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Pain Sense: Nociception, Affect and the Visual Encounter

By *Anthony McCosker*

Whether understood as sensation, perception, experience, or image, pain is caught within a conceptual bind. Like other modes of sensory and perceptual encounter, it undermines the linguistic and representational canons of late twentieth century media and cultural theory by insisting on bodily processes, affect and sensation over language and meaning. To think of pain representationally as an object of meaning making processes elides the physical and affective forces that underpin it. On the other hand, pain is also constrained within biomedical knowledge and practice as a kind of signalling event within the body, warning of physical damage. And in its “aberrant” forms, such as chronic pain, phantom limb pain or collective trauma, it often defies or resists biomedical models and treatment. By always exceeding these domains, pain problematises them. This paper aims to think through pain as productive force as it operates across these distinct domains of science and aesthetics, image and culture by bringing together the neuroscience of nociception (the sensation and perception of pain) with contemporary theories of affect.

After probing the problem of pain as sensation, mediation and expression, I turn to the early twentieth century empirical work and philosophical reflections of pioneering neurophysiologist Charles Sherrington. It was Sherrington who coined the term synapsis in an era preceding the mediating capacity of the electron microscope. In his studies of the sensory arc and nociception we get an account of pain that places the body in the world as an assemblage that includes noxious stimuli, excitation of the nervous system in relation to thresholds of intensity, and aversive affect. Sherrington’s processual and ecological account of nociception and the integrative nervous system aligns with contemporary empirical research into empathy and mirror neurons that observe the operation of affective and motor neural systems in the process of seeing the actions and states of others. In turn, these insights work to enrich recent theories of affect to provide a way of understanding pain as intensive encounter. Affect is conceived here as force, excess, intensity, as pre-personal and synaesthetic as it crosses sensory boundaries and emerges in the relation between bodies.

Drawing together these fields of thought and research, I argue here that the affective force of pain is located not simply within the perceiving subject, nor the object that “initiates” sense perception, nor in the impulse striking out between cells in afferent synaptic chains coursing through the body, nor at the synaptic interface or within the nerve cells themselves at the site of a wound. It is neither simply an image nor an internal signalling device. Rather the affective force of pain lies in the complex interchange of any and all of these elements, along with others, through which bodies act upon one another and in relation to one another within an encounter. The concept of pain developed here indicates the way that as image pain operates between bodies as sensation, affect, and encounter to also indicate the vitality of media and visual environments. Nociception describes the biomediation of force, sensation, affect and information that constitutes the productive ecology within which any aversive encounter occurs, including those of our media

and audio-visual environments. An encounter with pain as image thus has the productive potential to affect or bring into being forms of relationality and sociality.

Pain, Mediation and Expressibility

In three seminal works on the expressibility and apprehension of pain, Elaine Scarry (*The Body in Pain*), Susan Sontag (*Regarding the Pain of Others*) and Judith Butler (*Frames of War: When is Life Grievable?*) share a concern for the volatility or even silence that accompanies human suffering. For Scarry, pain serves as the very paradigm of doubt and retains an inherent expressive instability or reversibility so that at any point the body in pain can become a weapon turned against itself or to the benefit of a powerful regime. While it can be “world destroying” for the sufferer, Scarry sees an individual’s own pain and the pain of others as two “wholly distinct orders of events” (4). In Sontag’s final book she revisits her early criticism in *On Photography* of the bankruptcy of the photograph of suffering in its inevitable turn to cliché, this time more ambivalently, perhaps more hopefully. Butler, on the other hand, attempts to think through this ambivalence in the context of the US war on terror, Israeli aggression in Gaza, and the circulation of photographs of torture and depravity in Abu Ghraib prison in order to offer a critical response to what she sees as the ethical failures behind the powerful media and governmental framing of a global war on terror. Where Scarry and Sontag ultimately and in different ways lament the failure of language and image for the sufferer, Butler argues that the interpretation that takes place in the expressive work of a photograph of suffering has the ability, though not always realised, to carry affect beyond the time and place of its production to achieve apprehension, and even recognition (63-100). Fundamental for Butler, particularly in the case of war, is the operation of the frames through which a life can be apprehended in its precarity and become properly recognisable and hence grievable. In this sense, vulnerability, the fact that we can be so easily injured or harmed, opens a path for affect, ethical conduct and sociality in an encounter with another’s pain.

Vulnerability, as a way of conceptualising the modern hypermediated environment, has informed a number of key cultural and media theorists throughout the twentieth century. Walter Benjamin saw a generalised sensory bombardment as an essential characteristic of the neurological shock of the modern industrial, mediated urban environment. In early writings Benjamin positioned film and other technological media as shock-absorber and narcotic (Meek). But this notion of numbing, popularised often as desensitisation, tells only a part of the sensory story of the media encounter. Re-examining Benjamin’s “On Some Motifs in Baudelaire,” Susan Buck-Morss explains Benjamin’s notions of shock and the bombardment of the senses in terms of the “synaesthetic,” the crossing of sensory fields – vision and touch for instance. From the notion of the synaesthetic Buck-Morss extracts both the neurophysiological and aesthetic elements of the cultural encounter in urban, industrial and mediated contexts, a corporeal aesthetic of autonomous and immediate impact that precedes conscious reflection or detached aesthetic contemplation. Images and media can act as much to absorb and nullify the bombardment of the senses posed by modern industry and urban environments, as they can to amplify and distribute shock. For Buck-Morss, this is because the relationship between organism and environment is an open neurological system; the body is not only “open to the world through the sensory organs, but the nerve cells within the body form a network that is in itself discontinuous” (385). Within this schema, the brain is not an isolated body part “but a part of a system that passes through the person and his or her (culturally specific, historically transient) environment” (384-85). A number of scholars of visual and media culture have also explored the interconnections of touch, sound, taste and other senses with sight and the image historically and in contemporary visual culture (e.g., Beirnoff; Marks).

In her account of affect and the “biomediated body,” Patricia Clough has argued that in modern biological sciences a persistent model of the “body-as-organism” has defined the body “autopoietically as open to energy but informationally closed to the environment, thus engendering its own boundary conditions ...” (“The Affective Turn” 2). That is, there remains a strong tendency in biological sciences to isolate “human biology from its environment” in the

modern endeavour to gain mastery through knowledge and thus control over both (Buck-Morss 385). It is in experiences such as trauma or pain that a privileged assumption of the “autopoietic organism-milieu,” as Clough puts it, becomes problematic. Clough notes that in the humanities and social sciences, trauma has been a key site for rethinking the boundaries of the body, “both problematizing skin and complicating the nature of affective transmission across bodies” (“Afterword” 226). Trauma has been a term used in this context to bridge the cultural, social and psychological operation of forms of suffering with its designation in medical science and practice as wound. In pain as in other sensory encounters the movement between bodies, affect and thought matters.

In Descartes’s classic account of pain represented by a flame burning the toe, the relation between external stimulus and pain equates with a rope and bell. The nerves are excited at the periphery sending a signal to the brain, which reacts by sending a message back to the muscles to contract or withdraw from the stimulus causing the pain (Williams and Bendelow 156-57). In this vein, contemporary bio-medical discourse also often reduces pain to its function as signalling device and protective mechanism (Hall and Guyton 583-93). [1] Tissue, nerve or organ damage is targeted because the objective is always the elimination of the cause of pain by surgical, pharmacological or therapeutic means (Meyer et al.). The register of pain is contained within the body, in the firing of nerve signals and their reception in the brain allowing the cause to be isolated and potentially negated. By implication, this model has established the axiomatic designation of “two pains” (Morris): of body and mind, or physical injury and nerve excitation on the one hand and psychological suffering, emotion, displeasure or discomfort on the other. And ultimately, this conception of pain sets up an incorporeal understanding of the process of seeing someone else’s pain as only ever representational, immaterial, psychological or symbolic. This aligns with the modern privileging of vision, or ocularcentrism, associated with a Cartesian inflected modern scopic regime (Jay), which positions sensory phenomena like pain resolutely within the body, and the object, image or representation outside.

Attempts to define pain more broadly, in order to address chronic pain or phantom limb pain for example, have introduced a potentiality that expands the ecology of pain beyond the boundaries of the body-as-biology. Elizabeth Grosz recounts the history of phantom limb research and theory to describe the complex integration of anatomy, sensation and neurological functioning as it reaches beyond the literal surface of the body (*Volatile Bodies* 70-79). These types of experience have been vital for better understanding and treating forms of chronic pain. In this context, Harold Merskey and Nikolai Bogduk define pain as: “an unpleasant sensory and emotional experience associated with actual or potential tissue damage” (210). By including both the affective “qualities” of the experience and mere “potential” damage, this definition seeks to de-pathologise chronic pain and better account for the integrative ecology within which pain and other sensory experience arises.

An integrative conception of pain becomes more apparent when we consider the perceptual series that leads to pain conceived as event or process. As event, the distinction between the physical mechanism and affective qualities of pain begins to unravel. This is a point made by Gilles Deleuze in *The Fold*. He includes in the pain event the multitude of “microperceptions” or indiscernible actions and stimuli that precede conscious perception (98-99). His use of the example of the dog being beaten incorporates a range of perceptions and affects into the pain event that do not spontaneously arise in the body, nor simply switch on or off with the impact of the stick on the body’s surface:

pain has not abruptly followed pleasure, but has been prepared by a thousand minute perceptions – the pitter-patter of feet, the hostile man’s odor, the impression of the stick being raised up, in short, an entire, imperceptible “anxiousness” from which pain will issue “sua sponte,” as if through a natural force integrating the preceding modifications. (64)

These are the microperceptions of the event providing the worldly context for pain, its relation to events and perceptions that precede and follow it. Pain in this way folds the surface of the body through sensation into the world and into the ecology of which it is an integrated part. A similar enfolding occurs in the process of seeing pain, and this in turn points to the significance of the concept of vulnerability that underpins Butler's account of the perceivability of pain in relation to the "recognition" of another's inherent, though always necessarily "established" precarity. The neurophysiological understanding of these related notions of vulnerability and integrative ecology that follows can shed more light on how pain operates as media encounter and media practice.

Nociception: the Integrative Neurophysiology of Charles Sherrington

Modern neuroscience has begun to offer some significant insights into pain as experience and encounter. The following exposition is not intended to be comprehensive, but touches on some key productive moments for thinking through the integrated ecology of pain as affect and image. To begin with, there is a great deal of merit in Sherrington's pioneering work on the modern neurophysiology of pain. Sherrington resisted the trend toward autopoietic accounts of the organism in his 1906 masterpiece *The Integrative Action of the Nervous System*. It was Sherrington who introduced the term synapse. His account of the integration of the organism through nervous communication across the *gap* between nerve cells, and in the movement of forces of stimulus through bodies attempted to maintain a neurophysiological conception of the organism as situated within, dependent upon, and integrated by its environment. Within a corpus of work devoted to the activation of the nervous system through the various species of reflexes, one of his central achievements was in furthering the modern science of the mechanisms by which we perceive pain. He referred to the mechanism as "nociception." Sherrington's work can still be read for its contribution to contemporary neurophysiology, but his contribution also extends to the cultural framework he developed to explain the "integrative" characteristic of the organism made possible by the nervous system (Finger 217-37).

Rather than positing pain within the strict confines of the physical organism as a closed, mechanical system Sherrington's theoretical discussion of nociception details an integrative tripartite relation between the environment, a set of processes resonating through the nervous system and a corresponding affective quality. This is a sensory ecology that locates bodies among and in relation to other bodies, indicating a sensory flow as mechanic process, always in flux. For Sherrington nociception is constituted by: a broad range of stimuli that have in common a noxious character ("intensity constituting their harmfulness") (227); impact upon the nervous system above a certain threshold; and its experience as an aversive affect (228). In this formulation, intensity and affective quality combine with mechanical nerve excitation to constitute the experience of pain. That is, unlike most bio-medical accounts, Sherrington emphasises affective quality, intensity and nervous excitation as equally active or "integrative" elements of the mechanism: "[a]s psychical adjunct to the reactions of that apparatus, we find a strong displeasurable affective quality in the sensations" that noxious stimuli evoke (228).

Referring to some of Sherrington's formulations, Brian Massumi highlights proprioception as a "sixth sense directly attuned to the movement of the body," a sensibility of muscles and ligaments, of positionality and countenance as differentiated from tactility or exteroception, and "visceral sensibility" or interoception (*Parables* 58, 179). Where proprioception "folds tactility into the body, enveloping the skin's contact with the external world" (58), nociception can be described as the sense directed specifically at the diverse range of stimuli experienced at a certain threshold as noxious. It indicates, as with proprioception, the enfolding of affective or intensive stimuli, including visual and auditory stimuli, into the body. Nociception was conceived by Sherrington at the turn of the twentieth century as playing a central part in the integration of the organism through the nervous system and nervous reactions:

In the multicellular animal, especially for those higher reactions which constitute its behaviour as a social unit in the natural economy, it is nervous reaction which *par excellence* integrates it, welds it together from its components, and constitutes it from a mere collection of organs as an individual animal. (2)

A body thus operates within, and as, a complex ecology of molecular flux and microperceptions. Reflecting on the implications of his research, Sherrington describes beautifully the movement of forces through the body:

The organism itself, like the world surrounding it, is a field of ceaseless change, where internal energy is continually being liberated, whence chemical, thermal, mechanical, and electrical effects appear. It is a microcosm in which forces which can act as stimuli are at work as in the macrocosm around. (129-30)

Sherrington's theory of the "bodily resonance of emotions" underlying his discussion of nociception provides a way of thinking about "affective-states" as an attribute of the subject's physical (reflexive) relation to the stimuli of the world (255-68). This is because, as a neurophysiologist who attempted to place the nervous system "in the world," Sherrington canvassed a sophisticated picture of the individual in the context of an environment saturated with sensory experience. Within his view, the encounter with nocuous stimuli in part constitutes the normal state for an organism:

With its liability to various kinds of mechanical and other damage in a world beset with dangers amid which the individual and species have to win their way in the struggle for existence we may regard nocuous stimuli as part of a normal state of affairs. (227)

The environment or plane through which the body is integrated consists of continuity between bodies and the fluctuating qualities of intensive stimuli that are experienced as nocuous as well as cellular and synaptic continuity and discontinuity.

There are many moments in modern neuroscience that have expanded our understanding of the relation between sensation, perception, action, body, brain and thought. Donald Hebb, for instance, made major contributions to connecting cognitive science and neuroscience by demonstrating the expansive distribution of the neural system, and in identifying and elucidating the neural basis of learning and memory in the process of synapsis (Shepherd 11-13). In particular, two areas of contemporary research have provided an increasingly sophisticated account of the affective and precognitive qualities of the process of seeing (and understanding) the actions and states of others: research into neurological mechanisms that enable "empathy," conceived as the ability to comprehend another's state without actually experiencing that state, along with research into a class of neural cells that have been called "mirror neurons." This research provides some useful insights into the ways in which the distinction between sensing and seeing might be broken down. These strands of research may also provide some empirical foundations for the bodily capacity or "potential" that has been the focus of recent cultural and media theories of affect, as well as in Merskey and Bogduk's broader definition of pain discussed above.

For Massumi affect becomes apparent at "the edge of the virtual, where it leaks into actual" (*Parables* 43). This is where seeing, understanding, and sensing the actions and states of others (including their suffering) happens instantaneously in the body of the observer, in-excess of thought and prior to its cultural coding as emotion, in the emergence of sensation before becoming conscious thought, meaning, language or any other form of "frame" or semantic network. In Sherrington's terms, the body is integrated through these mechanisms as they in turn are integrated within a cultural, physical and aesthetic environment of expressive (including aversive) sensory stimuli. Another way of conceiving of the movement between virtual and

actual is by considering the neurological basis of empathy resulting from seeing another's pain.

To take two examples, Tania Singer et al. and Alessio Avenanti et al. have attempted to identify and map the empathic, affective and motor neuronal systems in action as people observe others in pain. [2] Having couples observe each other receiving painful stimuli, Singer et al. found that "empathizing with the pain of others does not involve the activation of the whole pain matrix, but is based on those second-order representations containing the subjective affective dimension of pain" (1160). They emphasise the role of these mechanisms in our ability to form "subjective representation of feelings that allow us to predict the effects of emotional stimuli with respect to the self" and also noted the importance of the *intensity* of the stimuli for another person, and its associated consequences (1161). Avenanti et al. showed that there is more to the process of empathising with the pain of others. Their experiment focused on the "motor mapping of others' pain" (995). In their study, when participants observed a needle apparently pushed into another participant's hand (not couples this time), the neurological effects were highly localised. The source and intensity of the stimulus was mapped "onto the observer's motor system according to topographic rules" (958). The two experiments observe both the affective qualities (including intensity) and a projected sensory topography in the process of pain observation. Interestingly, the visual content mattered greatly; for example, in the difference between a needle pushed into a tomato versus a hand. In a later discussion of the two experiments, Singer and Chris Frith draw attention to the different stimuli used to induce empathy, and the mental attitude of the participants (their personal "investment" in the receiver of pain) (846).

These studies accord with work on what have been called "mirror neurons" – a class of neural cell that fire both when an act is performed and observed, crucial to learning, empathy and our ability to see and comprehend the states of others (including states of suffering). Mirror neuron research particularly challenges cognitive models that consider the processing of an image as a speedy set of mental computations based on prior experience or knowledge. In innovative studies of the neuronal activity of Macaque monkeys, researchers have shown that the brain works more rapidly and efficiently. Mirror neurons are described as a class of neurons that fire in the brain both when the Macaque acts, and when it sees another monkey, human or even robot doing that same action (Rizzolatti and Craighero; Gazzola et al.). The firing of mirror neurons, in the researchers' words, is an autonomous response: "[t]his automatically induced, motor representation of the observed action corresponds to that which is spontaneously generated" when the individual acts in full knowledge of the outcome of their action (Rizzolatti and Craighero 172). [3]

The processes described in these areas of research can be understood as "mimetic," but not simply in the sense of a learned response or imitation. Exploring what she calls "mimetic communication" or "affect contagion," Anna Gibbs, following Massumi, Roger Callois and Daniel Stern, positions mimesis not as representation or copy, but rather within the relation, in the shimmy between subject and object and their relationality. Rather than framing mimesis through the language of representation and within the dominant sensory mode of sight, Gibbs emphasises a "rendering" in the encounter between things, and the importance of synaesthesia as a mimetic process (202). She argues that "at the heart of mimesis is affect contagion, the bioneurological means by which particular affects are transmitted from body to body" (191). In combination, and with respect to Sherrington's work on nociception and the integration of the nervous system, these studies highlight the synaesthetic relation between seeing and other senses, but also show that the encounter with sensory and visual stimuli is always multi-faceted, complex, multi-directional or relational and contextual.

Pain-Image, Vulnerability and Affect

The intention here is not to uncritically incorporate the results of these selected instances of neuroscience research into a concept of the visual and media encounter with pain. There are, I

would argue, problems with the emphasis on the role of these mechanisms purely for language and learning, and a problematic conception of empathy that I discuss below. They do, however, help extend theories of affect and approaches to visual culture and mediation, and these in turn offer additional spheres of application and implication for the empirical observations.

Sherrington's account of the integrative nervous system, and the neuroscience research described above, attempt to characterise pain as affective encounter. Likewise, the concept of vulnerability in Judith Butler's work, which is based partly at least in a shared sense of "injurability," along with the notions of shock and the synaesthetic as understood by Benjamin, Buck-Morss and Massumi, address in their own ways the question of the "locatability" of sensation and affect.

It is the term "empathy" that has been most commonly used to describe the way we might "feel for" another person and come to understand their state of being or experience in an encounter. Empathy is the term used by neuroscientists to help explain their findings in research as described above (Singer et al.). In order to make the conceptual shift from empathy as it is commonly understood to vulnerability and affect, it is worth revisiting its etiology. Empathy can be traced to the later nineteenth century German term "einfühlung," meaning "feeling into" something, with E. B. Titchener first using the English term "empathy" in a 1909 lecture (Barnes and Thagard). The integrative meeting of object and subject implied in this use of the term was explored in the aesthetic theory of Robert Vischer, Rudolph Lotz, Wilhelm Wundt and others in a way that has been lost to the common contemporary usage that emphasises comprehension of another's state – in particular, an emotional state – and the associated sense of compassion (Vischer). In Jill Bennett's notion of "empathic vision," she also emphasises the sense of feeling into, but seeks to move away from the distancing sense of spectatorship deployed in much trauma theory (8, 34). Bennett adopts Deleuze's notion of the "encountered sign," which refers to "the sign that is felt, rather than recognized or perceived through cognition" (7).

These alternative uses of the term can help shift between empathy as it is commonly conceived, and the visceral reaction, "gut feeling" or feeling into that characterises the more direct *affect* of a nociceptive encounter. Henri Bergson wrote about affect and perception in a similar way: "Affection, then, is that part or aspect of the inside of our body which we mix with the image of external bodies," and he added that "there is no perception without affection" (58). Read through Sherrington's account of the nervous system as integrated with and through nocuous stimuli, and the notion of vulnerability and encounter outlined here, a clearer picture of pain emerges to dismantle the strict separation of the object of sight or an image and the "feeling" or sensory "processing" of pain within the boundaries of the body. This is reflected in the difficulty of "locating" pain: as sensation, as object of perception or as image, as emotional experience (or psychological suffering), as force operating either within the autopoietic body as isolated biology, or in the relation with the external world.

It is in this sense that affect has often come to be defined as "in-excess," as a force shared by object and subject, but not reducible to either, or to their relation (Clough; Gregg and Siegworth 1; Grosz *Chaos, Territory, Art* 7-8). A pain-image insists on this integrated sense of irreducibility and excess. In Sherrington's schema nocuous stimuli must impact on the nervous system above a certain threshold with the quality of aversive affect. The stimuli defines the intensity of a force, the threshold indicates the particular character of bodily vulnerability and the affect enfolds these elements into a variable quality – colour, valence, tone or other modulation. Nociception can thus be thought of as a process of biomediation operating as force, sensation, affect and information. It designates the intensive and relational ecology within which an aversive encounter occurs, including those of our media and audio-visual environments.

Seeing someone else's pain is one of those "complex cases of affect where action is never actualized and where affect remains at the level of the virtual" but nevertheless takes on the intensity of force and operates as a form of feeling into or "sensing" that emerges often as visceral encounter (Colebrook 54). This is a virtual action on the body in the form of a "motor

preparation" and moment of affective contagion. Thus, as image pain takes on the qualities of a force. But if through media or aesthetic practice pain manages to surge beyond the boundaries of a given body (Bennett 50), it is due to these autonomous, relational and intensive qualities in the force of affect (Massumi, "Half-life"), and in relation to the vulnerability that underpins the integrated ecology of a body's capacity to be affected. In considering the movement between the virtual and actual, Massumi's emphasis is on the nature of emergence, as potentiality or capacity, at the "seeping edge" that enables or triggers change and induces the new (*Parables* 43). Likewise, the pain-image can only be designated as such at the point of emergence in forms of aversive encounter.

The apprehension of the force of pain in the visual encounter is integrated with the mechanisms through which "actual" pain is felt. They are not equivalent, but are both reliant on the affective and intensive qualities of pain and variable thresholds above which they emerge as sensation. There are implications here for media and aesthetic practice that are generally understood on an intuitive level. This is best illustrated in Deleuze's account of the artwork of Francis Bacon and his attempt to "render forces." For Deleuze, the production of affects and percepts constitutes one of the primary problems for art, and we could say media more generally, and signals their role in extending and saturating the cultural environment with intensity and vitality. The artist strives to make affect "*stand up on its own*" or "to wrest the affect from affections as the transition from one state to another: to extract a bloc of sensations, a pure being of sensations" (Deleuze and Guattari 164, 167). Deleuze sees in the art of Francis Bacon the struggle to render forces through painting.

Not insignificantly, Deleuze singles out Bacon's attempt to paint the scream, referring to the forces "that convulse the body until they emerge at the mouth as a scrubbed zone" (*Francis Bacon* 60). In these works Bacon sought to render the forces of pain not through the wound or the act of violence, but in their point of emergence as convulsion and scream. In so doing, his painting moves beyond the spectacle or the narrative to reach the sensation, that which acts immediately on the nervous system, avoiding the "boredom" of narrative (34, 61). Deleuze puts this struggle best when he says: "[t]he violence of sensation is opposed to the violence of the represented (the sensational, the cliché)" (39). But there is no need to limit this endeavour to art and the work of certain modern artists. The media and "cultural industries," practitioners of visual culture more generally, and producers of user generated content across distributed communication environments all strive to affect in a competitive and chaotic economy of attention. In open, dense media environments, affect as force, intensity and duration in the image becomes the key organising factor in the generation of attention. One of the key tools for this purpose is the ranging quality and intensity of the pain-image.

Visually saturated media cultures often seem to operate as if with the force of violence. This has always been generally understood, and has also been a source of anxiety and regulatory attention, or blatant politicisation. And yet, while in the discourse of "trauma theory" many point to the failures of modern media and aesthetic cultures to sustain or resolve the legacies of historical violence (Meek), there is a sense in which at some level we cannot *but* be affected by the sight of pain. Concepts and observations in neuroscience have the productive potential to reveal the processes by which media engender such a "profound technical expansion of the senses" (Clough, "The Affective Turn" 2), and the pain-image may be considered a key site. In this sense the capacity to be moved and to move others, our vulnerability, injurability, or "precarity," as Butler puts it, remains vital to encounters and interactions within technically mediated environments; and in this sense "vitalises" those environments.

Sherrington saw in the activation of the nervous system an integration of the organism. This integrative process takes place as a tripartite relation between the flux of natural stimuli, nervous excitation and affective experience. The body continuously comes into being, or simply becomes, through the ebb and flow of forces (or energy). In this process lies the constitutive and productive capacity of the senses in relation to the multifaceted stimuli that surround us. It also

de-individuates pain as inherent to the internal operation of the body-as-organism, or autopoiesis. Pain insistently acts upon bodies singularly, but also calls for an affective attunement that brings to the fore the collective quality or resonance of shared events, states and experiences (Massumi, "Microperception" 12). Affect contagion, or the "transmission of affect," to use Teresa Brennan's phrase, is significant precisely because it designates "the basis for a sense of 'belonging,' and, ultimately, of the polis, as what forms the affective basis of political orders" (Gibbs 191). That is, the vulnerability implied in the processual operation of an encounter with pain as image has the productive potential to affect or bring into being forms of sociality.

Anthony McCosker lectures in media and communications at Swinburne University. His research explores the affective qualities of pain, violence and conflict across visual and networked media, and has been published in journals such as *Continuum*, *Sexualities*, *M/C* and *Scope*. He is the author of the book *Pain, Affect and Visual Culture: Intensive Media* to be published in 2013 by Palgrave MacMillan.

Endnotes

1. There is a consensus in bio-medical literature that certain nerve fibres at the periphery of the body, the small diameter A-fibre and C-fibre nociceptors, selectively respond to nocuous stimuli, sending an impulse to the brain via the spinal cord and the central nervous system (Meyer et al.; Guyton and Hall 583-93). These nerve fibres have been found to transmit pain messages through the release of chemical messengers (prostaglandins, bradykinin and substance P are some that have been identified) that initiate impulses along nerve pathways to the brain.
2. Between these two studies there were key methodological differences. Singer et al. used functional magnetic resonance imaging (fMRI), while Avenanti et al. used transcranial magnetic stimulation (TMS) to observe "motor evoked potentials" (MEPs), the former recorded at the brainstem, the latter at the muscles. In Singer et al.'s study couples were used to deliberately incorporate an affective element, whereas Avenanti et al.'s participants were not known to each other.
3. Mirror neurons respond not only to the sight of an action, but also to sounds that can be interpreted as that action taking place unseen (Rizzolatti and Craighero 172). In addition there does not have to be a tight match between "the kinematics of the observed actions and the actions within the observer's motor vocabulary" in order for the mirror neuronal system to be activated; the neurons fire even when observing comparable robotic actions (Gazzola et al.).

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