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The Affective Turn

Political Economy, Biomedicine and Bodies

Patricia T. Clough

WHEN IN the early to mid-1990s, critical theorists and cultural critics invited a turn to affect, they often did so in response to what they argued were limitations of post-structuralism and deconstruction. As Rei Terada would suggest, there was a growing sense that post-structuralism generally but deconstruction in particular were ‘truly glacial’ in the pronouncement of the death of the subject and therefore had little to do with affect and emotion (2001: 4). More accurately, as Terada goes on to argue, the turn to affect and emotion extended discussions about culture, subjectivity, identity and bodies begun in critical theory and cultural criticism under the influence of post-structuralism and deconstruction. Affect and emotion, after all, point just as well as post-structuralism and deconstruction do to the subject’s discontinuity with itself, a discontinuity of the subject’s conscious experience with the non-intentionality of emotion and affect. However, the turn to affect did propose a substantive shift in that it returned critical theory and cultural criticism to bodily matter which had been treated in terms of various constructionisms under the influence of post-structuralism and deconstruction. The turn to affect points instead to a dynamism immanent to bodily matter and matter generally – matter’s capacity for self-organization in being in-formational – which, I want to argue, may be the most provocative and enduring contribution of the affective turn.

Yet, many of the critics and theorists who turned to affect often focused on the circuit from affect to emotion, ending up with subjectively felt states of emotion – a return to the subject as the subject of emotion.¹ I want to turn attention instead to those critics and theorists who, indebted to Gilles Deleuze and Felix Guattari, Baruch Spinoza and Henri Bergson, conceptualize affect as pre-individual bodily forces augmenting or diminishing a body’s capacity to act and who critically engage those technologies that are

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making it possible to grasp and to manipulate the imperceptible dynamism of affect. I want to argue that focusing on affect – without following the circuit from affect to subjectively felt emotional states – makes clear how the turn to affect is a harbinger of and a discursive accompaniment to the forging of a new body, what I am calling the biomediated body.

I will explore the technical frames of the biomediated body, specifically ‘biomedia’ that make possible the mass production of genetic material, and ‘new media’ where digitization makes possible a profound technical expansion of the senses. I will argue that the biomediated body challenges the autopoiesis characteristic of the body-as-organism that, by the late 19th century, had become the model of what a body is. Because the body-as-organism is defined autopoietically as open to energy but informationally closed to the environment, thus engendering its own boundary conditions, Luciana Parisi and Tiziana Terranova have argued that the body-as-organism befits the disciplinary society of late 19th-century industrial capitalism ‘where the fluids which were circulating outside and between bodies, are folded onto themselves in order to be channeled within the solid walls of the organism/self/subject’ (2000: 4). The body-as-organism is organized for ‘reproduction within a thermodynamic cycle of accumulation and expenditure; and trained to work’ (2000: 5).

Like the body-as-organism, the biomediated body is a historically specific mode of organization of material forces, invested by capital into being, as well as elaborated through various discourses of biology and physics, thermodynamics and complexity, metastability and nonlinear relationality, reconfiguring bodies, work and reproduction. The biomediated body is a definition of a body and what it can do – its affectivity – that points to the political economic and theoretical investment in the self-organization inherent to matter or matter’s capacity to be informational, to give bodily form. But if what has allowed us to ‘see’ matter as informational or as self-organizing ‘is the advance in technology that materially supports (nonlinear) mathematics, and with it mathematical technology’ (De Landa, 1992: 134), then the biomediated body is not merely technological all the way down. More importantly, the biomediated body exposes how digital technologies, such as biomedia and new media, attach to and expand the informational substrate of bodily matter and matter generally, and thereby mark the introduction of a ‘postbiological threshold’² into ‘life itself’.³ Therefore, while I am drawing on critical discourses on new media and biomedia that define these media as technically expanding what the biological body can do while, however, remaining biological, I also am pointing to the postbiological threshold, as the limit point of these discourses.⁴

In offering a sampling of some few scholars who are critically engaging affect, biomedia and new media, I want to take the affective turn beyond itself, beyond the body-as-organism that the discourses of affect, biomedia and new media still often privilege. I want to do so in order to elaborate the historically specific mode of organization of material forces that the biomediated body is, both in relationship to what I will discuss as capital

accumulation in the domain of affect and the accompanying relations of power in the shift of governance from discipline to biopolitical control, a shift that depends on a certain deployment of racism. The turn to affect in critical theory and cultural criticism provides the opportunity for so expansive an exploration precisely because the cultural critics and critical theorists engaged with affect, especially those to whom I am about to turn, have treated affect both in terms of what is empirically realized and in terms of the philosophical conception of the virtual. It is at the crossing of the empirical and the virtual that the postbiological threshold inserted into 'life itself' is both exposed and shielded from view. At this threshold the virtual is the potential tendency of biomedica and new media to realize the challenge to autopoiesis of the body-as-organism that the biomediated body poses. It is here too that the virtual is met by the reach of political economic capture.

Affect, Bodily Capacities and the Virtual

In what has become a canonical text about affect that links it to the philosophical conceptualization of the virtual, Brian Massumi defines affect in terms of bodily responses, autonomic responses, which are in-excess of conscious states of perception and point instead to a 'visceral perception' preceding perception (Massumi, 2002).⁵ But if this reference to autonomic responses seems to make affect the equivalent of the empirical measure of bodily effects, registered in activity such as dilation of pupils, constriction of intestinal peristalsis, gland secretion, galvanic skin responses, Massumi goes on to use such measures for a philosophical escape to think affect in terms of the virtual as the realm of potential, unliveable as tendencies or incipient acts, indeterminant and emergent.

So, for Massumi the turn to affect is about opening the body to its indeterminacy, for example the indeterminacy of autonomic responses. It is therefore necessary for Massumi to define affect in terms of its autonomy from conscious perception and language, as well as emotion. He proposes that if conscious perception is to be understood as the narration of affect – as it is in the case of emotion, for example, there nonetheless always is 'a never-to-be-conscious autonomic remainder', 'a virtual remainder', an excess of affect (2002: 25). Further, it is out of this excess that the narration of emotion is 'subtracted', smoothing it over retrospectively 'to fit conscious requirements of continuity and linear causality' (2002: 29). Consciousness is 'subtractive' because it reduces a complexity. It is 'limitative', a derived function in a virtual field where any actualization becomes, at that same moment of actualization, the limit of that field, which otherwise has no pre-given empirical limit. Affect and consciousness are in a virtual-actual circuit, which defines affect as potential and emergent.

Massumi's turn to the body's indeterminacy, then, is not a return to a 'pre-social' body. Arguing that affect is not to be misunderstood as pre-social, Massumi proposes that it is 'open-endedly social', that is, 'social in a manner "prior to" the separating out of individuals' (2002: 9). So, when

there is a reflux back from conscious experience to affect, it is registered as affect, such that ‘past action and contexts are conserved and repeated, autonomically reactivated but not accomplished; begun but not completed’ (2002: 30). There is an intensification of affect. There is bodily memory – ‘vectors’ or ‘perspectives of the flesh’ – what Massumi calls ‘memory without content’, which, however, remains indeterminate, the indeterminate condition of possibility of determinant memory and conscious perception (2002: 59). Thus, affect refers to the metastability of a body, where the unstable pre-individual forces, which make up the metastability of a body, are neither in a linear nor deterministic relationship to it. The temporality of affect is to be understood in terms of thresholds, bifurcation and emergence – the temporality of the virtual.

It is its participation in the virtual that gives affect its autonomy – its escape from the particular thing that embodies it. As such, affect, refers to the openness of a body, an openness to participation in what Massumi, following David Bohm, refers to as the quantum indeterminacy of an ‘implicate order’ (Massumi, 2002: 37). As implicit form, affect is potential that, as soon as it begins to take form, dissolves back into complexity across all levels of matter, as quantum effects feed the indeterminacy appropriate to each level – the subatomic, the physical, the biological and the cultural. As Massumi sees it, quantum indeterminacy puts affect at every level of matter such that the distinctions of living and nonliving, the biological and the physical, the natural and the cultural begin to fade (2002: 37).

If Massumi’s turn to autonomic responses of the body is in fact a way to think the sociality of metastability, it also brings materiality closer to the nonphenomenal, the incorporeal, through the philosophical conceptualization of the virtual, played out against theories of nonlinearity and metastability, open systems and the quantum indeterminacy of implicate order. What is at issue in these philosophical-theoretical connections is not merely the affectivity of the human body but, I would argue, the affectivity of matter, matter’s capacity for self-organization, its being informational. It is this understanding of matter as affective, as informational and self-organizing, that connects the autonomic responses of the body, or what Massumi calls the ‘infraempirical’ experience of the human body, to the incorporeal, nonphenomenal complexity that is the condition of possibility of the empirical, what Massumi calls the ‘superempirical’ (2002, 144–61 *passim*). Just as the virtual falls away with each actualization, which, at the moment of actualization, limits the virtual field, the super-empirical falls away with the emergence of the empirical.

But if it is increasingly possible, as I am proposing it is, to register the dynamism of the super-empirical as the dynamism of matter, it is because the super-empirical is not only a philosophical conceptualization of the virtual but a technical expansion that reveals matter’s informational capacity. To get at this, it is necessary to return to Massumi’s illustrations of affectivity in experiments measuring bodily responses and to notice the technology or technical framing that the experiments require to make the

experiments exemplary illustrations of affectivity. For example, one illustration involves measuring participants' verbal and physiological responses to images, which leads Massumi to distinguish the effect of an image's intensity, its affect, from the content of the image. Another illustration concerns monitored bodily reactions that show participants' brain activity to occur a half-second before they can consciously register the reactions. Another illustration involves a device that is used to strike the retina with the full spectrum of color in order to research the physical and physiological conditions of vision.

While for Massumi, these experiments both illustrate the autonomy of affect and leave a trace of the super-empirical which he expands temporarily with a philosophical conceptualization of the virtual, I am proposing that these experiments are technical and conceptual framings of bodily responses that produce affect and reveal the capture of the virtual. Massumi's exemplary illustrations of the autonomy of affect not only show what the body can do; they show what bodies can be made to do. They show what the body is becoming, as it meets the limit at a postbiological threshold, which draws to it the dynamism of matter that had been hidden in oppositions held in place by the body-as-organism, between the living and the nonliving, the physical and the biological, the natural and the cultural. It is to this postbiological threshold, I want to argue, that the critical discourses taking up affect, new media and biomedica are drawn and with which they are ambivalently engaged.

New Media/Biomedica: The Technical Framing of Affect

In an impressive set of readings of post-structural thought and new media criticism, Mark Hansen revisits the relationship of technology, digitization and the body (2000, 2004a). While recognizing the severe anti-mimesis of the digital image, whose infrastructure, after all, is only layers of algorithmic processing or a matrix of numbers that has severed all reference to an independent reality, Hansen surprisingly makes this the very possibility for rethinking new media, as he focuses on the relationship digitization invites between the digital image and the body's internal sense of its movement, its tendencies or incipencies, which, following Massumi, Hansen refers to as affectivity (2004a: 7). Hansen argues that digitization engages bodily affect, inviting it to give information a body. Thus, bodily affect is called to transform 'the unframed, disembodied, and formless into concrete embodied information intrinsically imbued with (human) meaning' (2004a: 13). While Hansen's treatment of new media is important in that it uniquely draws out the relationship of digitization and bodily affect, it does so, however, while shielding the autopoiesis of the body-as-organism from the challenge his treatment of digitization seems to pose.

For Hansen, the relationship of bodily affect and digitization requires that we rethink the image as informational. With digitization, he argues, the image itself has become a process, which not only invites the user's interaction but rather requires the human body to frame the ongoing flow of

information, shaping its indeterminacy into meaning. New media require the affectivity of the body, just as new media allow for an experience of affectivity in that new media expand the body's sense of its own affective indeterminacy. Thus, Hansen takes issue with those theorists who favor a homology between consciousness and media, and thereby fail to grasp the importance of the human body's experience of technology generally and the specific importance of bodily experience to digital technology. His critique of these theorists, such as Deleuze and Bernard Stiegler, are provocative in the way they show how digitization calls us to rethink the body in terms of affect. Hansen's critiques are also important because they move the theorization of media beyond those that have taken cinema as a reference point.

For one, Hansen differs with Stiegler (1998) who takes up cinema as a way to show the evolution (beginning with the flint stone) of the indissociability of the human and the technological in terms of the technical framing of memory. For Stiegler, cinema reveals how the subject is able to have its own memory as well as experience the present or the self's flowing in time because the subject is given a 'nonlived collective memory' of the past, tertiary memory as Stiegler refers to it, through technical supports like cinema. For Stiegler, then, the technical contaminates all memory and, as such, the living present as well; the technical is their condition of possibility (Hansen, 2004b: 594–602 *passim*). For Hansen, what Stiegler misses in coupling the human and the technological as a matter of memory is the function of the body as the frame of this coupling.

Hansen also refuses Deleuze's theorization of the cinema, especially Deleuze's proposal that the cut into the flow of images, say in montage, makes the interval between images visible, not only giving an image of time, what Deleuze calls the time-image (Deleuze, 1989) but also suggesting that the cinematic framing of images is a formal aspect of cinema itself (Hansen, 2004b: 589–94 *passim*). For Hansen, Deleuze's treatment of the time-image constitutes a displacement of the body, which is also a disembodiment of what Bergson referred to as 'centers of indetermination' (in Hansen, 2004b: 605). Differing from Deleuze's take on Bergson, Hansen means to reveal the 'Bergsonian vocation of new media' (2004b: 605). Returning to Bergson's treatment of the body as a privileged image or center of indetermination that in its movement draws out or 'subtracts' perception from the world taken as an aggregate of images, Hansen argues that bodily affectivity, its capacity to act, to move, is central to, indeed 'forages', the digital image. Therefore, what links the subject and technology is bodily affectivity itself. For Hansen, focusing on the affective capacity of the body allows us to grasp the way in which technology enters the human subject first and foremost by 'tingeing or flavoring the embodied perceptual present' (2004b: 605).

While on Hansen's take, this is true of all technology, it is digitization that specifically engages this bodily sense of the present in the body's capacity to affectively sense the passing of time. The digital image inserts a technical framing into the present, expanding bodily affectivity, and thereby allows us to experience 'the very process through which our

constitutive living present continually (re)emerges, from moment to moment – that is the selection from a nonlived strictly contemporaneous with it’ (2004b: 614). This nonlived that is contemporaneous with the present is not a matter of a technological support of tertiary memory, as Stiegler would have it. Nor is it a formal aspect of the digital image itself, as Deleuze might propose. Rather it is a technological intensification or digital expansion of the nonlived, nonlinear complexity, or indetermination, of bodily affectivity. For Hansen, affective capacity and digitization are a coupling framed by the body-as-organism.

In addressing this nonlived, Hansen draws on Francisco Varela’s discussion of affect and the neural dynamics constitutive of conscious perception that connect affect to the flux of time. Hansen focuses especially on Varela’s discussion of the abrupt perceptual shift or reversal of images in such phenomena as the Necker cube, pointing to ‘the depth in time’ in neural dynamics that this shift implies. Varela argues that it is this ‘depth in time’, a depth of presence, that makes the perceived reversal of the image possible ‘as a sudden shift from one aspect to the other, and not as a progressive sequence of linear changes’ (Hansen, 2004a: 250–1).⁶ In that sudden shift or depth in time, there is ‘a stabilization’, a vectored assemblaging of ‘the distributed cognitive system, while the “depth” or “thickness” correlates with the host of competing distributed neural processes from out of which this stabilization emerges’ (Hansen, 2004a: 251). This is to say, ‘the microphysical elements of a neural dynamics are selectively combined in aggregates (cell assemblies) that emerge as “incompressible but complete cognitive acts”’ (Hansen, 2004a: 251). Varela concludes:

... the relevant brain processes for ongoing cognitive activity are not only distributed in space, but they are also distributed in an expanse of time that cannot be compressed beyond a certain fraction of a second, the duration of integration of elementary events. (Varela, 1999: 7)

For Varela, there is a ‘frame’ or ‘window of simultaneity’ that corresponds to the duration of the lived present, in which aggregates assemble, emerging from complexity. This frame is ‘a horizon of integration’, where integration, however, is always emergent and intrinsically unstable, a metastability (Hansen, 2004a: 251).

This fraction of a second, this impossible timing of the present in the passing of time registered neurophysiologically, is not unlike the half second of brain activity before a subject indicates a conscious response to stimuli that Massumi points to. They are illustrations of affect as bodily capacity, or incipient act. Varela too treats this fraction of a second in which ‘the self-organization of elementary events’ occurs as a matter of affect, arguing that implicated in this fraction of a second of organizing is affect’s very nature as ‘tendency, a “pulsion” and a motion that, as such, can only deploy itself in time and thus *as time*’ (Hansen, 2004a: 253). As Hansen sees it, Varela’s

analysis opens up ‘to the microphysical domain in an unprecedented manner’ (2004a: 250) and therefore shows the function of affectivity ‘in the genesis of time consciousness’, as affectivity links ‘the striving of the human being to maintain its mode of identity with the embodied basis of (human) life. In sum, affectivity comprises the motivation of the (human) organism to maintain its autopoiesis in time’ (2004a: 250).

Surely Hansen’s treatment of new media moves the theorizing of technology beyond the theorizing of cinema, suggesting that new media not only incorporates cinema’s capacity to represent the subject in terms of unconscious desire, where everything about the subject’s bodily matter has been referred through a foreclosure of the real, to the imaginary, to reflection, to the mirror; new media also brings the subject in touch with other senses than the visual. In this, new media is closer to what has been called haptic media, what Laura Marks (2002) calls ‘multisensory media’, which engages all of the subject’s senses on behalf of bodily experience. But new media, on Hansen’s take, does even more; it offers the possibility of experiencing by means of a technological expansion the nonlived complexity of affective bodily capacities. As Hansen puts it: ‘When the body acts to enframe digital information . . . what it frames is in effect itself: its own affectively experienced sensation of coming into contact with the digital’ (2004a: 13).

Digitization, then, offers the body a certain empowerment, an invitation to deploy ‘its own constitutive singularity (affection and memory) not to filter a universe of preconstituted images, but actually to *enframe* something (digital information) that is originally formless’ (2004a: 11). But Hansen’s view of information as formless, waiting only to be in-formed by the human body, not only begs the question of what information is, refusing to see matter as informational. It also seems to forget that, by its own accounting, it is digitization that makes the experience of affectivity possible, makes it possible through a technical expansion. Thus Hansen does not account for the examples and experiments that assemble technology and affect, that like new media, frame affect’s appearance, a production that makes affect felt in an unprecedented manner. Indeed, Hansen finds these assemblages troublesome; he proposes that there is ‘an urgency at this moment . . . for a differentiation of properly human perceptual capacities from the functional processing of information in hybrid human–machine assemblages’ (2004a: 101).

While Hansen recognizes that digitization challenges ‘the human to reorganize itself’, nonetheless the affective body with which Hansen begins this reorganization remains the body-as-organism. Hansen returns to the body’s autopoiesis, finding it in the neurophysiological registering of affect. He draws new media back from the biomediated body and from the very digitization that makes possible the technical expansion of the experience of affectivity. Hansen’s treatment of new media withdraws it from the larger technological environment that includes biomediation, where the immateriality of information (and therefore seemingly in need of a human bodily

form) turns quickly into the materiality of information or matter's capacity for self-organization or capacity to in-form. At the crossroads of genetics and informatics, the body's being informational not only raises the question of the relationships being forged between biology and information, matter and information, 'life itself' and information. It also raises a question about the productivity of these relationships, beyond the artful experience of human affectivity, as a political economic production.

Whereas Hansen's treatment of new media insists on the difference between the human body and human-machine assemblages, between bodily affect and digitization – differences that hark back to the differences that haunted constructionism, Eugene Thacker's treatment of biomedica reveals the informational substrate of the body and the impossibility of the distinctions Hansen seeks to maintain. Thacker argues that the body of biomediation is not merely a body-as-constructed, given that 'constructionism formulates an ontological division between the "bio" and the "media," such that the latter has as its main task the mediation of some unmediated "thing"' (Thacker, 2004: 12). Therefore, Thacker defines biomedica as a technical reconditioning of biology, a technological framing that enables biology to perform in novel ways beyond itself, while remaining biological (2004: 14–15). Thacker offers two examples. One is biocomputing, where DNA molecules or the base pair complementarity of A-T and C-G are used to perform computation in a test tube, as the bio-logic is repurposed as a computer. Here the means are biological and the output is computational – a proof-of-concept that a computer 'can theoretically be made of any material, as long as certain principles (e.g., a storage device, a read program, a write program) are fulfilled' (2004: 4). But there is another example of biomedica: bioinformatics, where DNA is taken as information, and as such made amenable to the digital domain, available 'for archiving, searching, editing, pattern matching and other computational procedures' (2004: 4).

With these two examples, Thacker proposes that, in thoroughly integrating the computational logics of computers and biology, biomedica produces a body that is informational. This is not merely a matter of technology representing DNA as information but rather understanding information as inhering in DNA as 'a technical principle', as biology's computational capacity. (Thacker, 2004: 39). For Thacker:

... information is seen as constitutive of the very development of our understanding of life at the molecular level – not the external appropriation of a metaphor, but the epistemological internalization and the technical autonomization of information as constitutive of DNA. (2004: 40)

But Thacker is not endorsing the equation of biology or life with DNA, recognizing as he does the 'the multitude of heterogeneous elements that collectively form an operational matrix', in which DNA is only a part (Thacker, 2005: 98). Rather, his focus on DNA is meant to point to the ongoing investment of capital and technoscientific discourses in the

molecular level of the body as an informational body, the biomediated body. The biomediated body, therefore, is not disembodiment. Rather it is a recent complexification in bodily matter at the molecular level as its informational capacity is made more productive.

Thacker argues that biomedica is a 'generative' deployment of biotechnology, which, in providing the conditions for biology to surpass itself, selects properties of the body, affective bodily capacities, and gears them 'toward extra organism ends' (Thacker, 2004: 10). This is in the service of producing a surplus of information realizable as surplus value. Therefore, what makes biomedica different from other technological developments is the way it changes the relationship between capital, technology, labor and life. Biomedica surely generates all kinds of biotech services and products, as well as all kinds of labor involved in the development, marketing and managing of these products and services. But what is unique to biomedica, Thacker argues, is that it is biology that both 'drives production' and is 'the source material'. Biology is 'the process of production' and in replacing machines, biology 'is the technology' (Thacker, 2005: 201). In the technological framing of the 'labor performed routinely by cells, proteins, and DNA', biomedica produces the biomediated body as a laboring body (2005: 201).

It is in terms of political economy that Thacker's view of biomedica tracks both the forging of a new body and what minimal requirement is left for the presence of the body-as-organism in the processes of biomediation. This is because the productivity of the biomediated body is not merely a matter of the mass production of DNA. Biomedica, rather, is the infrastructure of a political economy which aims to continually transform informatic-based products, into 'the long-term generation of information' (Thacker, 2005: 80). Thacker gives the example of genetic-specific drug development. On one hand the drug has potential for economic gain, for which the consumption of the drug is necessary, 'connecting information to the biological body' (2005: 79). On the other hand, what is more lucrative than the sale of drugs is the 'booming industry of diagnostic testing and the production of databases'. There is the economic gain sought in maintaining 'the recirculation of products (pills, testing technologies) back into information (databases, test results, marketing and media campaign' (2005: 85). But in the development of 'database management, data analysis, software design, infomedicine, and of course diagnostics', the bodies that consume these commodities, Thacker argues, will be touched 'only to the degree the body and "life itself" are understood in informatic ways' (2005: 85).

From the larger perspective of political economy, the reduction of biology or life to DNA is rather a production of an excess of information. What has been referred to as junk DNA, for example, may be seen to be a block to the productivity of biomedica, or it might be better understood as the very noisy complexity out of which the demand for more efficient uses of data arises, a demand for the expansion of informatics. But more, at least more than Thacker seems to recognize, even those understandings of

genetics, that explore the complexities of gene expression beyond the reduction to DNA are not inappropriate to political economic investment. Indeed, the appropriation of these complexities as the noisy condition of chance mutation and creation may be most desirable for capital accumulation. In keeping so tight a focus on DNA, Thacker misses that it is in terms of these complexities, and the desire to appropriate the capacity to mutate or create, that the biomediated body challenges autopoiesis, characteristic of the body-as-organism, as it introduces into 'life itself' what Keith Ansell Pearson calls 'a techno-ontological threshold of a postbiological evolution' (1999: 170). It is to treatments of the postbiological threshold in evolution and to the biopolitical economy of the biomediated body that I now turn.

Labor, Energy, Information and the Body-as-organism

If by the late 19th century, the body of disciplinary industrial capitalism could be described as the body-as-organism, characterized by autopoiesis, it would not be until the late 20th century that Humberto Maturana and Francisco Varela (1980) would theorize the autopoiesis of the organism in order to refuse genetic reductionism. After all, in defining the organism as engendering its own boundary conditions, and therefore as informationally closed to its environment, Maturana and Varela's theorization of the organism's autopoiesis gives more weight to the organism's drive to preserve its homeostasis and equilibrium than it does to its component parts or its genetic structure. Yet, in doing so, autopoiesis makes it difficult to think the organism in terms of evolution. N. Katherine Hayles (1999) has pointed out that the circularity of autopoiesis, preserved in every situation of the organism, is contradictory to evolution, where species evolve through continuity but also through change and genetic diversity. Keith Ansell Pearson goes further than Hayles, situating his critique of autopoiesis in terms of what he calls 'machinic evolution'.

Not only is autopoiesis inconsistent with Darwinian theory of genetic diversity, but, as Pearson proposes, autopoiesis 'blocks off access to an appreciation of the dynamical and processual character of machinic evolution', which 'connects and convolutes the disparate in terms of potential fields and virtual elements and crosses techno-ontological thresholds without fidelity to relations of genus or species' (1999: 170). As Pearson sees it, the organism must be rethought as an open system that puts the organism 'within the wider field of forces, intensities and duration that give rise to it and which do not cease to involve a play between nonorganic and stratified life' (1999: 154). This would introduce into autopoiesis 'the complexity of non-linear, far-from-equilibrium conditions', which brings the human to 'a techno-ontological threshold of a postbiological evolution' (Pearson, 1999: 216). Pearson's rethinking of autopoiesis not only looks to the ongoing investment in the informatics of biology, an investment in the biomediated body's introduction of the postbiological threshold into 'life itself', he also takes a look back at the evolutionary history of genetic reproduction.

In critiquing autopoiesis, Pearson draws on Lynn Margulis and Dorion Sagan's (1986) theorization of endosymbiosis which suggests that machinic evolution not only befits the biomediated body but it also has a long evolutionary history. Margulis and Sagan point to the parasitic and symbiotic relations that precede the appearance of reproduction through nucleic DNA, a process called endosymbiosis. They also point to the process of endosymbiosis continuing in the body of the cell, challenging the model of evolution based on linear or filiative evolution. Endosymbiosis, that is, involves cellular elements other than nucleic DNA, elements, such as mitochondria, which are captured in the cell body without losing the autonomy of their reproductive machinery, their own method of information transmission. Mitochondria reproduce symbiotically, in a bacteria-like way, assembling (through contact or contagion) across phyla without fidelity to relations of genus or species. As Luciana Parisi puts it, endosymbiosis adds turbulence – 'microbial memories and cellular parasitism' – to reproduction through nucleic DNA (2004: 175). This turbulence links endosymbiosis and biomediated or artificial reproduction as the latter transmit information as the former does, without fidelity to species and genus.

In what she calls 'biodigital sex', Parisi proposes that the instability represented by bacterial-like information trading of mitochondrial recombination is being invested in both economically and discursively. Taking mammal cloning as an example, Parisi proposes that what occurs in cloning is that the cell is 'brought back to a virtual stage of growth also defined as zero degree of development' (2004: 157). While this suggests that the 'ageing time of adult cells can be reversed and reprogrammed for new functions', Parisi goes on to argue that this molecular time is neither progressive nor regressive, where 'a return to zero is a return to . . . ground zero out of which life grows' (2004: 157). Rather Parisi sees in cloning an example of the nonlinear relationship of metastability, the nonlinear relationship of causes and effects, which 'indicates the proliferation of unpredictable differentiation, the actual becoming of cells whose implications are yet to be realized' (2004: 157). Cloning 'triggers an unexpected cellular becoming rather than engendering a mere copy of an original' and therefore exposes 'the emergence of a new kind of sex defined by the intensification of mitochondrial recombination' (2004: 157, 159).

In taking cloning as an example, Parisi not only links biodigital sex and machinic evolution to the philosophical conceptualization of the virtual. She also suggests that there is political economic investment in the virtual, as biodigital sex is meant to stretch 'the unpredictable potential to differentiate beyond expectation', capturing 'the interval between states' (2004: 157). For Parisi, this means an investment in the tendencies of recombinant information understood in terms of matter, matter as informational, with the capacity to self-organize. As she puts it, biodigital sex is an investment in a mapping of the 'portals of immersion in the swerving flows of matter' (2004: 165), an investment in the 'ceaseless modulation of information that follows

the auto-transmutation of matter by changing its activity of selection from one moment to the next' (2004: 133).

For this understanding of matter and information, Parisi points to the various efforts to theorize the relationship of information, energy, entropy and 'life itself', stretching from the 19th-century interest in thermodynamics and entropic closed systems to the late 20th-century interest in dissipative structures and open, nonlinear systems under far-from-equilibrium conditions. This movement in the theorization of information suggests that in a closed mechanical system, as the second law of thermodynamics states, the increase in entropy is inevitable as a irreversible process of heat-death, while in terms of open systems, irreversibility or the passing of time is disconnected from heat-death or the entropic closed system, and is understood instead in terms that extend and revise Claude Shannon's take on entropy as the condition of possibility of information. Offering a mathematical theory of information, Shannon argued that information is the measure of the (in)probability of a message going through a channel from sender to receiver. Information, in the mathematical account, Tiziana Terranova suggests:

... represents an uncertain and probabilistic milieu by reducing it to sets of alternatives that determine more or less likely sets of possibilities on the basis of a given distribution of probabilities as determined by the relation between channel and code. (2004: 24)⁷

As such, meaning is secondary to information; information is primarily a matter of contact and connectibility, a modulation of affectivity and attention by fashioning or reducing the real through the exclusion of possibilities.

Although Shannon's theorization of information in the late 1940s followed his dissertation dealing with 'the algorithmic and combinatoric properties of genetic code' (Thacker, 2005: 52), Norbert Wiener's theorization of information at around the same time was more directly linked to biology and 'life itself'. Wiener conceived of information differently than Shannon did. Shannon had theorized information as positively correlated with entropy, such that the more entropy, the more improbable the message being sent, and therefore the more information. Wiener proposed that information was an organization or an ordering in the indifferent differences of entropy or noise, and thus was to be understood to decrease entropy. Information is a local organization against entropy, a temporary deferral of entropy – that is life. Even as entropy increases in the universe as a whole, information can prevent entropic collapse temporarily as extrinsic resources of informational order or energy arise. If we take Shannon's definition of information to hold at the point of sending the message and Wiener's at the point of receiving the message, these definitions are not contradictory as they first seem; both fit the mathematical definition of information.

But this understanding of information as a negentropic decrease of entropy, along with the understanding of information as positively correlated with entropy, makes it possible to theorize information once again, this time in terms of open systems, where information is connected both to the movement from disorder to order and from order to disorder in relationship to the irreversibility of time. If open systems are understood in terms of the nonlinear, nondeterministic relations of metastability, where the microscopic forces are ontologically defined as probabilities, then information's negentropic decrease of entropy can be understood to decrease information (or to increase the probability of the range of microscopic forces) at the same time that an increase of complexity or turbulence, a disordering of order, can emerge, thus increasing information (or the improbability of any particular microscopic force). This is what Ilya Prigogine and Isabelle Stengers (1984) capture in theorizing the dissipative structures that emerge by chance in far-from-equilibrium conditions of an open system, such that the dissipation of entropy is itself dissipated or temporarily reversed in the chance emergence of a dissipative structure. Here information as contact or connectibility is not only a matter of the real arising in the exclusion of all other possibilities as the mathematical theory of information proposes. Rather, theorizing information in terms of the metastability of open systems under far-from-equilibrium conditions allows for the virtual or potential emergence, that is, the deferral of entropy, the dissipation of negentropic dissipation across the levels of unstable microscopic forces, their different dimensions, speeds or temporalities.

Drawing on Prigogine and Stengers, Parisi argues that turbulence is understood to be the norm in the biophysical world, where now the 'asymmetrical relationship between pre-individual and individuated multiplicities composing all assemblages of energy forces' is intensified by biodigital sex (2004: 158–9). It is out of this turbulence that order and disorder emerge. It is this turbulence that is captured in the biomediated body at the convergence of the potential viral expansion or bacterial recombination of information with open systems under far-from-equilibrium conditions. For Parisi, this convergence moves the threshold introduced with the biomediated body toward a 'third wave cybernetics', at the core of which is 'artificial life and genetic engineering' (2004: 137), and this is where 'symbiotic assemblage of non-analogous modes of information . . . multiply the lines of transmission – stimuli and receptions – between all modes of communication: a virus, a human being, an animal a computer' (2004: 134).

The shift in the relationship of the empirical and the virtual at the post-biological threshold also turns on what Parisi describes as the 'real subsumption of all machines of reproduction' (including most recently the machine of biodigital sex, working at the molecular level) into capital (2004: 127–40 *passim*). In real subsumption, capital has begun to accumulate from within the very viscera of life. It has abstracted life to 'life itself', an abstraction which reduces life to a new unit for negotiating an equivalency between the cost of energy expenditure and its reproduction or replacement. This

abstraction of life is meant to control, if not prevent, post-biological evolution, as much as to provoke it. At the same time, the dynamic of capital itself becomes governable by immanent controls, rather than external criteria of fitness. For Parisi: 'This immanence defines an undecidable proposition between absolute control and absolute deterritorialization of the molecular variables of matter' (2004: 140).

The Political Economy of the Biomediated Body

When the turn to affect was invited in cultural criticism and critical theory in the early and mid-1990s, the invitation had a certain resonance with the fast capitalism of an intensified financialization, as capital propelled itself around the globe along with the innovative technologies that made its lightning speed possible, while at the same time transforming ideological institutions – those of the state under the pressure of transnationalism, and those of the private and public spheres under the pressure of global expansion of commodity markets and media technologies. In cultural criticism and critical theory, there was the accompanying celebration of border cultures, hyphenated identities and queered subjectivities that yielded, however, in the later half of 1990s to the elaboration of melancholy, a focus on trauma, a worrying about memory that shifted remembering and forgetting to the body. In this context, the turn to affect, as Eve Kosofsky Sedgwick (2003) proposed, could lead cultural criticism from the 'paranoid strong' theorizing of deconstructive approaches, while making it possible to reverse the effects of trauma. It would do so because affect, it was argued, is 'freer' than the drives as theorized in psychoanalysis, and therefore affect is more amenable to change.

In such accounts, the affective turn's privileging of movement, emergence and potentiality in relationship to the body often returned to the subject, the subject of emotion, as a surplus of freedom that could be aligned with what was referred to as globalization in the wake of the break-up of the Fordist–Keynesian regime of capital accumulation, a break-up thought to offer possibilities, even as its downside was foreshadowed in the focus on melancholy and trauma in cultural criticism and critical theory. There were, however, critical theorists and cultural critics who had turned to affect recognizing that the transformation of the Fordist–Keynesian regime into the turbulence and complexity which accompanied what David Harvey (1989) called 'flexible accumulation', marked the passing from formal subsumption to real subsumption, thus the political, economic and cultural relevance of taking the affective turn.

As a regulation of overaccumulation, the Fordist–Keynesian regime had overseen the drawing of laborers' reproduction into the exchange relationships of an expanding commodity market, a 'formal subsumption', accompanied by the development of the state apparatuses of civil society aimed at the socialization of laborers, along with the expansion of mass media in facilitating mass consumption of the output of mass production. Subsumed into capital, the reproduction of the laborer becomes itself a force

of production, further motivating the appropriation of every aspect of reproduction and communication by technology, further widening the reach of mass media with the development of information technologies and further enlarging the service economy.

While formal subsumption was meant to be a solution to the problem of overaccumulation, it too produced overaccumulation as wages rose in response to laborers' demand for higher wages in order to meet the cost of reproducing themselves and their families through the market exchange in commodities and services. But they also demanded more in terms of quality of life, expressed as a frustration magnified in social movements of identity and recognition. By the early 1970s, as the relationship between work and life was restructured, the wage became a matter of political demand, severing the production of surplus value from the laborers' surplus production. On one hand, there was an attempt to stabilize prices and wages through manipulating a basic resource of energy in the oil crisis of 1973. On the other hand, there was a drive to technological development that transformed the very function of media; there was a shift from selling products to manipulating affect, an expansion of the service economy and the technological autonomization of its functioning (Caffentzis, 1992).

Cultural critics and critical theorists who turned to affect often noted that, under the conditions of formal subsumption, all that is thought of as social reproduction had become central to the economy. Social reproduction had become a matter of time, capital invested time realized in images to be consumed by the consumer, for example, in watching television, but also in doing therapy or going to the gym (Dienst, 1994). The function of the media as a socializing/ideological mechanism had become secondary to its continuous modulation, variation and intensification of affective response in real time, where bodily affect is mined for value. There is a socialization of time as media makes 'affect an impersonal flow before it is a subjective content', as Massumi would put it (1998: 61).

In this context, the circuit from affect to emotion is attached to a circulation of images meant to simulate desire-already-satisfied, demand-already-met, as capital extracts value from affect – around consumer confidence, political fears, etc., such that the difference between commodification and labor, production and reproduction, are collapsed in the modulation of the capacity to circulate affect. If all this seems only to characterize First World economies, actually formal subsumption necessarily had a global reach not only in terms of the outsourcing of capitalist production to regions all around the world, a flexible accumulation allowing capital investment to move from one region to another around the globe. There also was the globalization of media and digital technologies.

The technologies that would allow for the intense period of financialization beginning in the 1970s would be globalized, setting off financialization in various parts of the world other than the First World, bringing nations and regions, unevenly to be sure, into a world-wide capitalist economy.

However, privatization-oriented fiscal and monetary policies also would be internationalized. Through financial institutions such as the World Trade Organization (WTO), the International Monetary Fund (IMF) and World Bank, policies of neoliberal structural adjustment of debt were meted out that would produce crisis in most of these economies, preparing for what might be described as a capital accumulation by dispossession of the life forces of some populations, some animals, some forms of vegetation, some cells.⁸

In this global situation, the connection of affect and capital is not merely a matter of a service economy's increasing demand for affective labor or media's modulation of the circuit from affect to emotion. Rather, pre-individual affective capacities have been made central to the passage from formal subsumption to the real subsumption of 'life itself' into capital, as the accumulation of capital has shifted to the domain of affect. While appearing as the expansion of affective labor and media modulation of the circuit from affect and emotion, or as international exchange in body organs and other body parts, or as the demand for adherence to normative procedures for guarding life, such as human rights protocols, in order to control entrance into economic circuits (see Chow, 2002; Negri, 1999; Thrift, 2005; Virtanen, 2004), capital accumulation in the domain of affect is seeking at a deeper level a reduction of energy resources, including the human body and 'life itself', to their informational substrate, such that equivalencies might be found to value one form of life against another, one vital capacity against another. With information providing the unit, capital accumulation in the domain of affect is an accumulation and an investment in information as the dynamic immanent to matter, its capacity for self-organization, emergent mutation and creation. In this passage from formal to real subsumption, the tendencies of capitalism are moved by the technological postbiological threshold.

Biopolitical Racism and the Biomediated Body

If capital accumulation in the domain of affect means that there is an 'assimilation of powers of existence, at the moment of their emergence (their phased passing)', this assimilation, Massumi argues, also serves as biopolitical governance, as the powers of existence are made to pass 'into a classificatory schema determining normative orbits around which procedural parameters for negotiation and advocacy are set' (1998: 57). Biopolitical control is not the production of subjects whose behaviors express internalized social norms; rather, biopolitical control is an effect and cause of the 'normative' undergoing:

... rapid inflation, as classificatory and regulative mechanisms are elaborated for every socially recognizable state of being. ... 'Normal' is now free-standing, no longer the opposite and necessary complement of 'abnormal,' 'deviant,' or 'dysfunctional,' as it was under disciplinary power, except in limit cases. (1998: 57)

For Massumi, control transforms the subject of discipline into ‘generic figures of affective capture’ that provide a ‘gravitational pull around which competing orbits of affect and thought are organized’ (1998: 54). These figures are not individual subjects but rather what Deleuze referred to as ‘dividuals’ (1995: 180), statistically configured in populations that surface as profiles of bodily capacities, indicating what a body can do now and in the future. The affective capacity of bodies, statistically simulated as risk factors, can be apprehended as such without the subject, even without the individual subject’s body, bringing forth competing bureaucratic procedures of control and political command in terms of securing the life of populations.

The linking of control and political command with the risk factors of statistically produced populations is a form of power that Michel Foucault called biopolitics. In contrast to disciplining, biopolitics turns power’s grasp from the individual subject to ‘life itself’. As Foucault put it: ‘So after a first seizure of power over the body in an individualizing mode, we have a second seizure of power that is not individualizing, but, if you like, massifying, that is directed not at man-as-body but at man-as-species’ (2003: 243). But biopolitics is not without any interest in the individual; biopolitics individualizes as it massifies. In linking biopolitics to biomedicine, Thacker argues that ‘biopolitics accounts for “each and every” element of the population, the individual and the group, and the groups within the group (the poor, the unemployed, the resident alien, the chronically ill)’ (2005: 25). However, if populations, in this gradated approach, ‘can exist in a variety of contexts, defined by territory, economic class groupings, ethnic groupings, gender based divisions, or social factors’, they do so ‘all within a framework analyzing the flux of biological activity characteristic of the population’ (2005: 25). What makes the biopolitics of the biomediated body a political economy then, is the break into biology or ‘life itself’ by carving out various populations in order to estimate the value of their capacities to live, a deployment of what Foucault described as racism (2003; see also Mbembe, 2003).

Although speaking to events of the first half of the 20th century, even while remembering 19th-century colonialism, Foucault offers an important take on the racism at play in contemporary biopolitics. He argues that it is ‘far removed’ from the racism that takes the ‘form of mutual contempt or hatred between races’, or the sort of ‘ideological operation that allows states or a class to displace the hostility that is directed toward them or which is tormenting the social body onto a mythical adversary’ (2003: 258). Instead, racism permits a return of something like the sovereign right to kill in the context of biopolitics, deployed as something like a crude evolutionism, it permits the healthy life of some populations to necessitate the death of others, marked as nature’s degenerate or unhealthy ones. Of course, the mutual hatred among races, or the projection of hate and fear onto a population that makes it into a mythical adversary, may come to function as a support of evaluations of populations, marking some for death and others for life (see Ahmed, 2004).

If a population racism is central to the political economy of the biomediated body, it is because it is a racism that is deployed each and every time a differentiation is made among and in populations, constituting additional bodies of data. In contrast to the racism linked to the body-as-organism and its skin-morphology, the racism that Foucault points to gives the biomediated body its differences, even as the biomediated body gives racism its informatic existence. Although the visibility of the body-as-organism still plays a part, the biomediated body allows the raced body to be apprehended as information. Here the very technologies of surveillance and security, which presently operate to race populations, do so by monitoring bodily affect as information, ranging from DNA testing, to brain fingerprinting, neural imaging, body heat detection and iris or hand recognition – all are proliferating as ‘total/terrorism information awareness technologies’.⁹ The biopolitical racism of the biomediated body engages populations in terms of their ‘vulnerable biologies’ – ‘vulnerable not only to illness, life and death, but also to national and international regulatory policies, military research programs, and a range of social anxieties concerning the level of threat’ (Thacker, 2005: 228).

Conclusion

In pointing to the devastating potential of biopolitical racism at the post-biological threshold, it is important to remember, however, that a threshold is indeterminate. It is the limit point beyond which there will have been change irreducible to causes. To elaborate the political economy of the biomediated body is not to determine the political economic as the cause of the biomediated body or its potential. It is rather to offer a back-formed analysis of the conditions of possibility of arriving at this threshold – which will help to move thinking about political economy from a prior back-forming analysis and set the stage for strategizing about what is to be done. While the political gain expected by the affective turn – its openness, emergence and creativity – is already the object of capitalist capture, as capital shifts to accumulate in the domain of affect and deploys racism to produce an economy to realize this accumulation, it is important to remember the virtual at the threshold. Beyond it, always a chance for something else, unexpected, new.

Notes

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1. For a recent review of the turn to affect in cultural and literary studies, which takes up the difference of emotion and affect but also exemplifies the way in which such criticism ends up with feelings and emotions, see Sianne Ngai’s *Ugly Feelings* (2005).

2. I am taking this term from Keith Ansell Pearson (1999).
3. I am following Eugene Thacker, who puts the scare quotes around 'life itself' to indicate that there is no essence that is discoverable – as life itself. But since the term has been used by molecular biologists since the 1950s, Thacker keeps the term. I will too, especially to argue that 'life itself' is being abstracted through capital accumulation in the domain of affect (Thacker, 2005: 60–61).
4. Brian Massumi argues: 'It is only by reference to the limit that what approaches it has a function: the limit is what gives the approach its effectivity, its reality.' The reality the limit gives 'is movement or tendency' (Massumi, 2002: 147).
5. Massumi argues that: 'Visceral sensibility immediately registers excitations gathered by the five "exteroceptive" senses even before they are fully processed by the brain. . . . The dimension of viscosity is adjacent to that of proprioception, but they do not overlap' (2002: 60–61).
6. Hansen is drawing from Francisco Varela (1999).
7. My discussion of information draws on a number of sources; besides Tiziana Terranova (2004) and N. Katherine Hayles (1999), there is John Johnston (1998) and Mark Taylor (2001).
8. I am borrowing here from David Harvey's (2003) discussion of 'accumulation by dispossession', giving it my own spin.
9. I am drawing here on discussions with Jasbir Puar and her unpublished book manuscript, entitled *Terrorist Assemblages: Homonationalism in Queer Times*.

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