bodies in code

interfaces with digital media

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Introduction

From the Image to the Power of Imaging: Virtual Reality and the "Originary" Specularity of Embodiment

1. ALL REALITY IS MIXED REALITY

According to a recent article in *The New York Times*, the (near) future of television will witness a triumphant conquest of virtual reality, a realm of experience that, with its cumbersome gear and prohibitive costs, we have grown accustomed to considering as distinct from normal perceptual reality.[1] Though we "see the world in three dimensions," the article notes, "throughout most of history, we've only been able to depict it in two." While this Achilles heel of representationalism has long inspired experiments involving perceptual trickery—and indeed might be credited as inspiration for an entire tradition in Western art—only in the past half century has scientific and artistic attention focused on the total simulation of perceptual reality, on the projection of images in three dimensions. The fruit of this attention, however, has recently undergone a minor revolution, as the article explains:

Until recently no one had come up with a better solution to this problem than goofy eyewear. When Rover sent back images from Mars, NASA scientists studied them wearing much the same glasses that audiences in '50s movie palaces donned to watch "It Came from Outer Space." Within the realms of industry, that's been changing, as what's known as stereoscopic imaging has become a big business involving everyone from drug researchers doing molecular mapping to car designers building next year's SUV.… the ever-evolving high-tech revolution is finally moving 3-D entertainment to the next stage.

Stereoscopic imaging, the article goes on to explain, generates "natural three dimension" using a principle called "multiplexing." Multiplexing does for three-dimensional perception what cinema and video did for two-dimensional perception: by delivering 300 images per second (30 images a second from ten different angles), it adds a stereoscopic or depth dimension to the illusion of motion generated by its technological precursors. With the ever increasing speed of home entertainment devices, delivery of three-dimensional content has now become practicable, even if its realization seems to loom fairly far out on the horizon.

What is particularly interesting about this story—at least for my purposes here—is its congruity with the more specific technical paradigm emerging from recent virtual reality research and art experimentation: the paradigm (to borrow a term from artists Monika Fleischmann and Wolfgang Strauss) of "mixed reality." Having tired of the clichés of disembodied transcendence as well as the glacial pace of progress in head-mounted-display and other interface technology, today's artists and engineers envision a fluid interpenetration of realms. Central in this reimagining of VR as a mixed reality stage is a certain specification of the virtual. No longer a wholly distinct, if largely amorphous realm with rules all its own, the virtual now denotes a "space full of information" that can be "activated, revealed, reorganized and recombined, added to and transformed as the user navigates … real space."[2]

What comes to the fore in this reimagining is the central role played by the body in the interface to the virtual. With the convergence of physical and virtual spaces informing today's corporate and entertainment environments, researchers and artists have come to recognize that motor activity—not representationalist verisimilitude—holds the key to fluid and functional crossings between virtual and physical realms. In what amounts to a position statement for the mixed reality movement as a whole, Fleischmann and Strauss speak of "turning the theory on its head that man is losing his body to technology"; as they see it, "the

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interactive media are supporting the multisensory mechanisms of the body and are thus extending man's space for play and action" (cited in Grau, 219).

To be sure, this recognition of the primacy of embodied motor activity simply ratifies on a vastly broader scale the position of early VR pioneers like Myron Krueger and of cutting-edge perception researchers like Paul Bach y Rita, who insist on the poverty of our ocularcentric metaphysical tradition and its representationalist aesthetics.[i] From the standpoint opened up by these and like-minded artists and engineers, what is truly novel and promising about contemporary consumer electronics is not the possibility they open for creating ever more immersive illusory spaces, but rather the expanded scope they accord embodied human agency.

The massive increases in processing speeds ushering in today's microcomputing revolution thus serve less to revitalize the dream of perfect simulation than to underwrite a more expansive and fluid *functional* interpenetration of physical and virtual spaces. Although today's venture capitalist is inclined to reference the "evolution [of humanity] toward ever more sophisticated representations of reality,"[ii] for a media artist like Myron Krueger, the development of three-dimensional simulations puts us in touch with our most primitive perceptual capacities: "… the human interface is evolving toward more natural information. Three-dimensional space is more, not less, intuitive than two-dimensional space.… Three-dimensional space is what we evolved to understand. It is more primitive, not more advanced [than two-dimensional space]."[3]

Thus, although Krueger and today's venture capitalist admittedly share a desire for a more natural interface, their respective understandings of how such a desire might be realized could not be more distinct. For the latter, "natural three dimension" denotes a more immersive, data-rich *visual* simulation. In contrast, for Krueger, "natural information" means information produced through an extension of our natural—that is, embodied, perceptuomotor—interface with the world.

By capturing the difference between the industrial and the aesthetic interest in advances in contemporary media technology, this distinction perfectly expresses the defining principle of mixed reality as a second generation in virtual reality research: its eschewal of representationalism and embrace of a functionalist perspective rooted in perceptuomotor activity. For this reason, today's mixed reality movement has marked affinities with what Krueger has long designated as "artificial reality"

(as opposed to the HMD paradigm synonymous, for him, with the term "virtual reality"). Indeed, as I shall argue in Chapter 1, Krueger stands as a kind of father figure for the entire mixed reality paradigm.

It can hardly come as a surprise, then, that Krueger has recently described this terminological difference in terms highly reminiscent of the latter's challenge to earlier conceptions of virtual reality: "Whereas the HMD folks thought that 3D scenery was the essence of reality, I felt that the degree of physical involvement was the measure of immersion."[iii,4] On Krueger's account, one of the crucial components of physical involvement was lack of bodily encumbrance and, in a testament to the prescience of his thinking, the mixed reality environments now ubiquitous in our world do require a nonencumbered interface.[iv] The theoretical underpinnings of Krueger's alternate vision of "artificial reality" have found their practical fruition in today's mixed reality environments, and the "first generation" model of VR as a disembodied hyperspace free of all material constraints simply no longer has any purchase in our world.

Following from this defining principle of mixed reality are several important corollaries that serve to differentiate it from earlier conceptions of virtual reality and predecessor technologies. First, the mixed reality paradigm radically reconfigures a trait that has characterized virtual reality from its proto-origin as the representationalist fantasy par excellence: namely, a desire for complete convergence with natural perception. This trait serves to distinguish it from all *discrete* image media, including cinema, which, as underscored by Gilles Deleuze's correction of Bergson's criticism of the "cinematic illusion," function by breaking with natural perception.

Such a break (at least on Deleuze's reading) grants cinema the capacity to present the world from a nonhuman perspective and thus opens a properly autonomous machinism; by contrast, the functional homology linking virtual reality technologies with natural perception supports a prosthetics that functions to expand the scope of *natural* perception, to tap the technics at its core. In its fantasy form, though certainly not in reality, virtual reality works—or rather would work—like an externalization of neuroscientist Antonio Damasio's analogy for consciousness: if consciousness can be likened to a "movie-in-the-brain" with no external spectator, then virtual reality would comprise something like a movie-outside-the-brain, again, importantly, with no external spectator.[5]

The mixed reality paradigm differs most saliently from this fantasy in its deployment of the functional homology between virtual reality technologies and perception: rather than conceiving the virtual as a total technical simulacrum and as the opening of a fully immersive, self-contained fantasy world, the mixed reality paradigm treats it as simply one more realm among others that can be accessed through embodied perception or enaction (Varela). In this way, emphasis falls less on the *content* of the virtual than on the *means of access* to it, less on what is perceived in the world than on how it comes to be perceived in the first place.

Bluntly put, the new mixed reality paradigm *foregrounds the constitutive or ontological role of the body in giving birth to the world*. For today's researchers and artists, virtual reality serves to highlight the body's function as, to quote phenomenologist Maurice Merleau–Ponty, an "immediately given invariant," a "primary access to the world," the "vehicle of being in the world."[6] The body forms an ultimate background, an absolute here, in relation to which all perceptual experience must be oriented. That is why virtual reality comprises something of a reality test *for the body*; as philosopher Alain Millon points out, it "puts into place constraining apparatuses that allow us to better understand the limits and the weakness [but also the powers] of the body."[7]

A further corollary of the functionalist perspective of mixed reality follows closely upon this focus on the ontological or constituting function of embodiment: the role of self-movement as the bodily—or better, the tactile—face of perception. Insofar as it yields a doubling of perception, this tactile dimension serves to confer a bodily—that is, sensory—reality on external perceptual experience (whether it is "physical" or "virtual"). It generates a felt correlate of perception that is part of the functionalist understanding of embodied agency. Together, these two corollaries—the primacy of the body as ontological access to the world and the role of tactility in the actualization of such access—effect a passage from the axiom that has been my focus thus far (*all virtual reality is mixed reality*) to the more general axiom that *all* reality is mixed reality.

In one sense, this passage simply recognizes what, with Brian Massumi, we can consider to be the priority (or the "superiority") of the analog—especially, though by no means exclusively, where digital technologies are in play.[v] "Always on arrival a transformative feeling of the outside, a feeling of thought," sensation

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is the being of the analog. This is the analog in a sense close to the technical meaning, as a continuously variable impulse or momentum that can cross from one qualitatively different medium into another. Like electricity into sound waves. Or heat into pain. Or light waves into vision. Or vision into imagination. Or noise in the ear into music in the heart. *Or outside coming in.* Variable continuity across the qualitatively different: continuity of transformation. (135)

Understood in this sense, the analog creates reality out of the fusion or mixing of realms, out of transformation; not surprisingly, the body forms its primary agent: "If sensation is the analog processing by body-matter of ongoing transformative forces, then foremost among them are forces of appearing as such: of coming into being, registering as becoming. The body, sensor of change, is a transducer of the virtual" (135).

Situated against the backdrop of this understanding, the sensory integration of or interface with a concrete virtual domain (distinct from the virtual as a source of potential) would form one (particularly illustrative) instantiation of a more general sensory pattern: transformative integration of the force of the outside, of the virtual. That is why Massumi's conception of the analog conditions of virtual reality experience perfectly anticipates the contemporary shift to the mixed reality paradigm:

> The sight-confining helmets of early virtual reality systems have given way to immersive and interactive environments capable of addressing other-than-visual senses, and looping sense modalities more flexibly and multiply into each other, packing more sensation into the digitally assisted field of experience—and with it, more potentialization. (142)

Because experience as such is "analog processed," there can be no difference in kind demarcating virtual reality (in its narrow, technicist sense) from the rest of experience; again, all reality is mixed reality.

2. THE POWER OF IMAGING AND THE PRIVILEGE OF THE OPERATIONAL

Let us now take a step backward to recognize the larger cultural transition in which the shift to mixed reality is embedded. The period from the early '90s until today has witnessed a veritable cascade of interest in the topic of the body, one that reached its apogée with the triumph of the cultural

constructivist paradigm. It might be useful to align this triumph with a moment in the development of what (following the importation of post-structuralism into the English-speaking world) came to be called, simply, "theory." Such a moment occurred—as Eve Sedgwick and Adam Frank's 1995 polemical attack on neo-Foucauldian constructivism highlights—when theory became synonymous with antiessentialist constructivism.

Condensed into a single claim, Sedgwick and Frank's compelling, if massively reductive, argument runs as follows: the specification that _____ (fill in with appropriate object domain) is "discursively constructed" rather than "natural" *is precisely what constitutes theory.*[8] "[T]*hat* specification," Sedgwick and Frank claim, "is today understood to constitute *anything* as theory": "'theory' has become almost simply coextensive with the claim (you can't say it often enough), *it's not natural*" (513). Despite the distraction of its polemical fervor, this criticism manages to capture the thoroughgoing hostility to anything biological that literally permeated the ethos of theory—that is, of poststructuralism following its productive, if also (multiply) deformational, confrontation with homegrown feminist, race, gender, and queer theoretical enterprises.

The years following this triumph of the constructivist paradigm have witnessed several waves of further rumination on the topic of the body, fueled by "inputs" as diverse as cybercultural studies and Luhmannian sociology. Yet, despite a common concern with the limitations of the antibiological imperative of cultural constructivism and a perception that making good on this concern was part of their driving purpose, these latter-day theories of the body have to date hardly succeeded in producing a viable—not to mention widely palatable—account of the role played by biological embodiment in cultural experience, identity, and community. Leaving aside speculation on the reasons for this failure, which are no doubt complex enough to merit a study of their own, I would like instead to postulate that the shift to a mixed reality paradigm in our contemporary technoculture (that is, in our contemporary culture) brings with it an opportunity to revalue the meaning and role accorded the body within the accepted conceptual frameworks of our philosophical tradition.

With its functionalist model of perceptuomotor activation, the mixed reality paradigm exposes the primacy of what, with Merleau–Ponty, we might call motor intentionality for the constitution of "reality." Although this primacy is certainly not new (indeed, it coincides, as Krueger's earlier cited claim suggests, with the proto-"origin" of the

human as a distinct species), the specific conditions of mixed reality (namely, the fusion of the virtual and the physical) bring it to the fore with unprecedented clarity and force. Today's exemplary mixed reality situations—interrupting a meeting to get data from a digital database, comparing a two-dimensional architectural drawing with a real-time three-dimensional visualization, acquiring an image of oneself through the social prosthesis of common sense that is contemporary television—all have as their condition the abandonment of the dream of total immersion, i.e., the representationalist form of verisimilitude. Thus, they literally beg the question of their possibility: what makes the passage from one realm to another so seamless, so unnoticeable, so believable?

The answer, as we have seen, is the capacity of our embodied form of life to create reality through motor activity. However, the crucial point here—and this is what makes mixed reality so promising—is that this question *did not need to be posed* so long as perceptual experience (with only atypical exceptions) remained within a single experiential frame—so long, that is, as experience typically occurred within a single perceptual world as a coupling to a single form of extension or homogeneous outside.

This, it should be obvious, is precisely what has changed with mixed reality, understood as one of those events, dear to Walter Benjamin, where a quantitative amplification self-modifies into a qualitative difference.[vi] As the experiential correlate of contemporary technics, mixed reality comprises a norm determining what perception is in the world today. Put another way, today's mixed reality paradigm makes ubiquitous (specifically as a technical phenomenon) what we might think of as the experiential condition of mixed reality—that is, mixed reality as the condition for all real experience in the world today. In this function, mixed reality opens a domain of "transcendental sensibility" (Deleuze) or of the "sensible-transcendental" (Irigaray)[9]. This transcendental domain, paradoxically, is entirely *within* the empirical world, though invisible to traditional philosophical modes of capture, and deploys technics as its nonsupplementary core or "essence."

If, in a certain sense, mixed reality specifies how "media determine our situation" (following Friedrich Kittler's media-theoretical deepening of Foucault's epistemo-transcendental historiography[10]), it does so in a way that foregrounds, not (as in Kittler) the autonomy of the technical, but precisely its opposite: the irreducible bodily or *analog*

basis of experience which, we must add, has *always* been conditioned by a technical dimension and has *always* occurred as a cofunctioning of embodiment with technics. Here, the transcendental function of mixed reality as a specification (our contemporary specification) of technics is to stimulate or provoke the power of the body to open the world.[vii]

We must struggle to comprehend, then, how mixed reality can be *both* a minimal condition for experience of *and* a concrete moment in the history of human technogenesis in which the constituting or onto-logical dimension of embodiment is incontrovertibly exposed. (This is equally to fathom how mixed reality can harbor a "generic" techni-cal element of experience, a technical–transcendental structure, at the same time as it demarcates a concrete technical stage of the history made possible by such a structure.) Let us say that mixed reality appears from the moment that tools first delocalized and distributed human sensation, notably touch and vision. (Following paleontologist Andre Leroi–Gourhan, this would mean from the "origin" of the human.[viii]) Placed in this context, mixed reality, then, designates *the general condi-tion of phenomenalization* ensuing from the "originary" coupling of the human and the technical. It names an originary condition of real experi-ence, a condition which can only be thought under the category of the transcendental because it can only be known through its effects.

To think our situation today, we must ask what happens when the transcendental structure underlying mixed reality—mixed reality as the technical conditioning of experience as such—gets exposed through and as the concrete technical configuration that specifies its being in the world today. Otherwise put, what remains unprecedented in the history of mixed reality (that is, of experience as such), and what is thus singular about our historicotechnical moment, is precisely the becoming-empiri-cal, the empirical manifestation, of mixed reality as the transcenden-tal–technical, the condition for the empirical as such.

Blindspot (1991), a recent work by American artist Tim Hawkinson, perfectly captures this leveling of the divide between the empirical and transcendental structures of mixed reality (see Figure 0.1). *Blindspot* is an anatomically arrayed photographic portrait of all the surface areas of the artist's body that he cannot see with his eyes. It brilliantly inter-weaves a paradigmatic expression of the minimal condition of mixed reality—the externalization of the gaze afforded by a reflective surface—with the technical condition of our being-in-the-world today: namely, our being subjected to and made subject by the technically-supported

Figure 0.1 Tim Hawkinson, *Blindspot* (1991), photomontage capturing body surfaces not visible through natural perception. (Courtesy of the artist and the Whitney Museum of American Art.)

and technically-generated gaze of others, by the images of ourselves (including images through which we see ourselves) produced by and through society and the media.[ix]

Hawkinson's (critical) intervention into the terrain more or less owned by Lacanian theory is singular because of its rigorous commitment to sustaining the collapse of the boundary separating the empirical and the transcendental. *Blindspot* recognizes—indeed celebrates—the inescapability of a cofunctioning of "natural" perception and technically extended perception; it thus appropriates (or better, restores) the external imaging of the body as part of the body's constituting power.

Blindspot does not simply present an image of Hawkinson's body; rather, it images his body *from the standpoint of that body* (or better, of the organism that appears as that body). The image—which depicts what he *can't* see with his eyes—forms the strict correlate of what he *can* see and what, for that reason, does not require depiction. At the limit, then, the image of the body presented in *Blindspot* is not an image of the body, but rather an expression of the power (a power of imaging) that belongs to the embodied organism insofar as it is an "originarily" technical being.

Hawkinson's image thus makes common cause with French philosopher Raymond Ruyer's dismissal of the body as a merely scientific—that is, objectivized and external—entity, a kind of epiphenomenon of (radical) subjectivity:

> We are therefore, like all beings, pure subjectivities. Our organism (excluding the nervous system) is a set of subjectivities of a different order from conscious subjectivity. We are an object only in appearance; our body is an object only abstractly, in the subjectivity of those who observe us (or even, partially, in our subjectivity, when we see ourselves in a mirror or when we encounter ourselves as a particular image in our visual field). We are not, and other beings are not any more than us, really incarnate. Mind–body dualism is illusory *because we do not have a body*, because our organism is not a body.[11]

Despite appearances, Ruyer does not so much deny the (physical) reality of embodiment as displace it in favor of an ontological understanding of radical, indeed "originary," subjectivity. The body as object, along with incarnation and "conscious subjectivity," belongs to a derivative ontological plane, one that emerges from the primordial subjectivity—or, rather, the set of subjectivities—comprising the (human) organism.[x]

Like motoric embodiment discussed early, as well as Ruyer's later concept of the "absolute survey," the organismic perspective is absolute in the sense that it opens access to everything—to the world, to other bodies, to my body as object.

Ruyer conceptualizes his understanding as "reversed epiphenomenalism," meaning a reversal of the doctrine that subjectivity is an epiphenomenon of physical, material properties. For Ruyer, these latter (that is, the entire physical world, including that peculiar materiality known as consciousness) are simply epiphenomena of primary subjectivity.[xi] In this respect, Ruyer's work radicalizes the perspective of autopoietic theory, with its categorical and concept-defining privilege of the *operational* perspective of the organism over any *observational* perspective.[xii] For Ruyer, a primordial dimension of the living not only remains inaccessible from an external standpoint but also can only be (as philosopher Michel Piclin puts it) "felt from within."[12]

By assimilating the external image of the body to the perspective of the organism, Hawkinson's *Blindspot* might be said to depict the operational perspective for an age of total technical mediation (of *exposed* mixed reality) like ours. In so doing, *Blindspot* lays bare the technical element that inhabits the originary subjectivity of reversed epiphenomenalism: it reveals that self-experience today necessarily encompasses the power of imaging as a power of the organism (in this respect, it actualizes what has always been potentially the case). With its technical support in our world today, imaging has become what it has always been potentially: an aspect of *primary* self-experience (and not simply a derivative of the image of oneself held, and thus mediated, by the other).

Viewed in this context, Ruyer's own dismissal of the mirror image (a concrete figure for the minimal condition of mixed reality) can be seen as part of the technophobia characteristic of Western metaphysical discourse.[xiii] Eschewing such technophobia, Hawkinson announces in works like *Blindspot* that concrete technical conditions for self-experience today necessarily include the "internal observational" perspective made possible—*as a power of imaging*—by technical image mediation.

To anticipate an argument from Part II of this book, *Blindspot* thus pronounces the nonpathological generalization of the social–technical–psychological condition of psychasthenia, meaning "a state in which the space defined by the coordinates of the organism's body is confused with represented space".[13] If such a confusion has become normative for our experience in the world today—and what else is at stake in the technical exposure

of mixed reality?—this is not because the organism has lost its perspective to that of external images (the gaze of the other), as *all* constructivist theories allege, but rather *because technical progress has exposed imaging as the crucial organismic dimension that it has always potentially been.*

With this conclusion, we are now in a position to fathom how the mixed reality paradigm (together with the second generation of virtual reality technologies that comprise its technical support) contributes to a revalued conceptualization of the body. With its picture of an originarily technical organismic perspective, this paradigm effectively repudiates all *externalist* accounts of the body, including constructivist theories that have recently held sway in critical discourse. It thus offers an affirmative model of bodily agency that conceives of the embodied organism's constitutive coupling with the social (paradigmatically, the technically mediated world of images, including linguistic images) in a fundamentally different manner than does (for example) Judith Butler's theory of performative iteration. The latter, *in the final instance*, subordinates the agency of the body (the force of iteration) to the content of the social images that, following the paradoxical operation of (linguistic) performativity, open up the space of its exercise.[xiv]

On the mixed reality paradigm, by contrast, coupling with the domain of social images occurs *from within the operational perspective* of the organism and thus comprises a component of its primordial embodied agency. One crucial consequence of this difference is the principle of indirection, loosely modeled on the autopoietic principle of organizational closure. This principle states that the organism undergoes change by reorganizing in reaction to external perturbation.

More precisely, because external images (including ones that are fantasized, i.e., of endogenous origin, as well as other images explicitly "from the operational perspective") have an impact on the organism *as part of its primordial operation*, they cannot be said to modify the organism *directly* (they do not comprise an informational input). Rather, they affect the organism *indirectly*, through the self-reorganization it undergoes in response to perturbation from the outside. Therefore, operating beneath the complex reappropriation of social images that Butler conceptualizes as performativity is a yet more primordial level of bodily, or organismic, processing. The latter forms nothing less than the enabling transcendental—the technical–transcendental—structure for the effects that Butler describes.

3. VIRTUAL REALITY AS EMBODIED POWER OF IMAGING

The potential promise of second-generation virtual reality/mixed reality for rethinking culture through embodiment reverberates throughout Alain Millon's recent discussion of the role of the body in media environments. Indeed, according to Millon, it is "across the virtual body that our culture constructs its own body image." That is why the conceptualization of the virtual body is a directly political issue, one that will determine not only the image but also the degree of agency our culture is willing to accord the body.

By postulating an opposition between "the cyberbody of cyber-culture" and the "virtual body of computer modelization," the body "supposedly liberated from spatiotemporal constraints" and the body "immersed in these limits," Millon is able to specify the terms in which the externalist–internalist distinction comes to inhabit virtual reality, and, through it, the world itself (9). Thus, he asks:

> Is the virtual body simply a body without a corporeal envelop, a body without weakness, a body of pleasure without desire, in the end, a body without life? Isn't it rather a body in power, a body that antici-pates all the forms but also all the thoughts to come, a body that furnishes the opportunity to pose the question of the person and its status, but also of its proper limit? (15)

Ultimately at stake in this questioning and in the distinction it supports are the irreducibility and priority of interior life, of the primordial organism, of the operational perspective. Millon makes this clear when he claims that the body "is not an envelop but an aggregate in which desire, suffer-ing, and need find their place" (40); the body, he writes, forms an "obstacle and a resistance to all forms of transparence" and is living only "when it is opaque, complex, confused, flexible, and in perpetual mutation" (16). "In this perspective," he continues, "if there is a need for a liberation of the body, it is uniquely to affirm a more powerful interior life, all the while continuing to understand that the body remains … a presence" (40).

It is precisely the primordial operation of the organism that is at stake in the cultural debates surrounding the virtual body and it is entirely to Millon's credit that he understands this to be of direct concern to the social and cultural significance accorded the body: "The analysis of the virtual body … thus participates in a more global reflection on the manner in which our culture understands the body … [and] especially the way in which … it constructs a singular image of this body." Here, virtual reality is shown to comprise a chance for our culture to affirm

the body as the primordial agency that it is, one that, as we have seen, includes imaging as part of its constituting power. The analysis of the virtual body thus constructs an "object that is a dense and opaque body, a body that has its limits and its weaknesses, an intimate body and one that, especially, refuses transparence and total clarity [*netteté*]" (18).

Forging such a cultural image of the body is crucial if we are to forestall the instrumentalization of the body and all that follows from it, above all the foreclosure of being-with or the finitude of our form of life.[xv] Far from being a mere "instrument" or the first "medium" (as some versions of posthumanism allege[xvi]), the body is a primordial and active source of resistance; indeed, it is as resistance—as the "living expression of something simultaneously organization and obstacle to its organization"—that the body forms the source of excess supporting all levels of constitution (or individuation), from the cellular to the cosmic.[xvii] As source of excess, the body possesses a flexibility that belies any effort, such as that of cybercultural criticism (and behind it, of cultural constructivism), to reduce it to a passive surface for social signification. The body is, affirms Millon, "an entity that becomes a person, a creative subject, a being or an individual according to the circumstances" (59).

As a technology that lays bare the enabling constraints of the body (that is, the body's *necessity*), virtual reality comprises our culture's privileged pathway for laying bare mixed reality as a technical–transcendental structure, which is equally to say, for exposing the technical element that lies at the heart of embodiment. To see why, let us turn to a pair of mixed reality works that correlate the contemporary generalization of psychasthenia—the confusion of the organismic with the representational and the ensuing exposure of imaging as a dimension of the organism—with the concrete context of virtual reality technologies.

In *Rigid Waves* and *Liquid Views*, Monika Fleischmann and Wolfgang Strauss present two technical mirrors for the self which function less to reflect the social gaze than to potentialize technical vision as a dimension of organismic being. Both works engage the myth of Narcissus and Echo to undermine the autonomy and closure of the visual register; to do so, both specifically, though differentially, interrogate the act of disappropriation and disembodiment involved in the "mirror image" (and also in the psychoanalytic interpellation it supports—namely, Lacan's famous "mirror stage"). The first work, *Rigid Waves* (1993), reproduces the apparatus of the mirror image only to decouple self and reflection (see Figure 0.2). As the artists explain, *Rigid Waves*

Figure 0.2 Monika Fleischmann and Wolfgang Strauss, *Rigid Waves* (1993), digital interactive work that disjoins the mirror image from the self, thus freeing "autonomous" self-images. (Courtesy of the artists.)

transforms the acoustic mirroring of Narcissus and Echo into visual form. Narcissus gives up his body to his mirror image. The "self" becomes another (body). His own movements are only an illusionary echo. As the observer approaches the mirror, he is confronted with a mirror image that does not correspond to his normal perception of things. He sees himself as an impression, as a body with strangely displaced movement sequences and, ultimately, as an image in the mirror that smashes as soon as he comes too close. He is unable to touch himself. A small camera hidden in the picture frame is used to place the observer in the image. The computer-controlled projection surface is controlled by an algorithm that calculates the distance to the observer. *Rigid Waves* is a virtual mirror which does not reflect but rather recognizes. Sight and movement, approaching and distance are triggers for the unusual images. This is an attempt to see oneself from the outside, to stand side by side with oneself and to discover other, hidden "selfs." In this fractured mirror, we are able to find ourselves, our "self" has been liberated. But how will I ever recognize myself again?[14]

Rigid Waves operates a disjunction of self from mirror image or, rather, of mirror image from self, thereby replacing the integrationist operation of mirror identification with the disintegrationist creation of autonomous self-images—images of the self unstuck from the self they image. The mobile spectator is empowered to control the changes the image undergoes, but cannot coincide visually with the image (because movement generates distortion) or touch the image (because proximity causes the image to shatter into pieces).

Situating perception between two perceptual limits (the distance required to see, on the one hand, and the distance required to touch, on the other), *Rigid Waves* thus liberates the self, as the artists proclaim, in an act of dispossession that leaves motility as compensation for loss of visual mastery. Their anxious query—"How will I ever recognize myself again?"—expresses the structure of transcendence inherent in motility as an existential dimension of human being. Because movement always displaces the self, thus preventing it from coinciding with itself, movement can only provisionally—or, perhaps better, only partially—compensate for the loss of visual identification.

Not surprisingly, the second installation, *Liquid Views: The Virtual Mirror of Narcissus* (1993), aims to complete this compensation (See Figure 0.3). It does so by coupling motility (specifically, tactile motility) directly with the deformation of the mirror image so that the

Figure 0.3 Monika Fleischmann and Wolfgang Strauss, *Liquid Views* (1993), digital interactive work that confronts the viewer with the scattering of his or her image. (Courtesy of the artists.)

viewer never loses control over the disintegration of the (self-)image. Thus, if *Rigid Waves* works to unfasten the self-image from the self (and vice versa), *Liquid Views* proffers a compensatory interface that reasserts—albeit, on radically different sensory terms—the embodied viewer's control over the body-image correlation. Again, let us allow the artists to describe the work:

> The central theme of *Liquid Views* is the well in which Narcissus discovers his reflection. He initially sees water as someone else, as another body. Like the small child in the various "mirror stages" described by Lacan, he decides to recognize his fictive body as himself. This installation has the objective of arousing the observer's curiosity and seducing him to undertake actions that bring him into contact with his senses.… Instead of pressing keys and buttons, the observer must experiment with his own sense of touch.… Attracted by the sounds of water and a room of shimmering lights, the visitor approaches the virtual well. Seeing the image of himself he is tempted to touch it. Touching the image with his fingertip, the image in the water breaks up. Drawn by the sensation triggered by touching his own image in the water, the observer immerses himself in the situation. (Fleischmann and Strauss, "Images")

What is striking about the experience of *Liquid Views* is that the image's scattering, far from ending engagement (as we might expect), in fact catalyzes a transition to another realm—to the realm of the disintegrated image. That is precisely why Fleischmann depicts the installation as an effort to open the access to the self closed up by Narcissus' "drowning in himself": "The central theme is the transition from the upper to the lower world…. The Narcissus of the media age is watching the world through a liquid mirror that questions our normal perception."[15] If this means that the "mirror becomes the actor," it acts *necessarily* in conjunction with the embodied spectator, whose immersion in the situation is enabled by the self-reflexivity characteristic of touch as the most primordial of the senses, as the root of premodal sensation.

The spectator's touch—touch as trigger for the image's scattering—materializes the power of imaging qua dimension of organismic being. Transformed from an external, visual image of the self into an internal correlate of the organism's imaging potentiality, the mirror of Liquid Views thus comprises what Fleischmann and Strauss call an "unsharp interface," an operator of the fusion of realms constitutive of the mixed reality paradigm: "The interface is not interpreted as such. It goes unnoticed and is not consciously perceived. These natural references turn *Liquid Views* and *Rigid Waves* into virtual reality." (Fleischmann and Strauss, "Images")

What makes these two works singular in the present context is the way that they support the opening of virtual reality not as a technical apparatus enabling some prescripted play, but rather as a *technically triggered experience of the organism's power of imaging*, an experience of imaging as an inherently technical, originary element of the organism's being. Here virtual reality is not built on a virtual reality support, so each work must produce the virtual; and because they can only do so through the interaction they trigger, we can rightly conclude that human experience actualizes the virtual potential of these art works. Accordingly, what these works add to the expression of Hawkinson's *Blindspot* is the direct incorporation of the concrete technologies supporting mixed reality: together, *Rigid Waves* and *Liquid Views* facilitate a comprehension on the part of the observer that his or her engagement with virtual reality technology *is* the contemporary manifestation of what can only be an originary correlation with technics.[xviii]

Commenting on an earlier work, Fleischmann and Strauss describe the transition from (external) image to (internal) imaging power, from the observational to the operational perspective, that informs such a comprehension. This transition renders their mixed reality works *allegories* of mixed reality as the minimal condition of phenomenalization:

> While the observer is only the onlooker, this "looking" is a kind of movement. It embodies "active observation." From a certain moment when the observer becomes immersed in the action, his "passive onlooking" is replaced by "active observation." The observer discovers that he—and not the artist—is the one creating the situation. When the situation changes and the observer becomes a player, he suddenly begins to identify himself with the situation. Observation becomes more than merely consumption.[16]

By catalyzing a coincidence of observational and operational perspectives, virtual reality artwork, as Fleischmann and Strauss describe it, perfectly captures the transformation at issue in the recuperation of imaging as a fundamental, existential power. When observation ceases to be consumption, imaging takes its proper place *within* the organism's primordial operation as a general condition of phenomenalization.

Contrasted with Hawkinson's *Blindspot*, therefore, *Rigid Waves* and *Liquid Views* expand the agency of the operational perspective because they directly incorporate the concrete technologies supporting mixed reality. More precisely, by placing the organism into relation with the image as a dimension of its operation and by supporting

the disjunction between embodiment and imaging (i.e., the otherness and the disintegrating function of the image), *Rigid Waves* and *Liquid Views* facilitate the actualization of the organism's potential to extend its bodily boundaries and to expand the scope of its bodily agency.

What is then singular about these two works as exemplars of digital art and as mediators for digital culture is their use of the concrete technology of virtual reality *to stage a disconnection of the (fundamentally motile) body schema from the (fundamentally visual) body image*. In the experience of *Rigid Waves* and *Liquid Views*, the viewer is technically enabled to utilize the excess of the body schema over the body image to increase his agency as an embodied being.

Such technical mediation of the body schema (of the scope of body–environment coupling) comprises what I propose to call a *"body-in-code."* By this I do not mean a purely informational body or a digital disembodiment of the everyday body. I mean a body submitted to *and constituted by* an unavoidable and empowering technical deterritorialization—a body whose embodiment is realized, *and can only be realized*, in conjunction with technics. As I shall argue in this study, it is precisely through the vehicle of bodies-in-code that our contemporary technoculture, driven by digital technologies, comes to constitute a distinct concrete phase in our contemporary technogenesis (our originary yet historico-technically differentiated coevolution with technics).

Indeed, if we take the experience of *Rigid Waves* and *Liquid Views* as exemplary of this phase, we can immediately comprehend how digital technologies, as the contemporary expression of the originary technical mediation of the human, broaden what we might call the sensory *commons*—the space that we human beings share by dint of our constitutive embodiment. This is because digital technologies:

1. Expand the scope of bodily (motor) activity; and thereby
2. Markedly broaden the domain of the *prepersonal*, the organism–environment coupling operated by our nonconscious, deep embodiment; and thus
3. Create a rich, anonymous "medium" for our enactive co-belonging or "being-with" one another; which thereby
4. Transforms the agency of collective existence (of individual and collective individuation, to use French philosopher of technology Gilbert Simondon's terminology) from a self-enclosed and primarily cognitive operation to an essentially open, only provisionally bounded, and fundamentally motor, participation.

To think of the body as a *body-in-code*, then, is simultaneously to think of human existence as a *prepersonal* sensory being-with. As we will see, this is largely responsible for the promise of the digital, understood not as some autonomous moment in the history of technology but rather, first and foremost, as a stage in the ongoing technogenesis of the human.

To conceptualize this particular stage of our technogenesis—and the particular technical expansion of prepersonal bodily function that digital technologies facilitate—we will need to draw extensively on philosophical and psychological exploration of the "body schema" and the skin as a generalized sense organ. We will also need to develop a fundamentally or "essentially" technical phenomenology of the body, one that takes as its primary task the elucidation of the originary technical basis of embodied experience. Part I of my study is devoted to this task. Not surprisingly, it progresses through and attempts to update the work of Maurice Merleau–Ponty, the phenomenologist most committed to the ontological dimension of (human) embodiment.

The discussion begins with two crucial and interrelated concepts of Merleau–Ponty's *Phenomenology of Perception*—namely, the absolute priority of the phenomenal body (largely akin to the operational perspective of the organism) and the primary role accorded bodily motility (i.e., the body schema) in the constitution of a systemic coupling between organism and environment. The argument ultimately aims to conceptualize a technics on the basis of (and adequate to) the chiasmic correlation of being and world that forms the heart of Merleau–Ponty's final unfinished project, as documented particularly in *The Visible and the Invisible* and *Nature*. In contrast to the clearly delineated (and still subordinate or secondary) dimension of technics associated with Merleau–Ponty's exploration of motor intentionality in the *Phenomenology* (a dimension famously telescoped in the example of the blindman's stick), such a technics must be capable of supporting—of *being*—the *medium* of human individual and collective individuation.

The theoretical argument of Part I gives way in Part II to a logic of singular exemplarity. In the four chapters of this section, theoretical analysis will be made immanent to sustained exploration of notable instances of digital culture—singular instances in which a "body-in-code" functions to open the digital as a medium of prepersonal commonality. In line with our effort to restore virtuality as an originary technical element of human being and to expose mixed reality as its contemporary phenomenological dimension, these four chapters will implicitly narrate

a progression backwards from the most artificial (and narrow) conception of virtual reality to the most natural (and broad) conception.

Thus these chapters will move from the brilliantly unconventional virtual environments of artist Char Davies (Chapter 2) to the imaginary reality of fiction as exemplified in Mark Danielewski's recent novel, *House of Leaves* (Chapter 5). The Internet as the medium for contemporary community (Chapter 3) and architectural space as a predigital and originary mixed reality (Chapter 4) will instance two intermediary points along the continuum connecting these poles. Singly and as well as a whole, these Chapters will "exfoliate" crucial aspects of the essentially analog basis of the virtual that necessarily installs it, to recall Massumi's argument, as the vehicle for any (concrete) technical contribution (including that of the so-called digital) to our ongoing and constitutive technogenesis.
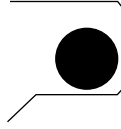
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