

**CONSTRUCTING AUTOPOIESIS:  
THE ARCHITECTURAL BODY IN LIGHT OF CONTEMPORARY COGNITIVE SCIENCE**

**“Constructing life”/constructing metaphors**

*We wanted it because it signaled the connection between what we do and work being done in the fields of self-organization, autopoiesis, artificial life and consciousness studies.*

(Arakawa and Gins, *Architectural Body*, “Preface” n. pag.)

When crossing disciplinary domains, one always crashes head-first into the problem of metaphor: how can you connect ideas from distinct intellectual fields by means of a device analogous to what mathematicians recognize as an equal sign or a congruency sign?<sup>1</sup> The problem intensifies when both domains have to buy into the term employed.<sup>2</sup> Since theorizers about metaphor now understand that a metaphor has no absolute stability, even with respect to its home discourse, one can question why bother: as Jean-Jacques Lecercle argues in this collection, Gilles Deleuze famously denies their existence. Given: 1) Their tacit or “conventional” status; 2) their drifting, gaseous irreducibility: Why bother to employ metaphors (or tropes generally), or even attempt to cross disciplines, if all that happens is to turn distinct orderly domains into a maze? Perhaps that is the point. When questions become unanswerable within a single domain, innovators seek analogous questions in foreign realms in order to resituate their lines of inquiry, and even to pursue several lines simultaneously, hoping, through juxtaposition, to find answers or more powerful questions in between, or beyond. Perhaps what we need are periplum meanderings from questions formerly situated on standard grids. Arakawa’s early visual works often involve a mazy juxtaposition of different cognitive and conceptual schema, as well as an immanent “blankness,” all competing for the aesthetic attention of the conventional art consumer. Metaphor and planes of interdisciplinary schema; foreground and background—navigation can become treacherous quickly.

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<sup>1</sup> Yet, the work of Brian Rotman reveals the rhetorical and semiotic nature of mathematical communication. (see works-cited list). Mathematics and metaphoricity are not as far apart as they once appeared

<sup>2</sup> See the famous collection outlining the problem over the stability of metaphor in scientific discourses, *Metaphor and Thought*, ed. Andrew Ortony. See also Bono; and Rosenberg “*Chess RHIZOME* and Phase Space,” for a more extended discussion of this point.

In the above quote from Arakawa and Gins, we seem to have terms that refer not just to one discipline but to four. Uh oh. We can simplify things by noting that these four terms are all relevant to one discipline, albeit the hybrid discipline of cognitive science—born of recent increasingly stable alliances amongst linguistics, philosophy of mind, neuroscience and artificial intelligence—which have processed, in parallel, a series of questions concerning the nature of mind (Varela, Thompson and Rosch 7). Now, I'm speaking to a construction of cognitive science that rejects an exclusively top-down model of cognitive functioning dominant until recently and exemplified by the strengths and weaknesses of symbolic manipulation by main-frame computers. This top-down model has had correlates in the organization of information and even of human beings so ancient that it seemed to its early advocates Von Neumann and others to have been somehow "natural." Yet the weaknesses of the model, including and yet not limited to the tendency to global catastrophic failure, required further theorizing, which in turn led to at least a partial rejection of the model.

Accompanying this rejection, we find an embrace of a model of cognitive functioning which, while recognizing top-down behavior (and its socio-cultural correlates), signals an investigation into bottom-up emergent properties. The term emergent properties refers to processes of self-organization with two related properties—distributed and enactive—which force the analysis of even single organisms as societies united through spontaneous cognitive activity. Whether talking analogically about connectionist computer architecture, the behavior of organic neural nets, aggregating natural and artificial life forms, or models of distributed "social" cognition, "mind," and its behavior, become understood not as that which controls the body, but as that which results spontaneously as embodied cognitive processes emerging locally, and then producing global effects (see Haugeland; Dyson; Holland; Edelman; Ramsey, Stich, and Rumerhart; Shostak; Prigogine and Stengers). For the human corpus, we refer to processes of cognition located in the senses, the nervous systems, muscles, endocrine system and the individual organs of the body. In particular, we may find analogical explorations of these issues in the philosophy of Gilles Deleuze, whose smooth and striated spaces of the *Body Without Organs* bears a strong resemblance to the distinction between bottom-up and top-down cognitive processes.

Notice that I imply that academic inquiry across the disciplines often works analogically, and that analogic thinking may have something to do with the methodology informing Arakawa and Gins's architectural and poetic practices. One need only to refer to the work of Douglas Hofstadter and his Fluid Analogies Research Group to recognize that analogy formation seems to lie at the heart of the struggle for dominance by these two competing models of cognition, even with respect to their simulation in computer architecture and software processes.

Arakawa and Gins refer to standard terms in cognitive science which are associated with the bottom-up hypothesis: *self-organization* (a description of emergence applicable to physics, chemistry, and biology as well as cognition), *autopoiesis* (a description of an emergent mechanism originally from biology), *artificial life* (an application of self-organization to the realm of non-organic, even virtual domains in computer science), and *consciousness studies* (noting that these other terms represent parallel investigations into the prime target of inquiry for the philosophy of mind—human consciousness!). Most relevant for a discussion of Arakawa and Gins, major figures within this new discipline of cognitive science point to an ethical dimen-

sion to this line of inquiry with respect to human socio-cultural institutions, and of relevance, to a hybridizing of the study of human cognition by reference to non-western epistemologies.

Some of these terms from *Architectural Body* refer explicitly to a specific “brand” associated with the Chilean biologists, cyberneticists and cognitive scientists, Humberto Maturana and Francisco Varela. The term *autopoesis* specifically refers to their work. We can go farther to say that Arakawa and Gins’s discourse seems initially to offer a series of easily understood analogues to the collaborations of Maturana and Varela and their later individual lines of inquiry. This raises the question: why this brand of cognitive science, rather than one seemingly more related to poetic and artistic production, with its roots in linguistics, such as the school of George Lakoff, Mark Johnson and Mark Turner. This “school” has greater familiarity, and has established ties to Arakawa and Gins since George Lakoff wrote an important essay on their work in the volume of their 1997 Guggenheim retrospective *Reversible Destiny: We Have Decided Not To Die*. This essay attempts to explain through an analysis of the limitations of the Lakoff, Johnson and Turner school of cognition and meaning-making, why exactly Arakawa and Gins’ analogical relations with the cognitive science of Maturana and Varela and the philosophy of mind of Gilles Deleuze offer a pair of conceptual/analogical landing sites that enables them to move beyond cognitive science and philosophy of mind to a profound reconfiguration of art and ethics.<sup>3</sup>

First, let’s take a stab at a simplistic, but at least temporarily useful series of analogy constructions between Maturana and Varela and Arakawa and Gins. We do this not to bring into question the significance and originality of Arakawa and Gins’s corpus, but to underscore the sophistication of their analogy-formations in their attempts to confront the nature of human cognition. The following comes from *Architectural Body*:

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<sup>3</sup> Lecercle notes the importance of *The Logic of Sense* in articulating the Peircean semiotics at work in Deleuze’s attempt to resituate the subject back into the mechanism of meaning. As he well knows, Deleuze’s interest in accounting in a rigorous way for subjectivity, extends back to his first volume on Hume, *Empiricism and Subjectivity: An Essay on Hume’s Theory of Human Nature*. See the Body Without Organs concept in Deleuze’s two volume collaboration with Guattari, *Anti-Oedipus* and *A Thousand Plateaus*, and my discussion of the BYO with respect to the cognitive science of Francisco Varela in “Portals in Duchamp and Pynchon.”

Term from Maturana and Varela	Term from Arakawa and Gins	Relevant Quotation	Anomaly or Hybrid-reference
Embodiment: Biological activity inherently involves cognition even at the level of the cells of the body.	Organism that Persons	We have adopted the admittedly clumsy term... because it portrays persons as being intermittent and transitory outcomes of coordinated forming (2)	They insist that the body “needs to be defined together with that within which it moves; peering at it from the other way around, the surroundings need to be defined together with the bodies moving with them.” (xx)
Autopoiesis: Self-making for an organism involving self-referential processes capable of evolution despite an operationally-closed relationship with its environment	Landing Sites: Perceptual/Imaging Dimensionalizing	Think of the part that judgements of dimension play in (blind) Dahlke’s surprisingly precise picturing of the polyomino puzzle... Dimensionalizing is conducted cross-modally, as are all the actions of a person. (21)	The account of the internal dialogue of schematizing processes accounting for and situating the organism that persons in relationship to “the outside” only addresses a small part of the autopoiesis hypothesis.
Structural Coupling: Occurs when autopoietic entities become linked together, as with a frog and a fly, or, in a more collaborative model, a rhizome or an aggregating slime-mold.	A tentative constructing towards a holding in place	In any case, there can be no doubt that, as great and as intimate as the human architectural heritage is, the architectural heritage of snails is as great and far more intimate. (27)	Here I find this resonates also with the animate-inanimate coupling reminiscent of the work of Bruno Latour, Edwin Hutchins and Peter Galison. They speak of the inanimate <i>agency</i> of tools in scientific practices, as well as current theorizing about human-machine prostheses, including Deleuze and Guattari among others. <sup>4</sup>
Consensual Domain: An ecology enacted through multiple and complex couplings	Architectural Surround	Everything begins for these organisms with a tentative constructing toward a holding in place. The environmental communal, which has everything to do with how an organism persons, can, when reworked in a concerted manner, lead to persons being able to supercede themselves. (47)	“Architectural Surround” resonates powerfully with current studies in ecological ethics. See Guattari, <i>Chaosmosis</i> , and Varela, <i>Ethical Know-How</i>

<sup>4</sup> For crucial works of Bruno Latour see works-cited list. See also Hutchins; Galison; Guattari.

Arakawa and Gins employ modalities of scale, as exemplified by the large size of Arakawa's early work and the panels of their *The Mechanism of Meaning* (1963-71), in order to confront the question of how the body couples with its environment. As I stated earlier, Arakawa's early paintings force into play a number of distinct cognitive and conceptual processes within the mind and body of the art consumer. He does so perhaps to induce a chiasm where these processes cancel each other out, and perhaps to induce a pre-conceptual cognitive response where control over cognitive and conceptual input becomes impossible and the charged but blank background of the painting mirrors the chiasmic field of awareness. We see *The Mechanism of Meaning* extending these strategies by engaging an even wider range of distinct cognitive and conceptual processes at a level of specificity quite astonishing, as F. L. Rush discusses in the Guggenheim retrospective volume, *Reversible Destiny: We Have Decided Not To Die* (42-53). Here we might have a motive at work of short-circuiting an even greater range of these cognitive and conceptual processes, where blankness becomes at least initially identified as a zone of cognitive and conceptual liberation, a site of neutrality. The blankness bears a strong resemblance with the "smooth space" of the BWO as that space intimates a "plane of immanence." But notice that even in *The Mechanism of Meaning*, we find Arakawa and Gins engaged in the structural coupling of these processes with environmental and architectural references.<sup>5</sup>

To those of us in literary critical circles accustomed to thinking of the post-structuralist turn as *the* moment when literary and aesthetic theory escaped its naivety, it should be all the more sobering. Clearly, they had anticipated this important turn; now its time to conceptualize what else they may have anticipated. Rather than settling for an audience to gaze casually at works from a tranquil if sometimes troubling stance, the landscape design, architecture and city planning of Arakawa and Gins collectively require bodily engagement with bewildering landscapes inhabited by inanimate structures that defy familiar rules of use. Here, leisure is no longer an option, since the engaged body must bring to bear an even wider range of cognitive and conceptual processes.

We can more easily conceptualize this wider range if we assume that we should not consider their architectural productions and their textural productions like *Architectural Body* as separate activities. We should also assume that the goal has moved beyond simply blankness (and its Zen reverberations) to a active reconstituting of these cognitive and conceptual processes in a more life-affirming direction, in a direct manifestation of what they call "crisis ethics" involving human civilization (*Architectural Body* xvii).

Now we can look more carefully at the table above. I have linked four key concepts of Maturana and Varela to specific terms and quotations from Arakawa and Gins's *Architectural Body*. Yet, to avoid oversimplification, the fourth column offers suggestions of how this structural coupling between cognitive science and architectural poetics might become extended in order to recognize a consensual domain or "trading zone" of multiple disciplinary regimes and vocabularies within their corpus.

The first concept from Maturana and Varela, embodiment, requires a strict bottom-up model of cognition. Coming especially from Maturana's early work and their collaboration, *Autopoesis and Cognition: The*

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<sup>5</sup> See Rosenberg, fig. a (this\_aboutto\_split.jpg).

*Realization of the Living*, their research seems to be guided by a phenomenological account for all living processes. This account insists on the essentially cognitive nature of biological processes, even at the level of individual cells. Thus, sensation, gestation, growth, and evolution are all driven by “the realization of the living,” or, to define it most controversially, by the nature of life as a force of intelligence.

Arakawa and Gins similarly insist that all we understand about human nature—sensory perception, cognition, thought, activity, and even personality—emerges from the bodily basis of existence. Thus the term “Organism that Persons,” for which they explain: “We have adopted the admittedly clumsy term because it portrays persons as being intermittent and transitory outcomes of coordinated forming” (2). The anomaly or hybrid reference opens this analogy between “autopoiesis” and “organism that persons” to other couplings, and points to later work by Maturana and Varela as well as by others on the “enactive” or “distributed” nature of human bodily and cognitive existence. We are a collectivity as well as individuals, and how we negotiate that collectivity as individuals may have something to do with how we survive as a species.

To understand how Arakawa and Gins get to a conceptual model of the cognizing body that “needs to be defined together with that within which it moves” (xx), we need to address the mechanisms by which these “intermittent and transitory outcomes of coordinated forming” occur within the organism, as described by Maturana and Varela. As I hinted earlier, the term autopoiesis refers to the self-referential process of internal cognizing by which the organism makes itself, as well as enacts the contingent models of its environment in order to survive and thrive. Now this is an extended concept difficult to understand, for it first insists on what is called “operational closure”: an organism cannot know anything about its environment; it can only know representations of its environment through cognitive processes that are self-reflexive and autonomous from its situation (*Autopoiesis and Cognition* 8-14). So the activities of the organism involve “observing” itself as it engages in processing the cognitive activity resulting from the “observations” of models of its surroundings for the purposes of survival and thriving. These internal and modeled external observations all are “organized in a closed causal circular process that allows for evolutionary change in the way that circularity is maintained, but not for the loss of circularity itself” (9). Here we can hint that what Arakawa and Gins seek to accomplish is to engage and transform these cognitive loops by which each individual observer encounters their work. The chapter on Landing Sites addresses the circularity of these cognitive processes with astonishing clarity, in part because of the attention the chapter pays to the process of observation itself, for as Maturana and Varela put it: “Anything said is said by an observer” (8). We amend this famous expression to say: “anything cognized, said, written or read, is cognized, said, written or read by an observer,” and we will need to add the word “cognized” to this expression in order to account for the confrontation with embodiment which motivates their architectural procedures.

Maturana and Varela describe the internal dynamics of autopoiesis as follows:

*Due to the circular nature of its organization a living system has a self-referring domain of interactions (it is a self-referring system), and its condition of being a unit of interactions is maintained because its organization has functional significance only in relation to the maintenance of its circularity and defines its domain of interactions accordingly. (10)*

We distinguish here a first-order autopoeietic system only, but we have enough to draw the analogies we need. With the terms perceptual landing sites (*Architectural Body* 10), imaging landing sites (11), and dimensionalizing landing sites (21), each of which refers to distinct yet simultaneous cognitive processes that engage each other in self-referential ways, Arakawa and Gins offer an adequate and accessible version of Maturana and Varela's account of the multiple cognitive tasks occurring simultaneously when a body engages a world: the observer beholds simultaneously the entity that he considers (an organism, in our case) and the universe in which it lies (the organism's environment). This allows h/her to interact independently with both and to have interactions that are necessarily outside the domain of interactions of the observed entity (*Autopoesis and Cognition* 8). By using the blind mathematician Karl Dalkhe's attempt to solve the polyomino mapping puzzle (which had escaped a conventional mathematical solution) to illustrate how perceptual, imaging, and dimensionalized landing sites generate internal dialogic interactions capable of generating an adequate account of mathematical object which Dalkhe was physiologically incapable of actually "seeing," Arakawa and Gins offer a remarkably accessible model for operational closure. It might be useful to point out that Madeline Gins's long poem, *Helen Keller or Arakawa*, and even her earlier poem on the recluse Greta Garbo, anticipates the question of cognitive processes occurring under the condition of operational closure (at least as far as the senses are concerned). Arakawa and Gins offer a schematic account of landing sites in potentially N dimensions, schematic in the sense that they describe the mechanisms by which an "organism person" can actively register, and contingently, passively and tentatively embrace their bodily orientation in the world. They present scales of bodily engagement through the construction "Organism-person-environment" and indicate that there are "sites and would-be sites" in order to account for the contingent processes by which the organism-person coordinates these sites simultaneously in order to adequately account for here and now, from one instant to the next. As with a chess player, the organism person has to redraw the range of possible future trajectories for future juxtapositions of multiple sites, after each and every "move."

A perceptual landing site "lands narrowly as an immediate and direct response to a probable existent, a bit of reporting on what presents itself" (7). An imagining landing site lands widely and in an un-pinpointing way, dancing attendance on the perceptual landing site, responding indirectly and diffusely to whatever the latter leaves unprocessed. As with the above block quote from Maturana and Varela, here we have the simultaneous, hybrid cognitive construction of a strong foreground coupling (object) and a weak background coupling (environment). Arakawa and Gins call the place where these multiple cognitive processes occur and interact dialogically the "dimensionalizing landing site," which "lands simultaneously narrowly and tightly and widely and diffusely, combining the qualities of a perceptual landing site with those of an imaging one, coupling and coordinating direct responses with indirect ones, the formed with the formless" (8). While the strong perceptual landing site represents immediate data, the weak imagining landing site marks the place where modeling occurs. We will address where these models come from in a moment, but let me stoop to personal anecdote to illustrate how wrongly these two processes can interact in an uncoordinated landing site.

About twenty years ago, I visited my alma mater, wandering nostalgically from the married student housing where I had lived for three years, to the Student Union, because I had heard that they had renovated it. As I approached the entrance, I was talking with a friend when suddenly I smacked with some velocity into a recen-

tly windexed and therefore all-but-invisible glass wall. Part of a boxed portico around the entrance to save heating costs, and built after I had attended school there, the portico did not exist on the imaging landing site that I had constructed for myself after years of walking in and out of the Student Union. Furthermore, my poor vision and the distraction of my conversation had distorted the processes for constructing transitory perceptual landing sites, and as a result, my dimensionalized landing site was profoundly uncoordinated. I ended up with a nose broken in three places (and ridicule from close friends which has yet to abate). Therefore, a coordination of sites requires what Arakawa and Gins call “a neutral zone of emphasis” (*Architectural Body* 22), and which in turn forces a dissolving of the subject-object dichotomy by transforming the screen of cognitive coordination into an “event-marker in and of the event-fabric that is the organism-person-environment” (22). Here, Arakawa and Gins accomplish for complex cognitive causality a distinction as important as that between an event-cone and a phase-space diagram in accounting for complex causality in physics. Arakawa and Gins use the blind mathematician Dalkhe to illustrate these processes by describing a purely cognitive and conceptual feat divorced from the world accomplished through the tactile manipulation of felt objects on a table. And, this tactic should alert us to an application to philosophical investigations, as well as to an understanding of emergent cognitive properties of an “organism-person” in an “architectural surround.” More on that another time. Here the next step needs to be taken: how do Arakawa and Gins get from a single cognizer scanning the foreground and background of their N Dimensions of a “landing site configuration” (9) at any particular instant, to a coupling of two cognizers becoming aware that they are not alone and that they may have entered the landing site configurations of another? Or, in an anomalous version of Maturana and Varela’s concept of structural coupling, how do we get from an autopoietic construction of the organism-person to a merging of organism-person with an architectural surround constructed by an other?

For Maturana and Varela, and especially for Varela, structural coupling constitutes a second-order autopoietic system. It involves a recursive feedback system by which

*[...] the continued interactions of a structurally plastic system in an environment with recurrent perturbations will produce a continual selection of the system’s structure. This structure will determine, on the one hand, the state of the system and its domain of allowable perturbations, and on the other hand will allow the system to operate in an environment without disintegration. (Varela, Principles of Biological Autonomy 33)*

This requires a discussion of the organic system and its environment in terms of its “interlocked history of structural transformations, selecting each other’s trajectories” (33). Now, Arakawa and Gins are clearly interested in the subtleties involving competing or collaborating landing sites by multiple organism-persons, but here our main concern lies with establishing an analogy between structural coupling and architectural surrounds.

This coupling, involving all the activities of the contingent cognition of landing sites, becomes called “a tentative constructing towards a holding in place” (*Architectural Body* 23), in order to hypothesize a concept of architecture as “intentionally provisional, replacing definite form with tentative form, the notion of a lasting structure with that of an adaptive one” (29). I indicate in the table previously that Arakawa and Gins offer a hybridized version of structural coupling, seeming to embrace the theorizing about the “agency” of tools, of

physical objects having subjectivity in the context of the sociology and anthropology of scientific practices, exemplified by the work of Bruno Latour, Edwin Hutchins, and Peter Galison. In referring to one of their architectural projects meant for actual habitation measurable in square feet: “This house is a tool, a procedural one” (30). But the illustration to which they signal their investment in the concept of structural coupling with the greatest assurance is that of the snail, and the poem by Ponge: “In any case, there can be no doubt that, as great and as intimate as the human architectural heritage is, the architectural heritage of snails is as great and far more intimate” (27).

For Arakawa and Gins, the organism-person-environment complex cannot be described with greater economy than by reference to a snail. To what end, then, can we understand the range of the “tools” of architectural procedures which can bring a greater intimacy for humans and its environment? Before we get to this question, we will need to address the final coupling, between Maturana and Varela’s term “consensual domain” (Varela, *Principles* 49), which is the third order of autopoiesis, and Arakawa and Gins’s term “architectural surround” (39), a term which also enables them to think of building not just individual buildings for human habitation, but entire cities: “Everything begins for these organisms with a tentative constructing toward a holding in place. The environmental communal, which has everything to do with how an organism persons, can, when reworked in a concerted manner, lead to persons being able to supercede themselves” (*Architectural Body* 47). In the process of superceding themselves, reconfigured organism-persons have the capacity to link together and then reconfigure society as a collectivity.

In a chapter entitled “On the Consequences of Autopoiesis,” Varela begins to formalize the extension from the individual living system to ecological systems. Describing the movement beyond the mutual deformations that occur when two entities structurally couple, Varela claims that these autopoietic entities engage in “communicative interactions.” Varela writes:

*If the coupled organisms are capable of plastic behavior that results in their respective structures becoming permanently modified through the communicative interactions, then their corresponding series of structural changes (which would arise in the context of their coupled deformations without loss of autopoiesis) will constitute two historically interlocked ontogenies that generate an interlocked consensual domain of behavior, which becomes specified during its process of generation. (Principles 49)*

In a move important for our understanding of Arakawa and Gins’s employment of cognitive science, and for understanding why they seem to embrace the work of Maturana and Varela rather than that of Lakoff and Johnson and Turner, Varela now stakes a huge claim. Once Varela proposes a “conceptual domain” out of the dynamic “communicative interactions” of coupling autopoietic entities, we have now moved to the realm of language: “such a consensual domain of interactions is a linguistic domain” (49).

The crux of this essay concerns the role of metaphor in understanding the relationship between bodily existence and cognitive processes in the context of Arakawa and Gins’s corpus. In a passage relevant to a negotiation of this problem, Varela states:

*A linguistic domain, then, as a consensual domain that arises from the coupling of the ontogenies of otherwise independent autopoietic systems, is intrinsically noninformative, even though an observer, by*

*neglecting the internal determination of the autopoietic systems that generate it, may describe it as if it were so. (49)*

We are now back to where we started—the realm of metaphor, a realm threatening because of its potential to be non-informative from a disciplinary perspective. We need to ask ourselves just how informative we find this coupling between architecture and cognitive science, by juxtaposing the work of Maturana and Varela with Lakoff, Johnson, and Turner's competing theory of cognitive science, and their accounting for metaphor and cognition and the body.

Now, in an extended version of this essay, I offer a more carefully considered account of Arakawa and Gins's architectural poetics with respect to Maturana and Varela, moving through each of these concentric circles of what might be called increasingly enlarged cognitive realms. But, for the moment, we should note that the career trajectory of Maturana and Varela (from biology to cybernetics to cognitive science) is significant because their work's signature concept (autopoiesis) involves locating cognitive processes even inside individual cells of the body, and thus finds harmony with the phenomenology of mind of Maurice Merleau-Ponty (a figure raised by Mark C. Taylor in particular with respect to Arakawa and Gins), and the empirical subjectivity of Gilles Deleuze and Felix Guattari.

More important, their career shifts suggest that the biological origins of their concerns with cognition resonates with Arakawa and Gins's own movement from the body outward. Still, one concept needs to be discussed explicitly, a concept fundamental because all the other concepts and competing theories of cognitive science depend upon it for grounding assumptions: *embodiment*. By embodiment, we mean how the relationship between the human organism and its mind becomes constructed and then employed in cognitive science as a foundational assumption. For the old, computational model of top-down cognitive architecture, we have mind over body, a body manipulated by symbolic activity; for bottom-up cognitive architecture, we have mental activity as a spontaneously emergent property of organic processes, as the body negotiates the world. I would argue that we need to understand Arakawa and Gins's *Architectural Body* as a spontaneously-inspired extrapolation from concerns over cognitive freedom in their collaborative *The Mechanism of Meaning*, as well as in their individual productions: Arakawa's visual images of competing cognitive and conceptual apparatuses short-circuiting a single aesthetic frame from which to gaze; Madeline Gins's philosophical poetic explorations of creative expression emerging from a mind stripped of the will to power over the body, possible when the mind must function under the conditions of operational closure.<sup>6</sup>

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<sup>6</sup> See Rosenberg, fig. b (yoromap.jpg).

### **The problem: Site of Reversible Destiny, Yoro park, and embodiment**

In his essay on Arakawa and Gins in *Reversible Destiny* (112-113), George Lakoff offers a trenchant critique of the question of cognitive freedom from within his own cognitive theory of embodied meaning-making. Lakoff believes that he has created an emergent-properties account for metaphor-making. Because one could argue that they have offered the most influential account of cognitive science for metaphor and literary studies generally to date, it would be useful, therefore, to take Lakoff (and his school) on their own terms, in order to see if that theory remains adequate to account for Arakawa and Gins's corpus. Here, a review of a problem of bodily orientation and balance may help provide a "landing site" for this analysis. I'm thinking specifically of the treacherous environment constructed by Arakawa and Gins called *Site of Reversible Destiny—Yoro*.

In the "Initial Directions For Use (to be continued)" (203), Arakawa and Gins offer their assessment of the problem of human trajectory through their treacherous "Elliptical Field." Now, some notoriety emerged in response to their sites, because of the injuries sustained by visitors, a notoriety for which Madeline Gins, in conversation, has expressed regret because of the distraction it has created from other issues at stake at the site. But I don't think we can leave it alone just yet. The question of danger, and of balance, has been raised by Bernhard Waldenfeld, who discusses the need to recognize the condition of "free fall" for any motor activity. The question of balance and of embodied cognition can be illustrated by reference to this site in ways directly relevant to a discussion of Lakoff, Johnson, and Turner. Arakawa and Gins address balance directly in their "Directions":

*To secure a sense of yourself as this site (the entire elliptical field):*

*Vary the rate at which you move through it.*

*Associate each of the extreme forms your body is forced to assume in traversing it with both a nearby and distant form.*

*If accidentally thrown completely off balance, try to note the number and also the type and the placement of the landing sites essential to constituting a world.*

*Frequently swing around to look behind you.*

*Minimize the number of focal areas (perceptual landing sites) at any given moment... (203)*

Here they claim that the sheer difficulty of negotiating the terrain at Yoro may serve to reorient and reconfigure the mind's relationship with the body at a moment when the body must feel its own way through an environment with so few dependable visual cues as to render a person as blind as Helen Keller, or the mathematician Dalkhe. One can barely edge from one moment to another, reconfiguring one's relationship to the terrain only as fast as the reorientated mind can process. While they have tackled this fragile relationship in their earlier "Mechanism of Meaning 16. Review and Self Criticism" (108), there is nothing like an experiential

basis for meaning-making to drive the point home, to make visible the epistemological and ethical implications for competing cognitive styles.<sup>7</sup>

When one (as a “Maker”) is inside the elliptical field, one cannot resort to a bird’s eye perspective (from “Above”) that could help track prospective hurdles and hazards. Only the will to experience vertigo can enable a visitor to continue, to test the capacity of the body (from “Below”) to process, unthinkingly, through.<sup>8</sup> The question of balance, and its correlates proportion and perspective, have aesthetic and cognitive implications explored rigorously by Kant. Yet, while still considered conventionally true, Kant’s model had been debunked as early as Henri Bergson and Henri Poincaré because of its dependence upon (and assumption of the “natural status” for) a Newtonian axis of time and space in a relational grid governing human cognition. For Bergson in particular, the appearance of the technologies that enable clock-time and calculus to become widely adopted for the government of human and social behavior represents the moment when human cognitive freedom becomes lost. I believe that Arakawa and Gins address this loss, and that Lakoff’s discussion of the limits of cognitive elasticity in his essay on the site at Yoro, reveals the point where the Lakoff school becomes inadequate in comprehending Arakawa and Gins’s corpus, and why recourse to the work of Maturana and Varela, and Gilles Deleuze and Félix Guattari becomes necessary.

### **Body, mind, metaphor and the Lakoff School of Cognitive Science**

Please consider this seeming digression as a stab at a question that has been nagging at me ever since I read backwards from Mark Turner’s *Reading Minds: English Studies in the Age of Cognitive Science*, to Mark Johnson’s *The Body in the Mind*, to George Lakoff’s *More Than Cool Reason, Metaphors We Live By*, and *Philosophy in the Flesh*, co-authored with the others. My question has to do with the status of their systems of image-schema, specifically in terms of the arguments that Lakoff and Johnson have made concerning the embodiment of orientational metaphors in lived human experience—grounded in the orientation of the body as the body negotiates the external world. At the time I had been reading the works of Maturana and Varela, particularly Varela’s take on the concept of embodiment and enaction, as these biologists and cyberneticists might inform the writings of Gilles Deleuze. I sensed that the notion of embodiment from Lakoff and Johnson was in fact incompatible with that of Varela and Deleuze.

Now I have learned from Gregory Colomb that behind Lakoff and Johnson’s notions of embodiment lies Gerald Edelman’s neural darwinism, and these differences might therefore be justified by the distinction between Varela’s and Edelman’s understanding of the conditions for emergence, a distinction that is not necessari-

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<sup>7</sup> See Rosenberg, fig. c (Makerpoem.doc).

<sup>8</sup> See Rosenberg, fig. d (ellipticalfield1.jpg).

ly incompatible because they really are discussing apples and oranges. But there is more at stake here than just playing with models of embodiment and the emergent properties.

Given that Mark Turner's ideological extensions of his colleagues' arguments fit comfortably into the image schema of argument-as-warfare against the field of contemporary critical theory, and given that my current work explores the intimate relationship between complexity theories in physics and cognitive science and contemporary critical theory, particularly the work of Gilles Deleuze and Felix Guattari, I felt it necessary to make visible exactly where the differences lie between these two notions of embodiment. My instinct here can be stated bluntly: Lakoff, Johnson, and Turner seem to be committing a major category error. Rather than demonstrating that their systems of metaphorical schema result from an experiential, bodily basis for meaning, as expressed by the title of Johnson's book, *The Body in the Mind*, these schema, in fact, reveal an expectation for a pre-existing condition of coherence or of a systematicity which could only be the result of a global state of cognition which, by definition, represents the condition of the mind over the body.

To put it another way: Rather than understanding these image-schema and their metaphorical and moral or ideological extensions as emerging spontaneously, a process resulting from the condition of embodiment, what they seem to demonstrate is a condition that can be described, even in the case of riding a bicycle, for example, as unmoored from sensory-motor affect: *At every moment, we are always-already disembodied*. I would argue that this condition of disembodiment, and its psychological, social and political costs, constitutes the real target for Arakawa and Gins's corpus of artistic production for the last forty-odd years.

The influential claims of Lakoff, Johnson, and Turner for an epistemological and moral imagination grounded by the bodily and experiential basis for meaning deserve to be tested against the work of cognitive scientist Francisco Varela and the philosophers Gilles Deleuze and Félix Guattari. In *The Embodied Mind* (co-authored with Eleanor Rosch and Evan Thompson), Francisco Varela reviews the debate over the two antithetical though perhaps complementary cognitive processes discussed earlier: bottom-up emergence, which is necessarily contingent and which involves the spontaneous confluence of heterogeneous lower-order processes into a global state; and top-down repression of those heterogeneous processes, often described as a superimposition of categories or schema onto complex sensory data in a way resonant with the epistemological legacy of Immanuel Kant.

So, while the global state is indeed a fiction, it constitutes a fiction necessary to ensure the survival of the aggregate, which may refer to a computer, or a human being, or even a bureaucratic system. This distinction becomes interesting from the perspectives of epistemology and social philosophy in the following way: for the first, the emphasis is placed on the total control of the trajectories of symbolic manipulation; any loss of control brings down the computational house. For the second, the emphasis is placed on the connections among elements of systems, the deliberate relinquishing of control of those elements, and the observance of the contingent emergence of new forms of order among the connected elements that might not necessarily be predicted.

The top-down exertion of control, and the contingencies of bottom-up emergence, represent epistemological and ideological stances toward cognitive functioning, and in the study of human cognition, there is no question that both processes go on simultaneously, and perhaps even at cross purposes. I would like to argue

that, of all work in social philosophy, Gilles Deleuze and Felix Guattari's collaborations have played out the ideological as well as aesthetic implications of these two styles of cognitive functioning.

This correlation between bottom-up and top-down cognitive and social processes may help to frame a discussion of why Lakoff, Johnson, and Turner's assumption of the bodily basis for meaning remains unsatisfactory, especially given the epistemological, "moral" and ideological extensions that they have placed upon that basis for meaning. Following the trajectory of my own readings, we will move backwards from Turner to Johnson back to their mentor Lakoff.

The extent to which Lakoff and Johnson's assumption of the bodily basis for meaning has become grounds for ideological warfare within the realm of literary and culture studies can be seen in Mark Turner's attack on contemporary critical theory, *Reading Minds: English Studies in the Age of Cognitive Science*. Turner suggests that contemporary theorizing has led to a dead end in English studies; he considers these discourses suspect because of their complexity and inaccessibility. Calling contemporary theory "ungrounded bootstrapping" and "fragmented," Turner argues that "contemporary theory fails to connect with the full human world to the extent that it treats objects in literature that can only be seen by means of the theory: in that case, if the theory vanishes, its objects vanish" (4).

Turner argues for humanistic studies grounded in schemes and tropes that are working metaphors in the physical world. He grounds his systematic exploration of the matrices of schemes and tropes by resurrecting classical stasis theory: "image schemas to structure our understanding of forces"—in other words, through ordered semiotic relations reducible to geometric structures. What makes Turner's polemic so astonishing is its seeming ignorance of a trend in cognitive science, represented by the work of Maturana and Varela, called the emergent or enactive paradigm.

Instead of connecting cognitive science and English studies through reference to geometric schemes and tropes organized by an implied and unified subjectivity, one could pursue such an interdisciplinary connection by postulating a human cognizing subject that has no essential unity, but the unity that the subject perceives in itself is a fiction constructed to encompass the heterogeneity of cognitive processes occurring. Yet, what Turner misses in his attack on contemporary critical theorists is that the oft' cited genealogy for this emergence paradigm can be found as early as Henri Bergson's *Time and Free Will* and *Matter and Memory*, and perhaps more immediately important, with respect to the genealogy of contemporary cognitive science in Maurice Merleau-Ponty's *The Primacy of Perception*. Dormant though it was in cognitive science, as Varela, Thompson, and Rosch report, for over twenty years after Merleau-Ponty first conceived of the possibility for human cognition without an autonomous consciousness, the emergence-enactive paradigm has led to major reevaluations of our understanding of the human mind, computer intelligence and even social systems. Merleau-Ponty's work, crucially, has also provided some of the grounding concepts in critical theory that lead to Barthes, Foucault, and others' assaults on naive formulations of the nature of authorship as an explicitly top-down phenomenon which informs much contemporary theorizing.

Thus, Turner attempts to ground his assault on the "bootstrapping" of contemporary theorists in one paradigm in cognitive science, ignoring how another, competing paradigm of cognitive science grounds the very

theories that he attempts to refute. And, it is Turner's grounds, specifically in the works of George Lakoff, Mark Johnson, and behind them, in the writings on embodiment of Gerald Edelman, that I wish to make visible now.

When we examine simply Lakoff and Johnson's presentation of metaphorical systems in *Metaphors We Live By*, we are struck by how completely systematic that presentation is: their discussion of the "systematicity of metaphorical concepts," their invocation of the structuralist truism involving the interdependence of the visible and the invisible (here I am echoing Merleau-Ponty, Jean Piaget, Roland Barthes and many others), of the relational grid of metonymy and metaphor, of systems and their grounds. In fact, the project of establishing a system of metaphorical schema involving simultaneously the analysis of that system and its grounds—*itself* implies a grounds. And, we can find reference to the nature of the grounds for such theorizing metaphorical systems in a term that appears five times in the table of contents: *coherence*. What can coherence mean, if it applies to the *grounds* underlying "the systematicity of metaphorical concepts," *and* to the *grounds* which enable Lakoff and Johnson to construct their systems to begin with? One hint at the grounds for their systematic presentation, as well as for the metaphorical systems that they are presenting, is that the concept of space, and its capacity to be organized with reference to geometric forms, predetermines how coherence is understood as a concept.

Yet Lakoff and Johnson do demonstrate self-consciousness about their account of space as a structuring principle for the representation of concepts. While they can say "spatialization metaphors are rooted in physical and cultural experiences" (*Metaphors We Live By* 18), they also say that "there is an overall external systematicity among the various spatialization metaphors which defines coherence among them" (18). Demonstrating that their notion of coherence completely depends upon a pre-existing concept of conceptual space, they admit that "spatialization is so essential a part of a concept that it is difficult for us to imagine an alternative metaphor that might structure the concept" (18). The fact that they insist that system and coherence are inseparable concepts, forces them to hedge their bets a bit by saying that, although they believe that they are practicing a science of metaphorical systems rooted in human experience, they are willing to conceive of a social as well as a biological-embodied sense of the nature of that experience: "the concepts in a scientific theory are often—perhaps always—based on metaphors that have a physical and/or cultural basis" (19).

Finally, because of this very necessary hedge, Lakoff and Johnson really back off quite a bit on their claims for what they mean by experience: "We do not know very much about the experiential bases of metaphors. Because of our ignorance in this matter, we have described the metaphors separately, only later adding speculative notes on their possible experiential bases. We are adopting the practice out of ignorance, not out of principle" (19). Now it is important that we remember this extremely tentative attempt to straddle positions here, although the move is also strategically important so that this claim for the experiential basis for meaning does not collapse into "begging the question," thus preserving the primary rhetorical intent of *Metaphors We Live By*, which is to argue for their *system*, leaving the grounds for that system still up in the air. However, it is the grounds that we are most interested in, and we can approach those grounds from another direction by examining their claims for an "experientialism" that explodes the distinction between objectivism and subjectivism as fundamental epistemological stances.

Despite being unable to really demonstrate the connection between the metaphorical systems and their posited experiential grounds, in five concluding chapters, Lakoff and Johnson's attempt to argue that their posited "experientialism" makes visible the mythic dimension to the objectivist and subjectivist grounds for meaning systems. On the one hand, an embrace of the experiential grounds for metaphoricity and its extension into conceptual formations makes claims for an objectivist reality untenable, while at the same time insisting that the bio-orientational and social nature of these very metaphorical and conceptual systems require a rejection of the naive subjectivist postulation represented by romantic psychology and its progeny. On the other hand, the very account of this system of metaphoricity must necessarily be grounded in the top-down domination of experiential grounds by mental processes generally speaking, represented specifically by cognitive schema within the individual, and by the forms of geometry capable of spatializing even duration in establishing subject positions in science and in society. It is this top-down domination that enables "objectivity" to exist in the first place. In other words, to cut the grounds from under objectivity would be to undercut their own. What I would like to do, then is to demonstrate how this relationship between coherence and spatiality, and its origins in what Varela calls the Global State, and what Deleuze and Guattari call the Body Without Organs, requires a pre-existing condition of cognitive wholeness before ANY metaphorical or conceptual or even moral system can be constructed to begin with.

The "place" where Lakoff and Johnson back off on their claims for the experiential basis for meaning systems by hedging their bets, is the starting point for Johnson's master work, *The Body in the Mind*. Mark Johnson tackles the question of the role of the body in the experientialist paradigm directly. He defines the body as "a generic term for the embodied origins of imaginative structures of understanding, such as image schemata and their metaphorical elaborations." He rejects objectivism in the final analysis by resurrecting a different representation of subjectivity from those ensconced in romantic psychology: "I focus on the indispensability of human understanding for meaning and rationality" (xv). He insists on dethroning objectivism so completely that he calls for a definition of "Understanding" as inhabited by "just those kinds of imaginative structures that emerge from our experience as bodily organisms functioning in interaction with an environment," structures dependent upon "pre-conceptual and non-propositional" forms capable of becoming "metaphorically projected and propositionally elaborated to constitute our network of meanings" (xvi). "Experience" thus must be understood as involving a range of inputs, and here Johnson comes close to an understanding of embodiment that Francisco Varela might embrace: "including basic perceptual, motor-program, emotional, historical, social and linguistic dimensions" (xvi). And he attempts to both assert this more "grounded" notion of experience, and explain its mechanisms (a very tall order!):

*My purpose is not only to argue that the body is 'in' the mind (i.e.) that these imaginative structures of understanding are crucial to meaning and reason but also to explore how the body is in the mind—how it is possible, and necessary, after all, for abstract meanings, and for reason and imagination, to have a bodily basis. (xvi)*

But the question we need to ask is as follows: do these systems of meaning really have a bodily basis, or are we already dealing with a level of cognition that is globally managing the body, and, in fact, with a form of cognition capable of constructing these metaphorical and conceptual systems out of image schema with the

preconscious intent to *manage* the body by encompassing it in a wholeness capable of registering its entirety for the purposes of operational control?

Johnson's first move is to posit "image schemata," defined as "gestalt structures, consisting of parts standing in relations and organized into unified wholes, by which our experience manifests discernible order" (xix). These image schemata come into existence when "human bodily movement, manipulation of objects, and perceptual interactions involve recurring patterns without which our experience would be chaotic and incomprehensible" (xix). Johnson argues that it is by the mediation of these image schemata that we begin to comprehend our experience. We might refer to these schemata as "habit" in ways resonant with both Bergson and Bourdieu. But before we try to actually confront the priority of precisely the chaotic and the incomprehensible from the emergent properties perspective of Varela and Deleuze and Guattari, we need to examine a little more closely the claims that Johnson is making for these schemata.

First of all, by insisting that these gestalt structures consist of part-whole relations, Johnson seems to imply an essential basis for geometric forms based on the priority of the synecdoche, yet he seems to insist that these gestalt structures are actually the originating forms by which metaphoricity becomes possible. Since Johnson allows that "I will not be using 'metaphor' in the traditional sense as merely a figure of speech; rather I shall identify it as a pervasive, indispensable structure of human understanding [...]" (xx), we can suggest that the term metaphor here can be replaced with the more generic term trope, a wholeness capable of subsuming the part we called earlier, synecdoche. This brings us to a chicken and egg situation from which we might release ourselves through a more directed examination of his concept of experience as a condition of embodiment. He argues that, "[v]irtually everyone agrees that human *experience* and *meaning* depend in some way upon the body, for it is our contact with the entire spatio-temporal world that surrounds us" (xxi). Now Johnson is arguing for an externality in which we are embedded. Yet, he defines that externality by reference to a construct of the world as represented by a relational grid of time and space, so that time becomes simply another category of spatial form, a form which does not surround us at all, but which, as Poincaré and Bergson argued before the turn of the twentieth century, is superimposed *by us* upon the world for the purposes of operational control, a superimposition which grounds the very objectivism Johnson is trying so hard to dethrone. In other words, Johnson's "constructive theory of imagination and understanding that emphasizes our embodiment" seems instead to demonstrate that the functioning of the imagination as he is defining it is actually engaged in ensuring our disembodied response to external and internal stimuli from a posited transcendental ground, a being that, like a manager out of the Dilbert comic strip, controls the becomings of lower-order cognitive processes for its own metaphorical purposes. Let's test this challenge to Johnson's bodily basis for meaning by reference to one of his more powerful representations of embodied knowledge, the borrowing of Michael Polanyi's extended metaphor "bicycle rider" from his master work *Personal Knowledge*, to illustrate the image schemata and metaphorical extensions of "balance." We do so in order to finally argue for replacing the Body in the Mind as the source of Johnson's image-schema and their metaphorical, ideological, and moral exten-

sions, with Deleuze and Guattari's *Body Without Organs*, and its capacity for both striated/geometric and smooth/contingent cognitive processes.<sup>9</sup>

### Personal knowledge, balance, and the body without organs

In *The Body In the Mind*, Mark Johnson refers to Polanyi's discussion of the bicycle rider from *Personal Knowledge*, and this reference is paradigmatic of his claims for the bodily basis for cognition. He writes: "The experience of balance is so pervasive and so absolutely basic for our coherent experience of our world, and for our survival in it, that we are seldom ever aware of its presence" (74). He goes on to say: "without it our physical reality would be utterly chaotic" (74). He emphasizes that balance is something that "*we learn with our bodies* and not by grasping a set of rules" (74). It cannot be taught, according to Johnson, because "it is something we do" (74), it is "a preconceptual bodily activity that cannot be described propositionally" (74). Here he invokes the author of *Personal Knowledge*: "As Michael Polanyi has argued, you cannot tell another what steps to take to achieve the balanced riding of a bicycle" (74). Now the footnote cites the book but not the page, and it took me some time to guess where the passage might be. It will be worth looking briefly at what Polanyi actually says, and to situate what Mark Johnson makes of Polanyi's point against our common sense understanding of what is involved in learning how to ride a bicycle, even on an easily navigable surface.

What Polanyi refers to is the concept of *unspecifiability*, a condition of cognitive and motor functioning so habitual that it becomes subsumed into our preconscious awareness "beyond recall" (*Personal Knowledge* 62). This kind of functioning involves a kind of "trial and error by which we *feel our way* to success and may continue to improve on our success without knowing how we do it" (62). He goes on to describe the mastery of swimming strokes, and then invokes "the principle of cycling without realizing that it consists in the adjustment of your momentary direction and velocity, so as to counteract continuously your momentary accidental unbalance" (62). Polanyi thus is trying to describe the instrumental processes by which one discovers the "wide range of not consciously known rules of skill and connoisseurship which comprise important technical processes that cannot be completely specified" (62). However, we are a LONG way from saying that, because something is instrumentally mastered without conscious intellectual effort, it must be knowledge and action that arises from the body itself without a mental controlling function.

Polanyi himself gives us the clue for problematizing his own assertions here when he describes an activity of adjusting "your momentary accidental unbalance" without specifying the agency which is engaged in the act of adjustment by the processing of one's direction and velocity with respect to the topology of the landscape and the force of gravity. The language of calculus which Polanyi invokes involving trajectory and velocity be-

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<sup>9</sup> See Rosenberg, fig. e (Mech2\_2.jpg).

comes telling here, as is the reference to an unnamed agent involved in computing these forces and processes against a spatio-temporal field.

That agency is of course the Dilbert manager that we have referred to, the top-down manager of a myriad of cognitive inputs, top-down precisely because this executive function has removed itself from the bodily processes and local cognitive inputs (from muscles and organs such as the inner ear) in order to exert control. Now here comes our bit of “common sense” reflection: Of course we cannot tell someone how to ride a bicycle. But think of how it was that you actually *learned* to ride.

I remember teaching my daughter Annie how to ride 14 years ago in a parking lot next door in Ann Arbor. I placed her on the bicycle, with her feet on the pedals (with no gears the pedals would move simply by the wheels placed in motion), her hands on the handlebars. Then I walked, slowly pushing the bicycle by holding on to the handlebar closest to me, and onto the seat upon which Annie sat, terrified, and then talking her through the sensations she would be experiencing so that she would not panic from the sensory overload. Then I went into a trot, maintaining Annie’s balance on the bicycle through innumerable computations that were below my preconscious awareness concerning her trajectory, speed, and the effect of gravity on the perpendicular positioning of the bicycle frame with respect to the tar surface. In effect, I was the Dilbert manager for her at that point. But at the moment of release, the Dilbert in me attempted a pass of the reins of control over to the Dilbert manager in her, and she wobbled her way, vertical, on a trajectory with a certain velocity, over a relatively safe terrain, with her eyes firmly on a target at a closely situated horizon, until the Dilbert in her fell down on the job and brought her down to the sidewalk with him (gender distinction deliberate).

Annie did not learn to ride that time, nor the time after that, nor the time after that; but every time I served as surrogate Dilbert manager, I gave the Dilbert within her a chance to learn how to manage more and more sensations while involving itself in more and more computations from the relative condition of safety. Despite all of my good intentions, what I was teaching Annie was how to disembodify herself for the purposes of top-down, operational control over her own body, which in turn enabled control over her bicycle as it traversed its terrain under the influence of gravity and velocity. Now we can talk about the epistemological and moral costs for that kind of top-down removal from embodied existence to a realm of virtuality, but for now, let us simply end by saying that as far as Lakoff, Johnson, and Turner’s constructions are concerned, there ain’t no body in that mind: if we have a body at all in such a moment, it is what Gilles Deleuze and Félix Guattari call the constricting striations of the Body Without Organs, a preexisting condition of wholeness capable of generating a state of coherence which can subsume and control a multiplicity of necessarily chaotic cognitive processes below the threshold of its conscious awareness. What we have is what some cognitive scientists call the “executive function,” and what Francisco Varela among others calls the top-down processes of cognition which have been shown, by analogy to problems in computational science, an inadequate account of cognitive behavior, with potentially catastrophic ethical implications.

## Conclusion

I am not a cognitive scientist. Nor have I played one on TV. I am trained as a literary critic interested in twentieth-century intellectual history. But the question of disembodiment, defined as the technologically driven unmooring of human cognition, has remained the focus of my scholarship since before I entered graduate school. I pursue my scholarship by exploring the parallel processing of this question in different discourses, beginning with the mathematician Henri Poincaré, the philosopher Henri Bergson, and the artist Henri Robert Marcel Duchamp at the turn of the century. I first became aware of the corpus of Arakawa and Gins when I met Madeline Gins at the Duchamp/Poincaré Conference at Harvard University in 1999. Recognizing instantly the value of their work to those of us interested in the interactions among science, philosophy, and the arts, I arranged for Arakawa and Gins to give a keynote presentation at the 2000 Conference of the Society for Literature and Science in Atlanta. In the process of getting to know the history as well as the methodologies governing their artistic and architectural corpus, I discovered that they are way ahead of us literary critics in understanding just how complex the problem of embodiment (as explicated through the term landing sites) is to grasp. In reading their equally sophisticated accounts for transforming the internal cognizing processes of organism-persons in the various texts on Architectural Procedures, including recent ones excerpted in this issue, perhaps I'm not ready to admit quite yet how ridiculously simple it might be to solve. But, as I told them some time ago, "I'm in it for the long haul" to see what happens with their development of the "architectural body" and the "procedures" for cognitive liberation. And, I certainly hope that this "long haul" is as long as they claim it could be, no matter how decrepit I become.

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## WORKS CITED

- ARAKAWA, and Madeline GINS. *Architectural Body*. Tuscaloosa: The University of Alabama Press, 2002.
- . *Architecture: Sites of Reversible Destiny*. London: Academy Editions, 1994.
- . *The Mechanism of Meaning*, New 3<sup>rd</sup> Edition. New York: Harry N. Abrams, Inc., 1979.
- . *Reversible Destiny: We Have Decided Not To Die*. Introduction by Michael Govan and Jean-François Lyotard. New York: The Solomon R. Guggenheim Foundation/Harry N. Abrams, 1997.
- BERGSON, Henri. *Creative Evolution*. 1907. Translated by Arthur Mitchell, New York: Holt, 1911.
- . *Matter and Memory*. 1908. Translated by Nancy Margaret Paul and W. Scott Palmer. New York: Zone Books, 1988.
- . *Time and Free Will: An Essay on the Immediate Data of Consciousness*. Authorized translation by F.L. Pogson. New York: The MacMillan Company, 1910.
- . *The Two Sources of Morality and Religion*. 1935. Translated by R. Ashley Audra and Cloudesley Brererton. New York, Doubleday Anchor Books, 1954.
- BONO, James. "Science, Discourse and Literature: The Role/Rule of Metaphor in Science." *Literature and Science: Theory and Practice*. Ed. Stuard Peterfreund. Boston: Northeastern University Press, 1990. 59-89.
- BOURDIEU, Pierre. *The Field of Cultural Production*. Ed. and intr. Randall Johnson. New York: Columbia University Press, 1993.
- DELEUZE, Gilles. *Empiricism and Subjectivity: An Essay on Hume's Theory of Human Nature*. 1953. Trans. and intr. Constantin V. Boundas. New York: Columbia University Press, 1991.
- . *The Logic of Sense*. 1968. Trans. Mark Lester with Charles Stivale. Ed. Constantin Boundas. New York: Columbia University Press, 1990.
- DELEUZE, Gilles, and Félix GUATTARI. *Anti-Oedipus: Capitalism and Schizophrenia*. 1972. Minneapolis: University of Minnesota Press, 1977.
- . *A Thousand Plateaus: Capitalism and Schizophrenia*. 1980. Minneapolis: University of Minnesota Press, 1987.
- DYSON, George B. *Darwin Among the Machines: The Evolution of Global Intelligence*. Reading, MA: Perseus Books, 1997.
- EDELMAN, Gerald. *Bright Air, Brilliant Fire: On the Matter of the Mind*. New York: Basic Books, 1992.
- GALISON, Peter. *Image and Logic: A Material Culture of Microphysics*. Chicago: University of Chicago Press, 1997.

- GINS, Madeline. *Helen Keller or Arakawa*. Santa Fe: Burning Books with East-West Cultural Studies, 1994.
- GUATTARI, Felix. *Chaosmosis: An Ethico-Aesthetic Paradigm*. Trans. Paul Baines and Julian Pefanes. Bloomington and Indianapolis: Indiana University Press, 1995.
- HAUGELAND, John (ed.). *Mind Design II: Philosophy, Psychology, Artificial Intelligence*. Revised and enlarged edition. Cambridge: MIT Press, 1997.
- HOLLAND, John. *Emergence: From Chaos to Order*. Reading, MA: Helix Books, 1998.
- HOFSTATER, Douglas and the Fluid Analogies Research Group. *Fluid Concepts and Creative Analogies: Computer Models of the Fundamental Mechanisms of Thought*. New York: Basic Books, 1995.
- HUTCHINS, Edwin. *Cognition in the Wild*. Cambridge: MIT Press, 1995.
- JOHNSON, Mark. *The Body in the Mind: The Bodily Basis of Meaning, Imagination and Reason*. Chicago: Chicago University Press, 1987.
- . *Moral Imagination: Implications of Cognitive Science for Ethics*. Chicago: University of Chicago Press, 1993.
- LAKOFF, George. "Testing the Limits of Brain Plasticity: Or Why Is There a Wall Down the Middle of the Tub." Arakawa and Gins, *Reversible Destiny* 112-123.
- LAKOFF, George, and Mark TURNER. *Metaphors We Live By*. Chicago: University of Chicago Press, 1980.
- . *More Than Cool Reason*. Chicago: University of Chicago Press, 1989.
- . *Philosophy In the Flesh: The Embodied Mind and Its Challenge To Western Thought*. New York: Basic Books, 1999.
- LATOUR, Bruno. *Pandora's Hope: Essays on the Reality of Science Studies*. Cambridge: Harvard University Press, 1999.
- . *The Pasteurization of France*. 1984. Trans. Alan Sheridan and John Law. Boston: Harvard University Press, 1988.
- . *Science in Action*. Cambridge: Harvard University Press, 1987.
- LATOUR, Bruno, and Steve WOLGAR. *Laboratory Life: The Construction of Scientific Facts*. 1979. Princeton: Princeton University Press, 1986.
- MATURANA, Humberto, and Francisco VARELA. *Autopoiesis and Cognition: The Realization of the Living*. 1972. *Boston Studies in the Philosophy of Science* vol. 42. Boston: D. Reidel Publishing Company, 1980.
- MERLEAU-PONTY, Maurice. *The Primacy of Perception*. *Northwestern University Studies in Phenomenology and Existential Philosophy*. Ed. and intr. James M. Edie. Evanston, IL: Northwestern University Press, 1964.

- . *The Visible and the Invisible*. Ed. Claude Lefort. Trans. Alphonso Lingis. Evanston, IL: Northwestern University Press, 1968.
- ORTON, Andrew (ed.). *Metaphor and Thought*. 2<sup>nd</sup> Edition. London: CUP, 1993.
- POINCARÉ, Henri. "On the Foundations of Geometry." *Monist* 9 (1898): 1-43.
- . *Science and Method*. 1914. Trans. Francis Maitland. New York: Dover, 1952.
- POLANYI, Michael. *Personal Knowledge*. New York: Harper and Row, 1964.
- PRIGOGINE, Ilya, and Isabelle STENGERS. *Order Out of Chaos: Man's New Dialogue with Nature*. New York: Bantam Books, 1984.
- RAMSEY, William, Stephen P. STICH, and David E. RUMERLHART (eds.). *Philosophy and Connectionist Theory*. Hillsdale, NJ: Lawrence Erlbaum Associates, 1991.
- ROSENBERG, Martin. "Chess RHIZOME and Phase Space: Mapping Metaphor Theory Onto Hypertext Theory." *Intertexts* 3. 2 (Fall 1999): 147-167.
- . "Portals in Duchamp and Pynchon." *Pynchon Notes* 34-35 (Fall 1994): 148-175.
- ROTMAN, Brian. *Ad Infinitum: The Ghost in Turing's Machine—Taking the God Out of Mathematics and Putting the Body Back In*. Stanford, CA: Stanford University Press, 1993.
- . *Mathematics as Sign: Writing, Imagining, Counting, Writing Science Series*. Ed. Timothy Lenoir and Hans Ulrich Gumbrecht. Stanford, CA: Stanford University Press, 2002.
- . *Signifying Nothing: The Semiotics of Zero*. Stanford, CA: Stanford University Press, 1987.
- SHOSTAK, Stanley. *Becoming Immortal: Combining Cloning and Stem-Cell Therapy*. Albany, NY: State University of New York Press, 2002.
- TAYLOR, Mark. "Saving Not." Arakawa and Gins, *Reversible Destiny* 125-139.
- TURNER, Mark. *Reading Minds: The Study of English in the Age of Cognitive Science*. Princeton: Princeton University Press, 1991.
- VARELA, Francisco. *Ethical Know-How: Action, Wisdom, and Cognition. Writing Science Series*. Ed. Timothy Linoire and Hans Ulrich-Gumbrecht. Stanford: Stanford University Press, 1999.
- . *Principles of Biological Autonomy*. New York: Elsevier North Holland, 1979
- VARELA, Francisco, Evan THOMPSON, and Eleanor ROSCH. *The Embodied Mind*. Cambridge: MIT Press, 1991.
- WALDENFELD, Berhard. "Out of Balance." Arakawa and Gins, *Reversible Destiny* 208-213.