, Arendt's words profoundly resonate within the continuing drives of reproductive lab sciences, genomics, and notably, the experimental attempt to create a closed 'Earth-like' system known as Biosphere 2, whose objectives included exploring the possibility of creating Earth-like domes of life-support for space colonization. A joint venture of two private companies, unified under the name Space Biospheres Ventures, Biosphere 2 was an experiment in creating nothing less than a mini-Earth, with representative species and topologies from five planetary biomes. [11] The project, located on three acres of land in Oracle, Arizona, was conceived, researched and tested during the late 1980's, and in 1991, eight 'biospherians' entered this would-be modern-day escape ark for an un-precedentedly long maiden voyage. The original eight stayed in the facility for two years, during which time attempts were made to grow all food, to metabolize all wastes and to produce the optimal atmospheric blend to support life. The failure to achieve this latter objective proved the Achilles heel of the system; all of the pollinators in the ecosystem died as did nineteen out of twenty-five of the vertebrate species. The human biospherians survived only through the injection of oxygen from outside of the closed sealed environment. [12]

Although Biosphere 2 experienced a number of serious glitches that demonstrated the difficulties in reproducing Biosphere 1, namely the Earth, space colonization remains an explicit, ultimate goal of space programs. Former NASA Administrator (2005-2009), Michael Griffin, goes so far as to say "a single-planet species will not survive", therefore, colonization in space is the only way to ensure longitudinal continuity of the human species. [13] Transcending the Earth, our bodies and other so-called 'natural' limitations remains as powerful an imperative in contemporary material and psycho-geographies as it did in the time that Arendt first suggested the notion of Earth alienation.

Atmospheric alienation

Coincidentally, in the year before Arendt's first description of *Earth alienation*, the climate scientists, Revelle and Suess spoke these prophetic words:

Human beings are now carrying out a large-scale geophysical experiment of a kind that could not have happened in the past nor be reproduced in the future...we are returning to the atmosphere and oceans the concentrated organic carbon stored in the sedimentary rocks over hundreds of millions of years. [14]

I suggest that these two scholars, and indeed their forebears, including Joseph Fourier, Svante Arrhenius, John Tyndall, and Guy Callendar, [15] were foretelling the dawn of a new kind of alienation, -- what I call here, *atmospheric alienation*. Although modern science had offered a cosmic horizon as a new set of conditions for a transcendent humanity, the advent of climate change, by (re)inscribing atmospheric layers that condition planetary life, has catapulted humanity back within planetary horizons. As Arendt highlights, although there is a tendency toward cosmic pretensions, we "still and probably forever are earth-bound creatures, dependent upon metabolism within a terrestrial nature" [16]; this dependence is profoundly reflected within the phenomenon of climate change (and ironically confirmed within the atmospheric failure of the would-be planet-evading technology of Biosphere 2). Like Arendt's account of Earth alienation, atmospheric alienation is suggestive of material-cultural loops of estrangement. I propose four elements of atmospheric alienation below, though crucially, these elements are interwoven within climate change as a cultural-material phenomenon.

Material atmospheric variation

The first element of atmospheric alienation manifests in the atmosphere itself. Significantly, the advent of anthropogenic climate change creates the conditions for the atmosphere to *appear* as a matter of concern. Alfred Russell Wallace, who partnered with Darwin in the theory of natural selection first called the atmosphere "the Great Aerial Ocean", to appropriately describe the flows and currents of gases overhead that condition planetary life [17]. While the atmosphere goes largely unnoticed by 'humans' at large when the systems operate within a range conducive to life for our species, the emergence of a *troubled* atmosphere as a planetary concern demonstrates the return of our long-forgotten antecedents buried in the deep history of the Earth itself.

The great aerial ocean, indivisible and omnipresent, has so regulated our planet's temperature that for nearly 4 billion years Earth has remained the sole known cradle of life amid an infinity of dead gases, rock and dust. Such a feat is as improbable as the development of life itself; but the two cannot be separated, for the great aerial ocean is the cumulative effusion of everything that has ever breathed, grown and decayed. [18]

As Flannery highlights, we (not a globally collective *we*, but an asymmetrically developed one) have intensified the atmospheric effusion of the remains of these life forms by 'digging up the dead' in the form of the fossil fuels whose combustion has driven the engines of progress in these past few centuries. Only relatively recently have we understood that the atmosphere is a complexly-blended protective layer that absorbs some solar radiation and reemits some to produce a beneficial greenhouse effect; but the recency of this understanding has produced alienating effects. This protective layer is becoming compositionally unfamiliar within a human-species-time and the

increase in carbon dioxide has had an impact on global surface temperatures.

Since the beginning of the twentieth century the average surface temperature on the planet has increased from 13.5 to 14.5 degrees Celsius; this seemingly insignificant one degree difference represents a quarter of the change in temperature between the last ice age and today. [19] Even minor changes in global average surface temperatures, differentially felt in specific regional climates may have a significant impact on agricultural production, and water availability, thus making certain regions inhospitable to the lives of many species. Crucially, the atmospheric carbon continues to surpass levels experienced within the past eight hundred thousand years. [20] Most climate scientists agree that while there have been times during which the Earth has had much higher concentrations of carbon dioxide, the life forms that flourish in these conditions are generally cold-blooded species. [21] In other words, the conditions of low atmospheric carbon, widely thought to create the conditions of possibility for a 'human' species, are becoming troubled and further, widespread expert consensus reveals that the unprecedented time-scale of the changes in the atmosphere is the unintentional consequence of the industrial processes dependent on fossil fuel extraction and combustion by our species. [22] A shared sense of crisis over these rapidly-changing planetary conditions leads to the second element of atmospheric alienation.

'Species' anxiety

Although paleoclimatic records suggest that the conditions for our survival as a species on Earth did not come pre-packaged with the 'gift' of the planet, we are more acutely and immediately reminded of this matter with the advent of climate change. Like Dipesh Chakrabarty [23], I employ 'species' as a placeholder here. Critical scholarly attention to the essentialist and colonial tendencies and histories caught up with this category appropriately warns against its unproblematic usage. [24] Despite these problems, it must be acknowledged that the species category is central to the discourse of climate change. Moreover,

although many are able to think of climate-related loss of species, in the plural, the species most commonly evoked in the discourse of climate change is *homo sapiens*. The acronym for Al Gore's campaign/ movement that launched the Live Earth concerts -- "SOS: *save our selves*" strongly suggests an appeal at the species level. [25] This SOS call is symptomatic of a kind of species anxiety as a "structure of feeling" that pervades contemporary life in an age of climate change.

I use Raymond Williams' term, *structure of feeling* provisionally here as a way of indexing a kind of pervasive societal constellation that can be seen as historically and culturally 'emergent'. [26] Williams, finds within societal practices and artefacts the means of identifying common characteristics of a cultural consciousness within a given epoch; structures of feeling are not traditionally 'ideological' in that they do not map onto traditional Marxist class divisions, but rather can be shared across classes (and, I would add, across geo-political regions affected by climate change). His analyses are based on a "genetic structuralism" within cultural artefacts and practices that exposes not only a prevailing structure, but the historical processes that constitute these artefacts and the ways in which they emerge. Williams thus foregrounds organizing principles that constitute and structure ways of knowing about given events and phenomena.

I contend that a pervasive structure of feeling within climate change discourse demonstrates a species preoccupation with survival that is evident within the notion of *S.O.S.* and is reinforced within the highly prevalent global discourses of catastrophe. This species anxiety builds on previous (and ongoing) material-cultural sources of anxiety such as nuclear annihilation. Climate scientist's Konrad Steffen's doomsday-clock warning, "the time is already five past midnight," [27] demonstrates this shared genealogy of species anxiety.

As well as using species provisionally in this essay, my occasional use of 'we' similarly reflects this tentative engagement with a shaky and uneven, but atmospherically-relevant collectivity. Because the atmosphere is a global commons with

conveyor systems and circulation cells, greenhouse gases do not remain loyal to their place of production; rather, these gases are dispersed throughout the Earth's protective layer. Thus the atmosphere itself is, in part, complicit with the universalizing tendencies of the discourse of climate change. I am also aware however, that even as I attempt to 'pussy-foot' around a universal-subject position, those in sub-Saharan Africa and small island nations who are now feeling, or will soon be feeling the impacts of climate changes, may find my gesture (and significantly, the gestures of those at the table in Copenhagen) of collectivity inadequate. The inadequacy of unilaterally invoking a species collectivity as the singular relevant political category within the phenomenon of climate change reveals a third element of atmospheric alienation.

Geo-political estrangement

The unevenness of: responsibility for causes, felt impacts, and the ability to adapt to anthropogenic climate change suggests other kinds of relevant geo-political taxonomies of a non-Linnaean order. Some of these novel categories such as the global North and South, small-island nations, low-lying countries, and most transparently, 'winners' and 'losers' reveal alienating geo-political ontologies. Such geo-political unevenness and estrangement were evident in the events leading up to and including the Copenhagen conference whose attempts to create an international accord fell far short of the desired outcomes for many. The African delegation's protest and threatened walk-out on the talks and the negotiator from Tuvalu's impassioned speech on behalf of small island nations are just two demonstrations of a growing alienation between those who strongly and viscerally feel the need to act swiftly, in concert, but with an awareness of those who are already suffering, and those for whom climate change is not a priority. I do not mean to suggest reductively that there are/were only two positions at the negotiating table; the complexities that riddle the politics of climate change are, I believe, unprecedented. What I contend, however, is that climate

change may exacerbate existing estrangements and present novel ones, with potentially devastating consequences.

As military documentarian, Gwynne Dyer, demonstrates in his book, *Climate Wars*, scenarios of climate change now being mapped by American and British military which use climate modeling to predict early 'losers' and 'winners' in climate impacts. [28] Military predictions feature:

... a world where people are starting to starve, but it is not always the familiar scene of helpless peasant societies facing famine with numb resignation. Some of the victims now are fully developed, technologically competent countries, and their people will not watch their children starve so long as there is any recourse, however illegitimate, that might save them. So the lucky countries in the northern tier that can still feed themselves -- but have little or no food to spare -- must be able to turn back hordes of hungry refugees, quite probably by force. They must also be able to deal with neighbours who try to extort food by threats -- and these desperate neighbours may even have nuclear weapons. Appeals to reason will be pointless, as it is reasonable for nations to do anything they can to avoid mass starvation. [29]

The anticipated security risks from global 'others' who are vying for scarce survival resources motivates military organizations to plan for worst-case scenarios. Dyer's documented evidence shows that military preoccupations with climate change feature not only resource protectionism and violent border control to secure national populations from the viral parasitic populations that threaten to swarm those inside, but also larger military interventions to prevent nuclear annihilation. From the perspective of totalizing military regimes, the world

may be evacuated of plurality and construed along green zones and red zones in militarily-predicted climate wars.

As military organizations in their tireless operations of securitization attempt to predict the unpredictable, an alienating sense of uncertainty paradoxically both evades and reifies military *intelligence* (as in the military logic that partly underwrites 'carbon tracking' discussed below). This pervasive sense of uncertainty about what is to be done defines the fourth aspect of atmospheric alienation.

Uncertainty about institutions, mechanisms

As a quintessentially ecological phenomenon that occurs at multiple scales simultaneously and through socio-material loops of complexity in ways that flagrantly defy human political structures, climate change exposes the limits of our dominant institutions. At the global level, the lack of consensus on how to move equitably to reduce greenhouse gas emissions has resulted in the grand failure of both the Kyoto Protocol and more recently, the Copenhagen Accord. Part of this failure stems from the outward projection of responsibility from key international players. Especially problematic is the nation-bounded discourse of "If they don't do it, why should I?" that dominates discussions around the reduction of greenhouse gases. Thus far, reduction targets largely express aspirations, but not regulations. Many target dates set by various levels of governments come and go, but nobody knows exactly what 'carbon neutral' means and how to achieve it. Further, targets of greenhouse gas reductions, steeped in the discourse of statistics, reductively render a narrative of linear simplicity. The implication is that 'if we achieve this goal, then we will have mitigated greater warming and destruction', but the mechanisms for reaching the targets (social, political, technological, etc) still lag behind the relatively empty numerical aspirations. Institutional uncertainty similarly challenges every scale of politics from the municipal to the regional to the national and all of the more recently conceived recombinant forms.

Although uncertainty plagues attempts to deal with climate change, certain emerging trends reveal how this phenomenon is recursively taken up within pre-existing formations. I suggest that the logic of "tracking" is one such formation that constitutes a trend of engagement within atmospheric alienation.

Carbon tracking

Jordan Crandall's seminal essay on contemporary real-time perceptual grids within human-machine interfaces of technology highlights a dominant cultural preoccupation with 'tracking'. [30] According to Crandall, who builds on Heidegger, Kroker and Virilio's insights into the implications of militarily founded technology moving information *at the speed of light*, embodied vision is no longer the key locus of perception. Tracking rather than seeing becomes the contemporary mode of locating objects, or what Virilio calls 'trajects' to highlight constant rapid movement.

Tracking arises as a dominant perceptual activity in a computerized culture where looking has come to mean calculating rather than visualizing in the traditional sense and where seeing is infused with the logistics of tactics and manoeuvre ... Such processes of calculation ... are distributed and shared in a larger field of human and technological agency. [31]

This field of shared perceptual agency is pervasive. In an obvious example, the airport, the traveler is constantly hailed by disembodied machinic voices to become part of the security loop by tracking suspicious behaviour (even one's own). As Crandall highlights, however, tracking, as a circuit of military and capital loops, extends well beyond such explicit fields of security: "We aim to detect, process, and strategically codify a moving phenomenon -- a stock price, a biological function, an enemy, a consumer good -- in order to gain advantage in a competitive

theatre, whether the battlefield, the social arena, or the marketplace". [32]

Following Crandall, I argue that a dominant form of perceiving and apprehending carbon is caught up in a computerized techno-military-market calculus. Under pressure from the biospherical return of a spectral 'nature' within climate change, technology begins to take up carbon anew, not only as the material basis for nanotube transistors in advanced computing circuitry, but also as an object to be tracked, targeted and eliminated in the war for the earthly survival of a threatened human species...at least at the surface, it *appears* as though the goal is to eliminate carbon. Because of the circuits of complexity into which carbon enters, paradoxically carbon really cannot disappear, but must *appear* as a supplement within other orders. Emerging cultural-material perceptual grids are targeting carbon as a traject that produces both 'carbon subjects/citizens' and 'capitalized carbon'.

The first discourse presents a subject whose carbon emissions are to be tracked and managed. One of the primary technologies to track such subjects will be the 'smart meter', a device that is poised to enter each household in most developed and some developing countries within the next five to ten years. [33] Key to this technology is the ability to track, in real-time, the energy consumption of households and to communicate 'the numbers' to a central body/machine. In more sophisticated technologies, the smart meter will be part of a 'smart grid' system, a two-way digital interface that enables the system to turn off and on appliances in households to help manage demand during peak load. The smart meter will not only be able to give each carbon subject a reading on energy consumption that can easily be converted to greenhouse gas output, it will also enable more robust data for use by nations on per capita emissions calculations. Further, these technologies offer the means to mitigate increasing greenhouse gas emissions in a variety of ways. Individuals who monitor their emissions through smart meters and attend to the specific energy impact of certain appliances may be empowered to adjust their behavior vis-a-vis

these appliances. In dealing with the transformation of energy regimes from fossil fuels to 'renewables', smart metering and smart grid technologies provide key ways of understanding and, more importantly, managing both 1) peak load issues (enabling the system to deliver power during the times of greatest demand) and 2) the unreliability or 'intermittency' of renewables issue (the problem that wind and sun for example are not 'constant', but must be fed into transmission systems that are built for a constant input of fossil fuel). [34] In other words, this technology is touted to be integral to the transformation of energy systems that will ultimately be a key solution to climate change; however, this solution is steeped in other 'cultural solutions' that impact its constitution. An uncritical acceptance of this planet-blanketing technology is founded on an assumption that we are all in this fight against climate change together and forgets the 'constitutive role of conflict' that animates the real-time perceptual grids of tracking technology. [35]

When we speak about the formation of real-time perceptual agencies -- which, again, manifest a distributed processing and storage capacity among humans and machines, enabling increased efficiency and accuracy... -- we often assume that cooperation reigns...And yet, competition plays an equal role. We do not necessarily want to see on a level playing field alongside everyone else. We need to see faster, better and more precisely -- whether in the name of convenience, profit, or protection -- in order to outwit competitor and combatant alike. We are driven equally by such acquisitive and aggressive impulses. They are the stuff of our cultural dramas. They derive from the production demands of both consumerism and warfare -- to the extent that these become mutually reinforcing components of the same economic engine. [36]

Crandall reminds us to uncover how *competitor* and *combatant* emerge as integral to the loops of smart grid projects. Smart grid tracking technology is emerging as a new frontier for capital accumulation and companies are vying for market shares in this competitive market. Significantly, many for-profit companies on the forefront of smart metering networking technologies are those that have already mastered the machine-to-machine (M2M) digital systems of closed-circuit TV (CCTV), the tracking surveillance grid that has virally proliferated in Britain. One of the leading British CCTV companies provides M2M technologies for everything from commercial alarm monitoring to ATM security to environmental monitoring, including smart-grid technology. [37] Thus, smart-grid technology is commensurate with what Caroline Bassett calls a 'total surveillance trajectory', a material and symbolic cultural formation whose many different instantiations (including technologies, governing structures and consumer drives) aim in one way or another to reconcile 'bodies' to bodies of data [38]. In thinking through the relevance of the production or reification of competitors and combatants, smart grid technologies open up a field of critical questions. What will be the effects of this new form of energy/carbon monitoring, intermediated by and through the circuitry of bodily monitoring for surveillance? In a post-9/11 war-on-terror logic, how could a real-time carbon/energy footprint provide a perceptual grid that may re-enact or produce new forms of geo-political alienation? And given that the CCTV business is a highly lucrative 'arms-race', how does the advent of atmospheric alienation provide the means to extend the market to include an increasingly relevant and profitable monitoring of carbon? [39]

A second discourse of carbon tracking reveals that not only are these carbon-monitoring technologies themselves sources of new capital for companies in the surveillance business, but carbon itself is emerging as capitalized 'nature' within a nascent carbon economy. Whereas climate change could be interpreted as a challenge to a free-market metabolism that externalized the atmosphere, an emerging solution is to reconcile

a newly-internalized carbon within global trading schemes. Many articulations of the *carbon footprint* metaphor, a key expression of a new form of carbon citizenship, rely on this market. In entering this metaphor in a Google search, what appears immediately is a direct connection between a carbon footprint maker and a carbon offset, a means of buying a 'dispensation' for carbon guilt. [40] Off-sets, cap and trade, and carbon credit systems have created a multi-billion dollar business sector. Within this network, the tracking of carbon and carbon citizens presents opportunities for mega-projects that address a capital-atmospheric perceptual grid of carbon while ignoring all other 'Earthly metabolisms'. The pretense of transcending climate change through investment in man-as-cosmic-creator plays to the hopes of a species anxious about its own demise, but still caught within the same loops of experimental expansionary cosmic forces that unleashed the original crisis. Atmospheric alienation and a tendency toward carbon tracking thus bring forward another emerging tendency toward perceiving 'man' as ambivalent geo-techno agent.

Geo-techno agency

Extending Paul Crutzen's thesis of the contemporary age as 'anthropocene,' [41] Dipesh Chakrabarty and Naomi Oreskes have suggested that this era highlights the human as 'geological agent'. [42] This notion draws attention to the fact that, as a species, we have become a force strong enough to disturb the boundary conditions for life on Earth. Whereas conventional environmental frames recognize humans as *biological* agents, creating impacts on a bodily and localized geographical scale, the notion of geological agency represents a fundamental shift in thinking:

To call human beings geological agents is to scale up our imagination of the human. Humans are biological agents, both collectively and as individuals. They have always been so. There was no point in history when humans were not

biological agents. But we can become geological agents only historically and collectively, that is, when we have reached numbers and invented technologies that are on a scale large enough to have an impact on the planet itself. [43]

Echoing Arendt's diagnostic of the profoundly nature-making capacity of modern *homo faber*; Chakrabarty reads this intensified and scaled-up species agency through the climate impacts of 'civilizing' forces enabled by fossil fuels. Whereas former conceptions of climate theory ranging from Hippocrates to Jean Bodin to Montesquieu referred to the climate as a fundamental determinant of humans, [44] contemporary anthropogenic climate change theory overturns such an assumption by insisting that humans are now the force driving climatic conditions. In fact, prior to the anthropocene, the term 'geological agent' was used to refer to *the atmosphere* as a conditioner of the Earth. In the 1890's, climate scientist, Thomas Chrowder Chamberlin first evoked the *atmosphere as geologic agent* in describing the feedback loops between atmospheric CO₂ levels and the relative cooling or warming of the planet. [45] Following the work of foundational climate scientists, Tyndall and Arrhenius, Chamberlin developed a fairly robust notion of a carbon cycle incorporating oceanic cycles of carbon dioxide and water vapour. He ultimately recanted on his theories as they fell out of favour in the two decades following his description; however, he made some fundamental contributions to the discipline of climate science in his observations and theses on glaciation, oceanic currents and atmospheric agency. [46] Although his thesis bracketed the impact of humans on the atmosphere, Chamberlin's work on climatic feedbacks and geologic conditions informs an understanding of the recursivity of planetary boundary conditions. Arguably, his implicit notion of recursivity could productively temper a dominant relational understanding of climate change that posits humans as the stronger of 'geological agents' who, through our uniquely human

innovations, may be able to win in the ultimate battle against 'nature'.

As well as producing an unprecedented kind of species anxiety, an awareness of our humanly geological agency through climate change has urged us to scale-up our technological interventions to 'correct' a climate that may become hostile to human survival. Proposed remedies of an experimental-cosmic nature reveal a certain *geo-techno agency* located among technologists who are capable of conceiving and crucially, unilaterally implementing global carbon solutions.

According to Ken Caldeira, a prominent senior scientist with the Department of Global Ecology at the Carnegie Institution and a Professor in the Department of Environmental Earth System Sciences at Stanford University, geo-engineering schemes that were easily dismissed two decades ago, are now being more widely considered in scientific circles. [47] One particular solution suggested within such geo-engineering research is the re-creation of the 'Mount Pinatubo' effect. In the months following the eruption of this volcano in the Philippines, global temperatures decreased by more than .05 degrees Celsius due to the amount of atmospheric particles which filtered the sun's rays. In order to recreate such global cooling, certain scientists propose to shoot two cubic metres of sulphate aerosols per hour into the atmosphere. The attraction of such a techno-fix, Caldeira claims, is that it is "relatively cheap" and can be done by a "small group of actors or countries". [48] That this kind of geo-techno agency could be accorded to a handful of people on behalf of the planet is truly a *chilling* proposition.

Another serious contender in such schemes is seeding the ocean with iron to produce algal blooms. These blooms increase the number of phytoplankton which will extract more carbon dioxide from the atmosphere into the ocean. [49] Although this solution may 'fix' the carbon dioxide problem, the bacteria created as a result of the dying phytoplankton will also create dead zones in the ocean that will be inhospitable to species other than jellyfish. There are many known by-products of geo-engineering schemes, but perhaps more threatening are the non-

linear outcomes that cannot be known in advance; these are the cosmic forces that Arendt warns will threaten the survival of an Earth-bound species with transcendent pretensions.

How to proceed?

What does adapting Arendt's theory and positing the notion of "atmospheric alienation" offer to on-going efforts to think about and institutionalize the politics of climate change? I would argue that, first, Arendt's notion of Earth alienation presents a way of understanding how seemingly disparate material and cultural events and practices co-produce what we know of as 'climate change'. A simple linear problem-solution account of climate change that short circuits from climate science to policy forgets the highly relevant recursive cultural-material loops that constitute the phenomenon. As a thinker of dominant historical-cultural-material loops that condition life itself, Arendt evokes a notion of complexity that would productively enrich thinking on climate change.

Second, Arendt's attention to the conditions of plurality that animate politics underscores the need to keep alive a lens for particularities, even as a collectivity is also necessarily evoked within this phenomenon. Given the extent to which we now recognize our species' role in (largely) irreversibly shaping the Earth and its systems, there is clearly little place for a politics based on a purely romantic-nostalgic/utopian vision of living harmoniously as one of many species within an Earthly context. We are world-makers and will continue to be for as long as we populate the Earth. The question is *what or who is going to shape our world-making actions and what will be our (particular and collective) aspirations in the world(s) we create*. The action that is called upon within climate change falls short of an Arendtian politics if it assumes a planetary collectivity whereby certain forms of unilaterally-imposed geo-engineering are seen as the only solutions through the foreshortening of dialogue. Paradoxically however, a collectivity needs to be posited in order to shake free from a shared libertarian perspective of an individual's right to expand and emit at will. Further and on-

going consideration needs to be given to how collectivity can be evoked without an appropriation of multiplicity or the blatant disregard for asymmetrical relations.

I am aware that, just as Arendt was criticized for attempting to dismantle an Archimedean transcendent perspective by reinscribing another kind of classical transcendentalism based on Greek politics, my own attempt to posit a cultural 'hypothesis' of atmospheric alienation (though not nearly as eloquent or extended as Arendt's) may fall victim to the same critique. Atmospheric alienation presents a narrative of a planetary *natureculture* [50] in a way that often veils particulars; this narrative is not sufficient on its own, but rather needs to be constantly interrupted by other narratives. [51]

Thus, the notion of atmospheric alienation is troubled as it should be; I believe, nonetheless, that this story offers some explanatory potential that may inform dialogic political responses to climate change. Grappling with emergent estrangements and the tensions between particulars and universals -- in mitigation and adaptation strategies, climate justice, technological 'solutions', and political institutions -- may present some of the greatest challenges of the next few decades in a time of climate change. This phenomenon challenges current scientific practices and political institutions in ways that require a re-awakening of pluralized imaginative horizons. Arendtian politics do not offer a way of overcoming climate change (not least because change is already presently occurring with varying degrees in different geographical regions), but rather they may present alternative ways of constituting political thought and action on climate change involving flux and negotiation in *natureculture*; this constitution would privilege a politics of *living among* populated on-going climate changes, rather than *living against* or *escaping from* a chronically alienating transcendent version of both 'man' and climate.

Notes

[1] Tim Flannery, *The Weather Makers* (Toronto: Harper Collins, 2007); IPCC, *Climate Change 2007: The fourth assessment report of the Intergovernmental Panel on Climate Change* (Cambridge: Cambridge University Press, 2007); Michael Mann & Lee Kump, *Dire Predictions* (New York: Dorling Kindersley, 2008); Naomi Oreskes, "The Scientific Consensus on Climate Change: How do we know we are not Wrong?" In *Climate Change: What it means for us, our children and our grandchildren*. Ed Joseph Dimento & P Doughman (Cambridge: MIT, 2007); William Smith, "Presence of Mind as Working Climate Change Knowledge: A Tonic Cosmopolitics" In *The Social Construction of Climate Change: Power, Knowledge, Norms, Discourses*, Ed. M. Pettenger (Burlington: Ashgate, 2007), 217-234; Andrew Weaver, *Keeping Our Cool*, (Toronto: Viking, 2008).

[2] Hannah Arendt, *The Human Condition* (Chicago: University of Chicago Press, 1958), 248-280.

[3] *Ibid*, 5.

[4] Weaver, 116-118.

[5] Although the term, "alienation" is heavily determined in political thought by the writings of Hegel and Marx, I will bracket these thinkers here in favour of Arendt's version, which firmly lends itself to a discussion of climate change.

Conventional political theorists may not be satisfied with the absence of the founding fathers of the political theory of alienation, but I suggest the notion of alienation is more usefully open to interpretation in the interdisciplinary circles that are discussing climate change. While bracketing these thinkers does not preclude the relevance of a Hegelian and/or Marxist analysis, such an exploration is beyond the scope of this piece.

[6] Arendt, 1.

[7] *Ibid*, 264.

[8] *Ibid*, 148-149.

[9] *Ibid*, 265.

[10] *Ibid*, 273-284.

- [11] See official description of the project <http://www.biospherics.org/experimentchronol.html> (accessed on 30 April 2010); Dan Vergano, Dan. "Brave new world of Biosphere 2?" *Science News* 150, no. 20 (November 16, 1996): 312-313. <http://ezproxy.library.uvic.ca/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=mih&AN=9611198052&loginpage=Login.asp&site=ehost-live&scope=site> (accessed on 2 May 2010);
- [12] Joel E. Cohen & David Tilman, "Biosphere 2 and Biodiversity: The Lessons So Far" *Science*, New Series, Vol. 274, No. 5290 (Nov. 15, 1996), 1150-1151. <http://www.jstor.org/stable/2891578> (accessed on 30 April 2010). A second mission was attempted in 1994, but was aborted due to funding, management and interpersonal issues originating in the factions created in the first mission over whether the project should be cast primarily as a business venture or a science experiment. The project was officially terminated and management of Biosphere 2, no longer a closed system, was transferred to Columbia University who used it as an Earth sciences research facility. The site was sold by one of the original owners in 2005, and since 2007 it has been a research facility for the University of Arizona under the ownership of a private development company. Sabine Höhler presents a compelling critique of the project by highlighting how the environmental preoccupations during the 1960's-1990 blended with Cold War military concerns and techno-scientific attempts to re-make a 'better nature' in closed, self-sustaining systems, Sabine Höhler, 'The environment as a life support system: the case of Biosphere 2', *History and Technology*, 26: 1, 39-58 <http://dx.doi.org/10.1080/07341510903313048> (accessed on 30 April 2010).
- [13] Washington Post "NASA's Griffin: 'Humans will Colonize the Solar System'" September 25, 2005. <http://www.washingtonpost.com/wp-dyn/content/article/2005/09/23/AR2005092301691.html>, (accessed on 27 February 2010).

- [14] Roger Revelle & Hans Suess, "Carbon Dioxide Exchange between Atmosphere and Ocean and the Question of an Increase of Atmospheric CO₂ During the Past Decades," *Tellus* 9: 18-27, 1957.
- [15] Weaver, 71-80.
- [16] Arendt, 268.
- [17] Flannery, 12-13.
- [18] *Ibid.*
- [19] Mann & Kump.
- [20] Flannery; Weaver.
- [21] Flannery, 72.
- [22] For a representation of some of the expert consensus see: Flannery; IPCC; Mann & Kump; Oreskes; Smith; Weaver.
- [23] Dipesh Chakrabarty 'The Climate of History: Four Theses', *Critical Inquiry*, Winter 2009.
- [24] See, for example, Gayatri Spivak, *A Critique of Postcolonial Reason* (Cambridge: Harvard University Press, 1999), 76-78; Cary Wolfe, *Animal Rights, American Culture, the Discourse of Species, and Posthumanist Theory* (Chicago: University of Chicago Press, 2003), 169-189, 191.
- [25] See <http://www.wireimage.com/gallerylisting.asp?navtyp=gls====260437&nbc=1&source=rss> for the documented images of Al Gore launching this campaign with Kevin Wall and Cameron Diaz.
- [26] Raymond Williams "Structures of Feeling" in *Marxism & Literature* (Oxford: Oxford University Press, 1977), 75-141.
- [27] Elizabeth Kolbert, *Field Notes from a Catastrophe* (London: Bloomsbury, 2006) 58.
- [28] Gynne Dyer, *Climate Wars* (Toronto: Random House, 2008).
- [29] *Ibid*, 4
- [30] Jordan Crandall, "Precision + Guided + Seeing" In A. & M. Kroker Eds. *Critical Digital Studies: A Reader* (Toronto: University of Toronto Press, 2008), 87-105.
- [31] *Ibid*, 90.
- [32] *Ibid*.
- [33] See Google Smart Metering Program maps for a flattened image of the Earth blanketed in smart meter/smart-grid

trajectories <http://maps.google.com/maps/ms?ie=UTF8&hl=en&msa=0&msid=115519311058367534348.0000011362ac6d7d21187&ll=53.956086,14.677734&spn=23.864566,77.519531&z=4&om=1> (accessed on 10 March 2010).

[34] For more on the grid-connections issues of renewables, energetics and peak load demand, see: Vaclav Smil, *Energy*, (Oxford: Oneworld Publications, 2006), 169-171.

[35] Crandall, 89.

[36] *Ibid*, 89-90.

[37] See Wyless UK's corporate website whose descriptions of products and graphic images describe a 'total surveillance trajectory' with obvious Archimedean pretensions.

<http://www.wyless.com/index.php/about-m2m> (accessed on 20 February 2010)

[38] Carolyn Bassett "Forms of Reconciliation," *Cultural Studies* 21/ 1 (2007): 82-94.

[39] See some of the press on the top 5 smart meter companies in the U.S. who are currently fighting for the market share -- especially in light of the Obama's economic stimulus money for smart meter implementation. Katie Fehrenbacher, "Who Will Win Big in the Smart Meter Rollout?", earth2tech website, <http://earth2tech.com/2009/03/31/who-will-make-good-in-the-smart-meter-rollout/> (accessed on 20 February 2010).

[40] See for example, the website of Carbon Footprint Ltd, a carbon management company

<http://www.carbonfootprint.com/aboutus.html>, (accessed on 26 April 2010); and Clean Metrics

http://www.cleanmetrics.com/html/carbon_footprints.htm (accessed on 26 April 2010).

[41] Paul Crutzen, "Geology of Mankind," *Nature*, 415/23/3, January 2003.

[42] See Oreskes; Chakrabarty. Another relevant text for thinking through geological agency, although from an earlier conventional frame of geology as rock or 'inanimate' nature is: R. L. Sherman's *Man as Geological Agent: An Account of his Action on Inanimate Nature* (London; H.F & G Witherby, 1922).

<http://www.archive.org/details/manasgeologicala00sheriala>,

(accessed on 26 April 2010). This text deals mostly with mines and quarries, so the boundary conditions for life are considered quite literally as the foundational rock, rather than the atmosphere.

[43] Chakrabarty, 206-207.

[44] J.R. Fleming, *Historical Perspectives on Climate Change* (Oxford: Oxford University Press, 1998), 11-12.

[45] *Ibid.*, 83-92.

[46] *Ibid.*

[47] Canadian Broadcasting Corporation "The Current" November 13 Edition, 2009, Guest host David Suzuki. Part 3: Geo-engineering.

<http://www.cbc.ca/thecurrent/2009/200911/20091113.html>

(accessed on 20 November 2009)

[48] *Ibid.*

[49] *Ibid.*

[50] I borrow Donna Haraway's term here to draw attention to the ways in which nature and culture are chronically and impossibly held apart in discourse (and disciplines). As Haraway insists, cross-boundary ways of being and constructing worlds have always existed; I use natureculture here to foreground a responsibility to the recursive effects of 'human' agency that are evident within the phenomenon of climate change, though not always explicitly attended to in disciplinary silos that take up climate change. See Donna Haraway, *The Haraway Reader* (New York: Routledge, 2004).

[51] See Julie Cruikshank's *Do Glaciers Listen?* (Vancouver: UBC Press, 2006) for accounts of indigenous elders in the glaciated spaces of the Mount St Elias region of the Pacific Northwest. Given the ways in which glaciers are singularly 'read' factually as thermometers red-lining geologic 'tipping points' within a contemporary epistemology of climate change, this collection of voices represents an important alternative story of cultural-material life in glaciers. Elders' stories show how glaciers are taken up and shaped by natural-cultural encounters just as they, in turn, shape such encounters. A key feature of these stories is their ability to conjure collective and even somewhat

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prescriptive ways of being that demonstrate the necessity of humility against a dominant form of geo-techno hubris. See also "Transition Town" initiatives, a community-based approach, founded in the U.K whose aims are to create radical shifts in energy regimes in order to avoid complete dependence on fossil fuels. Initial successes in many communities suggest momentum for a bottom-up, proactive approach to what seems like a problem that can only be addressed at a 'cosmic' scale. This following website describes the first Transition Town in Totnes, <http://totnes.transitionnetwork.org/> (accessed on 20 February 2010).

A Sonic Economy

STEVE KENNEDY

A Sonic Economy is a methodology that allows for critical engagement with, and the identification of, the heterogeneous apparatus (or dispositif) of politics and power that is operational at any given time. [1] As industrialism morphs into an information society wherein the dispersion of discrete elements is manifest but not always clearly visible, an appropriately dynamic, mobile mode of analysis is required: one not tethered to representation, one that can accommodate an almost perpetually shifting ground.

Bestowing materiality on that which cannot be actualized visually, whilst recognizing the influence of Marx's "Theses on Feuerbach" and Bataille's concept of "Base Materialism" -- insofar as it is a materiality that resides in the day-to-day rhythms of the urban milieu -- is not an act intended to represent a new kind of truth that heralds particular ends or beginnings. Instead it raises the dilemma that when you *look* you can't always see the connections between people/institutions/events that common sense tells us are separate and unrelated, or at least belonging to different realms and operating according to different rules; but if you *listen* you can hear the politics!

Listening then becomes a strategy for political engagement, a means of making connections across time and space between people/institutions/events/phenomena. It is sometimes, but not always, literal insofar as it proposes the strategy be employed to demonstrate the interrelationship of factors that don't necessarily or exclusively reveal themselves on an audible sonic register.

As an approach it is necessary because, as has been stated by the online music and media distribution organisation Slow to Speak,

Life in its truest form is a kind of music; characterized by propulsive syncopated rhythms, polyphonic ensemble playing, varying degrees of improvisation, and often deliberate distortions of pitch and timbre. Implied is a series of balancing acts. It must always be disciplined -- but never driven -- by formulas, agendas, or sheet music. It must always be pushing outward, forward, upward -- and therefore, inevitably, against complacency. *Slow To Speak* exists to run parallel with life's music. *Slow To Speak* aims to offer its own distinctive melodies, rhythms without pretense and the entrapment of modern life. It is a groove that ignites passion -- hot beads of sexual excitement, a groove that is gravitational -- creating the sweet funk of action and influence. *Slow to Speak* is raw, convicting and at times uncomfortable -- setting itself apart as a media outlet subsisting on truth and its convictions.

slow to speak is taken from a Bible verse found in the book of James, 1:19. It reads, "be quick to listen, slow to speak and slow to anger." This is the approach we are taking to compiling and sequencing music. It is one that begets genuine appreciation for the work, its presentation and the audience. [2]

The term "Sonic Economy" operates in accordance with this statement. It sets out a mode of thought in which multiple aspects of production, communication and exchange are assigned and/or assume interrelated value, duration, and speed/tempo. As an approach it imbues notions of rhythm and harmony with a materiality not present in much of contemporary analysis. Hence, "Political Economy" as an approach to understanding the complexities of the contemporary technologically mediated environment is reconfigured using approaches that have hitherto

resided in the apocryphal realm of music or sound more generally.

The term Political Economy is used here to describe an amalgam of factors relating to the systematic management, production, and distribution of goods and services/information/data, and both the formal and informal political environment in which that process takes place. Too often, previous attempts to understand the complexity of such arrangements have done so in a manner characterised by neat periodizations with attendant beginnings and ends, as well as clearly marked lines of demarcation between specific spheres of activity. [3] The largely static nature of such analyses, however, relying as they so often do on representational certainty and dialectical rationality, cannot adequately account for the seemingly relentless drive towards ubiquity of the now not-so-new and converging communication technologies, or their coming into being.

The emergence and continued development of such technologies is a story that is not easily told. Formal narrative structures that employ a beginning middle and end are unable to account for the complexity of this particular tale. When *The Guardian* newspaper reported, "In 1994, say those in the know, the world will fast forward into a high-tech future that will alter the way we think, talk and live..." [4], it did so in a manner that simultaneously heralded the end of one particular time and the beginning of a new one. In doing so it assigned an abstract neutrality to technology that failed to address its genealogy and the complex contrivance of interrelated factors that only a sonic methodology could potentially account for. [5]

Dialectical and representational approaches that ignore such complexities serve to fix and represent spatio-temporal phenomena according to a particular logic. They do so with a claim to authenticity that endures until an acceptable challenge is instituted and sanctioned. History and progress are set out in a linear succession of periods or blocks that subsume all in their continuous path. Heidegger called it ontic knowledge -- a kind of ordering principle that could explain the world and our place in it

to a degree -- a primarily visual degree that had come to dominate Western thinking since the time of Plato. But what of the invisible, the things that exist in the folds, the things that fail to conform to conventional explanation? Are they simply not there, or, more worryingly, to be classified as unimportant or as statistical anomalies? And finally where does it leave sound? What about phenomena that reveal themselves to the ear but not to the eye? In the multimedia, technologically mediated environment that we currently inhabit, the importance of sound as well as other sense stimuli needs to be restated. [6]

But the call for a sonic method is not simply promoting the case for an alternative -- one mediated via exposure to the forces of negation to produce a concrete new implacable method -- but rather is intended to set method free in the digital sense of multiple possibilities for connection across space and time. It does not for instance call for a dialectic struggle between formal political/economic and creative sectors as was the case recently with the Demos Report on Cultural diplomacy. [7] The Report advocated a modified form of economic and political imperialism that embraced and took seriously the power of contemporary British cultural products -- in this particular case, highlighting the diplomatic potential of the band Razorlight as a means of advancing Britain's standing on the global stage. Simply putting music into the equation is not the same as a sonic economy.

Finally the term "sonic," with its connotations of speed and movement, is conjoined with "economy" because of the already-stated interest in material exchange value and reciprocity which, whilst dealing with issues of ontology and/or metaphysics, is, as well as being a philosophy of historical movement and connectivity, also an economy of immanent relations of exchange with lines of flight as trade routes and feedback loops forming sonically actualized activity that operates in relation to the management of, mismanagement of, or outright failure to manage, resources, physical and otherwise, in a manner that goes beyond the formally political or economic without leaving them behind. It therefore considers factors not accounted for in the strict parameters of Political Economy.

The sounds that resonate in certain specific political locales or milieu can tell us something significant about a particular place and time, and arranging political, economic, technological, and cultural factors, into "harmonious scores" will be beneficial. Music/sound/noise should therefore be regarded as important in and of themselves and also as interrelated frameworks for understanding complex historical machinations in which timing replaces time in a space in which diverse statements are *arranged* into discourses or agendas.

The notion of an agenda is posited here as an arrangement of often disparate elements, or an interplay of harmonies and melodies, across time and space. They operate sonically, picking up mood, rhythm, timbre and tempo, and then sit out a few bars in silence as other, momentarily more apposite, factors take their place. An agenda is not a hierarchy but a bringing to order; not always logical or possessed of clear motive, an agenda is always demonstrative of a process of power in operation. [8] Accordingly, practically distinct spheres of life such as politics, philosophy, art, and science, can and do exist within and between agendas, and are not subsumed under a universalising meta-narrative or ideology that can be readily identified or represented. They exist in their own right, as Political Economy approaches have shown us, but they also exist in relation to one another. Like distinct items on an agenda, or aspects of a musical arrangement, they play off each other. For this reason we need to be in a constant state of readiness in our assessment of which line is resonating with which others and when.

A sonic examination of such agendas can assist us in making sense of the complexities of contemporary technological environments when simply looking may not be enough. [9] The task of arranging the sometimes invisible -- which finds its theoretical ground in Heidegger and later in Deleuze & Guattari, as will be shown below -- draws together two aspects of Foucault's work, namely Discourse and Luminosity.

For Foucault, "...the term discourse can be defined as the group of statements that belong to a single system of formation; thus I shall be able to speak of clinical discourse, economic

discourse, the discourse of natural history, psychiatric discourse." [10]

Laclau and Mouffe describe a similar category that they call *articulation*. In a manner that directly echoes Foucault they say, "We will call *articulation* any practice establishing a relation among elements such that their identity is modified as a result of the articulatory practice. The structured totality resulting from the articulatory practice, we will call discourse." [11]

Thus it might be asked, is it now possible to speak of a discourse on technology? One that is multiple and dispersed, that cannot be seen but can be heard? In this respect I draw again on Laclau and Mouffe, who have pointed out Foucault's rejection of four hypotheses in relation to principles around which discursive formations might cohere. They are:

reference to the same object, a common style in the production of statements, constancy of the concepts, and reference to a common theme. Instead he makes dispersion itself the principle of unity, insofar as it is governed by rules of formation, by the complex conditions of existence of the dispersed statements. [12]

Such dispersal renders certain phenomena invisible. "Technology," for instance, is not a specific object that can be seen; it is present and spoken of in a number of forms that in turn are not stylistically uniform. Many concepts are drawn on: historical, scientific, artistic, and philosophical. In terms of themes, again these are multiple: political, socio-cultural, economic, human/post-human, etc. The process of bringing them together and making connections is what is being described here as sonic. That discourse can be identified in different forms in different dispersed locations is the very point that demonstrates its significance as a category, but this also makes it difficult to identify specific discourses using conventional means. This difficulty is raised by James Faubion in his introduction to Foucault's *Death and The Labyrinth*, in which Faubion highlights

the way Raymond Roussel's literary cosmos is shown to operate as one of thresholds and parentheses in which elements (or discourses) get closed off but then suddenly open up in relation to other elements to create a kind of unity. Once more, however, it is a unity that is not always clearly visible: "It is a place of relentless spectacle, of sheer visibility, but of a luminosity so intense that it can be disorientating, even blinding. It is thus a place in which what is most fully exposed has perhaps the best chance of remaining secret." [13]

Hence the trade and communication between discrete elements or discourses needs to be established using a sonic methodology that highlights the extent to which multiple discursive practices moving at varying speeds or tempo periodically cohere to form a "refrain," in the sense that Deleuze and Guattari use the term. Accordingly, phenomena such as technological development, or technology as discourse, can be said to be set to a particular score -- synchronized and harmonic.

Reference to Deleuze and Guattari in relation to this matter assists us in a questioning of Heidegger's essentialism and the ultimate dialectical choice between modern technology and a return to a kind of reconceptualization of technology that embraces poiesis, as set out in his *The Question Concerning Technology*. [14] Heidegger's phenomenology/ontology of Being is useful in moving us beyond Platonic knowledge based on the primacy of visual stimuli, stating as it does that just because it can't be seen doesn't mean its not there, or that it does not possess materiality. But perhaps of more use in this respect is the concept of the refrain -- not as metaphor but as an operational mode of analysis making multiple connections within a rhizomatic "world wide web of significance."

"Of The Refrain" [15] sets out the way in which sonic milieu components consist of sounds that perform a specific function -- marking out the availability of food, warning of danger, etc. They are the noises our world makes. The refrain, on the other hand, organises sounds together, bringing order to chaos. It can be, but is not always, sonic. It consists of organised rhythms and patterns, daily routines and habits, the justification

for which has long been forgotten. It marks out the territories that we recognise as our own or as belonging to others. It creates a sense of familiarity and belonging, yet can also bring about alienation and a sense of detachment. It is our local neighbourhood, our political system and our state. Music/sound/noise, according to Deleuze and Guattari, can deterritorialize this ordered terrain -- disrupt the rhythm, creating a momentary energy field that distorts the dominant order of things as specific spheres or milieu in Rousellian parentheses, open up, creating thresholds for movement and connection with the outside. As Deleuze says,

Thus philosophy, art, and science come into relations of mutual resonance and exchange, but always for internal reasons. The way they impinge on one another depends on their own evolution. So in this sense we really have to see philosophy, art, and science as sorts of separate melodic lines in constant interplay with one another. With philosophy having in this no reflective pseudoprimary nor, equally, any creative inferiority. Creating concepts is no less difficult than creating new visual or aural combinations, or creating scientific functions. [16]

The concept of the sonic then operates on two levels here: as a philosophy of non-representation that embraces movement and fluidity, and at the level of music/sound/noise as significant sites for investigation. [17] In doing so it echoes Jacques Attali's *Noise: The Political Economy of Music*, insofar as it concentrates its attention on that which is often marginalised in relation to more "legitimate" political and economic concerns. Attali has stated:

Today, our sight has dimmed; it no longer sees our future, having constructed a present made of abstraction, nonsense, and silence. Now we must

learn to judge a society more by its sounds, by its art, and by its festivals, than by its statistics. [18]

As useful as Attali's work is, it still operates, as the title suggests, at the level of traditional Political Economy. Its principal claim is that an analysis of music from a political and economic perspective will allow us to identify the future of the wider political landscape. The point of a sonic approach, however, is not to necessarily privilege sound, art, or festivals, but to place them in relation to other phenomena in such a manner that emphasis (on value/duration/speed/tempo) is constantly shifting. That is to say, to engage political economy sonically. It is necessary to apply sonic thinking to the statistics as well as to festivals. To do so will require that Jaques Attali's Political Economy approach be augmented. This can be achieved by introducing what Pauline Oliveros calls "Deep Listening." It is a process that unifies the senses in acoustic space, and which facilitates an awareness of the present and the immediate as well as trajectories and sequences in relation to other phenomena across what she calls the space/time continuum. Oliveros goes on to make the further very important point that Deep Listening might be usefully applied to aspects other than the audible -- to urban environments and broader political economies, as well as to sound. In doing so connections can be made between dispersed phenomena -- without privileging one over another -- across time and space that might not be visible to the naked eye. As Oliveros says,

The level of awareness of soundscape brought about by Deep Listening can lead to the possibility of shaping the sound of technology and of urban environments. Deep Listening designers, engineers and city planners could enhance the quality of life as well as sound artists, composers and musicians. [19]

Such an approach can tell us something about politics,

power and resistance -- music and sound existing not simply as metaphor but as significant nodal points in a complex contrivance of interconnected factors, each inhabiting an expanded, wider, and deeper political terrain in which we must listen to dispersion. [20] If looking confirms abstraction then listening establishes connections. It is this musical principle, the arrangement of resonant phenomena, that is being proposed here and which constitutes a means of sonic critique that supplements all the other senses. Life in its truest form is a "kind of music," made up of immanent and material relationships between dispersed phenomena.

Notes

[1] <http://foucaultblog.wordpress.com/2007/04/01/what-is-the-dispositif/>

[2] <http://slowtospeak.net/originalabout.html>

[3] Habermas draws a distinction between what he calls "System" and "Lifeworld" as independent spheres of activity.

<http://www.csudh.edu/dearhabermas/habfouc02.htm>

[4] *The Guardian* 1.1.1994

[5] The problems associated with the strict assignment of beginnings and ends are discussed by Jean-Francois Lyotard in *Soundproof Room: Malraux's Anti-Aesthetics* (Stanford: Stanford University Press, 2001), 2-7 and also by Gilles Deleuze in *Negotiations* (New York: Columbia University Press, 1995), 121-122

[6] In doing so it is useful to reflect on McLuhan's concept of Acoustic Space:

Acoustic space is a complete contrast to visual space in all of its properties, which explains the wide refusal to adopt the new form. Visual space, created by intensifying and separating that sense from the interplay with the others, is an infinite container, linear and continuous, homogenous and uniform. Acoustic space, always penetrated by tactility and other senses, is spherical,

discontinuous, non-homogenous, resonant, and dynamic. Visual space is structured as static, abstract figure minus a ground; acoustic space is a flux in which figure and ground rub against and transform each other.

(Marshall & Eric McLuhan, *Laws of New Media: The New Science* (Toronto: University of Toronto Press, 2007), 33.

[7] The relationship between formal political/economic factors and the "creative sector" can and should be related to the distinction, mentioned above, that Habermas draws between "System" and "Lifeworld"

<http://www.demos.co.uk/publications/culturaldiplomacy>

[8] In previous research the term "The Technology Agenda" (S. Kennedy PhD thesis 2003) has been used to describe how disparate statements, in the Foucauldian sense of that term, across a range of mediated forms and emanating from distinct spheres of life -- politics, economics, as well as the media and the arts -- could be somehow sutured together to give us a better understanding of the way in which discourses work to normalise technological life, or in this particular case the utilisation and adoption of developing network technologies.

[9] In the same way that listening to the stars can reveal something deeper than just observing them, listening to political, economic, technological and cultural shifts will reveal something significant about the movement and intensity of power and resistance <http://bbc.co.uk/1/hi/sci/tech/7687286.stm>

[10] Michel Foucault. *The Archaeology of Knowledge* (London: Routledge, 2004), 121.

[11] Ernesto Laclau and Chantal Mouffe. *Hegemony and Socialist Strategy: Towards a Radical Democratic Politics*, (London: Verso, 2001: 104).

[12] *Ibid*, 105.

[13] Michel Foucault. *Death and The Labyrinth* (London: Continuum, 2004), vii.

[14] Martin Heidegger. *The Question Concerning Technology and Other Essays* (New York: Harper Row, 1977).

[15] Gilles Deleuze and Felix Guattari *A Thousand Plateaus* (London: Continuum, 2004).

[16] Gilles Deleuze. *Negotiations* (New York: Columbia University Press, 1995), 125.

[17] This paper supports the methodology being proposed for a research project, provisionally entitled *Sonic Economies: The politics of the Motor City*, that will examine confluences between Coventry and Detroit from the point of view of music and industrial decline. A study of Coventry and Detroit can tell us something simple about the way in which creative sectors came to represent significant economic importance in crumbling cities. But if approached from a sonic perspective they reveal so much more about a politics of affect, about connection and movement of both people and sound, as well as resources. The stories of Coventry and Detroit are important narratives in trying to understand the shift from analogue to digital -- from concrete jungle to technopolis. It is best told as a story without beginning or end, and through sonic means where visualisation fades to reveal intrigue, betrayal, political action on a Machiavellian scale, heroes and villains, and the most stunning soundtrack.

[18] Jaques Attali. *Noise. The Political Economy of Music* (Minneapolis: University of Minnesota Press, 2006), 3.

[19] Pauline Oliveros. *Deep Listening* (New York: iUniverse, 2005), xxv.

[20] Dispersion is a concept that applies readily to music, with technology allowing for the movement and reconnection of musical fragments across time and space in the form of samples and the multiple generic arrangements so common in electronic music. Listening to such dispersed fragments implies the creation of a narrative that, when it is listened to deeply, goes beyond music to allow connections to be made with all other aspect of life so that a unity of narratives without specific beginnings or ends can be formed. This relates to Foucault's work in *Death and The Labyrinth*, and also to Jean-Francois Lyotard's *The Soundproof Room: Malraux's Anti Aesthetics* (Stanford: Stanford University Press, 2001).

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