

Processual Media Theory

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ABSTRACT

This paper argues that new media studies is dominated by a particular empirical mode of research that overlooks the dynamic relationship between that which has emerged as an object, code or meaning and the conditions of possibility. The paper proposes a processual model for media theory that extends the current empirical paradigm into what Deleuze terms “radical empiricism.” New media aesthetics are considered in relation to systems theory in order to register the processual dimension of sensation. The paper concludes by suggesting that a politics of time is central to processual systems.

KEYWORDS

processual, new media empirics, aesthetics, time, movement, politics

INTRODUCTION

“Process as such,” writes Michel Serres, “remains to be conceived...”[59]. Furthermore, if we take Gilles Deleuze and Félix Guattari at their word (something they warn us not to do!), then all concepts are connected to problems.¹ The relationship between concepts and their problems constitutes a situation. For the purpose of this paper, the formation of intelligibility is a system consisting of concepts, problems, and situations. Process is something ongoing in nature, an emergent quality whose expression is shaped by the contingencies and field of forces of any particular situation. In this respect, process can never be conceived in itself. Given this immediate predicament, this paper investigates the possibility of at once conceiving a processual theory for media studies whilst locating the emergent concept of process alongside a series of problems. Or rather, the concept of process emerges through the encounter with a series of problems, which in turn can be understood as situations of possibility or “a continuum of variation”[49]. The central problems addressed in this paper include those of aesthetics, new media empirics, time and movement. Of course this series of problems, this continuum of variation, in no way outlines the totality of the field of new media studies.² That would be absurd, or just plain stupid. These problems emerge as instances of encounter, as framing devices, in thinking the concept of process.

The term aesthetics (*aesthesis*) is used in this paper to speak of the organisation and management of sensation and perception. My interest is in the way sensory affect and an aesthetic regime, as distinct from representation (*mimesis*), can be discussed in relation to new communications media. The aesthetic dimension of new media resides in the processes – the ways of doing, the recombination of relations, the figural

dismantling of action – that constitute the abstraction of the social. Herein lies the unconscious code of new media empirics. That’s to say, new media empirics can become something other than what it predominantly is at the current conjuncture. It is the potential for a superempirics of new media that this paper seeks to translate through the concept of process.

A processual aesthetics of media culture enables things not usually associated with each other to be brought together into a system of relations. The combination of art, commerce and the routine practice of stock market day trading constitutes such a system, as I will go on to discuss. A processual media theory describes situations as they are constituted within and across spatio-temporal networks of relations, of which the communications medium is but one part, or actor. As with any approach, processual media theory itself is implicated in the systems of relations it describes; as such, it too operates in a reflexive mode that contributes to change within the system. Aesthetic production is defined by transformative iterations, rather than supposedly discrete objects in commodity form. Processual aesthetics is related to the notion of the sublime, which is “witness to indeterminacy” (see [45, 44, 58]). The media sublime unravels the security presupposed by the political economy of empirical research on new media.

Political economy has a tendency to treat the media as a set of objects and, accordingly, objectivises media technologies or media content as “products,” such as advertisements. Political economy and functionalist sociology of the media cannot understand the locus of socio-technical transformations that are relational and have sensory effects whose operation is not determined by a positivist empirics of the media as seen, for example, in traditional media impacts/effects analysis, content analysis and “uses and gratifications” functionalist research (see [38, 31, 5, 16]).³ Then there is the political economy of new media empirics. That is, the political, economic and institutional conditions which shape neo-empirics as the emergent paradigm in the field of new media studies.⁴ While new media empirics is useful for cataloguing observable trends and phenomena, this paradigm is not so adept at reflecting upon the dominant interests and questions of power that condition its own legitimacy.⁵

The political dimension of aesthetics is manifest in the power relations that attend processual systems. In order to undertake an analysis of the socio-technical assemblages that constitute the processual, attention would need to be paid to the institutional settings of new media and their uses, be they in the office, at home, or in networked gaming arcades, for example, and the conditions of cultural production. A processual aesthetics of the socio-technics of these arrangements attests to the politics of post-representation. The articulation of various elements that constitute a network can be thought of in terms of duration (a mode of temporality that is antithetical to instrumental time), which might also be termed the processual aesthetics of new media. So, a processual aesthetics of new media is related to and constituted within the time and space of the media event (see [65, 55]). Networked gaming, online opinion polling, web petitions, and blogs are all instances of new media that incorporate an aesthetic regime defined by non-linearity, interactivity and real-

time that constitutes everyday media events.

A processual media theory can enhance existing approaches within the field of new media studies, registering the movement between that which has emerged as an empirical object, meaning or code, and the various conditions of possibility. Processual media theory inquires into that which is otherwise rendered as invisible, yet is fundamental to the world as we sense it. Thus, processual media theory could be considered as a task engaged in the process of translation (see [39]). To this end, this paper addresses the problematic of a renewed empirical mode that has come to dominate intellectual practice within media studies; indeed this predominant mode extends beyond any single discipline and prevails across the humanities and technosciences. The new media empirics has found itself enlisted in the mission of neoliberalism, which subordinates the practice of life to the demands of a market economy. Hence, this paper develops a processual model of media theory as an alternative to, and mode of critique of, empirical research. Further, this paper contends that a processual model of communications is useful in addressing the politics of information societies. As Deleuze has written, “concepts, with their zones of presence, should intervene to resolve local situations” [12].

NEW MEDIA EMPIRICS

Over the past few years, one is increasingly able to detect the emergence of empirical approaches to the study of new media as the current dominant paradigm. An empirics of new media describes the various forms, objects, experiences and artworks that constitute new media. The empiricist desire to fix all that is virtual into concrete is coextensive with a certain weariness, boredom or distrust of the excesses of “postmodern theory” that came to characterise much work going on in media and cultural studies and contemporary art during the 80s and 90s. Work carried out in sociology, international relations, and architecture has also taken this empirical turn.

These fields all share a desire to ground their objects of study, to retrieve them from the ravages of “speculative theory,” and in so doing, perhaps begin a process of reconstructing or securing disciplinary identities. Arguably, all of this coincides with the perceived displacement of national and local communities wrought by communications media such as satellite TV, the Internet, and the mobile phone. Very real displacement across social scales accompanies the structural transformations of national and regional economies in a post-Soviet era in which populations have become increasingly mobile at transnational levels as professional or unskilled labour, as refugees, or as tourists.

It is the task of empirical studies to describe and analyse these various transformations, yet to delimit such work to the scholastic mode of production is to overlook the ways in which such research corroborates the interests of capital which, in the corporatisation of universities, finds the current empirical paradigm as the new frontier of instrumental reason. Much research on the Internet is quantitative and commercially driven, measuring, for example, the number of hits and counting users on web pages. Researchers, or information workers,

in many instances are providing data analysis that has commercial applications in ascertaining consumer habits and, in the case of new media studies, there is an attempt to foreclose the myriad ways in which users engage with media forms and content. It’s all quite desperate. And it’s all related to a quest to capture markets.

A non-reflexive and non-reflective new media empirics assumes that the various uses of new media forms, or the practices constituted by media forms, define the horizon of intelligibility of new media. Different uses, different meanings. But is that all there is to it? Are the arrangements or networks of new media confined to their uses, whether it’s by human or non-human actors? And at what point does one say the field of actors has been identified? When does the list of actors end? Upon what plane of abstraction does use manifest? Are there registers of use that are overlooked because the multi-dimensional planes of abstraction are not identified? These are all questions which begin to problematise the security, even arrogance, presupposed by a method which seeks to quantify the semiotics of new media in terms of the uses made of particular new communications media.

Empirical research typically proceeds by securing what is otherwise a fluid, contingent and partially unstable process constituting a system of inter-relations. Louis Althusser locates the problem of empiricism as a method in terms of its assumption of having captured the essence of an object through the process of abstraction. As he wrote over thirty years ago in *Reading Capital*: “Empiricist abstraction, which abstracts from the given *real* object its essence, is a *real abstraction*, leaving the subject in possession of the *real* essence” [1]. In order to extract the real essence from the object, empiricism undertakes an operation that eliminates the object’s constitutive outside. This procedure serves as an epistemological validation of empiricism, since “To know is to abstract from the real object its essence, the possession of which by the subject is then called knowledge” [1]. Hence a relationship based on presence-absence is produced between that which is revealed as real (i.e. the objects of knowledge) and the procedural mode that has enabled this operation (i.e. the form of knowledge). For Althusser, empiricist knowledge is part of a larger hegemonic episteme or “apparatus of thought” that grants primacy to vision, seeking to make visible the invisible ([1]; see also [30]). The fundamental error of such abstraction is that it fails to reflect critically upon the conditions of possibility for such a procedure.

As a methodological practice, empiricism is captured by a delirium in which there is an assumption that the essence of the object can be revealed. Due to an incapacity to reflexively engage with the field of forces which condition its methodology, empiricism eliminates the processual dimension that underpins the emergence of the supposed essence of the object, revealed as a form whose meaning is stable. Marx and Engels write in *The German Ideology* that “Empirical observation must in each instance bring out empirically, and without any mystification and speculation, the connection of the social and political structure with production” [48]. And: “As soon as this active life-process is described, history ceases to be a collection of dead facts, as it is with the empiricists (themselves still abstract), or an imagined activity of imagined

subjects, as with the idealists” [48]. As a result of these oversights, empiricism offers nothing by way of political critique. Indeed, to do so would endanger the very legitimacy of empiricism as a method. Further, as David Holmes has noted, “The more it [empiricism] establishes the visibility of what it sees, the more it establishes knowledge, the better able it is to guarantee itself” [28]. Since the social relations of production that condition the space and time of “the political” are part of the constitutive outside that the empiricist problematic excludes, empiricism attributes, according to Althusser, an “inessential” value to socio-political and historical conditions of formation [1].

In the case of new media empirics, which reproduces the methodological procedure of empiricism, a reflexive encounter with its techniques of operation would begin to take into account the plurality of forces, including those of institutional interests, which condition the formation of a practice, code or meaning. In doing so, the multidimensional pluralism that functions as empiricism’s constitutive outside would come to bear. Moreover, the politics that attends such an operation could be situated in an agonistic framework in which pluralistic discourses, practices, forces, and interests procure a legitimacy that is otherwise denigrated by empiricism’s claim to have abstracted the essence of the object from the real.⁶

The shift in media studies and other disciplines to a non-reflective and non-reflexive empirical mode is perhaps best accounted for by paying attention to the shift that has occurred in the conditions of production associated with intellectual labour within a neoliberal paradigm. Within this mode is a pressure for intellectual practices to become accountable. This pressure is not motivated by ethical considerations, which include the delivery of knowledge and engagement with teaching and research in ways that are responsive both to their own disciplinary circumstances and to those who are subjects within a particular institution and its disciplinary formations. Rather, there is a managerialist demand for the products of intellectual labour – knowledge coded as intellectual property, which makes possible the commodity object – to be accountable to the logic of exchange-value and market mechanisms.

The neoliberal imaginary seeks to subject all socio-cultural practices to the laws of the market, which are one manifestation, albeit limited, of the logic of capital. As such, a technique of verification is required, and the humanities has turned to the sciences for such a tool. This is hardly surprising, since the sciences have long held a relationship with industry, which sees the output of labour within the sciences as holding commercial and industrial application. A perception dominates within the managerial culture of academe that assumes vulgar empirics to be the technique that best enables intellectual labour to be measured, quantified and reported in terms of stasis or stability.

The key problem of an empirics of new media aesthetics resides in its failure, in a number of instances, to understand that the aesthetics of artworks, software applications and technologies are conditioned by social relations as well as the theoretical paradigms through which analysis proceeds. Technology, as understood by Raymond Williams, is found in the processual

dimension of articulation, where the media is but one contingent element that undergoes transformation upon every re-articulation (see [67]). This presents a challenge to the empirical turn in net studies, which seeks in vain to pin down a terrain that is made historically redundant prior to its emergence. By way of an alternative, Scott Lash proposes that “Empirical meaning is neither logical (as in classification) nor ontological, but everyday and contingent” [37]. Empirical approaches to the net, if nothing else, need to work in a reflexive mode that is constantly aware of the conditions attached to funded research, to critique them, to describe the institutional cultures that shape the emergent third paradigm of net studies, and to see the seemingly secure ground of any empirical moment as something which is always interpenetrating with something else.

PROCESSUAL AESTHETICS AS RADICAL EMPIRICISM

With the invention of the telegraph came the genre, form or style of telegraphic writing, of news wires. Think of Ernest Hemingway, with his telegraphic, machine-gun writing style – a mode of writing within and through media of communication. Moreover, a zone of indistinction between the human and non-human emerges with the advent of new communications media. As Friedrich Kittler suggestively notes of Nietzsche upon his use in 1882 of a Malling Hansen typewriter: “Our writing tool not only works on our thoughts, it ‘is a thing like me’” [34]. With failing eyesight, the “mechanized philosopher” undergoes a transformation of expression: Nietzsche “changed from arguments to aphorisms, from thoughts to puns, from rhetoric to telegram style” [34].

The Malling Hansen model initiates a kinaesthetics based on touch, since its “semi-circular arrangement of the keys itself prevented a view of the paper” [34]. The shift from visual control and linearity associated with the pen and paper to the blind activity of typing constitutes a feminisation of philosophy, argues Kittler [34]. The primacy of the classical author corresponds with a closed system predicated on socio-technical distinctions associated with the “phallogocentrism of classical slate pencils” and “the sexually closed feedback loop” of the Gutenberg Galaxy [33]. The machinic philosopher, by contrast, is part of a combinatorial system that brings together philosopher, typewriter, a “delicacy” of touch, and women, who dominated the ranks of secretaries in printing houses in the late nineteenth century. Piano fingers turn out to be good typing fingers.

With the internet, we have seen hypertext, listserves, net.art, and so forth. With the mobile phone, short-text messaging (SMS) has emerged as one the most popular socio-technical forms of communication. These could all be talked about in terms of media aesthetics. However, I think it is more interesting for an aesthetics of new media to consider the ways in which social and cultural formations not immediately attributable to the media with which they are contemporary might also be included in the pantheon of media aesthetics. Such articulations might constitute the unthought of media aesthetics: social and cultural forms that are not determined by media technologies, but are potentialities that coincide with or are parallel to contemporaneous communications media.

A processual aesthetics of new media goes beyond what is simply seen or represented on the screen. It seeks to identify how online practices are always conditioned by and articulated with seemingly invisible forces, institutional desires and regimes of practice. Furthermore, a processual aesthetics recognises the material, and embodied dimensions of net cultures. When you engage with a virtual or online environment, are you simply doing the same thing as you would in a non-virtual environment, where you might be looking at objects, communicating, using your senses – vision, sound, etc? In other words if the chief argument of the new media empirics lies in the idea that we simply ought to pay close attention to what people “do” on the net and ignore any grander claims about virtual technologies – is this adequate? Is there anything in this “do-ing” which deserves greater analysis?

Do virtual environments simply extend our senses and our actions across space and time, or do they reconstitute them differently? There is a strong argument to be made for the latter. In the same way that visual culture – especially the cinema – legitimised a certain way of looking at things through techniques such as standardised camera work and continuous camera editing, then virtual technologies re-organise and manage the senses and our modes of perception in similar ways. As Kafka once noted: “cinema involves putting the eye into uniform.”

Software design, virtual environments, games, and search engines all generate and naturalise certain ways of knowing and apprehending the world. We can find examples of this with database retrieval over linear narrative, hypertext, 3D movement through space as the means to knowledge, editing and selection rather than simple acquisition, etc. So if empirics can record that we have virtual conversations, look up certain sites, and so forth – it doesn't consider *the technics of combining visual and tactile perceptions* in certain ways and in certain contexts to allow for distinct modes of understanding the world. Nor does a new media empirics inquire into the specific techniques by which sensation and perception are managed. This is the task of processual aesthetics.

The repetition of technics of sensation and perception are partially distinguished by the regimes of value (economic, legal, political, and cultural) which are inscribed upon such ways of doing. A processual aesthetics of media theory seeks to identify the various methods that typify empirical research on the internet, and to follow this up with a critique of the empirical mode by considering the institutional desires and regimes of practice that condition the types and methods of research undertaken on new ICTs at the current conjuncture within informational societies. While recognising that the Internet does make our social and cultural transactions more “abstract” – i.e. reconstituted from place-bound relations into the “space of flows” [8] – this of course does not mean that everyone uses the net in the same way, or that the net has the same significance for everyone. Instead, an emphasis is placed on process, on the organisation and management of sensation and perception, which are understood here as the basis of aesthetics. The experience of time, space, others, and embodiment cannot be encompassed by a new media empirics which simply lists and categorises what an

actor does, overlooking the forces and contexts that allow action to occur.

In *The Language of New Media*, media theorist and artist Lev Manovich undertakes a media archaeology of post-media or software theory [46]. He focuses on a very particular idea about what constitutes the materiality of new media, and hence aesthetics. In excavating a history of the present for new media, Manovich's work is important in that it maps out recent design applications, animation practices, and compositing techniques, for example, that operate in discrete or historically continuous modes. However, Manovich's approach is one that assumes form as a given yet forgets the socio-political arrangements that media forms are necessarily embedded in, and which imbue any visual (not to mention sonic) taxonomy or typology with a code: i.e. a language whose precondition is the possibility for meaning to be produced.

The aesthetic that constitutes a code is only possible through a process of articulation with modes of practice, of interpenetrative moments, of duration. In Niklas Luhmann's terms, a code is integral to the reproduction of structural difference within a functional system (see [43]). As Luhmann writes: “Codes are distinctions, forms that serve as observational devices. They are mobile structures that are applied differently from situation to situation” [43]. Structural determination is thus dependent on the code, whose function is to symbolize. Such an operation enables self-organisation within a system, as I discuss below. In Gregory Bateson's terms, codes are the “difference that makes a difference” [3]. These are all processes that new media empirics eliminates.

The network is not “decomposable into constituent points” [50]. That is what a non-reflective and non-reflexive empirics of new media, of informational economies and network societies, in its reified institutional mode attempts to do. The network is not a “measurable, divisible space.” Rather, it holds a “nondecomposable” dimension that always exceeds – or better, subsists within – what in the name of non-reflexive empirics are predetermined regimes of quantification, which, as Brian Massumi has it, “is an emergent quality of movement” [50]. This is not to say that things never occupy a concrete space. An analytics of space (and time), if it is to acknowledge the complexity of things, cannot take as its point of departure the state of arrest of things. Instead, attention needs to take a step back (or perhaps a step sideways, and then back within), and inquire into the preconditions of stasis. And this does not mean occupying a teleological position, which seeks to identify outcomes based on causes. Or as Massumi puts it, the “emphasis is on process before signification or coding” [50].

That is, there is a multi-dimensionality to socio-aesthetic experiences. They are not bound or contained by any particular communications medium or transport technology. Thus we can say, on precisely these sort of grounds, that the “virtual” and the “material” are always intimately and complexly intertwined. And to overlook this fundamental principle is to impoverish, among other things, the practice of research on new media. What Massumi terms a “superempirics” would register this multidimensionality of socio-aesthetics: a complex of

practices that is constituted within and across pathways, passages, and vectors of mediality.

In formulating a processual model for media theory, this paper does not dispense with empirical work. Far from it. A processual media theory registers the ways in which communications media – any medium of expression – are bound in a system of relations, a singularity of expression, that consists of a field of forces in which things are defined or registered as a concrete stable form, which in turn becomes a condition for transformation and change. In his book *Parables for the Virtual*, Massumi describes this process in terms of the *movement* between that which has emerged and the conditions of potentiality or “the virtual,” understood in a Deleuzian sense of radical empiricism (see [50, 11]). Time for new media empirics, which is not to be confused with radical empiricism, consists of the present, where things are manifest in concrete form. This kind of presupposition cannot account for the multiplicity of time immanent to the operation of the virtual and the actual, which Massumi explains in the following way: “The virtual is the future-past of the present: a thing’s destiny and condition of existence.... A thing’s actuality is its duration as a process...” [49]. Similarly, as Deleuze notes, “Movement always relates to a change, migration to a seasonal variation” [10]. Thus a processual media theory examines the tensions and torques between that which has emerged and conditions of possibility; it is an approach that inquires into the potentiality of motion that underpins the existence and formation of a system.⁷ Herein lies the practice of a radical transcendental empiricism. New media studies is yet to express this particular encounter.

If anything, the dominant mode of empirical research unwittingly defines “the axis of escape along which the differential object ... [slips] quietly away from its own growing objectivity” [50]. With regard to encountering the empirical, Massumi notes:

If by “empirical” is meant “pertaining to predictable interactions between isolatable elements, formulatable as deterministic laws,” then the conditions of emergence of vision are superempirical. They actively *include* the constancy of empirical conditions. The superempirical conditions of experience complexly include the empirical in the mode of responsive accompaniment. As experience takes off, its empirical conditions fall away. [50]

The superempirical is immanent to the concept of the processual, which questions the logic of the grid, of categories, of codings and positions (see [50]). That which precedes these orders of distinction are in fact bound together on a continuum of relations as partial zones of indistinction. Categories are only ever provisional, and emerge to suit specific ends, functions, interests, disciplinary regimes and institutional realities. To this end, the mode of empirical research that predominates in the humanities and sciences – and in particular current research on new media – needs to be considered in terms of not what categories say about their objects, but rather, in terms of what categories say about the *movement* between that which has emerged and the conditions of possibility. Herein lie the contingencies of process.

FEEDBACK LOOPS AND DISSIPATIVE STRUCTURES

... cybernetics, the theory of self-guidance and feedback loops, is a theory of the Second World War.

Friedrich Kittler [34]

A processual media theory can be related back to cybernetics and systems theory and early models of communication developed by mathematician and electrical engineer Claude Shannon in the 1940s. However, there is no single originary point of development of cybernetics. As Gregory Bateson notes, “The ideas were developed in many places: in Vienna by Bertalanffy, in Harvard by Wiener, in Princeton by von Neumann, in Bell Telephone labs by Shannon, in Cambridge by Craik and so on” [3].⁸ Shannon’s model is often referred to as the transmission model, or sender-message-receiver model. It is a process model of communication, and for the most part it rightly deserves its place within an introduction to communications programs since it enables a historical trajectory of communications to be established (see [52]).

However, it quickly becomes clear that this model holds considerable problems because it advances a linear model of communication flows, from sender to receiver. And this of course just isn’t the way communication proceeds – there’s always a bunch of noise out there that is going to interfere with the message, both in material and immaterial ways, and in terms of audiences simply doing different things with messages and technologies than the inventors or producers might have intended. As Katherine Hayles puts it, “Claude Shannon defined information as a probability function with no dimensions, no materiality, and no necessary connection with meaning” [25]. Such a model has limited uses in calculating choice, probability, behavioural patterns, and risk – and hence holds an appeal for determining likely economic outcomes, as the young Rupert Murdoch was to discover in his encounter with games theory⁹ – but it flounders when conditions are not stable but contingent, variable, and embedded in socio-technical and biological forms.

The point to take from this process model is that it later developed to acknowledge factors of noise or entropy (disorder and deterioration), once in the hands of anthropologists such as Gregory Bateson. Central to second-order cybernetic theory is the problem of change and relationships. As Bateson notes of self-referential relationships, “Cybernetics is, at any rate, a contribution to change – not simply change in attitude, but even the change in the understanding of what an attitude is” [3]. As distinct from understanding information as a homeostatic thing in itself, Bateson, by Paul Virilio’s account, “who was one of the first to think of information as a general process, added that ‘Information is a difference that makes a difference’” [64].

Second-order cybernetics shifted from a closed system to an open system of communication. Or, more correctly, it shifted from a linear system to one that took feedback loops into account. This becomes interesting for a model of processual media and cultural theory, which is interested in mutually determining relationships between

that which has emerged and the conditions of possibility. The notion of feedback loops is homologous with the concept of “organisational closure” in second-order cybernetics, as found in the work on neurophysiology and biological systems by Humberto Maturana and Francisco Varela, for example (see [25]).¹⁰ The central feature of Maturana and Varela’s autopoietic systems consists of the organisation of organisation. Difference intermingles with the operations of a system in order to maintain a dynamic equilibrium.

Organisational closure acknowledges the role of the observer in the functioning of a system, and hence introduces the concept of reflexivity where the observer constitutes a node within the scene or operation of observation. In this respect, second-order cybernetics shares something with post-structuralist critiques of the subject: both are concerned with questioning the primacy of the individual and the autonomy of the subject/consciousness from the environment in which it is embedded. Even a summary as cursory as this suggests the implications such a model has for political and ethical considerations: at issue is the status and limits of boundaries understood as constructed, and hence open to change. On the question of a system and its context, Hayles notes that “For Bateson, decontextualization is not a necessary scientific move but a systematic distortion” [25].

A significant extension of the cybernetic model is necessary in order to recast the limits of “organisational closure.” In so doing, it becomes possible to acknowledge the ways in which networks of communication flows operate in autopoietic ways where media ecologies develop as self-generating, distributed informational systems (see [22, 49]). Within the theory of social systems developed by Niklas Luhmann, a system is a set of possibilities whose relations are regulated, organised and distinguished by combinatory forces of interpenetration-penetration, indeterminacy-determination and contingency-stasis ([42]; see also [50]). Together, these features constitute the conditions of possibility for change within a self-referential or autopoietic system. For Luhmann, “in the self-referential mode of operation, closure is a form of broadening possible environmental contacts; closure increases, by constituting elements more capable of being determined, the complexity of the environment that is possible for the system” [42]. Thus closure is temporary in the sense that closure offers a distinction or boundary that feeds back into the system, making change and transformation possible.

Time is an important operation within any system. The multidimensionality of time corresponds with the varying planes of abstraction within which the movement between that which has emerged and the conditions of possibility occur. Luhmann expresses the organisational closure afforded by time and change within a system as follows: “‘time’ symbolizes the fact that whenever anything determinate occurs, something else also happens, so that no single operation can ever gain complete control over its circumstances” [42]. There is a seemingly paradoxical aspect to the notion of organisational closure within autopoietic systems whereby the ongoing process of feedback in the form of incorporating entropy and perturbations conditions the future of the system. Keith Ansell Pearson explains it

like this:

The claim that autopoietic systems are organizationally “closed” can be misleading if it is taken to imply that these systems do not interact with their environment. Such systems are simply closed in the sense that the product of their organization is the organization itself. [56]¹¹

Just as autopoiesis is understood as self-referentiality within the organisation of organisation, processual aesthetics can be understood as the resonance of the sensation of sensation (see [50]). Resonance is a feedback loop. Moreover, processual aesthetics of new media occupy what philosophers of science Ilya Prigogine and Isabelle Stengers call a “dissipative structure” that organises and incorporates contingencies, non-linearities and fluctuations into a dynamic state in “far-from-equilibrium conditions” ([57]; see also [49, 63, 66]).¹² A temporal dimension is reintroduced into the equation here, since “dissipative structures seem to prolong indefinitely the fertile instant of the genesis of structures” [57]. Elsewhere, Stengers enticingly proposes the following: “The contingent process invites us to ‘follow’ it, each effect being both a prolongation and a reinvention” [63]. Put another way, if a continuum of variation ceases to be, so too does communication within a system.

THE ART OF DAY TRADING

We are yet to see what capital can become. So goes the “new economy” mantra as its proponents go about laying claim to the future, which is synonymous with the “free market.” Mastery of the latter supposedly determines the former (see [17]). Bubble economies – exemplified in our time most spectacularly with dotcom mania and the tech wreck in April 2000, which saw the crash of the NASDAQ¹³ – are perhaps one index of the future-present where the accumulation of profit proceeds by capturing what is otherwise a continuous flow of information.¹⁴ Information flows are shaped by myriad forces that in themselves are immaterial and invisible in so far as they do not register in the flow of information itself. The condition of motion nevertheless indelibly inscribes information with a speculative potential, enabling it to momentarily be captured in the form of trading indices.

Michael Goldberg’s recent installation at Sydney’s Artspace – *catchingafallingknife.com* – nicely encapsulates aspects of a processual media theory [19]. The installation combines various software interfaces peculiar to the information exchanges of day traders gathered around electronic cash flows afforded by the buying and selling of shares in Murdoch’s News Corporation. With \$50,000 backing from an anonymous consortium of stock market speculators cobbled together from an online discussion list of day traders, Goldberg set himself the task of buying and selling News Corp shares over a three week period in October–November last year.

Information flows are at once inside and outside the logic of commodification. The software design of market charts constitutes an interface between what Felix Stalder describes as informational “nodes” and “flows” [62]. The interface functions to capture and contain – and indeed make intelligible – what are otherwise quite out of control finance flows. But not

totally out of control: finance flows, when understood as a self-generating system, occupy a space of tension between “absolute stability” and “total randomness” [61]. Too much emphasis upon either condition leaves the actor-network system open to collapse. Evolution or multiplication of the system depends upon a constant movement or feedback loops between actors and networks, nodes and flows.

Referring to the early work of political installation artist Hans Haacke, Goldberg explains this process in terms of a “real-time system”: “the artwork comprises a number of components and active agents combining to form a volatile yet stable system. Well, that may also serve as a concise description of the stock market ... Whether or not the company’s books are in the black or in the red is of no concern – the trader plays a stock as it works its way up to its highs and plays it as the lows are plumbed as well. All that’s important is liquidity and movement. ‘Chance’ and ‘probability’ become the real adversaries and allies” [21].

Trading or charting software can be understood as stabilising technical actors that gather informational flows, codifying such flows in the form of “moving average histograms, stochastics, and momentum and volatility markers” [19]. Indicators of this sort provide the basis for “technical analysis,” which is concerned with discerning the movement of prices according to the supply and demand of particular shares. While simplistic, the attention paid to supply and demand as basic concerns of financial management can be seen to correspond with the focus cultural studies and new media empirics places on the conditions of possibility and that which has emerged. In both instances a processual dimension is overlooked: that is, the very movement within and between these variables, which acts to continuously refigure both conditions, challenging the assumption that the world exists in a state of arrest.

Scott Lash claims that “The feedback loop is the locus of the critique of information” [37]. Software trading charts operate as a closed self-referential and self-generating system: movement up or down the trajectory of a graph is determined at one level by inputs of information that register the value of a particular share. Yet at another level, the stochastic chart is an interpenetrative system. That is, the movement of the graph is contingent on a wider field of forces. For example, Goldberg notes in his diary that he was unable to make a trade on a particular day. The Australian Stock Exchange had gone down. Not only does this impact upon the flow of information that enables the possibility of economic exchange, it also suggests the stability of a system interpenetrates with a wider political economy that articulates with technical standards. In this instance the maintenance of finance networks is subject to the vulnerability that attends concentrations of IT infrastructures. Herein lies a political and economic argument for distributed informational systems.

Chart-analysis software simulates the market situation, computing the movement and value of stocks. However, chart-analysis by a modelling program alone is insufficient. While the system is dynamic – in so far as the reaction of the user manifests as the sale or purchase of stock, which in turn feeds back into the system – the

system is necessarily a closed one. Parameters have to be defined that represent the effect various data inputs have on likely market outcomes. Any simulation model is thus based upon a principle of inclusion/exclusion. In his essay on breakdowns within international stock market systems, Wulf Halbach explains the construction of a simulation model as follows:

In order to create a model for any reality in question, as many details and parameters must be taken into consideration as possible (also a question of costs). The details and parameters chosen are the most relevant – maximum parameters – and those that are left out are the least influential – minimal parameters. [23]

By design, the simulation model reduces the complex field of forces that shape the perception one might have of the market value of a particular stock. That is, there is *something more* that comes to bear to shape the perception and actualisation of value. The excess of force that escapes the parameters of chart-analysis software is augmented by “fundamental analysis.” Fundamental analysis looks “at the realities underlying price movements – broad economic developments, government policies, demography, corporate strategies” [26]. Such market indicators are then rearticulated or translated in the form of online chatrooms, financial news media, and mobile phone links to stockbrokers, eventually culminating in the trade. In capturing and modelling finance flows, trading software expresses various regimes of quantification that enable a value-adding process through the exchange of information within the immediacy of an interactive real-time system. Such a process is distinct from “ideal time,” in which “the aesthetic contemplation of beauty occurs in theoretical isolation from the temporal contingencies of value” [60].

The *something more* that escapes both the parameters of chart-analysis software and fundamental analysis can be understood as “the question of the constitutive gap between “reality” and simulations” [23]. The aesthetic figure for this constitutive gap consists of the power of affect (see [13]). An affective dimension of aesthetics is registered in the excitement and rush of the trade; biochemical sensations in the body modulate the flow of information, and are expressed in the form of a trade. As Goldberg puts it in a report to the consortium mid-way through the project after a series of poor trades based on a combination of technical and fundamental analysis: “It’s becoming clearer to me that in trading this stock one often has to defy logic and instead give in, coining a well-worn phrase, to irrational exuberance” [20]. Here, the indeterminacy of affect subsists within the realm of the processual, where a continuum of relations defines the event of the trade. A continuity of movement prevails. Yet paradoxically, such an affective dimension is coupled with an intensity of presence where each moment counts; the art of day trading is constituted as an economy of precision within a partially enclosed universe or system.

McKenzie Wark makes a similar point in his analysis of the stock market crash on Wall Street in October 1987. Drawing on Serres’ notion (or was it an intuition?) of “noise as a ‘third man’ present in the exchange of information” [65]. Wark employs the metaphor of noise

to explain the “competing and contradictory interests,” irrationality, feedback loops, and unconventional techniques used by traders arguably more attuned to the informational patterns and flows in global finance markets. As Wark puts it:

Noise becomes a tool among others in what Donald Trump christened “the art of the deal.” Profiting from noise becomes equivalent to profiting from information, and in the short term, possibly more profitable. The volume of movement caused by noise in the short term may be more profitable than the tendency of movement in the long run. Which is bad news for the fortunes of the firms that make and sell things on the terrain of second nature. One can indeed make “cash from chaos,” as the self-styled pop svengali Malcolm McLaren proposed. The third nature of global finance, like the third nature of global style, admits the *false move* as a profitable option. [65]

The borders of a processual system are also open to the needs and interests of extrinsic institutional realities. The node of the gallery presents what is otherwise a routine operation of a day trader as a minor event, one that registers the growing indistinction between art and commerce. Interestingly, the event-space of the gallery expresses the regularity of day trading with a difference that submits to the spatio-temporal dependency news media has on the categories of “news worthiness.” A finance reporter for Murdoch’s *The Australian* newspaper gives Goldberg’s installation a write-up. Despite the press package which details otherwise, the journalist attempts to associate Goldberg’s trading capital with an Australia Council grant (which financed the installation costs) as further evidence of the moral and political corruption among the “chattering classes.” In this instance of populist rhetoric, the distinction between quality and tabloid newspapers is brought into question. The self-referentiality that defines the mode of organisation and production within the mediasphere prompts a journalist from Murdoch’s local Sydney tabloid, the *Daily Telegraph*, to submit copy on the event. Unlike the dismissive account in *The Australian* and the general absence of attention to the project by arts commentators, Goldberg notes how the *Daily Telegraph* report made front page of the Business section (rather than the News or Entertainment pages), in full colour, with his picture alongside the banner headline “Profit rise lifts News.” The headline for Goldberg’s installation was smaller: “Murdoch media the latest canvas for artist trader.”

Here, the system of relations between art and commerce also indicates the importance narrative or storytelling has in an age of information economies. Whether the price of stocks go up or down, profit value is shaped not, of course, by the kind of political critique art might offer, but rather by the kind of spin a particular stock can generate. Or, as Neil Chenoweth puts it in his book *Virtual Murdoch*, “Markets work on appearances” [9]. Goldberg’s installation discloses various operations peculiar to the aesthetics of day trading, clearly establishing a link between narrative, economy, time and risk, performance or routine practice and the mediating role of design and software aesthetics. *catc hingafallingknife.com* demonstrates that it is the latter

– a theory of software – that still requires much critical attention. And unlike most players in the new economy, Goldberg’s installation is a model in accountability and transparency.

There is a process at work in all this, part of which involves a linear narrative of stabilisation by structural forces. Massumi explains it this way: “The life cycle of the object is from active indeterminacy, to vague determination, to useful definition (tending toward the ideal limit of full determination)” [50]. Yet this seemingly linear narrative or trajectory, if that’s what it can be termed, is in no way a linear process. Quite the opposite. It is distributed or is constituted through and within a process of feedback where the technical object, in its nominated form, feeds back and transforms its conditions of possibility, which can be understood as “the field of the emergence” [50].

TOWARDS A POLITICS OF PROCESSUAL TIME

Media cross one another in time, which is no longer history.

Friedrich Kittler [34]

I speak once more in the language of history, processual time and its multiple circumstances pass through the cramped network of their own monuments.

Michel Serres [59]

The processual locates the temporal modes that operate within the information age. This is precisely why a processual model facilitates a political critique of network societies and information economies. Processes, after all, *take* time. That is, processes abstract time. A politics of legitimacy coextends with the instantiation of abstraction. Further, the fundamental problem with Lash’s thesis in his book *Critique of Information* is his failure to engage with “the political” by reducing the complexities of time. Time is not simply “long-duration” that corresponds with old media and its mode of representation, as distinct from the “short-duration” or immediacy that supposedly defines the new media as ephemeral presentations [37]. Time consists of a multiplicity of modes: rhythmic, instrumental, scalar, biological, compressed, flexible, and so forth. Each temporal mode has a different function in the regulation, control and organisation of entropy. Irrespective of its encoding mode, time is an agent of translation between stability and randomness. In this respect, time corresponds to the processual.

Modalities of time are also central to the constitutive framework within which politics happens. In the case of new media, a tension is played out across the temporal modes that distinguish new media forms and their concomitant uses and conditions of production. Each temporal mode is socially inscribed with varying degrees of legitimacy. For this reason, one can speak of a politics of time. New communications media consist of various temporal modes: mobile phones and instant short-text messaging, the web and real-time video and audio files, the interactive real-time of day trading, 24/7 and net-time (see [41]), and as Wark notes, “many kinds of time intersect” [65]. Whatever the operative mode

may be, time's multiplicity is internally situational to self-organisational closures or limits in socio-technical complexity. The contest over such closures thus constitutes the politics of technological time.

By way of conclusion, there are two key points to make. First, new media are characterised by their "remediation" of the spatio-temporal aspects of old media [6]. The form, content, meaning and techniques of use peculiar to old media such as cinema and the novel are refashioned and reformed within new media technologies. New media technologies are thus better characterised in terms of the multi-dimensional layers of space and modalities of time; there is a continuum of relations, albeit reconfigured, rather than strict rupture between old media and new media. Referring to McLuhan, Kittler explains the media continuum as "partially connected media links" in the following way:

... one medium's content is always other media: film and radio constitute the content of television; records and tapes the content of radio; silent films and audiotape that cinema; text, telephone, and telegram that of the semi-media monopoly of the postal system. [34]

Second, within a capitalist system, time determines exchange-value in as much as the smaller and more flexible the increment of time the higher the exchange-value. This operation also makes possible what Marx termed the "annihilation of space through time," where more intensive cycles of production and consumption are required to speed up capital circuits, as David Harvey has analysed [24]. And as Holmes has noted, "If capital can't get the cycle speeds it needs, it lobbies for war – the exchange-value of armaments will go up as others deflate; capital flows to war according to the law of equalisation of value, until the war's over."¹⁵ A processual model investigates the multiple, competing dimensions of time that condition the instance of exchange. Exchange-value itself is processual, yet it appears as a simple linear instance of exchange. This feature is symptomatic of the politics of labour-power and the ways in which the process of abstraction within a technologically enriched capitalist system subsumes the field of forces that condition the instance of exchange. The processual model attempts to register the complexity of forces and non-linearity of communications systems. What is at stake, finally, is the question of the legitimacy of existence that is irreducible to the techniques of instrumental time promulgated by new media empirics.

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Heidegger, Merleau-Ponty, Kant, Gadamer, Whitehead, Hegel, Foucault, Peirce and Bergson – that indeed would have been a very different paper! As it happens, the ideas of some of the above are implicit in this paper.

One thing I would strongly contest is that reviewer's claim that the Frankfurt School failed to produce any empirical research. The Frankfurt School did indeed undertake such work, as seen in their studies of labour movements and anti-Semitism prior to migrating to the United States, whereupon Adorno and Horkheimer embarked upon their study of the culture industries as well as participating, albeit briefly, in "administrative research" with Lazarsfeld which resulted in four articles on radio music. Adorno even undertook a content analysis of astrology columns in newspapers! Furthermore, as Martin Jay points out, upon their return to Germany after the War, Adorno, Horkheimer and their colleagues re-engaged in empirical research in order to address the distortion and growing amnesia of the Nazi era. It's unfortunate that impoverished caricatures of the Frankfurt School persist, for there's much to learn about the "new economy" and "creative industries," I'd suggest, by returning to both the critiques by the Frankfurt School of the culture industries and the tensions they negotiated over the status, deployment and legitimacy of empirical research. My own paper is an attempt to outline some of the possibilities for a renewed empiricism within prevailing socio-technical situations.

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NOTES

¹ "All concepts are connected to problems without which they would have no meaning and which can themselves only be isolated or understood as their solution emerges," write Deleuze and Guattari [13]. In a similar vein, Marx writes: "... mankind always takes up only such problems as it can solve, since, looking at the matter more closely, we will always find that the problem itself arises only when the material conditions necessary for its solution already exist or are at least in the process of formation" [47].

² To speak of a field of new media studies is problematic in itself, since "there is no stable object or ontology around which a conceptual economy can be concentrated." Holmes, David. Personal communication, 23 February 2003.

³ For critical appraisals of these empirical approaches, see [52, 29].

⁴ The first paradigm of net studies consisted of a techno-utopianism associated with the “Californian ideology,” the second, unsurprisingly, of techno-dystopianism. Terry Flew [14] provides a useful overview of these paradigms and the emergence of the third paradigm. See also Flew [15].

⁵ Admittedly I’m being very reductive about the diversity within political economy approaches. My point is not so much one about political economy per se, as about the lack of reflexivity within new media empirics that adopt political economy approaches. For a useful overview of political economy, see Hesmondhalgh [27]. For a discussion of political economy, the Braudelian *longue durée* and new media, see Flew [15]. For interesting ethnographic empirical studies, see Lally [36] and Miller and Slater [53].

⁶ For an outline of the model of agonistic democracy, see Mouffe [54].

⁷ On the role of “formations,” see Massumi [51].

⁸ Interesting accounts of cybernetics and computer processing can also be read Beniger [4] and Bardin [2].

⁹ Neil Chenoweth [9] discusses the influence of games theory on Murdoch during his studies at Oxford in the early 1950s.

¹⁰ An example of a second-order feedback model applied to the development of open source content and collaboration with African universities can be read in Keats [32].

¹¹ Gary Genosko [18] also picks up on this point by Pearson in his discussion of how Guattari extends the model of autopoiesis and second-order cybernetics into the realm of social relations and “machinic autopoiesis”.

¹² I thank one of the reviewers of this paper for correcting my understanding of dissipative structures and suggesting how I might express their operation (i.e. by drawing my attention back to Prigogine and Stengers).

¹³ As Neil Chenoweth recounts in Virtual Murdoch, ‘The Nasdaq composite index of high-tech stocks, which was the surest guide to the state of the tech economy, in the first three weeks of April had dropped 34 per cent down to 3200’ [9]. By 2001 the fall had increased to 90 per cent. See also Brenner [7].

¹⁴ For a rich analysis of the Wall Street stock market crash of October 1987, see Wark [65]. For an idiosyncratic analysis of foreign exchange markets, traders and the role of the computer screen, see Knorr Cetina and Brugger [35].

¹⁵ Holmes, David. Personal communication, 23 February 2003.