Image Flow: Photography on Tap

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Abstract

This essay is about the phenomenon of mass, mobile photographic images in a digital, networked context. In response to recent writings that challenge the relevance of the close reading of singular images, it proposes rethinking the opposition between singular images and images *en masse* through philosophical ideas of multiplicity and, in particular, via the concept of image flow. It examines four connected contexts in which concepts of flow have been used: in discourses surrounding the internet and digital media, where it is used to naturalise these media; in psychology, where ideas of flow underpin descriptions of consciousness and human/ animal perception; in robotics and Artificial Intelligence, where ideas of flow from psychology joined with a move away from dependence on representation to facilitate increasingly autonomous mobile machines; and finally, in studies of television, where the on-tap transmission of images has been understood in terms of a flow that articulates or choreographs bodies and attention, connecting the rhythms and temporality of private and public space, cities and suburbs. This model of flow, in particular, allows for analysis that operates across different scales, and undoes oppositions of scale and surface / depth that pervade recent photography theory.

Keywords

Photography theory, digital image, networked image, flow, visual culture

Recently, Martin Lister suggested the difficulties of sustaining critical-theoretical approaches to photography that treat images as singular, since we live in an era when images never appear individually. He writes that "The sheer degree of this change has rendered the analysis of singular images as discrete artefacts as largely inappropriate, the object of theory has changed" (2016, 267). He points to the way that digital images exist simultaneously in different places and are experienced as multiples: "We anticipate that behind an image we have alighted on there is another waiting or there is one, seen earlier, to be returned to. Rather than absorbing us in a singular manner each image seems to nudge us toward another" (2013, 8). A number of theorists, including Daniel Rubinstein and Katrina Sluis, have also written about how digital images appear "in series, repetitions, sequences, rapid volleys", with no necessarily identifiable original (2013, 154). They raise the question of how we might analyse images that are also carriers of ever-changing accumulations of metadata, much of which is tenuously connected, if at all, to the visible content of the image.

Moreover, the very existence of something such as a photographic image, distinct from other media, becomes questionable when images are reduceable to code. Friedrich Kittler puts it very succinctly,

> Sound and image, voice and text have become mere effects on the surface, or, to put it better, the interface for the consumer. . . . In computers everything becomes number: imageless, soundless, wordless quantity. And if the optical fiber network reduces all formerly separate data flows to one standardized digital series of numbers, any medium can be translated into another. (31-32)

For contemporary photography theorists, the problem with paying attention to individual digital photographs is that any single interpretation of an image addresses only the surface manifestation, not the code or the data concealed beneath. The algorithm is increasingly understood as the reality of an image whose visual appearance is no longer its principal or most salient characteristic. Since the visual appearance is often conflated with its representational function, the end of the single and singular image seems to announce the

irrelevance of approaches that treat the image as representation as well as of practices of close reading.[2]

Not only are digital images reducible to numbers, they are also no longer self-evidently *still.* They are quickly reproducible, exist in multiple simultaneous copies in different locations without an identifiable original and change their substance with each refresh of the screen. The photographic image is often indistinguishable from the video still. There is a risk, though, of this analysis of the digital networked image overestimating the stillness and singularity of pre-digital photographs. Similar statements to Lister's have been made regarding photographs in general, as they are experienced in everyday contexts: in 1982, Victor Burgin commented on how they require only a brief glance, and then "almost invariably, another photograph is always in position to receive the displaced look" (43). More recently, Paul Frosh claimed that "...photographs seem to be integrated — more seamlessly perhaps than other representations — into a total fluctuating environment in which the individual image loses its singular claims on the viewer's attentive gaze" (2012, 177).

Even in the case of art, the singularity of an individual image was always a useful fiction: as art historians have argued, the discipline of art history itself was itself built on reproductions, even when it fetishized the "original" (Keller 2001). Close reading of an individual image could be described as a synchronic slicing of time, an artificial pause for the purposes of analysis. The association of close reading with stasis is aggravated by what Paul Frosh calls the "attentive fallacy": the idea that meaning and interpretation take place in a "distinct, focused encounter between a visually immobilized viewer and a discrete and equally stationary image" (173). Yet technical images have long been taken, printed and reprinted, projected and reproduced in multiples, and photographic techniques are frequently inseparable from other technologies. Even in the case of an individual photographic print, its significance changed with each new context, and new caption, and the image aged and changed imperceptibly.

While I would not dispute many of these claims made about the digital networked image, here I want to challenge the implied distinction between pre-digital images that may be attended to individually and semiotically, and digital networked images which should not be, since they are a mass phenomenon whose visual appearance conceals a deeper, more systemic significance. I want to do so, not simply by reasserting the importance of close attention to the visual, but by questioning what it means to consider an image as isolated or singular in the first place, and how we envisage the movement of images through networks. I

also question the tendency in photography theory to associate machine vision with the reduction of the image to data, as opposed to the image as an inscription of light (and in this strict sense, as *photographic*). This analysis will rely less on a sharp distinction between analogue and digital image, and more on a broader category of technical images which encompasses both.

Metadata and Microbiota

Rubinstein and Sluis write, "it is not identity that the networked image delivers to the screen, but rather an image of the multiplicity engendered by the network" (2013). This "image" of multiplicity is a temporary stopping-point in a process by which the networked image reproduces itself but also changes as it accumulates metadata, tags and "likes". It is not just that there are innumerable networked images, multiplying, reproducing and being produced and circulated, but that the image itself is a multitude, a growing and changing mass of data. This accumulative data facilitates the interactions of the image, renders it legible to other machines, subjects the users and producers of images to invisible surveillance and tracking, but it is also arbitrary, misleading, irrational, contaminated with so-called "human error".

Technical images are also (by definition, according to Flusser) distinguished from traditional images by being constituted out of particles (grains of silver, electrons). Of course, in this sense, the whole universe is constituted likewise, but the difference is that unlike with other kinds of pictures, we cannot "bracket out" our knowledge of this granular structure, since it alone made the technical image possible (Flusser, 34). Yet this particulate structure is not fixed, once and for all. The technical image as an incomplete accumulation might also be understood via Deleuze and Guattari's rethinking of the body, the unconscious and the image as multitudinous. This emerged as part of their critique of a Western tradition of thought that relies on a separation of human from technology but also human from animal, and of the singular organism from the pack or swarm. In *A Thousand Plateaus* (1988), the concept of multiplicity is articulated in terms of animals in particular, with reference to packs and swarms and collectives (30-44). These collectives are joined not just through family resemblance or relation but through contagion, bodies that interact with other bodies in relations of mutual dependence and co-creation.

The image's accumulation and transformation can be compared with that of our own bodies moving through different environments. Each of us carries with us our own gut flora: the microbiota that live inside human and animal guts include bacteria, fungi, viruses and

other organisms, and they facilitate our interaction with, and digestion of, other materials. They are not other to, or separate from, the body but part of the multitude from which it is constituted. As we move through habitats we collect new microbiota and discard others. One theory of food allergy (the "old friends" theory) posits that our increasingly technological environments are relatively denuded of this necessary flora – we need to move through a historic grassland habitat in order to acquire these old friends (Rook et al.). Despite the potentially questionable contrast between rich (historic, organic) and impoverished (modern, technological), and the impression that such "old friends" are always useful or functional, this theory provides one model for thinking about the movement of the image in that it implies that the body / image is not finished, complete and self-contained, but constantly reconstituting itself, and that habitat is not "environment " (outside) but internal to this process. Technical images are mutually dependent on, and co-creative of other images and other materials. They are always multitudes – of marks, pixels, grains, photons as well as data and metadata.

Distributed perception

The electronically networked image challenges the ways in which images can be understood, not only because the image is a surface effect of calculable, numerical data, that could equally be translated into something entirely different, but also because perception or seeing now appear to be distributed beyond organisms. The separation of vision from a human observer in computational imaging, as noted by writers such as Jonathan Crary and Paul Virilio, is compounded by the development of networks through which images travel and are translated without necessarily being intercepted or subjected to visual scrutiny by humans. Writing in 1999, John Johnston saw this in Deleuzian terms, describing telecommunications as distributed assemblages, to the extent that,

> ...the viewing or absorption of images constitutes a general form of machinic vision, even as the specific kind of perception this involves becomes difficult to define and isolate, since it seems to occur simultaneously at multiple sites, the result of many parallel and machinic processes. As the correlative to both these assemblages and the distributed perceptions to which they give rise, the image attains a new status, or at least must be conceived in a new way... The image itself becomes just one form that information can take. (46-7)

Machinic vision here does not simply mean a kind of seeing by machines, rather Johnston is using Deleuze and Guattari's conception of machinic that incorporates both the human / organic and the technical / mechanical. Johnston argues that this concept takes on new meaning in the era of the internet — "inasmuch as the machinic has been actualized in our everyday experience in ways that can no longer be denied" (Johnston 48). While Deleuze and Guattari do not use the term "machinic vision", Johnston claims a rich resource for analysing technical images can be found in their writing on the "machinic", and the classification of types of cinematic images and modes of perception in Deleuze's books on cinema (Johnston, 29). Recent photography theorists have turned to their writings to think about the digital or computational image, and its distribution across networks, but as Johnston suggests, Deleuze also offered a way of understanding perception differently.

For instance, in *Cinema I: The Movement Image,* and through a reading of Bergson's *Matter and Memory,* Deleuze suggests that the redistribution of perception away from the human observer begins in cinema. Cinema is distinguished from photography by movement, and by its ability to represent not simply a series of instants but an increasingly acentred and constantly changing state of things. In cinema, Deleuze finds ways of seeing that do not simply extend human perception and augment the human eye with technology but which transfer perception from the subject position of a human observer into that of matter itself (89-94). [3] Cinematic perception becomes "gaseous", "liquid" and "molecular". Movement is understood at the level of dissolving solid and discrete objects into the masses out of which they are constituted. This world is buzzing, swarming; all of reality is particulate, molecular, amassing — here is the influence of Spinoza for whom objects were distinguished not by substance but by movement, which at an atomic level separates soft from hard objects, solids from liquids and gases (Spinoza 252-3).

Still photographic images, whether delivered in volleys or not, do not articulate time and movement in the same way as cinematic and video images. Nevertheless, they are caught up and part of new forms of machinic vision, new articulations of human and technical activity and perception. Technical images are mobile, multiple and embodied regardless of whether they are digital, and travel through electronic and fibre-optic networks. Dreams and bodies, and mental (embodied) images, are caught up with technical images. The art historian Hans Belting terms these endogenous and exogenous images, and describes a circulation between the two kinds (2011). In this circulation, humans are part of the network through which images move. If perception, imagination, interpretation and attention are embodied

activities, intimately connected to the production of images, then it is not such a leap to think of bodies as media and media as bodily.

Moving Images

How to describe this circulation, this movement of images? Kopytoff and Appadurai (1986) introduced terms such as biography and trajectory for thinking about the movement of objects across society and through time: the social lives of things. But such concepts are too linear to describe the movement of technical images. In an essay on the artist Gérard Fromanger, Foucault offers us the idea of the image as promiscuous escape artist, mobile but not unidirectional, and moving between media, bodies, across surfaces and screens (Deleuze and Foucault, 1999). Foucault calls this an "image frenzy" and dates it to the late nineteenth century and the circulation of reproductions amongst artists in that period. This notion of a frenzied, buzzing movement is more apposite and very different from the image of seamless and continuous movement implied in the liquid metaphors used by tech companies, such as flow, surfing, photostream, streaming. Yet it is "flow" that I want to examine here, for the different fields of interest it brings together, which sets it apart from terms such as frenzy or trajectory.

In general, the terminology used by tech companies to describe their products and processes evokes landscapes of clouds and streams, and a notion of cyclical time, and movement, via the endless processes by which water is exchanged between earth and sky. Rubinstein and Sluis point out that the use of the term "flow" is ideological: "the cyberspeak of clouds, shadows, streams, farms and flows is misleading and unhelpful as it uses these bucolic metaphors to conceal the profound unknowability of big data." (2013, 153). Such terms naturalise and neutralise a process that is not just about the delivery of a product but also the harvesting of sometimes unwittingly or unwillingly supplied data. The concept of flow is also associated with capitalism, which seeks out "a smooth space" without obstacles to facilitate the movement of capital (Hardt and Negri, 326-7).

Furthermore, analogies of flow imply not just movement but movement in a specific direction. Even in the case of water, the term gives a selective impression, of unbroken smoothness, a sedate stream rather than a stormy sea or a river broken by rapids. Ghislain Thibault (2015) claims that fluid analogies applied to analogue media are appropriate insofar as analogue signals are continuous. The notion of electricity "flowing" is already an analogy, appropriated from hydromechanics to help people visualise the movement of electricity. Applied to digital media, such analogies are misleading since these are discontinuous,

transmitted in bits and through the use of packet-switching. As Thibault argues, the language also suggests a continuity of experience and freedom of choice, a sense of liveness that more properly belongs to older analogue broadcast media and an idealised image of a continuous signal and perfect connection which barely ever realised — in fact digital streaming is more often than not subject to glitches, interrupted and fragmented by poor connections, intermittent signal or overloaded bandwidth.

Watery analogies also help to envision a continuity of movement without the movement of specific *things.* Deleuze writes of how French filmmakers were drawn to water partly because "because water is the most perfect environment in which movement can be extracted from the thing moved, or mobility from movement itself" (86). In other words, rather than the visual perception of movement being dependent on seeing an object in one place, and then seeing it relocated in another, running water provides a way of picturing movement *in itself.* Describing digital media and the movement of data in terms of flow does not depend on us envisaging discontinuities, discrete objects or packages of data. Furthermore, fluid metaphors imply an image, not just of movement, but of time: not only the cyclical time of nature but time as a stream: unidirectional, linear, unstoppable. They have the capacity to suggest the simultaneous presence of the past, in a stream of images that can be dipped into now (thus platforms like Facebook and Snapchat offer our own images back to us labelled as "memories", prompting us to recirculate images selected by algorithm), and a tyrannical linear time, an inevitable onward movement.

Flow and Consciousness

Thus a language of continuous flow and of streams offers a way of conceptualizing digital networked media as smooth, continuous, naturalized and harmonious, and of embedding it seamlessly into the passage of time in our own lives. Yet at the same time, it intimates potential disaster. Flow always risks overflow: there is always the sense of only just managing, the risk of too much, of flooding. The software through which we make, view and exchange images uses models for managing and retrieving data, and for capturing and sustaining attention. The specific techniques developed to make images available, searchable, viewable, such as the slideshow, the stream, the thumbnail image, and so on, can also be understood as ways of attempting to control or program what might otherwise be experienced as an unmanageable and inassimilable onslaught or flood of images.

Ideas of information overload or image saturation are particularly associated with moving image media such as television, but they are also familiar tropes in writing about

contemporary visual culture in general: too much information, too many images, an attack of visual stimuli that produce an immobilized, passive observer. While technology companies use terms such as "flow" to convince us of a seamless efficiency, media theorists use it to refer to an overwhelming diet of rapid, endless and instant imagery facilitated by electronic media. These notions have much older roots too: in the nineteenth century image of the neuraesthenic incapacitated by modern urban life, for example. They describe a human sensorium overwhelmed by the pace and intensity of external stimuli.

At the same time, terms such as "flow" and "stream" have been used to speak about the workings of consciousness in general. The idea of consciousness as flow can be found as early as the 1840s , but is most associated with the psychologist William James, whose phrase "stream of thought" appears in his *Principles of Psychology* (1890). He wrote: "consciousness, then, does not appear to itself as chopped up in bits ... It is nothing jointed; it flows. A 'river' or a 'stream' are the metaphors by which it is most naturally described" (James 1890/1950, 239). A century later, Mihaly Czikszentmihalyi adopted the term "flow" to describe a sense of being deeply immersed in the present, un-self-consciously absorbed in a specific activity. The idea has been popularised to describe a state of absorption in creative, intellectual or artistic activity (1990). For Czikszentmihalyi, media such as television tend to damage or inhibit flow: the rapid turnover of stimulation overwhelm or distract from the flow (Nakamura and Czikszentmihalyi 2009, 91).

While Czikszentmihalyi's flow research finds electronic media, particularly television, to be incompatible with a flow of consciousness or deep thought, other theorists see the inbuilt temporalities, flows or rhythms of electronic media as able to be synchronised with the rhythms of our perceptive and cognitive apparatus (Hansen 2011). Either way, theories of flow in relation to media are theories of human cognitive processes as well as of technologies, insofar as they bring together questions of consciousness, attention and perception with technical structures that are built-in, hardwired or designed into different media.

Intelligence without Representation

The obvious place to look for how ideas of technological vision come together with theories of consciousness is in the joined fields of Artificial Intelligence (AI) and robotics. As the term "artificial intelligence" suggests, the field is founded on assumptions of affinities or similarities between computers and the human brain. However, in the late 1980s, there was a paradigm shift in these fields, away from a dependence on representation, that is, away from

the assumption that in order to develop intelligent behaviours such as autonomously navigating an environment, a robot first had to be able to model or represent the world to itself in a way that mimicked human intelligence. Roboticists turned towards the production of robots that could perform specific tasks in a real (rather than artificially simplified) environment, without first modelling that environment to themselves.

In an article published in 1991 but written in 1987, Rodney Brooks described his research at MIT labs, where his team set out to build artificial intelligence in robots. Combinations of perception and activity were developed "incrementally" and "let loose", on the basis that "mobility, acute vision and the ability to carry out survival related tasks in a dynamic environment provide a necessary basis for the development of true intelligence" (Brooks 141).[4] In order to move, such robots had to be able to "see" and were equipped with television cameras. A live electromagnetic feed of images from one or two cameras (mimicking human stereoscopic vision) provided the input into the system, but in early versions, the robot had to use this input to model its environment before moving. In the early 1980s, according to Andrew Duchon and William Warren, these mobile robots could take a quarter of an hour of computation before the next move was made. They had to plan their movement through the environment, working on the principles of "sense-model-plan-act" (Duchon and Warren 2272). But the new behaviour based robotics of the late 1980s and early 1990s changed the approach: "These researchers are beginning to ask whether the robot need to model the visual world at all before acting upon it" (2272).

Brooks argued that there was no need to have a central system connecting the perception system (input) to the action system (output — "no single place where 'perception' delivers a representation of the world in the traditional sense" (147). His team discovered, through their work with robots navigating environments and avoiding obstacles, that "there need be no explicit representation of either the world or the intentions of the system to generate intelligent behaviors" (149). Johnston points to the similarities between these "distributed" approaches in scientific studies of perception and in robotics and AI (particularly in Brooks' work), and Deleuze's philosophy, in which consciousness and perception are acentred or distributed.[5]

Optical Flow

The idea of "intelligence without representation" is connected to psychological theories in which perception is understood to be translatable to action without prior interpretation and which centre around a concept of "optical flow". This concept was

introduced by James J. Gibson as part of his ecological approach to visual perception. Gibson challenged "the generally accepted assumption that the ability of an animal to respond to *light* and the ability of an animal to respond to *objects* are quite different problems" (Gibson 1958, 182). He proposed a theory of direct perception, in which animals and humans were able to register changes in illuminated surfaces, perceive other objects as moving and recognise depth, and thus navigate an environment, without having to make inferences and without the use of higher cognitive functions.

The same principle that underpins photography (digital and analogue) underpins the ability of the organism to see: light, "reflected in all directions from an array of surfaces" converges at any given point in the environment (including in an eye or a camera): this is its "projective" capacity, and it is the means by which animals and machines form images (183). The converging rays vary in intensity and frequency– together they form what Gibson calls an "optic array". The ability of an organism to register changing patterns in this optic array is what facilitates its locomotion. Or more specifically, the eye registers "focusable light" and responds by focussing it, turning it into an image. In Gibson's theory, the image, in itself, does not involve making sense of the environment: "the image is no more than a *response-produced* stimulus" (184). An animal that remains still, in an unchanging environment, receives a static image, while an animal that moves passes through a series of "station points", that is, artificially isolated moments in an otherwise continuous "optical flow" (185). It is the pattern of flow that the animal senses.

Gibson proposed that the eye (on animals that move) is a kinaesthetic organ, designed for locomotion. His approach, applied to robots, suggested their actions might be based on direct perception of light, and responses to optical flow. The robot's ability to move depends not on reading individual images but registering the patterns produced in a sequence of images ("station points") cut from a continuous flow. In this context, the image is never singular but is singled out, the product of a "cut" made by the observer. The image flow is not paralysing but quite the opposite, it makes locomotion possible. Also, in this context, machine readability is not (theoretically at least) first of all dependent on the image being digital and translatable into code, instead it is light-dependent, photographic.[6]

The redistribution of perception, away from humans and other animals and toward machines does not require the development of a consciousness akin to that of human beings. In the mobile robots of the late 1980s, 'vision' was kinaesthetic and dependent on optical flow. Yet digital and electronic media have tended to be associated with a loss of mobility, with a frozen human observer, and the eye has been treated as if it were a transcendent organ,

a portal to a disembodied mind, not a bodily and kinaesthetic one. Meanwhile machines that 'see' manifest themselves not as light sensing navigators but as data-accumulators. The idea of machinic perception invokes sinister, centralised surveillance, or vision machines that choreograph human bodies in rigid and dehumanizing (or disembodying ways) — Mark B.N. Hansen argues (via Paul Virilio) that new technical vision systems threaten to exclude and marginalise human consciousness and experience: "In short, what we face in today's vision-machines is the threat of total irrelevance: because our bodies cannot keep pace with the speed of (technical) vision, we literally cannot see what the machine can see, and we thus risk being left out of the perceptual loop altogether" (103).

Television

A very different concept of flow had emerged in Raymond Williams' 1974 study of television. Williams' work is interesting for our purposes because it too brings in questions of mobility and the connection between technical images and an embodied material world. His analysis of American commercial television addresses the movement of images through a network, the movement of bodies in a living room, and other movements and flows: the commute from the suburb to the city, the flow of capital and finance, even the global movement of peoples. Williams' book *Television* set out scaleable methods of analysis that can move from smaller to larger units — the single image, the sequence, the programme, segment, schedule — across a few minutes, a day or a week; and that could link the small scale (the singular image or short sequence) to the large (global capital). His concept of flow developed his 1960s idea of "mobile privatisation": television and radio were synchronized with the automobile and the suburb, scheduled around the suburban lifestyle and the commute to and from work.

Broadcasting facilitates the flow of capital by organising space and time to ensure the flow of capital, turning acts of spectatorship in the home into forms of work, and bringing together capitalism's tendency toward increased mobility with its inverse tendency toward the static sphere of the home and the nuclear family (although, in television theory, as David Morley has argued, this concept of flow was adopted and adapted into a "travelling theory" with a tendency to romanticise mobility and marginalise the domestic) (Morley 427). Williams later used the analogy of cars on a motorway, individual shells or pods of privacy, each moving with their own purpose, unconscious of being part of a larger determined and dehumanising system (1983). Similar to the exchange of personal photographs across online

networks, what is locally meaningful, rich and singular is (at one and the same time) co-opted into a more insidious general purpose (big data for example) which is not necessarily visible from the ground.

In some ways, the model Williams was describing has broken down. Work and consumption now happen inside the home as well as outside it and we use platforms such as Twitter to broadcast beyond the private sphere — indeed, such platforms reveal the complicated and blurred ways in which people navigate ideas of publicity and privacy. In the 2000s, a "mobilities turn" in social theory and in media and communications studies addressed questions of migration, tourism and other kinds of geographical mobility as well as the development of increasingly mobile media (via mobile phones in particular). This new emphasis on human mobility has challenged assumptions that connect the stable habitation of places with identity and belonging, but draws once more on Williams, particularly his notion of mobile privatisation, updating it for a new age of mobile technologies, social networking and multiple screens (Wiley and Packer, 263-5). Flow is now understood as happening *across* media technologies, platforms and different kinds of screen, such as the little screens of mobile phones, tablets, televisions and computer monitors. Such screens are increasingly and pervasively embedded into the environment: in cars, shopping centres, bus stops, aeroplane seats, fridges (Oswald and Packer). According to Kathleen Oswald and Jeremy Packer, advertising now follows the "flow of the user in time and space across devices", and on-demand media transfers the responsibility for the "management of flow" to users or spectators (284, 282).

There is a risk that these uses of Williams' theory give an impression of smooth movement which is actually at odds with his original theory of flow. Williams' concept of televisual flow was formed in response to the way American commercial television allowed disconnected imagery to vie for attention. It was not concerned with the use of televisual techniques for naturalising or smoothing ruptures (as in continuity editing). For Williams, flow meant a tumultuous, unstoppable sequence of rapidly changing sound and imagery that was characterised by sudden and surprising juxtapositions, particularly at the opening moments of programmes and ads, which were deliberately "violent or bizarre". Flow here is not smooth and seamless or soporific, it is jarring, jagged, disruptive, and exciting. This is all about the rhythm and pace of perception and interpretation and attention.

There is an evident connection here with Walter Benjamin's concept of shock (2003). Williams saw American commercial television in terms of a kind of training of the senses, its sudden disjunctures and rapid stimuli not as overwhelming or even just as hooking the viewer

in, but as part of a larger mobile capitalist culture to which Americans were becoming rapidly acclimatised. Images choreograph the robot and they choreograph us. Indeed photographs and cameras have always articulated bodies, producing new choreographies of both photographer and subject: think of writings about how people arrange themselves for the camera, or the many descriptions of Cartier-Bresson in the act of taking a photograph as a kind of strung-up dancer, a cat, a humming-bird or insect or Paul Frosh's writing on selfies as gestural and performative, bodily images (Ward 2012, 131; Westerbeck and Meyerowitz 1994, 157; Frosh 2015).

Recent theorists of the digital image take up the challenge of the mobilities turn, attempting to track how images articulate embodied human observers and technologies, not through visual representation but through algorithms and data, the dark underbelly of the flow of imagery. Lister warns of the danger of "throwing the baby out with the bathwater", and indeed the challenge of this is how to address "big data" and simultaneously recognise the cultural specificity of images (2016, 267). Technical images such as photographs are more than just another form that information can take: they run the gamut from complex cultural texts to recordings of an optic array that can be immediately transformed into activity without the interception of any more complex reading. They are also changing accumulations, inadvertently gathering and redistributing their own data-microbiota that track their passage through a network, that link them to other images and that transform them invisibly.

Conclusion

So how might these various and very different theories of "flow" help us to think the photographic image as an accumulation, a multitude, as mobile, frenzied, and as embodied. Rather than cease to address the visual appearance of the image, we might treat it as a temporary articulation, an arrangement that will shift and change. While electronic image flows conceal economic, social and technological transactions, through a language of flow (and other liquid metaphors) we are encouraged to consume quickly and move along. In the face of this emphasis on seamless consumption, it may be ever more necessary to pause and practice different kinds of reading. This does not mean subscribing to the fiction of the singular image, assuming that the still image is ever really still, ignoring the mass of images for a few privileged examples, or adhering to old interpretative models. Instead, we might find in every image a collective, a means to delve not only into infrastructures of power but

also into localised cultural expression and interaction; in Williams' terms, to encompass the view inside the car, and the view of the motorway from above.

A flow analysis would insist on flow as jagged and jarring, overflowing and frenzied, and refuse to subscribe to the notion of seamless and smoothly continuous transactions. It raises the problem of how we acknowledge that technical images involve new forms of acentred, dehumanised perception *and* situate them in direct relation to mental imaginings, human bodies and increasingly autonomous machines. It seems to me that it is crucial to observe the frenzied movement of images at different scales and temporalities not just across the technical network, but across the broader society. This means pulling in, not just the more exotic or overtly sinister examples of technical imaging, but those located in suburbs and living rooms. It means talking about dreams and screens and the temporality of images, seeing images as part of our own sensorium, seeing technical images as *both* potentially outside our own perception circuit and inseparable from specific lives, specific human bodies.

6133 words

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[1] This is an extended and developed version of a paper originally given at *Photographies: Critical Issues in Photography Today*, International Conference, London UK 18th and 19th May 2017.

[2] See Barbara Herrnstein-Smith (2016) for a perceptive analysis that reveals how the movement against close reading in literary studies is connected to the rise of the "digital humanities" and the increased influence of social science methods, exemplified in studies which underestimate and mischaracterize both science and the humanities.

[3] In the French school of cinema in particular, he finds a "liquid perception", increasingly autonomous and "more than human"; "What the French school found in water was the promise or implication of another state of perception, a perception not tailored to solids, which no longer had the solid as object, as condition, as mileu... camera consciousness... was actualised in a flowing perception..." (89). According to Deleuze, Dziga Vertov's "cine-eye" does not represent the camera as a prosthetic extension of the human eye, as it is often understood, but is "the eye of matter, the eye in matter" (90). This is the next state, beyond liquid perception, a "gaseous perception", "defined by the free movement of each molecule" (93). What begins in Vertov increases in video — "the formation of an image defined by molecular parameters" (94).

[4] This was a view he shared with H.P. Moravec at Carnegie Mellon University, who had been developing mobile robots since 1980. Moravec is particularly associated with "Moravec's paradox" in which he pointed out the difficulty in giving computers the equivalent of a young child's sensory and motor skills, in contrast with the ease with which they could be made to exhibit adult-level reasoning.

[5] However, Mark B.N Hansen argues that there can be no such thing as machinic perception since perception involves affect, and that we need to differentiate "properly human perceptual capacities from the functional processing of information in hybrid human–machine assemblages" (100-101). Hansen turns to Virilio and Bergson to emphasise the human body as the site for resistance to the "automation of vision" and sees his analysis "the basis for an ethics of perception rooted in a defense of the body as an ever-evolving perceiving form" that nevertheless does not reduce the body to something entirely natural and outside or alien to technology (102).

[6] Electromagnetic images are not necessarily digital, nor is computing, nevertheless the robot has to be able to identify patterns, and it has to translate optical information into locomotive activity.