

Machinic Vision

John Johnston

What can't be coded can be decoded if an ear eye seize what no eye ere
grieved for.

-JAMES JOYCE, *Finnegans Wake*

Among the inherited oppositions that continue to impose limits on reflection about vision and visual culture today, that which opposes the human to the technical is perhaps the most visibly widespread and invisibly pernicious. Indeed, in the current climate of accelerated technological innovation, "a new consciousness of the sense of technical objects" may be necessary if we are to be fully receptive to and engage critically with the new forms and singularities of contemporary visual experience.' This new "sense" -which we can postulate as at once already active and necessarily still developing-is perhaps best approached in relation to the kinds of perceptions it makes possible and that I would like to group within the general concept of machinic vision. Machinic vision, as I shall use the term, presupposes not only an environment of interacting machines and human-machine systems but a field of decoded perceptions that, whether or not produced by or issuing from these machines, assume their full intelligibility only in relation to them.

Unless otherwise noted, all translations are my own.

1. To create this sense is the objective of Gilbert Simondon's *Du mode d'existence des objets techniques* (Paris, 1958), from which this phrase is taken (p. 9). Simondon argues that since the Industrial Revolution "culture has constituted itself as a system of defense against technics; yet, this defense is presented as a defense of humanity, supposing that technical objects do not contain human reality" (p. 9).

The term *machinic*, of course, is Deleuzian. In *A Thousand Plateaus* it denotes the type of working relationship among the heterogeneous elements and relations defined by an assemblage, or *agencement*.² Deleuze and Guattari oppose the machinic on the one hand to the mechanical, which applies to the machine as a functional unity of discrete but homogeneous parts, and on the other to the organic, which applies to the organism as a hierarchical organization of biological organs. The assemblage itself is not opposed to either mechanical machines or organic bodies but encompasses both. Where bodies and machines enter into machinic relationships, that is, become parts of an assemblage, Deleuze and Guattari distinguish two opposed processes: at points of instability, where a functional equilibrium gives way to movements of change and becoming, there is what they call a decoding or deterritorialization; but on the opposed face of the assemblage, in contrast to these "lines of flight," there are processes of stratification, involving redundancy and recoding, or reterritorialization. A simple illustrative example: "the mouth, tongue, and teeth find their primitive territoriality in food," as Deleuze and Guattari put it, but then are deterritorialized in the articulation of sound; sounds, in turn, are reterritorialized in meaning.³ Finally, in Kafka's pushing further along lines of linguistic impoverishment already evident in provincial Czech German toward an asignifying, intensive use of language, Deleuze and Guattari find a deterritorialization of expression itself.

Can this conceptual scheme be applied to vision and the complex processes of seeing? Obviously, art presupposes a deterritorializing of perception, a freeing not only of the thing seen but the act of seeing itself from any specific context or purpose; whatever use to which we then put art would be a recoding or reterritorialization. But while Deleuze and Guattari refer to deterritorialized perceptions, which they call percepts in *What Is Philosophy?*, they never employ the term *machinic vision*. Nevertheless, at various points in Deleuze's writing, particularly in his monograph on the painter Francis Bacon and in the two-volume study of the

2. See Gilles Deleuze and Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, trans. Brian Massumi (1980; Minneapolis, 1987), pp. 88-91.

3. Deleuze and Guattari, *Kafka: Toward a Minor Literature*, trans. Dana Polan (1975; Minneapolis, 1986), p. 19.

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cinema, something like machinic vision seems very much at issue. Following (and extending) Deleuze, I want to say that machinic vision is not so much a simple seeing with or by means of machines-although it does presuppose this-as it is a decoded seeing, a becoming of perception in relation to machines that necessarily also involves a recoding. However, before turning to Deleuze, the necessity of this distinction and the double movement it entails can be usefully clarified by looking first at Paul Virilio's *The Vision Machine*. Everywhere concerned with machinic vision, this fascinating but problematic book cannot confront and discuss its central topic except as a series of symptomatic effects, precisely because it remains hampered by an inherited metaphysical opposition between the human and the technical.

1. *The Vision Machine*

Virilio argues that "sightless vision," or computerized, automated perception, is the latest inevitable stage in the long history of the "logistics of perception," his term for the operational agenda according to which perception is appropriated, delimited, and further produced by means of various technologies mostly controlled by the military and police.⁴ In his earlier book, *War and Cinema*, Virilio had proposed the term as a way to understand how and why certain technologies and strategies-developed in the first two world wars for reconnaissance, mapping battlefields, bombing, and so on, as well as for the production of the V-2 rocket were in fundamental solidarity and collusion with the development of cinema. Yet, inasmuch as Virilio's objective is to show how war and cinema mutually inform and relay each other, both on the battlefield and in those adjacent spaces where materiel is procured and the human population mobilized as the theater of military operations expands into society at large, he is unable to pursue a major insight: that as the wall becomes screen or interface, cinema also becomes a flight apparatus to other worlds, to "new vectors of the Beyond," as Virilio himself calls what amounts to a technological expansion of Western culture's realm of the dead.⁵

In *The Vision Machine* as well the notion of a logistics of perception is extended to domains not usually considered to be military per se-art, advertising, public lighting, police detection, and surveillance. Again, Virilio's methodology precludes the analysis of visual images in aesthetic or philosophical terms, as objects that would reveal new meanings to our contemplation or interpretive scrutiny. Instead, they are related to a his-

4. Paul Virilio, *The Vision Machine*, trans. Julie Rose (1988; Bloomington, Ind., 1994), p. 73; hereafter abbreviated VM.

5. Virilio, *War and Cinema: The Logistics of Perception*, trans. Patrick Camiller (1984; New York, 1989), p. 29.

tory of other visual practices and technologies. Accordingly, his "logistics of the image" (*VM*, p. 63) is not concerned with how the image appears and what it looks like but rather with the practices in which it partakes, that take place within it, and that give shape to the everyday life of the body, to its perception of space and time. But here a different kind of problem emerges. For while Virilio claims to write with or in relation to images, his stream of image-examples is actually held together by an underlying catastrophic narrative tracing a Fall into technology, the assumptions of which he never examines.

The narrative begins (though not in Virilio's order of presentation) with the long period of natural perception, brought to an end historically with the invention of the telescope and other visual prostheses and Galileo's mathematicization of nature. The first initiates a gradual loss of faith in natural perception that the second counters with a different kind of truth. Basically, the "truth" of what we see is no longer given by our eyes but by our instruments and their scientific interpretation or military appropriation. More disturbing, these prosthetic visual devices unanchor natural perception from the field of the human body's natural capacities. In the words of Merleau-Ponty (whom Virilio cites), "*Everything I see is in principle within my reach, at least within reach of my sight, marked on the map of the 'I can'*" (*VM*, p. 7). By destroying the natural, inherent linkage of sight to "the map of the 'I can,'" visual technology precipitates a veritable Fall into a "de-regulated world" in which "the age-old *act of seeing* was to be replaced by a regressive perceptual state, a kind of *syncretism*, resembling a pitiful caricature of the semi-immobility of early infancy, the sensitive substratum now existing only as a fuzzy morass from which a few shapes, smells, sounds accidentally leap out . . . more sharply perceived" (*VM*, p. 8). In this deregulation what principally interests Virilio, however, is the deconsolidation of place and perception that inhibits the formation of memory-images because this becomes a necessary precondition for the imposition of a "logistics of perception." To be sure, this deregulation poses no serious problem until the First World War. But on battlefields where all landmarks and singularities of terrain necessary for memory to operate have been reduced to rubble and mud, what Virilio calls "topographical amnesia" now defines the soldier's experience (see *VM*, pp. 1-17). His faith in perception is reduced to a line of faith, the *ligne de foi*, as the gun barrel's sightline was formerly referred to in French (see *VM*, p. 13).

In Virilio's condensed history, this deregulation, and the "fusion-confusion of eye and camera lens" that accompanied it, leads to a change in the regime of vision itself (*VM*, p. 13). Characterized as a shift from "substantial" to "accidental" vision, it is immediately evident in the marked preference among professional and amateur photographers alike for rapid shots and for letting the camera itself do the work of both eye and body movement (*VM*, p. 13). At the same time, various systems of

"message-intensification" in the culture insure that the perceptual field will be invaded by signs, representations, and logotypes that will proliferate beyond any immediate explanatory context: "Geometric brandimages, initials, Hitler's swastika, Charlie Chaplin's silhouette, Magritte's blue bird or the red lips of Marilyn Monroe: parasitic persistence cannot be explained merely in terms of the power of technical reproducibility, so often discussed since the nineteenth century" (*VM*, p. 14). By the end of the twentieth century, with the banalization of certain "teletopologies" brought about by television, which "finally undermines the age-old problematic of the site *where mental images are formed* as well as that of the consolidation of natural memory" what Virilio considered to be a pathology of the First World War has become a generalized cultural condition (*VM*, pp. 7, 6). Furthermore, to counteract these effects of deregulation the populace is made victim of standardized ways of seeing, most obviously through the repetition of targeted "phatic images" (*VM*, p. 14). And finally, as seeing and remembering are pressed into the service of a logistics of the image, art becomes preoccupied with its own death, or disappearance. "With the industrial multiplication of optical equipment," Virilio writes, "the artist's human vision is no more than one process among many of obtaining images" (*VM*, p. 16). Yet, in the narrative's concluding twist, human perception and the formation of memory-images are not doomed to be brought under total control but instead rendered useless and irrelevant by the appearance of the vision machine (*la machine de vision*) itself.

To understand how the simulation and displacement of human perception by computer-controlled machines can be the inevitable tendency and end of the logistics of perception (and thus logical conclusion) of Virilio's narrative we must understand that for Virilio the vision machine includes not only the technical device that automates perception but the whole panoply of issues raised by the digital image (particularly by its virtuality—the fact that, unlike a photographic image, it is not a physical inscription of any this-has-been), the instantaneity of telecommunications (above all the displacement of duration by "real time"), and the industrialization of the "nongaze," which is to say, the institutionalization of certain forms of blindness, all of which can be related to the new electronic battlefield (as well as to war by sounds and images), the development of stealth technology, and the military imperative to get humans out of the loop. What brings these various vectors into alignment is that they all further undermine the faith in natural perception and thereby exacerbate the crisis in the reality principle. Indeed, for Virilio, they too often amount to the same thing.

Of course Virilio is not the first or only one to draw attention to how modern technology provokes a crisis of natural perception. Jonathan Crary points out in the first pages of *Techniques of the Observer* that computer-aided design, synthetic holography, flight simulators, com-

puter animation, robotic image recognition (as in smart bombs), ray tracing, texture mapping, motion control, virtual reality helmets, magnetic resonance imaging, and multispectral sensors are all computer technologies that relocate vision on a plane severed from the human observers. Friedrich Kittler has also shown that psychophysics and the splitting of the data stream by new and separate technical media at the beginning of the twentieth century broke apart the *Bildung* or cultural unity that formerly had insured that "speaking, hearing, writing, reading [and seeing] would achieve mutual transparency and relation to meaning." As a result, the human sensorium was fragmented and redistributed as a multiplicity of particularized and "autonomic" functions, brought together again if ever only in the specious unities proposed by the entertainment industry. And other narratives could be brought in here, beginning with Heidegger's notion of Enframing [*Gestell*] and the conversion of nature and all natural processes to standing-reserve (*Bestand*) as the inevitable or "destined" consequence of modern Technics.⁶

Yet Virilio's version, precisely because it involves two opposed processes, both a deregulation and a logistics of perception, remains of interest. In particular, its double articulation at first seems to correspond to Deleuze and Guattari's double movement of deterritorialization and reterritorialization, to a simultaneous decoding and recoding. But at least one crucial difference stands out: in Virilio's theory there is no positive side to the deregulation of perception (unlike Deleuze and Guattari's deterritorialization), no positive value, aesthetic or otherwise, to the freeing of perception from preestablished codes. One might counter that this is simply because Virilio is more interested in movement and speed, perceptual confusion and the military advantages gained thereby, not in what new visual effects technology makes available. While this is largely true, the more serious problem, as I've already hinted, is that Virilio remains bound to a notion of the unified natural body. Accordingly, he can only view technology as an alien and external prosthesis, intruding on the body's natural capacities and consequently producing only disorienting, alienating effects, rendering it in turn ever more susceptible to manipulation.

2. *The Deterritorialized Eye*

For Deleuze, on the contrary, the unified natural body is a hierarchical organization of organs and biological functions never given once and

6. See Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (Cambridge, Mass., 1990), p. 1.

7. Friedrich A. Kittler, *Discourse Networks, 1800/1900*, trans. Michael Metteer and Chris Cullens (1985; Stanford, Calif., 1990), p. 214.

8. See Martin Heidegger, "The Question Concerning Technology," *The Question Concerning Technology and Other Essays*, trans. William Lovitt (New York, 1977), pp. 3-35.

for all but always adapting to (and evolving with) not only the forces of the natural environment but the social and technological assemblages within which it is always found. Deleuze and Guattari's description of the body's formation—particularly the organization of its various organs—is a complicated process that I shall not try to summarize here; let it suffice to say that it is based on the stratification of flows, the formation of boundaries, and the subordination of organic functions. As Deleuze shows in *The Logic of Sense*, this organization of the body into a hierarchical structure results in the body's subordination to a rational ego; indeed, it is the ego's condition of possibility. At the same time, however, the organization of the body in an organic unity obscures how forces act on the body and how the body enters into different assemblages with other bodies. Concerted movements of destratification, for example, can lead to the dis-organization of the body and, at the limit, to the Body without Organs, the (or a) body as pure surface of unrestrained flows. A fear of the body's dis-organization, in fact, is often experienced in schizophrenia, but Deleuze also speaks of decoded perception in these terms.

In his book *Francis Bacon*, subtitled *The Logic of Sensation*, Deleuze takes the freeing of a single organ—in this case the eye—from the body's organization as a way to understand the special intensity of Bacon's paintings, specifically of their Figures, which according to Deleuze convey rather than represent the forces acting on the body; they thus figure the body's corresponding attempt to escape its own corporality. These paintings assault and mobilize the eye:

Through color and line [the painting] invests the eye. But *it does not treat the eye as a fixed organ*. Liberating lines and colors from representation, it liberates at the same time the eye from its attachment /*appartenancel* to the organism, it liberates it from its character as a fixed and subordinated (*qualifié*) organ: the eye becomes virtually an indeterminate, polyvalent organ, that sees the body without organs, that is to say the Figure, as pure presence. The painting puts our eyes everywhere: in the ear, the stomach, the lungs (the painting breathes). This is the double definition of painting: subjectively it invests our eye, which ceases to be organic in order to become a mobile and polyvalent organ; objectively, it puts before us the reality of a body, lines and colors liberated from organic representation.⁹

Deleuze has much more to say about Bacon's paintings, about both their formal organization and their relation to modern art, but here I want to focus on an only hinted-at relation between Bacon's paintings and photography. Significantly, the cover of Deleuze's book reproduces several of Bacon's photographic self-portraits, obviously made in a coin-operated

9. Deleuze, *Francis Bacon: Logique de la sensation* (Paris, 1981), p. 37; hereafter abbreviated *FB*.

booth and appearing torn and expressive in a demented sort of way. However, even though Bacon surrounded himself with photographs, luxuriating in both their mad and banal proliferation, his painting has no truck with them. Deleuze explains their total rejection on both semiotic and aesthetic grounds: photographs operate by either resemblance or convention, analogy or code; in either case, they are not a means of seeing but are themselves what we see, and we end up seeing only them. (In this instance, at least, Bacon would surely agree with Virilio.) More to the point, unlike painting, photographs cannot produce an intensity of sensation or, rather, cannot produce differences within sensation.

This difference leads Deleuze to introduce his theory of painting as diagram—Van Gogh's distinctive hatching provides the obvious example—and its necessary encounter with chaos or catastrophe. It is a theme Deleuze had introduced in a memorable paragraph on Turner's late paintings in *Anti-Oedipus* and that he develops here in more detail. Basically, the diagram is at once "a violent chaos in relation to the figurative givens and the germ of a rhythm in relation to the new order of the painting," both an abyss into which visual coordinates collapse and the opening of a new domain of visibility through a rhythmic marking (*FB*, p. 67). Yet this description is still too abstract, or disembodied, inasmuch as the diagram emerges in the give and take, and the fundamental imbalance, between the painter's hand and eye. As Deleuze remarks,

It is like the sudden looming up of another world, because these marks, these lines are irrational, involuntary, accidental, free, haphazard. They are non-representational, non-illustrative, non-narrative. But they are also no longer significant or signifying: they are asignifying lines. They are lines of sensation, but of confused sensation . . . as if the hand had attained independence and passed into the service of other forces, tracing marks that no longer depend on our will or on our vision The artist's hand has stepped in to exercise its independence and to smash a sovereign optical organization: nothing more is seen, as in a catastrophe or chaos. [*FB*, p. 66]

Out of this chaos produced by the artist's hand, (dys)functioning momentarily as if it were a blind machine, a new visual world is made to emerge. It was, in fact, this miraculous emergence that often astonished Turner's contemporaries. An English art historian quotes this typical description of Turner at work on the canvas: "He began by pouring wet paint until it was saturated, he tore, he scratched, he scrubbed at it in a kind of frenzy and the whole thing was chaos—but gradually and as if by magic the lovely ship, with all its exquisite minutia, came into being:"¹⁰ As in the case of Bacon, however, what counts for Deleuze in Turner's

painting and what the catastrophe makes possible is not the resulting figure but the freeing of light and color-sensation itself—from any possible reinscription, as if line, color, and even light were elements of desire in themselves, asignifying means of escape from the dominant codes of meaning. Summarily, then, painting, in order to be painting (according to Deleuze), must perpetually reenact this catastrophe. So Bacon chooses painting as the catastrophe that only painting, and not photography, must both create and avert.

3. *The Machinic Assemblage of Images*

But the cinema also produces such radical acts of decoding. In *Cinema 1: The Movement-Image*, published two years after the Bacon book, Deleuze describes a tendency toward "gaseous" or molecular perception inherent to cinema understood as the art of concatenating images and signs in all of their various types and kinds of relationship." As a consequence of his Bergsonian approach, Deleuze rejects the phenomenological point of departure, that is, the centered view of an anchored, perceiving subject, from whose shifting perspective and limited horizon perception opens out onto a world. Instead, he argues, we must conceive of

a state of things which would constantly change, a flowing-matter in which no point of anchorage nor center of reference would be assignable. On the basis of this state of things it would be necessary to show how, at any point, centers can be formed which would impose fixed instantaneous views. It would therefore be a question of 'deducing' conscious, natural or cinematographic perception. [*CI*, pp. 57-58]

This Bergsonian assumption is fundamental not only for Deleuze's theory of cinema but also, as we'll later see, for what I am calling machinic vision. More immediately, the passage suggests why the cinema as apparatus leads Deleuze to conceive of the universe itself as cinema or metacinema, a machinic assemblage of images in a state of universal variation in which privileged instances of subjective perception are always subsumed in a mobile constellation of relationships with other images. In this state (and here Deleuze quotes Bergson), "every image is 'merely a road by which pass, in every direction, the modifications propagated throughout the immensity of the universe: *Every image acts on others and reacts to others, on all their facets at once*' and 'by all their elements'" (*CI*, p. 58). Parts of the body, especially the eye and the brain, are themselves images, which act and react with other images in the world. Perceptual consciousness is a trans-

10. Edith Mary Fawkes, quoted in Andrew Wilton, *Turner in His Time* (New York, 1987), p. 114.

11. Deleuze, *Cinema 1: The Movement-Image*, trans. Hugh Tomlinson and Barbara Habberjam (1983; Minneapolis, 1986), p. 84; hereafter abbreviated *CI*.

lucent photo, a point of stoppage or opacity at the heart of the image where light is stopped or reflected back. What makes consciousness possible is precisely the gap between the action of one image and the reaction of another. Subjective perception is therefore always less, following a moment of delimitation and subtraction.

Having defined the three subvarieties of the cinematic movementimage (and before proceeding to the singular instances that will provide the bulk of the material treated in *Cinema 1*), Deleuze takes up the specific kind of perception that corresponds to images in this state of universal variation. He calls it gaseous perception. To arrive at this objective state, however, we cannot simply leap to it from the subjective state of natural perception. While it is true that natural perception (at least as far as the cinema is concerned) already presupposes images in a state of acentered, universal variation (since it is from this state that natural perception must be derived), it is difficult to speak precisely of the degree of objectivity or subjectivity of a cinematic image. Most simply, the subjective image is seen by someone "qualified," the set seen by someone who is part of the set; an objective image would then be of the set seen by someone outside it. But this definition is at best only provisional because the frame of the set can always be framed in turn, leading eventually to notions like a cameraeye or camera-consciousness. One solution, introduced by Pasolini, is to postulate a cinematic equivalent of the novel's "free indirect discourse" (CI, p. 73), a mode of enunciation in which author and speaker are constituted in the same speech act rather than as separable, independent entities.¹² Cinematic free indirect discourse would thus allow a "differentiation of two correlative subjects in a system which is itself heterogeneous" (CI, p. 73). Although Deleuze rejects this solution, it points to a fundamental disequilibrium within the system of seer-seen that will force the cinema to evolve toward a state of increasing camera-selfconsciousness.

Yet there is another evolutionary path of more immediate interest: if "a subjective perception is one in which the images vary in relation to a central and privileged image" (CI, p. 76), what happens if this privileged center is itself put into movement? As Deleuze shows, this is exactly what a number of directors of the French school-Renoir, Vigo, Chéreau, Epstein, and Gremillon-do in films about water or the sea: "what the French school found in water was the promise or implication of another state of perception: a more than human perception, a perception not tailored to solids, which no longer had the solid as object, as condition, as milieu. A more delicate and vaster perception, a molecular perception, peculiar to a

12. In this sentence from *Madame Bovary*, for example: "She confessed she adored children; it was her consolation, her joy, her passion," the distinction between authorial discourse and the reported speech of a character is blurred (Gustave Flaubert, *Madame Bovary* [Paris, 1966], p. 139).

'cine-eye'" (CI, p. 80). Instead of two poles, subjective-objective, with its ultimate reflection in a formal consciousness, the perception-image splits into "two states, one molecular and the other molar, one liquid and the other solid, one drawing along and effacing the other" (CI, p. 80). We find an analogous effect in Wallace Stevens's poem "Sea Surface Full of Clouds," where shifting clouds reflected by ever-changing currents in the "machine of ocean" produce not only variegated effects of hue and tone on the ship's deck but different arrangements of chocolate and umbrellas in the mind of an observer.¹³

According to Deleuze, the image's deterritorialization is carried even further by Dziga Vertov's project of the "cine-eye" and then by American experimental cinema. Both strive to surmount the human eye's relative immobility as a receptive organ, Vertov by montage and experimental cinema by a variety of techniques, such as looping, refilming, hypermontage, and a granulation of the image. The objective is to attain to "the pure vision of a non-human eye, of an eye which would be in things," witness to the realm of universal variation and interaction of images described by Cézanne as an "iridescent chaos"- "the world before man" (CI, p. 81). (It is worth noting that in this context Deleuze is frequently drawn to Cézanne, as if his notion of gaseous perception were a way to make sense of Cézanne's enigma: "Man absent from but entirely within the landscape.")¹⁴

For Vertov, the creation of a "non-human eye, the cine-eye," the eye both of and in matter, will correspond to the "in-itself of the image" (CI, p. 81). But this state can only be reached by constructing it, using every possibility of the cinema as machinic apparatus. This Vertov accomplishes in what Deleuze describes as "three inseparable aspects of a single going beyond": the passage from the camera to montage, from movement to the interval-so that the interval is no longer what separates an action from a reaction but becomes the gap between two images incommensurable from the viewpoint of human perception-and from the image to the photogramme, as Deleuze calls the single frame of exposed film (in English, the usual term is the frame still). In *The Man with the Movie Camera*, the images of which comprise an anatomy of modern urban life in a completely machinic milieu, we see how Vertov manipulates both the frame considered as the differential element of movement and as the material surface on which light is inscribed, and the two in conjunction. In the intervals between images of a man filming, images of the camera-eye, and images of the material film itself, Vertov brings forth what Deleuze

13. Wallace Stevens, "Sea Surface Full of Clouds," *The Collected Poems of Wallace Stevens* (New York, 1954), ll. 7-8, p. 99.

14. Quoted in Joachim Gasquet, *Cézanne* (Paris, 1921), p. 21; cited in Henri Maldiney, *Regard parole espace* (Lausanne, 1973), p. 185. See Deleuze and Guattari, *What Is Philosophy?* trans. Tomlinson and Graham Burchell (1991; New York, 1994), p. 169.

describes as "the *genetic element* of all possible perception, that is, the point which changes, and which makes perception change, the differential of perception itself" (CI, p. 83).

From Vertov's film it is only a step to gaseous or particle-ized perception, as of molecular interactions, which is where American experimental cinema will take Vertov's acknowledged influence. But whereas in Vertov's dialectic nonhuman perception corresponds to the overman of the future, that is, material community and formal communism, in American experimental cinema it can only correspond to what Deleuze calls "drugs as the American community" (CI, p. 85). Indeed, for Deleuze, the effect of drugs, at least as described by Carlos Castaneda, defines "the programme of the third state of the image, the gaseous image": "to *stop the world*, to release the perception of 'doing,' that is, to substitute pure auditory and optical perceptions for motor-sensory perceptions; to *make one see the molecular intervals*, the holes in sounds, in forms, and even in water; but also, in this stopped world, to *make lines of seed pass* through these holes in the world" (CI, p. 85). Here I won't attempt to ascertain the extent to which this description adequately accounts for what we see in the films of Brakhage, Snow, Belson, Jacobs, and Landow. However, it seems at least a credible proposition that in Landow's *Bardo Follies*, where the final images of a burning celluloid still yield to granulated images of microscopic bubbles filmed through colored filters to reflect their various interacting facets, we arrive at something like the molecular limits of the visible.

Whether or not these or other images from experimental cinema qualify as perceptual signs of nonhuman vision is probably less important than the fact that they are both offered by the filmmakers and described by Deleuze himself in these terms. In any case, with Deleuze's nonhuman perception we come full circle, back, that is, to Virilio's vision machine. But whereas Virilio insists that "'objective perception'-how machines might perceive things-will be forever beyond us" (VM, p. 73), for Deleuze the issue lies elsewhere. The very fact that there *are* machines initiates a decoding of perception and flight into the perceptual unknown that artists and some philosophers will necessarily follow and explore. Virilio, of course, is entirely right to emphasize that the vision machine only "sees" pixels that, when falling into opto-electrically coded patterns, trigger "recognitions" of aspects of the world. The resulting images will be only virtual or, more exactly, statistical. But precisely in this sense the computer graphics technology so important for the vision machine can and perhaps must be understood as a recoding of the molecular perceptions the experimental cinema of the 1960s sought to produce.

4. *The Electronic Image*

With the arrival of the electronic or digitalized image, at once a decoding and recoding of the cinematic movement-image, limits in Deleuze's theory begin to appear. The digital image is a decoding because it frees the cinematic image from its material support, mobilizing it within a communicational network wherein it can be transmitted anywhere instantaneously; but it is also a recoding because, instead of being inscribed directly on a chemically treated surface, light is converted into information, mathematical data whose infinitesimal discreteness allows the real to be synthesized or recomposed. This last feature of the digital image impels Virilio to claim that an ever more encroaching "artificial reality" is currently being constructed by electronic media. More soberly, Deleuze notes in passing that these "new images no longer have any outside (outof-field), any more than they are internalized in a whole."⁵ But if digital images can no longer be conceptualized in Bergsonian terms (as movement- or time-images), to what extent do they remain definable in Deleuzian, or machinic, terms? This is not an easy question to answer. It makes sense, for example, to think of the technique of morphing as a recoding of a molecularization of perception, whereas Joseph Nechvatal's highly granulated images, in which a computer virus has eaten away and particle-ized a formerly recognizable cultural icon, go in the opposite direction, toward a further decoding.⁶ On the other hand, photographic and digital images have proliferated in such varied and profuse combination that any theoretical pronouncement offered in the absence of detailed analysis of current visual practices and the technologies that enable them runs the risk of seeming premature.

Nevertheless, as far as machinic vision is concerned, the fundamental issue can at least be clearly formulated: in order for there to be a deterritorialization and thus a decoding of perception, there must be a movement toward the outside of an assemblage and beyond its coding apparatus, a movement carrying us into a zone where images become indiscernible, often as a result of a particle-ization of elements, as in molecular vision. But for the digital image there is no outside, only the vast telecommunications networks that support it and in which it is instantiated as data. Instead of an outside, the digital image seems only to have an electronic underside, so to speak, which cannot be rendered visible. We might therefore expect to see the most obvious effects of deterritorialization in mixed media art, where the digital image can work against a physical support and older, more stable forms, and in video installations, whose conditions and conventions of viewing allow for and indeed

15. Deleuze, *Cinema 2: The Time-Image*, trans. Tomlinson and Robert Galeta (1985; Minneapolis, 1989), p. 265; hereafter abbreviated C2.

16. For a sampling of Nechvatal's images, see the website at <http://www.dom.de/groebel/jnech/>

promote decoded visual effects, even though the latter are often recoded immediately by the viewer as private aesthetic languages.

In the age of digital technology, however, the greatest vectors of deterritorialization and visual decoding are not likely to be found in such hybrid or transitional forms. If, as Virilio and many others assume, digital technology leads inevitably toward and culminates in virtual reality (VR), then perhaps that is where we should look. Yet, initially, VR appears to offer the very antithesis of machinic vision, inasmuch as it replaces the act of looking with an electronically simulated experience of an entirely artificial visual world. Specifically, by beaming photons directly into the retina the VR machine provides not an experience of seeing but rather one of allowing one's body to become the site of a technologically induced hallucination. In full VR, the entire sensory body is put in relation to a machine that only simulates external stimuli. But as the body is simultaneously displaced and replaced, the world collapses into the machine, and the eye becomes a vision machine operating in a closed loop. What it "sees" are only precoded signals or data from sensors that can be presented electronically. Not surprisingly, this sudden displacement/replacement of the body and the consequent disappearance of the very conditions of seeing are often accompanied by a dizzying lightness and nausea, whether experienced momentarily or recurrently. Yet therein lies the singularity of VR: for whatever the experience may ultimately be, as the parameters are continually adjusted with the still evolving technology, VR brings about both an absolute deterritorialization of the body and a total (re)coding of perception."

5. *Chaos and the Brain*

It is doubtful that Deleuze, who died in 1995 after a protracted illness, had much knowledge or direct experience of the most deterritorializing aspects of contemporary computer technology, in virtual reality and on the internet, as well as in robotics, artificial intelligence, and artificial life, all of which have demanded innovative decodings and recodings of "natural" human functions. Nevertheless, significant references to the neurophysiology of the brain and to chaos theory in *Cinema 2: The TimeImage* and *What Is Philosophy?* suggest that he was moving toward a critical encounter with aspects of contemporary cognitive science. In *What Is Philosophy?* Deleuze stresses what is not captured or defined by the brain's pathways and connections or by its integration of different cognitive functions. In relation to a supposedly objectified brain, he says, art, science, and philosophy are not mental objects but vectors of deterritorializa-

tion—"the rafts on which the brain plunges into and confronts the chaos."¹⁸ At the same time, certain core aspects of Deleuze's philosophy exhibit striking affinities with a recent shift in the assumptions and approach of those same cognitive sciences, a shift that can be characterized as one from top-down to bottom-up computational architectures and from highly centered and hierarchical to decentered and highly distributed systems.¹⁹ Since this shift and Deleuze's affinity with it have a direct bearing on how machinic vision may be further theorized, I would now like to consider several of its aspects.

Among current models of human (or primate) perception, the computational theory assumes that visual information is processed in ways that can be modeled by computer technology. Not incidentally, Virilio also subscribes to this assumption: "Eyesight," he writes, "is itself merely a series of light and nerve impulses that our brain quickly decodes (at 20 milliseconds per image)" (VM, p. 73). As we would expect, solid objects, firm boundary lines, spatial depth, and orientation cues are all strongly coded, indeed, overcoded. But coded input still has to be submitted to a formal symbol-manipulation procedure or algorithm that enables properties in the world (the correct shape of a rotating body, for example) to be recovered from the data that a series of fleeting two-dimensional images is assumed to provide.²⁰ By conservative estimates, in the milliseconds before a visual image even reaches the brain, it has already been subjected to literally millions of calculations in the retina and optic nerve, which are then continued in the visual cortex in over a dozen visual centers. These calculations, however, are massively parallel and cannot be simulated by the von Neumann, one-step-at-a-time architectures of most digital computers. Hence they constitute a serious obstacle to the effort to build a vision machine. Furthermore, although parallel distributed processing (PDP) was developed in the 1980s, these PDP architectures cannot be programmed using conventional methods. Instead, programs have to be "grown" and mutated, as with genetic algorithms, or, in another

18. Deleuze and Guattari, *What Is Philosophy?* p. 210.

19. Deleuze's best-known formulation of a decentered and nonhierarchical system is his (and Guattari's) description of the rhizome in *A Thousand Plateaus*, pp. 6-21. But Deleuze's earlier understanding of "difference" in *Difference and Repetition* also adumbrates such a system, most explicitly when he describes an "intensive system" comprised of heterogeneous series brought into a state of resonance by the transversal movement of what he calls a "dark precursor." In such a system parts or part-objects communicate through a structure of differences, in contrast to a representational system where bounded entities or wholes communicate through an assumed likeness or identity (Deleuze, *Difference and Repetition*, trans. Paul Patton [1968; New York, 1994], p. 119).

20. In David Marr's theory of vision, worked out in the artificial intelligence lab at MIT in the 1970s, this assumption is taken to new levels of complexity. Not incidentally, the algorithms for 3-D computer graphics on which this work draws were developed in the same lab by Lawrence G. Roberts in the mid-1960s.

17. For a readable, up-to-date account of this technology, see Michael Heim, *Virtual Realism* (New York, 1998).

strategy, "connectionist" or artificial neural networks are created and then "taught" to respond to certain patterns by weighting specific nodes. Neural networks in particular have been successful in teaching machines to "recognize" complex visual phenomena. But the important point is that in both these instances programming becomes the experimental production of nonlinear effects of emergence and self-organization, effects that converge or resonate with fundamental aspects of Deleuze's philosophy²¹

Meanwhile, in adjacent areas of research, alternative theories of vision have been proposed that argue against the assumption that the eye and brain are information-processing devices whose primary purpose is to provide a representation of the world for "higher" cognitive functions. In contrast to this top-down view, these alternatives understand vision as a mode of embodiment in the world or as a system of articulation with it. In Gerald Edelman's biological theory (usually known as neural Darwinism), perception results from a highly dynamic kind of neuronal mapping that depends on no prior coding or innately given set of perceptual categories but rather on the survival of adaptively useful patterns of response ("neurons that fire together wire together" is Edelman's formula). In Humberto Maturana and Francisco Varela's systems theory approach, perception is understood as a structural coupling with aspects of the environment following certain trigger mechanisms. Whereas for Edelman perception (and memory) are always creative acts of remapping, for Maturana and Varela there is no essential difference between perception and cognition. Most important, neither theory makes perception subservient to the formation of a centralized, fully explicit representation of the world but models perception as a cofunctioning of highly distributed parts or elements, many of which are in the environment, not in the eye or brain.²²

In another parallel development, the roboticist Rodney Brooks constructs robots according to similar assumptions, which he calls "subsumption architecture."²³ Instead of attempting to build a robot with cognitive skills that would simulate those of a human being, he starts small, with cockroachlike constructions that have, say, three and only three func-

tions: to move, avoid obstacles, and collect small objects (like soda cans). The key to this architecture is that these three functions are not integrated—they each interact independently with a single aspect of the world—and are only connected through a controller designed to adjudicate conflicts. In other words, these distributed functions do not interface through a centralizing representation of the world, as was the case in earlier generations of robots, which consequently required long periods of number-crunching before the robot could negotiate even a simple space. Brooks also believes that human beings evolved in a way similar to his bottom-up approach: as highly mobile creatures that interacted robustly with different aspects of the environment through distributed systems. Consciousness, according to Brooks, is a cheap trick or gimmick that comes late in the developmental process; as an emergent property, it increases the functionality of the system but is not essential to its architecture.

Despite obvious differences, these examples all illustrate the move to distributed systems within contemporary cognitive science. A recent attempt to assess this move can be found in Andy Clark's *Being There: Putting Brain, Body, and World Together Again*. To be sure, Clark does not fully endorse Varela's radical critique of cognition as representation and his abandonment of an information-processing approach. In fact, for many who work in the field the issue is no longer an either-or choice between the old-style cognitivist, symbolic, computational, top-down approach and the connectionist, neural net, emergent, self-organizational, bottom-up one, since each approach has its own strengths and weaknesses. What is important, Clark shows, is the extent to which most higher cognitive activities take place through interactions with external resources (whether machines, methods, or both), so that while "individual brains remain the seats of consciousness and experience . . . human reasoners are truly *distributed* cognitive engines."²⁴ But from here it is only a step to see not only cognitive functions but most human activities as distributed functions dependent upon "external props or scaffolds," and this brings cognitive science into alignment with Deleuze (and Guattari)'s concept of the assemblage (*BT*, p. 82). Thus, when Clark asserts that the flexibility of human perception depends on "processes of decentralized soft assembly in which mind, body, and world act as equal partners in determining adaptive behavior," or that human "computational power and expertise is spread across a heterogeneous assembly of brains, bodies, artifacts, and other external structures," he validates in current scientific discourse ideas and assumptions at work in Deleuze's writing at least since *A Thousand Plateaus* (*BT*, pp. 47, 77).

21. A self-organizing system is one in which higher-level behavior emerges spontaneously or without external input from the interactions of many lower-level elements, components or agents. Deleuze's "intensive system" is a rudimentary example. Later Deleuze became more familiar with self-organization in physical and biological systems through the work of Ilya Prigogine and Isabelle Stengers.

22. See Gerald M. Edelman, *Neural Darwinism* (New York, 1987), and Humberto R. Maturana and Francisco J. Varela, *The Tree of Knowledge: The Biological Roots of Human Understanding* (Boston, 1987).

23. See Rodney A. Brooks, "Intelligence without Representation," *Artificial Intelligence* 47 (1991): 139-59 for a more complete account.

24. Andy Clark, *Being There: Putting Brain, Body, and World Together Again* (Cambridge, Mass., 1997), p. 68; hereafter abbreviated *BT*

6. Distributed Perception

An instance of what we can now recognize as distributed perception appears when Deleuze invokes the brain in *Cinema 2: The Time-Image*. It is distributed because what is perceived is not located at any single place and moment in time, and the act by which this perception occurs is not the result of a single or isolated agency but of several working in concert or parallel. In what Deleuze calls a "cinema of the brain," which both contrasts with and complements a "cinema of the body," either "the world itself is a brain," as in Stanley Kubrick's films, or "the identity of brain and world is [a] noosphere," as in Alain Resnais's (*C2*, pp. 205, 207). In the latter Deleuze finds this identity "at the level of a polarized membrane which is constantly making relative outsides and insides communicate or exchange, putting them in contact with each other, extending them, and referring them to each other" (*C2*, p. 207). This membrane is constituted by memory, whose constant foldings and layerings create a complex topology on which perception is inscribed. Consideration of this topology in Resnais's films, moreover, leads Deleuze to a reprise of how modern cinema distinguishes itself from classical cinema in its linking of images. In classical cinema, cuts are always subordinated to the linkage, and therefore always make the images part of two or more rational series because the cut divides the sequence into the final image of a first series and the first image of a second. Modern cinema reverses this relationship:

The cut, or interstice, between two series of images no longer forms part of either of the two series: it is the equivalent of an irrational cut, which determines the non-commensurable relations between images. It is thus no longer a lacuna that the associated images would be assumed to cross; the images are certainly not abandoned to chance, but there are only relinkages subject to the cut, instead of cuts subject to the linkage. [*C2*, pp. 213-14]

In Resnais's *Je t'aime je t'aime*, for example, we constantly return to the same image, but each time it is taken up in a new series.

For Deleuze, these two kinds of cuts are directly correlated with two views (or understandings) of the functioning of the human brain. In the classical understanding, the brain is responsible for organization and structure along two axes: the vertical one of integration and differentiation, and the horizontal one of association through contiguity or similarity (see *C2*, pp. 210-11). The first defines the law of the concept, the second the law of the image, and in classical representation the two are combined (they "cross") to produce a harmonious totality. In the cinema this "cerebral model" explicitly underlies Eisenstein's theory and practice of montage (*C2*, p. 211). However, not only has our scientific knowledge

of the brain evolved, but our relationship with it has also changed. Deleuze stresses two specific changes. First, we now consider the brain to be an extremely complex space, in which organic processes of integration and differentiation point to relative levels of interiority and exteriority in contact topologically, such that the cortex can no longer even be represented in Euclidean terms. Secondly, the discovery that the brain is not a continuous network means that the process of association has to be understood differently: "everywhere there were micro-fissures which were not simply voids to be crossed, but random mechanisms introducing themselves at each moment between the sending and receiving of an association message: this was the discovery of a probabilistic or semifortuitous cerebral space, an 'uncertain system'" (*C2*, p. 211). Together, these two aspects suggest that the brain should be defined as an "acentred system." On this basis Deleuze identifies the "irrational" cut of modern cinema with a specific type of synaptic, neuronal transmission (*C2*, p. 318), and, in a subsequent interview, he asserts that henceforth it is the biology of the brain, not linguistics or psychoanalysis, that will provide the criteria for evaluating cinema, according to what new cerebral circuits and pathways innovative films will forge. And finally, in *Cinema 2*, Deleuze concludes his discussion of the cinema of the brain with examples of "abstract or 'eidetic' cinema," including Norman McLaren's "cameraless cinema" in which film (or virtual film) always projects cerebral processes and membranes in contact replace screen, film stock, and camera (*C2*, p. 214, 215).

If, throughout these pages, the word *perception* hardly appears, it is because perception has become a distributed function, both everywhere and nowhere in the assemblage Deleuze describes under the aegis of a cinema of the brain. For us, however, living at the turn of the century, perhaps Deleuze's cinema of the brain may be better seen as a figure or anticipation of a more generalized and extended condition of visibility in the era of information machines, or of what I am calling machinic vision. The fact that within Deleuze's discussion the specific technical components of the cinematic apparatus drop away already begins to suggest as much. In the vast and multiply networked telecommunications assemblages within which we now live, those functions he labels virtual have simply been taken up by less noticeable machines, and functions that were formerly attributed to the brain have been autonomized in machines operating as parts of highly distributed systems. In short, the brain itself has become a deterritorialized organ.

Unlike the eye, however, the brain functions both *in* and as a network. On the one hand, as Deleuze puts it, the brain is "a spatial-temporal volume" where new pathways are constantly being traced, but on the

25. See Deleuze, "Sur *L'image-temps*," interview with Gilbert Cabasso and Fabrice Revault d'Allonnes, *Pourparlers* (Paris, 1990), pp. 85-86.

other, it is "the hidden face of all the circuits."²⁶ To be sure, Deleuze is less than explicit about these deterritorializations and their necessary re-territorializations at other levels. Deterritorialized, the brain enters into new assemblages: the world-brain or the city-brain, as he indicates in discussions of Kubrick's and Resnais's films and Bely's novel *St. Petersburg*. Yet the extent to which the brain is reterritorialized in its own and possibly other circuits remains unexplored. From the perspective of current technology, moreover, Deleuze's cinema of the brain presents a relatively limited instance. Compared with the operations of the World Wide Web, or net, where varieties of daemons and "autonomous agents" assume intelligent functions of which until recently only human brains were capable, the brain's deterritorialization in these films seems checked or limited by perception itself. In the circuits of global telecommunications networks, not only is the brain far more deterritorialized, perhaps no longer even conceivable as "the hidden face of all the circuits" (since this would deny the emergent, self-organizational possibilities of the net), but the multiplicity of images circulating through these circuits cannot be meaningfully isolated as material instances of cinema (or television) and brain. Many of these images, of course, are perceived, but their articulation occurs by means of another logic: the incessant coding and recoding of information and its viral dissemination. The image itself becomes just one form that information can take.²⁷

Unlike the cinematic apparatus, then, contemporary telecommunications assemblages compose a distributed system of sentience, memory, and communication based on the calculation (and transformation) of information. Within the social space of these assemblages (which may amount to a new form of collective psychic apparatus), 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

26. *Ibid.*, p. 87.

27. As Kittler suggests in the introduction to his "Gramophone, Film, Typewriter," computer networks and the digitalization of information efface the difference between individual media:

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. With numbers nothing is impossible. Modulation, transformation, synchronization; delay, memory, transposition; scrambling, scanning, mapping—a total connection of all media on a digital base erases the notion of the medium itself. [Kittler, *Essays: Literature, Media, Information Systems*, trans. Stefanie Harris et al., ed. John Johnston (Amsterdam, 1997), pp. 31-32]

way. As in Deleuze's analysis of the cinema, this image is not an icon or simulacrum representing something existing in the world (Plato), nor is it the internal or mental picture of an external object (Descartes); it is, rather, the perceptual correlative of actions in and reactions to a milieu (Bergson), but a milieu now defined by a variety of agents and subagents in human-machine systems. While Deleuze never explicitly describes this new machinic space, nor the specific kind of vision it elicits, both are anticipated in his Bergsonian study of the cinematic image, where the viewer is always already *in* the image, necessarily and inevitably positioned within a field of interacting images, with no means to step back, bracket the experience, and assume a critical distance. Instead of these phenomenological and Kantian moves (which require a subject that cannot be constituted in precisely this kind of space), Deleuze offers a strategy of "feed-forward," following lines of flight or decoded perceptions toward a postulated "outside." When Deleuze turns to the cinema of the brain, however, a more complex topology becomes necessary, one in which inside and outside communicate, and circuits of information exchange allow the brain, following the eye, to be in turn deterritorialized. But once the brain no longer constitutes a "centre of indetermination in the acentred universe of images," as it did for Bergson (CI, pp. 62-63), and is itself decomposed into distributed functions assumed by machines, perception can no longer be simply defined in terms of the relationship between images.

This intervention of information machines into the field of perception is precisely the complication that I have been calling machinic vision. While it would be tempting (but not sufficient) to define it in terms of a new relationship between information and image—the range and variety of perceptions evoked by the cinematic image should make us cautious in this regard—there can be little doubt that this relationship provides an overriding concern in much of contemporary art; indeed, inasmuch as machinic vision implies a qualitative change in the space in which art is viewed, the relationship between information and image is one that art must necessarily address. What is important, of course, is that it can be addressed in so many different ways that are not necessarily medium specific.²⁸ I am thinking of Gregory Rukavina's "photographic machines" (which visually span the conceptual gap between montage and the reproduction of cellular automata), Sara Hornbacher's video *Altered States* (a virtual anthology of molecular images and "irrational cuts"), and Antonio Arellanes's layered and translucent paintings of machine forms. There is also the new digitally inspired (and postdeconstructive) architecture of

28. A simple example from contemporary "object-oriented" programming languages may be instructive here. Visual Basic 5, for example, is comprised of two parts: a form or surface on which things appear (text, images, data, and so on) and an underlying code that links possible actions on this form through "event procedures"; both parts or functions, however, are transferable to other programs.

hypersurfaces and liquid constructions, which has the additional interest of being Deleuzian, at least in affiliation.²⁹

Both Virilio and Kittler, albeit in different terms and in a different tone, have suggested that current computer technology ushers in a new regime or condition of media. In this view, what I am calling machinic vision would be understood as either its symptom or effect. With Deleuze, however, the situation is somewhat more complex. From the start, his use of the term *machinic* constituted a refusal to valorize a set of oppositions (like the human versus the technical, or the biological versus the mechanical) as part of a conceptualization that allowed him to elude, or sidestep, certain metaphysical categories and humanist presuppositions—in other words, to think in another way. For us the situation is somewhat different, inasmuch as the machinic has been actualized in our everyday experience in ways that can no longer be denied. It is this trajectory—from Deleuze's conceptualization to the new conditions of our own experience—that I have tried to theorize through the concept of machinic vision.

29. See Alexander Stille's informative sketch, "Invisible Cities," *Lingua Franca* (July/ Aug. 1998). These scattered examples are of course all contemporary, but it may be that an early form of machinic vision arises as soon as there is an industrialization of the image. One could certainly speak of impressionist painting in these terms.