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# The Rhetoric of Digital Utopia after Sade: Utopian Architecture and the Static Subject of Digital Art

Eyal Amiran

A line of thought popular in new media theory still sees web space as a liberatory not-place (*ou-topos*) where boundaries collapse or disappear. Since its early days, cybernetics has had the objective to erase the divide between matter and code, the archive and the interface.<sup>1</sup> Jay David Bolter endorses a claim that is commonly made—a truism since Jean-François Lyotard on information in *The Postmodern Condition*—when he writes that “[t]he open architecture of the Internet and the World Wide Web” grants access to every place or site on the net equally.<sup>2</sup> The speed with which simultaneous information is available through networks “suggests that everything can be represented,” to give a variant of this point.<sup>3</sup> Richard Lanham cites as a given the notion that free circulation is “natural to electronic notation.”<sup>4</sup> As Rita Raley comments, “[T]he IT network . . . promises to go anywhere and allow everyone access.”<sup>5</sup> “The network is our contemporary intuition of infinity,” writes Alan Liu.<sup>6</sup>

While these writers are interested in the real politics of digital media, including the ways digital artifacts engage different kinds of borders (as in Raley’s “Border Hacks”), their interest in the “open architecture” of the net points to a significant assumption in the field. Media theorists often agree with a vision articulated for

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example by Miwon Kwon, whose *One Place After Another: Site Specific Art and Locational Identity* (2002) celebrates the “liberating effects” of the deterritorialization of sites and argues that the differential spacing of places allows them to be understood as part of a synchronic system.<sup>7</sup> As Jennifer González explains, “The apparently neutral space of the Internet is viewed as a potentially progressive domain for overcoming barriers that otherwise obstruct or restrict ideal forms of participation in the public sphere.”<sup>8</sup> Even the Marxist reading of the virtual age offered in McKenzie Wark’s *Hacker Manifesto* holds that the increasing flows of information under the rule of the “vectoralist” class, which exploits information as capitalists exploited capital, turns place into homogenized space, and turns nature into a virtual geography where anything “may be brought together with any other thing.”<sup>9</sup> Wark continues this line of thought in a more recent project on gamespace:

In gamespace, the very possibility of utopia is foreclosed. It is no longer possible to describe a shining city upon the hill, as if it were a special topic untouched by the everyday, workaday world. No space is sacred; no space is separate. Not even the space of the page. The gamelike extends its lines everywhere and nowhere.<sup>10</sup>

Here Wark opposes the closed model of traditional utopian space in favor of an absolute openness that constitutes a new digital utopia. This view of digital environments affirms an impossible (and vague) openness whose ideological effect is ultimately conservative, a kind of heaven beyond the conditions of possibility. In virtual worlds, objects are said to have no commerce with and supposed not to depend on analog environments, a totalizing vision against which some critics have cautioned.<sup>11</sup> As Mark Taylor sums up the position, “[T]he net wires the world for Hegelian Geist.”<sup>12</sup>

This view of the Internet is often applied to the ontology of computer-based art, though the two are different and separate topics. Alan Golding provides a comprehensive summary of the trend in new media theory to celebrate digital media’s “liberatory immateriality” and to see traditional media like print as “confining.”<sup>13</sup> Instead of multiplying examples, I consider as an extended example the work of Mark Hansen. In a series of articles devoted broadly to the challenge that digital images pose to older media, Hansen argues that dynamic properties of digital images make them simultaneous with their object, eliminating temporal and spatial barriers that characterize other art. This body of work is particularly challenging because Hansen’s larger project argues for the work of the body in the production of information, and in this sense it does not favor unbounded ontology. Hansen rightly objects to Lev

Manovich's influential idea that "the new media image is something the user actively *goes into*," an idea that again exemplifies the dissolution of boundaries between self and other in the digital domain, though he often appeals to this idea himself.<sup>14</sup>

To connect body and image, in line with Henri Bergson and Gilles Deleuze, whatever their differences, Hansen wants to eliminate the representational distinction between the image and space.<sup>15</sup> For example, in an essay on "wearable space," he writes that the cultural shift to the digital "has suspended the framing function performed by the (preconstituted) technical image (photograph, cinematic frame, video scanning, etc.)."<sup>16</sup> In "Cinema Beyond Cybernetics," he distinguishes the digital image from Deleuze's time-image. In Deleuze's account of Bergson's theory, time is split between the present and the past, which are both united in the image.<sup>17</sup> The image thus has two complementary parts, an actual and a virtual: the virtual image is not psychological, but has a separate, objective and even historical existence "preserved through time."<sup>18</sup> Whereas for Deleuze the time-image enters into serial relation with its own virtuality and is constituted by their exchange, for Hansen the digital image no longer divides space but contains that division: "[T]he digital image 'incorporates' the virtual within the actual, as the limitless potential for the generation of other images from any part of itself."<sup>19</sup> For Deleuze, recounting Bergson, present and past are different, but coexist in the image:

[T]he image has to be present and past, still present and already past, at once and the same time. If it was not already past at the same time as present, the present would never pass on. The past does not follow the present that it is no longer, it coexists with the present it was. The present is the actual image, and *its* contemporaneous past is the virtual image, the image in a mirror.<sup>20</sup>

For Hansen, the digital image makes virtual and actual images indiscernible, so in the digital there is "a constitutive doubleness within the (actual) image itself."<sup>21</sup> Unlike Deleuze's time-image, for Hansen,

the digital image explodes the frame, extending the image without limit not only in every spatial dimension but into a time freed from its presentation as variant series of (virtual) images: into time itself as the constitutive force and source of the future, the new.<sup>22</sup>

I am not concerned whether either formulation of the relation of the image to time is correct (as it happens, I think that anti-phenomenological approaches to images make a category mistake, because their redefinition of the image as such remains

phenomenological—hence Deleuze’s interest in framing is particularly ironic) so much as with the desire to see the digital as getting beyond division and beyond the temporality of the virtual preserved by Deleuze. Deleuze sees the virtual and actual image as the same, but he also writes that the image is constituted by a “circuit” between the actual and the virtual that functions as its “internal limit.”<sup>23</sup> Hansen’s formulation hopes to get beyond this internal limit to an undivided architecture: by insisting that the digital image “incorporates” the virtual within the actual as the limitless potential for the generation of other images from any part of itself, his formulation disavows the internal limit Deleuze assumes.<sup>24</sup>

The conception of the architecture of new media art as a non-dialectical and open is utopian, and its difference from traditional models of utopia as perfected places set apart from the world is essential to the promise much digital criticism sees in it.<sup>25</sup> In this essay, I compare the open-architecture model with Enlightenment models of utopia, from Sade to Freud, which it nominally opposes. These texts, utopian in their own ways, are representative of the Enlightenment tradition of self-affirming rational consciousness. They stage a rational self that is affirmed by returning to itself. Modern and digital art models are not in fact far apart, as we can see by reading utopian digital art by Casey Reas and work by Australian performance artist Stelarc. Both models produce a vision of a static and self-contained, even autotelic, self. What’s at issue, then, is not competing models of utopia, but the affirmation of Enlightenment ideas of mind and self in the new models, together with the disavowal of this affirmation. I ask both why some criticism thinks this way and why it might want to make such arguments.

### **Modern Utopias of the Limit: Foucault’s Sade, Derrida’s Freud**

Unlike preindustrial Western models of utopia as a condition, Sade’s utopia, as Roland Barthes explains, is a practice, a social construction: answering to its time, it expresses social hopefulness rather than something like Plato’s and eventually Thomas More’s idealism of natural harmony.<sup>26</sup> That distinction characterizes Sade as foundational to modernity, broadly conceived. The intellectual context of which he is emblematic and that he and Freud, among others, help to produce reaches into present digital theory. I read Sade and then Freud through Foucault and Derrida, respectively, because their readings critique the ideology of the humanist Enlightenment that Sade and Freud help establish in architectural and textual terms relevant to digital media today. Sade is also useful

here because he is invested in the seemingly contradictory features of totality and excess whose conjunction is important in digital utopianism,<sup>27</sup> while Freud's ambivalence about structures of return-to-self exposes the desire to keep that structure in the face of its untenability, a desire we can find in digital media studies.

Sade's hopeful philosophy, developed largely in the wake of the French Revolution, is also, as Foucault says, "the product of complex architectural laws."<sup>28</sup> Sade's formalism and his social message correspond: he advocates physical freedom, particularly the liberty to do violence with equality to fraternity, and so redefines the human body as a morally undifferentiated part of nature. The dissolution of physical and moral boundaries is one of the noted features of his utopianism. The imagination, he writes, must be free "to overstep those ultimate boundaries religion, decency, humanness, virtue, in a word, all our pretended obligations would like to prescribe to it."<sup>29</sup> "This scepter of Venus you have before your eyes," says Madame de Saint-Ange to Eugénie, her pupil in *Philosophy in the Bedroom*, in a moment of show-and-tell, "is the primary agent of love's pleasure: it is called the *member*: there is not a single part of the human body into which it cannot introduce itself."<sup>30</sup> To be a member of this society, one must be introduced everywhere. Saint-Ange explains the prevalence of mirrors as devices for extending the self: "By repeating our attitudes and postures in a thousand different ways, they infinitely multiply those same pleasures for the persons seated here upon this ottoman. Thus everything is visible, no part of the body can remain hidden: everything must be seen."<sup>31</sup> Dalia Judovitz suggests that this trope of unimpeded discovery parodies Enlightenment science, along with Sade's amusing technical scientism. Equally important is the use of mediation (the mirrors) to produce an unmediated or totally exposed world. The idea that one can make anything visible and "in a thousand different ways" available is a feature of Sade's tool-based utopianism.

Despite his implicit claim to expose everything, Sade does not offer to show us the wide world, but envisions a place that contains an internal infinity, the multiplication of possibilities, and the erasure of boundaries within that place. Sade looks for infinity within a border, not by breaking outside it. Barthes includes among Sade's organizing *topoi* his repeated use of the enclosure, the interchangeability of roles within the Sadean economy, and its perfection of rhetoric. The (bed)room is a symbolically autonomous space that enables the subject to interpret space as a projection of its own physicality.<sup>32</sup> The enclosure or "Sadian city," Barthes writes, "forms the basis of a social autarchy" and "permits the system"; it is a regulated, autonomous, and self-sufficient domain that

identifies happiness “with a completed and organized space.”<sup>33</sup> The interchangeability of parts is important because it shows that the structure that rules utopia is systemic and precedes individuation or traditional agential categories. The point is not who does what but what does whom: consistent with the instrumental model of mediated exploration, this is a structure where every whom can be a what and get done. As Barthes puts it, in Sade “everyone can be either sodomist or sodomized, agent and patient, subject and object, since pleasure is possible everywhere, with victims as well as masters.”<sup>34</sup> Sade’s rhetorical perfection, finally, performs a “metonymic violence” that “juxtaposes heterogeneous fragments belonging to spheres of language that are ordinarily kept separate by socio-moral taboo.”<sup>35</sup> His utopian move is to collapse spheres kept apart by convention and therefore to appeal to the potential of something better than social norms.

Sade’s unrestricted enclosures contrast with, but also anticipate, the boundless utopia in the digital that I consider here, so their structural homologies should not be ignored. First, the ontology they propose assumes both self-founded reiteration and exposure that in turn depend on the interchangeability, reversals, and systematicity Barthes identifies as *topoi* in Sade. One reason the digital has been said to be boundless is that it has been seen to have these properties—hence the claim in Hansen, for example, that the digital image is self-founded because it is abyssal, containing its own foundations in the capacity of virtuality to actualize itself. Second, there is an internal limit to boundlessness in Sade that can direct a reading of digital environments. I borrow the term *internal limit* from Foucault’s early essay on Sade, “Preface to Transgression”; in Foucault’s analysis, sexuality is the *human limit*: “not one which surrounds us as the basis of our isolation or individuality, but one which marks the limit within us and designates us as a limit.”<sup>36</sup> The *internal limit* is a rhetorical principle that generates or defines and continuously stages the self or the object.<sup>37</sup> By making digital art independent of the outside, the notion of the internal limit helps some digital theory argue for the self-sufficiency of digital objects. It may be useful to distinguish the internal limit from Derridean *différance*, particularly the difference within rather than between things, which is a feature of any identity and makes it different from itself. The internal limit is particular in each iteration to its object and helps constitute it as itself. Foucault argues that the act or process of transgression provides such an internal limit. In a move that presages his later work, he dismisses external opposition as the only useful architecture of limits. In abolishing external obstacles to desire, transgression creates a world without

resistance and without dialectics. The digital invokes an internal limit in the way Sadean utopia invokes transgression. “Transgression,” Foucault writes,

is not related to the limit as black to white, the prohibited to the lawful, the outside to the inside, or as the open area of a building to its enclosed spaces. Rather, their relationship takes the form of a spiral which no simple infraction can exhaust.

Transgression is neither violence in a divided world (in an ethical world) nor a victory over limits (in a dialectical or revolutionary world); and exactly for this reason, its role is to measure the excessive distance that it opens at the heart of the limit and to trace the flashing line that causes the limit to arise. Transgression contains nothing negative, but affirms limited being—affirms the limitlessness into which it leaps as it opens this zone to existence for the first time.<sup>38</sup>

Hence, the “language of the limit” transgresses itself, rather than some other reality, and so is “nondialectical.”<sup>39</sup> Sade’s language of transgression is “both object and instrument.”<sup>40</sup> So such transgression is *one* (rather than *the*) example of what is meant by internal limit; the concept of internal limit encompasses both Foucault’s loose notion of transgression as self-constitution through conceptual movement—one that does not actualize a preexisting self—and the more necessary if not always deterministic relation between a programming code and *its* actualization. Being both object and instrument is the supposed condition of the autotelic digital object when it is understood to include both the image produced and the code that helps produce it: it always *affirms* because it has no external object, in Hansen’s formulation. If it expresses something, it is a reflexive structural property of itself.<sup>41</sup>

Freud’s *fort/da* game, recounted in the second chapter of *Beyond the Pleasure Principle*, stands near the other end of modernity, at a moment when the utopian architecture of return-to-self and of self-as-return, which helped shore up the self, is defended against the growing suspicion that it does not really work. In the *fort/da* game, as Freud recounts, his grandson Ernst throws away a reel connected to a string and then pulls it back. He seems to say *fort* or “gone” when he throws it away, and *da* or “there” when he pulls it back. While the translator, James Strachey, inserts the English “there” in square brackets following the word “*da*” in Freud’s text, the word “*da*” also means “here,” so the ambiguity of the place and identity of the object is maintained in that word.<sup>42</sup> According to Freud, the reel represents Ernst’s mother, Freud’s daughter Sophia, who leaves the child, but it also represents the child himself; Ernst’s repetition of loss exceeds the mastery of the return and

suggests that there is something beyond the pleasure principle, the principle of mastery and recovery of the same. Freud speculates that that something is the death drive embodied in repetition.

According to Derrida, who reads this scene in "Coming into One's Own," Freud's sense of self is produced by a repeated rhetorical challenge from something that appears to be beyond it but is not.<sup>43</sup> The death drive, Derrida notes, is "an inner limit to the PP," a structuring device that enables it.<sup>44</sup> Derrida points out that Freud's interpretation of Ernst's behavior is a construction not based on the details he himself provides: Ernst makes vague sounds some of the time, for example, which Freud turns into words, and Freud himself says that Ernst usually just throws the reel away, so that it remains up to him to say that the return of the reel forms what he calls the completed game. Freud's interpretation, for Derrida, shores up his own role as the grandfather not just of Ernst but of the institution of psychoanalysis.<sup>45</sup> Although he claims to find a threat to sameness "beyond the pleasure principle," Freud fails repeatedly to demonstrate this threat. Instead, it is Freud to whom the future progeny return.

For Freud, according to Derrida's reading, the reel episode is utopian because it preserves the pleasure principle against death, and sameness against time and difference. For my purpose, it is utopian because it creates a structure that claims rhetorically to be self-sustaining and self-validating. It stages and promises a reflexive, self-authoring structure whose ability to repeat is a power of making present. "What's involved," says Derrida, "is . . . the self-presentation of re-presentation."<sup>46</sup> The episode makes the place of the same the place of foundation because the return of the spool creates a rhetorical origin for itself. Similarly, Freud's disciples validate his place as the grandfather of the discipline, creating a reflexive structure where they both precede and follow their origin. By exchanging roles with him, his descendants allow Freud to come into his own. This relation is figured, Derrida says, in the superpositioning of roles in Ernst's *fort/da* game, where the reel is the mother but also the child, because Sophie is literally Freud's child, so Ernst and Freud also occupy the same place structurally. We can "superpose what he [the grandfather] says that his grandson does earnestly on what he is doing himself in saying so, in writing *Beyond the Pleasure Principle*."<sup>47</sup> The formal structure of the episode becomes readable, according to Derrida, "since the objects of the *fort:da* can be substituted for one another so as to lay bare the substitutional structure itself."<sup>48</sup>

The internal limit, then, as Foucault and Derrida stage it in their readings of Sade and Freud, far from being an obstacle to

the modern idea of utopia, is necessary to its constitution—that is, necessary to the idea of an architectural utopia. Both for Sade and for Freud, as Foucault and Derrida read them, the internal limit is a movement across a boundary internal to a system that must be repeated in time in order to produce self-identity. Its concern is not with utopia but with the self, imagined as a coherent entity whose self-difference works in the service of producing and reproducing that coherence. Infinite difference in fact enforces a coherent (if not organic) identity responsible to itself and consistent with the self we know popularly as the unified self.

### Digital Utopias of the Limit: *Software Structures*

The structure of bounded space produced by an internal limit is part of contemporary thinking and helps determine the construction of recent digital art. My exemplary case study is *Software Structures*, a wonderful 2004 algorithmic art project created by Casey Reas together with Robert Hodgkin, William Ngan, and Jared Tarbell.<sup>49</sup> It is a computer-based algorithmic art form that has been developing over the last few years, which we can call *dynamic* or *emergent digital art*. This art continuously performs its own limit: it actualizes a set of programmed principles and is structured by them within the closed boundary of the work. Its limitedness cannot run out in a time frame its viewers experience, and shows how much variety and room there is within its limitation. The works in *Software Structures* articulate a dynamic relationship in the image between its perceived parts based on a more precise and technical version of the internal limit, but seeing them this way reframes the utopian rhetoric of digital art: this art does not tear down boundaries and eliminate difference but relies on and produces difference inside bounded space.

*Software Structures* was commissioned by the Whitney Museum and published on its website, <http://artport.whitney.org/commissions/softwarestructures>.<sup>50</sup> According to his own account, Reas generated twenty-six pieces of software from the mathematical properties of Sol LeWitt's drawings (see figure 1), focusing on different features of their structures:

After working with the LeWitt plans, I created three structures unique to software. These software structures are text descriptions outlining dynamic relations between elements. They develop in the vague domain of image and then mature in the more defined structures of natural language before any thought is given to a specific machine implementation.<sup>51</sup>

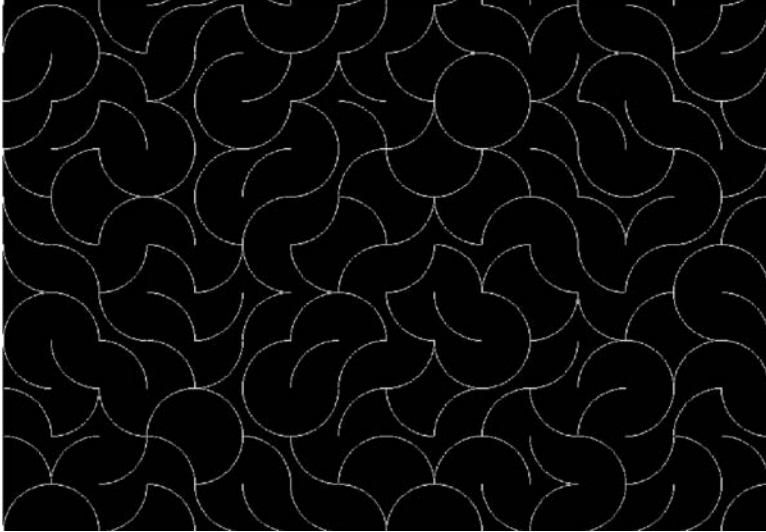


Figure 1. Sol LeWitt, *Wall Drawing #358* (2004–present), implemented by Casey Reas. [http://artport.whitney.org/commissions/softwarestructures/\\_358/index.html](http://artport.whitney.org/commissions/softwarestructures/_358/index.html).

In other words, Reas wrote software code based on an interpretation of elements in the work of Sol LeWitt and of their relations.<sup>52</sup> The software is then implemented so it produces a visual computer-based work.

Tarbell's work, a software application based on the principles set up by Reas, is cosmological, evoking stars and constellations in white against the black expanse of space. Slowly and continuously, undulating and generally circular chalk-white forms (and eventually also dark shadings) get written or inscribed sideways on the black background (figure 2). From the moment they begin to write and rewrite on/onto the space, they make it visible as space itself: the work is in part about the filling of space, for eventually, in principle, there would be only objects in this space, even when dark shadings compete with additional light inscriptions to overwrite the image on the screen (figure 3). This work is about *plenitude*, expressed as the idea that space as we know it is never empty, that if there is space there is also something in it. There is another way in which Tarbell's work evokes plenitude: as the notion that with infinite variation in production—the production of life or of variations of behavior, for example—any kind of object or being would be produced. This is the “principle of plenitude” of Spinoza, for whom “nothing less than the sum of all genuine possibles could be



Figure 2. Jared Tarbell, *Structure #003B* (2004–present), early in the implementation. The white figures develop horizontally across the screen like lines of text. Screen grab, [http://artport.whitney.org/commissions/softwarestructures/s3\\_jared\\_2/index.html](http://artport.whitney.org/commissions/softwarestructures/s3_jared_2/index.html).

the object of the divine will.”<sup>53</sup> *Software Structures* shares a version of this vision with Hieronymus Bosch, whose work it recalls—the star or constellation forms that unfold in its darkness even resemble Bosch’s asymmetrical monsters. Here, monstrosity is simply a function of permutation and endless potential, and so as natural a function as any other produced by/in plenitude. Any being may be imagined in space, and all space would be penetrated, ultimately, by the infinitely allowable permutations of beings suggested by this project. This is Sade’s idea of plenitude and of nature, too: there is no unnatural behavior—only further permutations within nature. As Sade writes, no part of the body is less or more natural than another, less or more clean than another, and any part could be introduced into any other part with an equal degree of nature. In

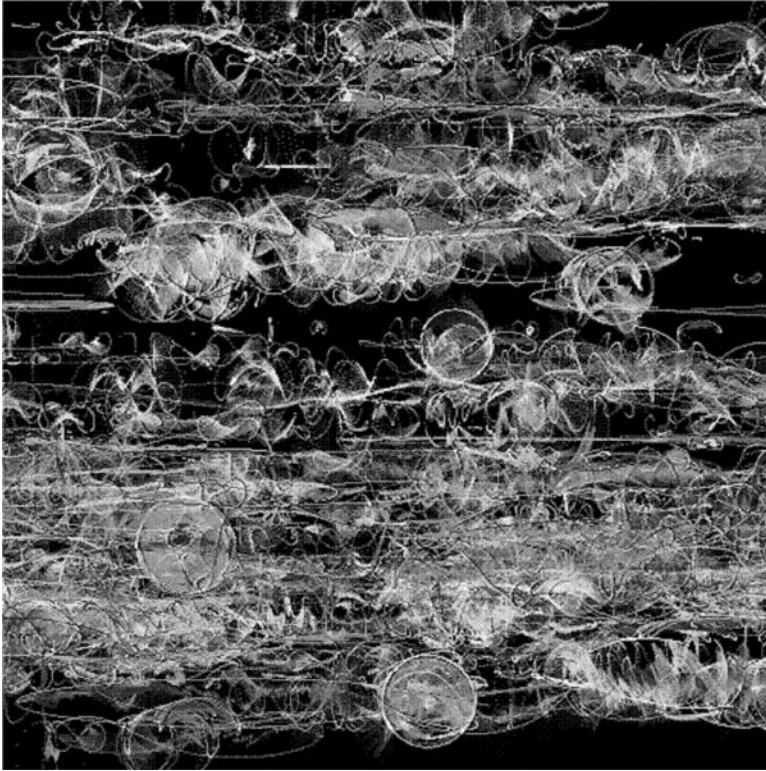


Figure 3. Jared Tarbell, the same work as in figure 2, later in the same implementation.

this way, Reas's and Tarbell's projects, like Sade's, erase the distinction between the natural and the unnatural (and so destabilize the categories *natural* and *unnatural*) in their understanding of material being in extended time, even as they reinforce the principle that variety relies on a limit internal to the art form.

William Ngan's software application of this same structure (the LeWitt structure provided by Reas) demonstrates a related feature of this project to use an internal limit in the service of utopian architecture. It not only shows that space and nature are variations of each other but also that organic and inorganic forms are connected. The work shows fuzzy filaments of unequal lengths radiating magnetically from central nodes, recalling crop circles perhaps but moving and shimmering and enlarging and reproducing, so as to cover, slowly and continuously, the entire space. They then continue to be produced and so impinge on the previously filled

space and produce more and more of these structures, which overwrite each other and the space of the work (figure 4). Watching the logic of this work repeat itself in variations shows how much room there is within a limit. Every variation is different, but the difference specific to the logic of the work, limited by the structure of the work, as well as limited externally by the space of the screen on which it is reproduced. Both of these examples, then, show an internal limit that allows for the unfolding of endless variations, of iterations of the objects produced in the works that always differ from one another and that produce that difference in producing and reproducing themselves over time; they also insist on the plentitude of space, that space is never empty—without in the process becoming territorialized place—but is always overwritten by new production.

Whereas in Freud's and Sade's utopias identity is produced through relations with other objects, here the differentiation between one and many objects is not tenable. The images on the screen are not discrete objects, least of all from the materialist point of view celebrated by Deleuze, where the world of matter registers the impact of "images."<sup>54</sup> Nonetheless, *Software Structures* follows the modern model of utopian architecture, not the open model sometimes proposed by new media theory. As part of its utopian work, following the Sade and Freud models, we can say that the work is *nondialectical*: it does not aim to exceed or go beyond or reject other objects in order to become something better. It develops only in the sense of continuing; the notion of, and motive for, improvement are absent. Like our modern utopias, these objects, seen together with the LeWitt drawings on which they are based, are founded on an abyssal relationship between the image and its code. There is a necessary relation between this figuration and the programs that express it, but it is not possible to speak of the *unity* of a work of art in the way one can attribute it to historical artworks like paintings and photographs. There is no image without the code, but the code is not in the image, nor is the code *of* the image, or extending it materially.<sup>55</sup> Reas's interpretation of LeWitt constrains its application to a kind of imaginative re-presentation. Once Reas derives from LeWitt a set of simple principles and implements them algorithmically, Reas's work is said to have an inner limit, a requirement to express dynamically rather than mimetically properties that structure it. And yet the work is an *emergent* system based on simple principles of relations and not on a fixed code that produces only one image or sequence of images. These works are not direct expressions of a logic that organizes LeWitt's

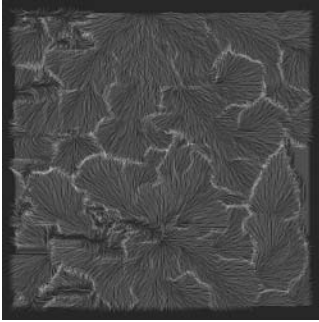


Figure 4. *Structure #003B* (2004–present), implemented by William Ngan. Screen grab, [http://artport.whitney.org/commissions/softwarestructures/s3\\_william\\_2/index.html](http://artport.whitney.org/commissions/softwarestructures/s3_william_2/index.html).

work, however simple, abstract, and mathematical LeWitt may be.<sup>56</sup> As Reas explains,

The concept of “emergence” refers to the generation of structures that are not specified or intentionally programmed. Instead of consciously designing the entire structure, simple programs may be written to define the interactions between elements. Structure emerges from the discreet [*sic*] movements of each organism as it modifies itself in relation to the environment. The structures generated through this process cannot be anticipated and evolves [*sic*] . . . through interacting with the software.<sup>57</sup>

So Reas’s work aims to state a principle for emergent algorithmic art: it would not work if it did not have an internal limit or generative principle.

*Software Structures* does not only thematize the abstract principles of digital art, expressed so well in its relation to conceptual and minimalist art; it also enacts the idea of an abyssal ontology of the digital artifact. It shows that the internal limit can be differential, infinite, and nonteleological, but like Sade’s and Freud’s utopias it does so in the service of the reaffirmation of its generative principle. It conjoins the dangerous materialism also found in Sade and Freud to the affirmation of identity through an internal limit. In this sense, it is a product of modernity. Because *Software Structures* is algorithmic and dynamic, it does not seem determined by the fixed relation between image and code that is generally assumed to characterize digital art, but that seeming difference only distracts us, as readers of digital artifacts, from seeing connections between it (and by extension less precise utopian structures that work by a similar logic) and more traditional digital objects like photographs (where there is a clear one-to-one relation between code and object). In fact, the ideology of identity produced in *Software Structures* is an element in the governing function of digital utopias, their ability to regulate and to order.

### I Touch Myself

What motivates the critical desire to deny limits often expressed or imagined in digital media, and why would one want a new, open utopia to replace the modern version that preserves an internal limit? The homologies between the two versions suggest that the open model internalizes the social architecture of modern utopia in order to retain its construction of thought as return-to-same while disavowing it. The open-model utopian formulation is not really about space: space stands in for mental space because the model's idea of the mind is spatial. Ken Hillis also makes this point but in a different register.<sup>58</sup> It also relies on internal limitation as a constitutive element while advocating infinite movement beyond itself. As I show more fully in this section, the two utopias (the modern and the digital) affirm a unified subjectivity, a model of mind that some digital theory disavows through its investment in open architecture. The modern model of Sade and Freud deploys its affirmation of the self against threats to the integrity of the organic self from materialism it itself recognizes; the dissolution of boundaries promoted by some digital theory, likewise, mobilizes traditional ideas of immediacy and presence in service of its construction of self-knowledge and self-presence.

An example of a digital utopia that offers self-presence through the abridgement of space is the digital work of performance artist Stelarc. Stelarc has tried to shock the public out of its complacency about the traditional self: he's hung himself from meat hooks, grafted an earlike structure on his arm, added a now-famous prosthetic "third arm," and has written about these projects.<sup>59</sup> As he explains, he has relied increasingly on computer-mediated staging of the body to challenge the unitary self and to promote the idea of an interactive, interfaced self. Bolter and Grusin describe his project as the putting-into-practice of Marshall McLuhan's idea that media extend the human senses.<sup>60</sup> But even a preliminary reading suggests that Stelarc's projects are in some ways self-contradictory and can be read as ironic meditations on the difficulties of their aims. *Prosthetic Head* (2003), for example, is a head shaped after Stelarc's; it is animated by a text-to-speech computer program that uses a database of expressions and can, in principle, react to speech by its interlocutor (its ability depends on available technology, but the principle is straightforward).<sup>61</sup> In a 2003–4 installation, the head was presented as a four-meter-high image projected on a screen that, with the aid of sensors, turned to talk with people who entered the room.<sup>62</sup> With increased technological sophistication, the head could think and act autonomously. Stelarc recognizes our

desire to speak with what seems to be an autonomous agent when we interact with computers. In a short essay about the work, "Prosthetic Head: Intelligence, Awareness and Agency," Stelarc articulates this instrumental interest and also suggests a more personal side to the project: the head duplicates him. Such head-agents can do things in our place:

In recent years I've had an increasing amount [*sic*] of PhD students requesting interviews to assist in their research. Now I can reply that although I'm too busy to answer them, it would be possible for them to interview my Head instead. A problem would arise when the Prosthetic head increases its database, becoming more informed and autonomous in its responses. The artist would then no longer be able to take full responsibility for what his Head says.<sup>63</sup>

Here, a project that begins with the desire to undo traditional assumptions about the self ends up affirming it both by representing and by duplicating it. As Julie Clarke writes, despite Stelarc's emphasis on the interface between bodies,

it is the identity of the *Prosthetic Head*, its massive size, and its likeness to the artist that is [*sic*] paramount in this project. In other words, it IS the face that becomes synonymous with identity. The skin of the *Prosthetic Head*, constructed from digital images of Stelarc' [*sic*] own head, overlaid onto the polygon scaffold becomes not just a *Prosthetic Head*, but Stelarc's prosthetic head, for it is an animated, digital self-portrait of the artist.<sup>64</sup>

This representationalism does not negate Stelarc's argument, which after all asks what a representation is to begin with, but instead of showing a new way to think the self, Stelarc finds himself reeled back to representation and to personality. The tension between the desire to show the artificiality of body-limit conventions and the need for traditional self-representation obtains in other of his works that have similar aims, such as *Blender* (2005), which literally blends fat taken from Stelarc's body together with liquid from his collaborator, Nina Sellars, in a large glass container, and *Creation* (2005), which merges and superimposes images of God, Eve, and an angel on a computer-generated armature. These works invoke the rhetoric of merging bodies, of the effacement of bodily boundaries, but reinforce our attachment to the received body as the locus of meaningful discussion of ourselves.

We can understand these seemingly contradictory impulses by reading them in the context of an Enlightenment argument about self-presence, where proximity, obtained through the dissolution of boundaries, is needed for self-knowledge. As in the earlier discussion of division in digital images, I am not concerned with the

legitimacy of this claim, but with its continuing importance in contemporary thought. Claudia Benthien makes this connection in her reading of Stelarc in her work on skin and sensation, which also amplifies the social dimension and motive of the utopian impulse in the field of digital performance.<sup>65</sup> In *An Essay towards a New Theory of Vision* (1709), George Berkeley argues that “it is only the sense of touch that teaches the eye to see,” and that “seeing in perspective necessarily derives from original experiences of touch.” As Benthien explains, “While the visual only shows representations and can therefore be deceived, the sense of touch alone confirms the materiality of things and thus their real existence.”<sup>66</sup> In a thought experiment in *Traité des sensations* (1754), Condillac endows a statue with the senses one by one, but the statue can only say “I” once it has the sense of touch.<sup>67</sup> Touching other objects, it does not find itself, and so knows these objects are *other*; when it touches itself with both hands, *then*, writes Condillac, “the same sentient being will reply from one to the other: this is myself, this is still myself.”<sup>68</sup> The self-sufficient reflexivity of knowledge for Condillac deserves notice.<sup>69</sup> But one reason for privileging touch in the model of knowledge, according to Benthien, who invokes Friedrich Schiller to make this point, is that unlike the other senses, the skin “cannot turn away or close itself against stimuli. Moreover, its sensory organs are not located exclusively on the head . . . but are spread out over the surface of the entire body.”<sup>70</sup> For Schiller, we are “subject” to this touch, its “involuntariness and direct physicality.”<sup>71</sup>

Touching need not be voluntary or intentional to produce an affirmation of the identity of the self, the kind Stelarc would like to transcend. Self-certainty is affirmed not despite but because of this apparent contradiction. We can see this by contrasting Stanislaw Lem’s formulation of physical self-recognition in *Solaris* with Deleuze’s take on the role of touch in *Cinema II*. The planet of Solaris is, in Lem’s novel, a place where mind and matter interconnect so that ideas become real (people the characters remember strongly come to life on the planet) and physical matter forms along mental lines (cities and gardens form spontaneously in the planet’s ocean). In the book, involuntary self-creation by contact produces knowledge and is subordinated to the production of consciousness. The narrator Kelvin dreams that he is imprisoned by matter; in that confined materiality he is created and creates by touch:

Inert, locked in the alien matter that encloses me, I can neither retreat nor turn away, and still I am being touched, my prison is being probed,

and I feel this contact like a hand, and the hand recreates me. Until now, I thought I saw, but had no eyes: now I have eyes! . . . I exist. And recreated, I in my turn create.<sup>72</sup>

Kelvin's own fantasies come to life in the story because he is connected to and touched by matter in a structure in which involuntariness and reflexivity complement each other. Deleuze wants to get away from phenomenological categories but ends up with a similar role for touching. He formalizes the role of the hand as part of an argument for a "pure sensory image" that eludes linguistic constructions: "[I]t is the tactile which can constitute a pure sensory image, on condition that the hand relinquishes its prehensile and motor functions to content itself with a pure touching."<sup>73</sup> The condition of manual success is that the hand not itself be regimented as part of language but that it should have a merely physical relation to what it touches. The hand can "double its prehensile function (of object) by a connective function (of space)."<sup>74</sup> And yet while touching can appear to be merely physical, it affirms a traditional affective identity:

The hand, then, takes on a role in the image which goes infinitely beyond the sensory-motor demands of the action, which takes the place of the face itself for the purpose of affects, and which, in the area of perception, becomes the mode of construction of a space which is adequate to the decisions of the spirit.<sup>75</sup>

For Deleuze in this passage, the reflexive model of the abridgement of space by the hand institutes a sensation of the self, though for Deleuze affect does not require a traditional subject, but the larger point is that because touching requires an abridgement of space, it produces identity between the hand and what it touches. It makes unity necessary—it expresses a model where everything is physical. This helps explain its privileged position in Stelarc's utopian effort to erase boundaries, an effort whose version of Deleuzian materiality is to posit a world of networked codes rather than of independent agents in space. As Hansen writes about vision,

Doesn't the all-too-frequent contemporary predicament of "not being able to believe your eyes" in fact compel us to find other ways to ground belief, ways that reactivate the very bodily modalities—tactility, affectivity, proprioception—from which images acquire their force and their "reality" in the first place?<sup>76</sup>

Both the modern utopia of transgression of internal limits and the digital-criticism utopia that demands complete opening of space

find in physical sensation or contact with the self the place in which to experience both loss of self-control and certainty about self-identity.<sup>77</sup>

The mechanism whereby distancing produces proximity when the self is touched by itself is the paradigm of *teletactility*, a version of cyberintimacy employed by Stelarc, among others. In mechanical engineering, there has long been a discussion (“for the past forty years”) about relating different senses through digital media.<sup>78</sup> Vibration or acoustic feedback is used, for example, to aid visually impaired people to navigate. An industrial application of the mediation of distance through touch is a “vibrotactile system designed for the harsh condition of undersea hydraulic connector mating” that helps operators working by remote connect pipes underwater.<sup>79</sup> Stelarc also wishes for a form of interpersonal transparency, the dissolution of boundaries between people. In Stelarc’s version of long distance touching, as Benthien recounts,

[a] system of electronic muscle stimulation induces the body to touch itself and then to feel this touch. When [Internet theorist] Sandy Stone asked him about the “cyber-sexual implications,” Stelarc . . . responded by saying: “If I was in Melbourne and Sandy was in NY, touching my chest would prompt her to caress her breast. Someone observing her would see it as an act of self-gratification. . . . she would know though that her hand was remotely and perhaps even divinely guided! Given tactile and force-feedback, I would feel my touch via another person from another place as a secondary and additional sensation. Or, by feeling my chest I can also feel her breast. An intimacy through interface, an intimacy without proximity.”<sup>80</sup>

Instead of feeling a loss of centered subjectivity, Stelarc imagines a godlike ability to control another being, and that he has gained his self in the process, a gain expressed here in a note of triumph. Like Freud’s grandson, he can reel in another in the service of his own identity. Stelarc’s form of simultaneity is explicitly utopian:

([T]heoretically) one senses both oneself as well as the stimulus-receiving surface of the other body. This feeling-the-feeling-of-the-other-person is indeed an unheard-of utopianism: indeed, for centuries the tragedy of all lovers has been precisely that one’s own sensations and feelings cannot be shared or conveyed.<sup>81</sup>

A more androcentric example, and more relevant to Stelarc’s work, is the Hug Shirt by Cutecircuit, described as a network of two Bluetooth-equipped shirts “coupled with Java-enabled cell phones,” that let users embrace virtually: “Don the shirt, give yourself a squeeze, and removable sensors (tucked into pockets) beam pressure and temperature data to your handset.” The other shirt then

gets that hug via the phone. The shirts were displayed at NextFest in New York City in 2006.<sup>82</sup> Stelarc also sees teletactility as a utopian project: skin no longer separates self from world but now is made “permeable by technology.”<sup>83</sup> One can tear down the wall, as Ronald Reagan requested, in order to extend the self’s global reach, confirming its self-realization, as in Taylor’s Hegelian telos, as the goal of history. It is an imperialist self that sees the world as itself and itself in the world (as Kurtz says, “my ivory,” “my intended”): Stelarc acts for another, and sees another’s acts as his own (“my touch,” “my chest”). As Benthien explains,

[T]he utopian designs of cyberspace thus seek once again to attain the phantasmal, primary-narcissistic nonseparation: the nearly total simultaneity of performed and experienced touch allows the distinction between the two to become blurred and in so doing abolishes the boundaries of the body.<sup>84</sup>

The abolition of the bounded self reinforces, rather than denies, primary narcissism. Relating these two arguments about sensation—the first, via Condillac and Schiller, that touching oneself leads to knowledge of the self; the second, via Stelarc, that touching oneself leads to expanded or fuller self-presence—we see that a vision of digital simultaneity can combine the utopian affirmation of the same with a vision of the free dissolution of boundaries. On this reading, both ideas of utopia are symptomatic of an effort to think the self along the lines Benthien helps articulate: the dissolution of the same-different boundary supposed in some digital environments is built into a model where the self is also consolidated as self-present by touch.

By proposing that the self is affirmed by such dissolution, utopian-space algorithmic works such as Reas’s and Stelarc’s, different as they are, reveal an additional programmatic desire, that the mind remain the same through transformation, affirm itself in the return to itself. The self-mind is static, re-producing itself when it seems to be revolutionized. Such digital utopia manages to preserve the self-contained self-production that characterizes the mind in the modern model. We can appreciate this art for its beauty and provocativeness, but it also requires critique.<sup>85</sup> There is a positive value to thinking critically, as well as enthusiastically, about this field in particular, because the new-media gold rush—the desire to shift critical paradigms—has staked some extraordinary claims. Sometimes the desire to understand the digital paradigm as revising notions of the human, culture, and society makes us reiterate the sheer fact of the medium itself as though it already constitutes a new world. Such criticism sees a collapse of virtuality and actuality,

self and other, while retaining the benefits of self-consciousness and self-presence. But so far, at least, utopian-space digital art has been conservative, not revolutionary. There are ways in which digital media continue and are in critical conversation with cultural logics and tropological systems that characterize modernity more broadly, as I argue here. The field of digital media needs to rethink the conflation of psyche and social space that characterizes so much thought (“since Plato”), and that modern utopias from Sade to Reas express in the wish that the mind perpetuate itself anew, guided by the extension and transgression of its limit, and so finally come into its own. This conflation is a metaphysical evasion at odds with the critical potential of the materiality and pragmatics of new media.

### Notes

<sup>1</sup> In Orit Halpern’s summary, “cybernetics aspired to an elimination of difference in the name of perfect communication, a perfection of transmission that would obliterate the separation between the archive and the interface” (“Dreams for Our Perceptual Present: Temporality, Storage, and Interactivity in Cybernetics,” *Configurations* 13, no. 2 [2007]: 283–319, quotation on 315).

<sup>2</sup> Jay David Bolter, “Theory and Practice in New Media Studies,” in *Digital Media Revisited: Theoretical and Conceptual Innovations in Digital Domains*, ed. Gunnar Liestøl, Andrew Morrison, and Terje Rasmussen (Cambridge, MA: MIT Press, 2004), 15–33, quotation on 23.

<sup>3</sup> Ken Hillis, *Digital Sensations: Space, Identity, and Embodiment in Virtual Reality* (Minneapolis: University of Minnesota Press, 1999), 182.

<sup>4</sup> Richard A. Lanham, *The Economics of Attention: Style and Substance in the Age of Information* (Chicago: University of Chicago Press, 2006), 135.

<sup>5</sup> Rita Raley, “eEmpires,” *Cultural Critique* 57 (Spring 2004): 111–50, quotation on 121.

<sup>6</sup> Alan Liu, *The Laws of Cool: Knowledge Work and the Culture of Information* (Chicago: University of Chicago Press, 2004), 42; see also 68–69.

<sup>7</sup> Miwon Kwon, quoted in Douglas Garrofalo, *Between the Museum and the City* (Chicago: Museum of Contemporary Art and University of Illinois Press, 2003), 24–25.

<sup>8</sup> Jennifer González “The Face and the Public: Race, Secrecy, and Digital Art Practice,” *Camera Obscura* 70, vol. 24, no. 1 (2009): 37–65, quotation on 37.

<sup>9</sup> McKenzie Wark, *A Hacker Manifesto* (Cambridge, MA: Harvard University Press, 2004), secs. 371, 323, 331, 332.

<sup>10</sup> McKenzie Wark, “Atopia on Vice City,” *GAM3R 7H30RY Version 1.1*, 102, launched 22 May 2006, [www.futureofthebook.org/gamtheory/](http://www.futureofthebook.org/gamtheory/), quotation at [www.futureofthebook.org/gamtheory/?cat=5](http://www.futureofthebook.org/gamtheory/?cat=5).

<sup>11</sup> Katherine N. Hayles, "Simulating Narratives: What Virtual Creatures Can Teach Us," *Critical Inquiry* 26, no. 1 (1999): 1–26; see 25–26.

<sup>12</sup> Mark Taylor, quoted in Peter Krapp, *Déjà Vu: Aberrations of Cultural Memory*, Electronic Mediations series (Minneapolis: University of Minnesota Press, 2004), 123.

<sup>13</sup> Alan Golding, "Language Writing, Digital Poetics, and Transitional Materialities," in *New Media Poetics: Contexts, Technotexts, and Theories*, ed. Adalaide Morris and Thomas Swiss, Leonardo Books series (Cambridge, MA: MIT Press, 2006), 249–84, quotations on 250–54.

<sup>14</sup> Lev Manovich, quoted in Mark B. N. Hansen, *New Philosophy for New Media* (Cambridge, MA: MIT Press, 2004), 10; see also 47, 109.

<sup>15</sup> See Hansen's argument for embodiment in *ibid.*, 146, 229.

<sup>16</sup> Mark B. N. Hansen, "Wearable Space," *Configurations* 10, no. 2 (2002): 321–70, quotation on 32.

<sup>17</sup> Gilles Deleuze, *Cinema 2: The Time-Image*, trans. Hugh Tomlinson and Robert Galeta (Minneapolis: University of Minnesota Press, 1989), 81.

<sup>18</sup> *Ibid.*, 79–80.

<sup>19</sup> Mark B. N. Hansen, "Cinema Beyond Cybernetics, or How to Frame the Digital Image," *Configurations* 10, no. 1 (2002): 51–90, quotation on 54. And see Deleuze, *Cinema 2*, 70.

<sup>20</sup> Deleuze, *Cinema 2*, 79.

<sup>21</sup> Hansen, "Cinema Beyond Cybernetics," 54.

<sup>22</sup> *Ibid.*, 56.

<sup>23</sup> *Ibid.*, 68, 69.

<sup>24</sup> Mark B. N. Hansen, "Digitizing the Racialized Body, or The Politics of Universal Address," *SubStance* 33, no. 2 (2004): 107–33. "The internet," as Hansen writes, "completes the positive movement beyond the spectacle and the trap of identity bound up with its (empty) promise." It "suspends the very force of the image, of capital's 'becoming image,' which forms the precondition for a reinvestment of the body *outside* the image" (110). The digital image helps consume the traditional image that traps the body under scopic regimes (capitalism, in this last example) and liberates the object or new body from them to produce a utopian singularity.

<sup>25</sup> Open architecture is characteristic in Thomas More's sixteenth-century city-state Utopia (he coined the term), where there are "no hiding places": citizens "live in the full view of all" and "are at home everywhere" (Thomas More, *Utopia*, ed. George M. Logan and Robert M. Adams [Cambridge: Cambridge University Press, 2002], 59, 58). In George Kateb's summary, modern utopians like Rousseau, More, and William Morris have in common the definition of *utopia* as the condition where "between appetite and satisfaction, between precept and inclination, between requirement and performance, there fell no shadow" (George Kateb, *Utopia and Its Enemies* [New York: Schocken Books, 1972], 9).

<sup>26</sup> Dalia Judovitz, "'Sex,' or, the Misfortunes of Literature," in *Sade and the Narrative of Transgression*, ed. David B. Allison, Mark S. Roberts, and Allen S. Weiss, Cambridge Studies in French series (Cambridge: Cambridge University Press, 1995), 171–98, quotation on 198.

<sup>27</sup> Marcel Hénaff, "The Encyclopedia of Excess," trans. Allen S. Weiss, in Allison et al., *Sade and the Narrative* (see note 26), 142–70, quotation on 143.

<sup>28</sup> Michel Foucault, "A Preface to Transgression," in *Language, Counter-memory, Practice: Selected Essays and Interviews*, trans. Donald F. Bouchard and Sherry Simon, ed. Donald F. Bouchard (Ithaca, NY: Cornell University Press, 1977), 31–52, quotation on 39.

<sup>29</sup> Marquis de Sade, *Philosophy in the Bedroom*, in *The Complete Justine: "Philosophy in the Bedroom" and Other Writings*, trans. Richard Seaver and Austryn Wainhouse (New York: Grove Press, 1965), 177–367, quotation on 234.

<sup>30</sup> *Ibid.*, 200.

<sup>31</sup> *Ibid.*, 203.

<sup>32</sup> Roland Barthes, *Comment vivre ensemble: Cours et séminaires au Collège de France*, ed. Claude Coste (Paris: Éditions du Seuil, 2002), 85, 88.

<sup>33</sup> Roland Barthes, *Sade, Fourier, Loyola*, trans. Richard Miller (Berkeley: University of California Press, 1989), 17.

<sup>34</sup> *Ibid.*, 30–31.

<sup>35</sup> *Ibid.*, 33–34.

<sup>36</sup> Foucault, "Preface to Transgression," 30.

<sup>37</sup> Foucault explains this concept similarly in "The Prose of Actaeon," where he imagines a nondialectical "endless internal movement" between two terms whose identity is affirmed in the relation (in *Essential Works of Foucault, 1954–1984*, vol. 2: *Aesthetics, Method, and Epistemology*, ed. James D. Faubion, trans. Robert Hurley and others [New York: New Press, 1998], 123–35). See also Gilles Deleuze, *Cinema 1: The Movement-Image*, trans. Hugh Tomlinson and Barbara Habberjam (Minneapolis: University of Minnesota Press, 1986), 13.

<sup>38</sup> Foucault, "Preface to Transgression," 35.

<sup>39</sup> *Ibid.*, 44. Again the connection with the formulation in "The Prose of Actaeon" is clear; in that essay Foucault writes that Pierre Klossowski's language "projects back over what it has just said in the helix of a new narrative" (134).

<sup>40</sup> Foucault, "Preface to Transgression," 50.

<sup>41</sup> There is a difference between a digital image and a code for producing it, even if both can be archived digitally. However, I am concerned here not with debates on the nature of the digital image but with the rhetorical claims for utopian space made on behalf of digital objects.

<sup>42</sup> Sigmund Freud, *Beyond the Pleasure Principle*, in *The Standard Edition of the Complete Psychological Works of Sigmund Freud*, vol. 18: "Beyond the Pleasure Principle," "Group Psychology," and Other Works, trans. James Strachey, 24 vols. (London: Hogarth Press, 1955), 1–64, quoted on 15. I thank Carey Mickalites for suggesting this point.

<sup>43</sup> Jacques Derrida also reads the episode in *The Post Card: From Socrates to Freud and Beyond* (1987), and see his related analysis of the return to self of the gift in his *Given Time: I. Counterfeit Money*, trans. Peggy Kamuf (Chicago: University of Chicago Press, 1992), 11.

<sup>44</sup> Jacques Derrida, "Coming into One's Own," trans. James Hulbert, in *Psychoanalysis and the Question of the Text: Selected Papers from the English Institute, 1976–77*,

ed. Geoffrey H. Hartman (Baltimore, MD: Johns Hopkins University Press, 1978), 114–48, quotation on 119.

<sup>45</sup> Ibid., 119.

<sup>46</sup> Ibid., 132.

<sup>47</sup> Ibid., 118.

<sup>48</sup> Ibid., 134.

<sup>49</sup> Casey Reas, *Software Structures*, Whitney Museum Artport, New York City, <http://artport.whitney.org/commissions/softwarestructures>.

<sup>50</sup> Casey Reas's description of the digital is useful here:

I use a very simple definition for “digital image.” It’s an image comprised of a series of numbers corresponding to colors. Unlike photography with chemicals, digital images have discrete borders and distinct color elements. Furthermore, I think a digital image can only exist within a computer, meaning that when it is printed, it’s no longer digital. Digital images are always seen as elements of light on a screen or projected on a surface. A digital image is a wonderful set of data which can be represented in myriad ways rather than its intended order. (“C. E. B. Reas Answers Tori Tan’s Questions for *XFUNS magazine* #13,” <http://reas.com/texts/xfuns.html>)

<sup>51</sup> Ibid.

<sup>52</sup> Sol LeWitt’s work is considered a locus classicus for algorithmic art, which uses logical procedures to generate artifacts—hence it’s a logical starting point for Reas’s exemplary work. See Peter Anders, *Envisioning Cyberspace: Designing 3D Electronic Spaces* (New York: McGraw-Hill, 1998).

<sup>53</sup> Arthur O. Lovejoy, *The Great Chain of Being: A Study of the History of an Idea* (1936; repr., New York: Harper & Row, 1960), 155, 74.

<sup>54</sup> Deleuze, *Cinema I*, 63 and 81.

<sup>55</sup> See John Cayley, “Time Code Language: New Media Poetics and Programmed Signification,” in *New Media Poetics: Contexts, Technotexts, and Theories*, ed. Adalaide Morris and Thomas Swiss, Leonardo Books series (Cambridge, MA: MIT Press, 2006), 307–33, quotations on 313, 327.

<sup>56</sup> Programs like Basic or Java do not program hardware directly; they are high-order computer programs written in a human syntax based on rules or a semantic structure. These programs direct the assembly language that runs the computer. The assembly language is itself translated to the machine language—the “ones and zeroes”—that operates the microprocessor specific to that computer system. See Casey Reas, “1101 1110 1100 0000 1101 1110,” (August 2003), in *Creative Code: Aesthetics + Computation*, ed. John Maeda (London: Thames & Hudson, 2004); essay available at <http://reas.com/texts>.

<sup>57</sup> Casey Reas says, “My understanding of emergence was informed by the publications of scientists and journalists including John Holland, Mitchell Resnick, and Kevin Kelly” (“C. E. B. Reas Answers”).

<sup>58</sup> Hillis, *Digital Sensations*, 195.

<sup>59</sup> Stelarc, *Extra Ear: Ear on Arm*, 2006–7. Related photos are available at [www.artslant.com/sfe/works/show/84463](http://www.artslant.com/sfe/works/show/84463) and [www.videodoc.ncca-kaliningrad.ru/](http://www.videodoc.ncca-kaliningrad.ru/)

participants/ii-limits-of-modeling/stelarc-australia/. A related video is at [www.meetmedia.com/watch/30790612](http://www.meetmedia.com/watch/30790612). Stelarc's projects are listed at [www.stelarc.va.com.au/documents/Stelarc-2010-1990.pdf](http://www.stelarc.va.com.au/documents/Stelarc-2010-1990.pdf).

<sup>60</sup> Jay David Bolter and Richard Grusin, *Remediation: Understanding New Media* (Cambridge, MA: MIT Press, 1999), 239–40.

<sup>61</sup> Mark Hansen wisely leaves Stelarc out of his relevant discussion of affect-eliciting heads and faces in “Affect as Interface: Confronting the ‘Digital Facial Image’” (chap. 4 in *New Philosophy for New Media* [see note 14], 127–60). Hansen sees the “digital facial image” (129) as providing “an interface between the domain of information (the digital) and embodied human experience” (134), though we note that one interacts with the digital domain, rather than with its information, only to the extent that the medium is the message—and then the subject matter (heads, faces) and the affect it produces are bracketed out by the premise of this claim.

<sup>62</sup> Stelarc, *Prosthetic Head*, 2003–4. See also note 59.

<sup>63</sup> Stelarc, “Prosthetic Head: Intelligence, Awareness and Agency,” *CTheory*, 19 October 2005, [www.ctheory.net/articles.aspx?id=490](http://www.ctheory.net/articles.aspx?id=490). See also the related note 59 and [www.neme.org/main/252/prosthetic-head](http://www.neme.org/main/252/prosthetic-head).

<sup>64</sup> Julie Clarke, “Stelarc’s Prosthetic Head,” *CTheory*, 19 October 2005, [www.ctheory.net/articles.aspx?id=491](http://www.ctheory.net/articles.aspx?id=491).

<sup>65</sup> On Stelarc’s interest in electronic distance manipulation of the body in the context of early experiments in electricity and the body, see Arthur Elsenaar and Remko Scha, “Electric Body Manipulation as Performance Art: A Historical Perspective,” *Leonardo Music Journal* 12 (2002): 17–28, 24–25.

<sup>66</sup> Claudia Benthien, *Skin: On the Cultural Border between Self and the World*, trans. Thomas Dunlap, European Perspectives: A Series in Social Thought and Cultural Criticism (New York: Columbia University Press, 2002), 195.

<sup>67</sup> “Only when the statue places its hands on itself is it able to finally discover its body as corporeal and spatial,” says Benthien (*ibid.*, 197).

<sup>68</sup> Condillac, quoted in *ibid.*, 197.

<sup>69</sup> According to the Divinyls: “I don’t want anybody else / When I think about you / I touch myself” (“I Touch Myself,” *diVINYLS* [London: Virgin Records, 1991]). A 2004 exhibition in the New York Academy of Art focused on contemporary self-touch, showing among others the digital video *Making Out with Myself* (1997), by Sue DeBeer, and the video *Now* (1973) by Lynda Benglis, in which the artist kisses herself in “a caricature of the artist’s imaginary autonomy” (David Humphreys, “When I Think about You, I Touch Myself,” in *When I Think about You, I Touch Myself* [New York: New York Academy of Art, 2004], 4–25).

<sup>70</sup> Schiller, quoted in Benthien, *Skin*, 197–98.

<sup>71</sup> *Ibid.*, 198.

<sup>72</sup> Stanislaw Lem, *Solaris*, trans. Joanna Kilmartin and Steve Cox (New York: Berkley, 1971), 187.

<sup>73</sup> Deleuze, *Cinema 2*, 12.

<sup>74</sup> *Ibid.*, 13.

<sup>75</sup> *Ibid.*, 12.

<sup>76</sup> Mark B. N. Hansen, "Seeing with the Body: The Digital Image in Postphotography," *Diacritics* 31, no. 4 (2001): 54–82, quotation on 64. Also, see his discussion of touching in *Bodies in Code: Interfaces with Digital Media* (New York: Routledge, 2006), 54–57.

<sup>77</sup> Recent neuroscience research is showing that when we see a representation of ourselves, for example, a rubber hand, that is stimulated simultaneously in the same way as we are (in this case, the subject's hidden real hand), we can confuse our body with that of the representation. Subjects thought a rubber hand was their own in this experiment (Matthew Botvinick, "Probing the Neural Basis of Body Ownership," *Science* 305, no. 5685 [2004]: 782–83).

<sup>78</sup> Thomas Debus, Theresia Becker, Pierre Dupont, Tae-Jeong Jang, and Robert Howe, "Multichannel Vibrotactile Display for Sensory Substitution during Teleoperation," in *Proceedings of the SPIE*, vol. 4570: *2001 SPIE International Symposium on Intelligent Systems and Advanced Manufacturing*, Newton, MA, 28–31 October (Newton, MA: SPIE, 2001), 2. [http://robotics.bu.edu/dupont/publications/01\\_SPIE\\_VBdisplay.pdf](http://robotics.bu.edu/dupont/publications/01_SPIE_VBdisplay.pdf).

<sup>79</sup> Ibid.

<sup>80</sup> Benthien, *Skin*, 227.

<sup>81</sup> Stelarc, quoted in Benthien, *Skin*, 229.

<sup>82</sup> "NextFest," *Wired*, September 2006, 127–66. The exhibition was sponsored by the magazine *Wired* and held at the Javits Center, New York City, 29 September–1 October 2006. On teledildonics, see also Thomas Foster, *The Souls of Cyberfolk: Posthumanism as Vernacular Theory*, Electronic Mediations series (Minneapolis: Minnesota University Press, 2005), esp. 86–90.

<sup>83</sup> Stelarc, quoted in Benthien, *Skin*, 229.

<sup>84</sup> Ibid. 229.

<sup>85</sup> It is worth noting in this context Theodor Adorno's charge against psychoanalysis that it turns thought or speculation into an object in order to resist change (*Minima Moralia: Reflections from Damaged Life*, trans. E. F. N. Jephcott [New York: Verso, 1978], 69). Instead, taking Freud's investment in difference more seriously, we can say that the critical construction of digital utopia resists differential psychology in favor of nonspeculative models.