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BEYOND AUTOPOIESIS:  
INFLECTIONS OF EMERGENCE AND POLITICS  
IN THE WORK OF FRANCISCO VARELA

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INTRODUCTION

Francisco Varela's work is a monumental achievement in 20<sup>th</sup> century biological and biophilosophical thought. After his early collaboration in neo-cybernetics with Humberto Maturana ("autopoiesis"), Varela made fundamental contributions to immunology ("network theory"), Artificial Life ("cellular automata"), cognitive science ("enaction"), philosophy of mind ("neurophenomenology"), brain studies ("the brainweb"), and East-West dialogue (the Mind and Life conferences). In the course of his career, Varela influenced many important collaborators and interlocutors, formed a generation of excellent students, and touched the lives of many with the intensity of his mind, the sharpness of his wit, and the strength of his spirit. In this essay, I will trace some of the key turning points in his thought, with special focus on the concept of emergence, which was always central to his work, and on questions of politics, which operate at the margins of his thought. I will divide Varela's work into three periods – autopoiesis, enaction, and radical embodiment – each of which is marked by a guiding concept; a specific

methodology; a research focus; an inflection in the notion of emergence; and a characteristic political question which specifies a scale of what I will call “political physiology,” that is, the formation of “bodies politic” at the civic, somatic, and “evental” scales. These terms refer to, respectively, the formation of political states, of politically constituted individuals, and their intersection in political encounters.

The first period, marked by the concept of autopoiesis, runs from the early 1970s to the early 1980s, and uses formal recursive mathematics to deal with synchronic emergence, that is, a focused behavior on the part of an organic system which is achieved via the constraint of the behavior of components of the system; synchronic emergence can be seen as the question of the relation of part and whole. The research focus is on identifying an essence of life. The political question here is the limit of using autopoiesis as a model for enacting social being. Varela sees autopoiesis as only an instance of a general mode of being, organizational closure; he restricts autopoiesis to cellular production – that is, to living systems bound by a physical membrane – and warns against using it as a model of social being. Here we see the question of the macro-scale of political physiology, the formation of a “body politic” in the classical sense, what we will call a “civic body politic.” Varela refuses to countenance the use of autopoiesis as a model for social systems, I will argue, not so much for purely “cognitive” reasons, but because when autopoiesis is enacted, when it is the model for a way of social being, then social systems become obsessed with physical boundaries, leading to a fratricidal zero-sum competition. For him, systems above the cellular level – i.e., neurological and immunological systems, and social systems – are to be thought as informational systems with organizational closure. (Luhmann, however, will use the term “autopoietic” with

regard to those systems as well.) The end result is that autopoietic enactment, in Varela's sense, is solely concerned with synchronic emergence (homeostatic part-whole relations), and is thereby unable to foster the condition for diachronic emergence in social and political dynamics (the emergence of novel patterns from the undoing of former patterns). I will argue that Varela implicitly holds that the historical changes and multiple causation of political systems must be thought in terms of a field whose dynamics are modeled with nonlinear differential equations, which is beyond the scope of autopoietic thought.

The second period, whose concept is that of enaction, spans the late 1980s and early 1990s, and uses differential equations to model dynamic systems in order to deal with diachronic emergence, the production of novel functional structures. The research focus is embodied cognition. In this period we must distinguish two time scales of diachronic emergence: (a) the fast-scale of the coming-into-being of a systematic focus of actual behavior from a repertoire of potential or virtual behaviors; and (b) the slow-scale of the acquisition of the behavioral modules that form the virtual repertoire available to a system at any one time. The interplay of these scales requires that we think a "virtual self." The political question here is leisure: politics as the system controlling access to training for the acquisition of skills according to the differential access to leisure or free time. Here we see the meso-scale of political physiology, the formation of a somatic body politic as the resolution of the differential relations that structure a dynamic social-political-economic field, a process that is very crudely analogous to crystallization in a "metastable" super-saturated solution.

The third period, whose concept is that of radical embodiment, runs from the mid-1990s to Varela's premature death in 2001, and uses the methodology of

neurophenomenology to discuss transversal emergence, the production of distributed and interwoven systems along brain – body – environment lines. The research focus is consciousness (both basic consciousness or “sentience” and higher level reflective or self-consciousness) as it arises in the interaction of affect and cognition. With the turn to affect in theorizing concrete consciousness as enacted in distributed and interwoven brain – body – environment systems we approach the political questions of the other and concrete social perception and hence a micro-scale of political physiology, the formation of “evental” bodies politic, or, perhaps less barbarically named, political encounters. As we will see, such encounters enfold all levels of political physiology, as a concrete encounter occurs in a short term social context between embodied subjects formed by long term social and developmental processes. More precisely – since “context” is too static – a political encounter, like all the emergent functional structures of political physiology, is the resolution of the differential relations of a dynamic field, in this case, one operating at multiple levels: civic, somatic and evental. (Here we see the limits of the crystallization analogy, as crystals form in homogeneous solutions, while political encounters coalesce in heterogeneous environments.)

#### AUTOPOIESIS AND SYNCHRONIC EMERGENCE

Varela is perhaps best known for his early collaboration with Humberto Maturana in developing the concept of autopoiesis. This work, published in Spanish in 1973, and made known to the Anglophone community by a 1974 article and then by a 1980 monograph, is a classic of “second-order” or “neo” cybernetics. In our terms, it is marked

by a notion of “synchronic emergence,” which is conducted in static part / whole terms. The concept of autopoiesis was developed to provide a horizon of unity for thinking living entities, rather than the haphazard empiricism of the “list of properties” model usually adopted (“reproduction, metabolism, growth ...”). In other words, Maturana and Varela were trying to isolate an essence of life, an essence which would provide a viewpoint on life that is “history independent” (Varela, Maturana and Uribe 1974: 187).

To produce the concept of the essence of life, Varela and his colleagues distinguish organization (essence) and structure (historical accident). Organization is the set of all possible relationships of the autopoietic processes of an organism; it thus forms the autopoietic ‘space’ of that organism (Maturana and Varela 1980: 88 [scare quotes in original]). Structure is that selection from the organizational set that is actually at work at any one moment (Maturana and Varela 1980: xx, 77, 137-38; see also Hayles 1999: 138 and Rudrauf et al, 2003: 31). Changes in the environment with which the system interacts are known as “perturbations” of the system. The system interacts only with those events with which it has an “interest” in interacting, that is, those events that are relevant to its continued maintenance of autopoietic organization (e.g., nutrients). These events of interaction form a process of “structural coupling” that leads to structural changes in the system. These changes, as reactions to the perturbation, either re-establish the baseline state of the system (they re-establish the homeostasis of the system) or result in the destruction of the system *qua* living (Maturana and Varela 1980: 81). Homeostatic restoration thus results in conservation of autopoietic organization. From this essentialist viewpoint, the origin of life must be a leap into another register, a *metabasis eis allo genos* (“the establishment of an autopoietic system cannot be a gradual process; either a

system is an autopoietic system or it is not” [Maturana and Varela 1980: 94]). From the autopoietic perspective, questions of diachronic emergence have to be thought in terms of “natural drift,” whose relation to autopoietic essential organization is problematic, as we will see. In any event, clearly autopoietic organization is synchronic emergence in which the whole arises from a “network of interactions of components” (Varela, Maturana and Uribe 1974: 187).<sup>1</sup>

The difficulty here is that the assumption of organization as a fixed transcendental or essential identity horizon prevents us from thinking life as the virtual conditions for creative novelty or diachronic emergence. Life for autopoiesis is restricted to maintenance of homeostasis; creative evolutionary change is relegated to structural change under a horizon of conserved organization. If virtual organization is conserved for each organism, no matter the changes in its actual structure – one of the prime tenets of their autopoietic theory – then on an evolutionary time scale, all life has the same organization, which means all life belongs to the same class, and has only different structure. As Katherine Hayles puts it: “either organization is conserved and evolutionary change is effaced, or organization changes and autopoiesis is effaced” (Hayles 1999: 152). Autopoietic theory gladly admits all this. “Reproduction and evolution do not enter into the characterization of the living organization” (Maturana and Varela 1980: 96); evolution is the “production of a historical network in which the unities successively produced embody an invariant organization in a changing structure” (104). Although autopoietic theory, developed in the 1970s at the height of the molecular revolution in biology, performed an admirable service in reasserting the need to think at the level of the organism, it is clear that autopoiesis is locked into a framework which posits an identity-

horizon (organizational conservation) for (structural) change. To summarize: for autopoietic theory, living systems conserve their organization, which means their functioning always restores homeostasis; evolution is merely structural change against this identity horizon.

Let us focus on another key feature of autopoietic systems, the autonomy that they possess in virtue of their synchronic emergence. Their internal complexity is such that “coupling” with their environment or endogenous fluctuations of their states are only “triggers” of internally-directed action. This means that only those external environmental differences capable of being sensed and made sense of by an autonomous system can be said to exist for that system, can be said to make up the world of that system. The positing of a causal relation between external and internal events is only possible from the perspective of an “observer,” a system that itself must be capable of sensing and making sense of such events in *its* environment.

Quite soon after writing *Autopoiesis* with Maturana in 1973, Varela came to restrict the validity of the idea of autopoiesis to the cellular level, rejecting the use of autopoiesis as a concept for thinking social systems. In this period of his work, Varela distinguishes between autopoiesis, limited to physical production within the spatial border provided by a cellular membrane, and organizational closure, which can be applied to systems with an “informational” component. Varela thus comes to insist on the “complementarity” of two forms of explanation: autonomy versus control or, what amounts to the same distinction, autopoietic versus informational-symbolic explanations. In “On Being Autonomous: The Lessons of Natural History for Systems Theory” (1977), Varela insists that autonomy and control perspectives are complementary. At this period

of his work, Varela is working with a recursion model of closure, where the “closure thesis” states that “every autonomous system is organizationally closed,” and organizational closure entails the “indefinite recursion of component interaction” (1977: 79). Here Varela distinguishes cells as “physically independent units” from “systems where autonomy is expressed in an ‘informational’ way . . . nervous and the immune system of animals, which are, as it were, cognitive systems in the macroscopic and microscopic domains of the organism” (79). It is this distinction between physical production enclosed in a physical space and the “information” of distributed systems that will lead him to restrict autopoiesis to the cellular level. “Information” of course must be in scare quotes as the cognition Varela is talking about entails structural coupling and triggering of autonomous response, rather than recovery of objective information.

Here Varela posits limits of “differentiable dynamic representation” (modeling of the changes in systems) due to the limited ability at the time to handle the differential equations necessary to model nonlinear dynamic systems (81) and so opts for his self-referring, indefinite recursion model, which needs “an infinite-valued logic.” Operator trees are constructed and “circularity is captured through the solutions or eigenbehaviors of equations in this operator domain.” This allows a “representation of autonomy which is not so abstract as indicational forms, and yet not so demanding of quantitative detail as in differentiable dynamic descriptions” (82). The paper closes with a clear statement of Varela’s constructivism and anti-realism: “the contents of our reality are truly a reflection of the recursive biological and cognitive computations . . . there is more a construction than a map” (82). We will see how what Varela would call the *autopoietic* enactment of this autonomous constructivism, whereby a system comes to focus on what it is already



set up to see as being in its “interest” in maintaining its *physical* boundaries, will have disastrous effects when such an “epistemology” is instantiated in a political system producing mutually blind – and hence fratricidal – competing systems, in a time of civil war.<sup>2</sup>

In the meantime, we should stick with the question of modeling of systems. In *Principles of Biological Autonomy* (1979) Varela explains that he is attracted to dynamical systems models, but finds them limited to the molecular level and suggests algebraic / formal recursion models as the most general kind to use in modeling larger systems. “The classical notion of stability in differentiable dynamics is the only well-understood and accepted way of representing autonomous properties of systems.... [we can find] excellent examples of the fertility of this approach for the case of molecular self-organization” (203). However, this approach has a restricted validity: “An underlying assumption, is, however, that there is a collection of interdependent variables, and it is the reciprocal interaction of these component variables that brings about the emergence of an autonomous unit.... [Thus] the differentiable dynamic description becomes a specific case of organizational closure” (203). More precisely, the dynamical systems approach is of limited validity for organisms (and political systems, as we will see), where we find a number of interlocking and embedded informational or symbolic systems: “At the same time one finds the limitations imposed by [the differentiable framework]: More often than not, autonomous systems cannot be represented with differentiable dynamics, since the relevant processes are not amenable to that treatment. This is typical for informational processes of many different kinds, where an algebraic-algorithmic description has proven more adequate. Accordingly, the fertility of the differentiable representation of autonomy

and organizational closure is mostly restricted to the molecular level of self-organization” (203).

The difference between the dynamical and the formal models depends on the difference between an abstract temporal approach and a concrete spatial approach. Varela refers to the dynamic approach of Eigen and Goodwin as that which focuses on a “network of reactions and their temporal invariances, but disregard on purpose the way in which these reactions do or do not constitute a unit in space” (204). In this emphasis on physical boundaries and material production we see what leads Varela once again to insist on the need for complementarity between control and autonomy perspectives in which dissipative systems are treated as input-output fluxes. Although he claims there is some evidence of dynamic models able to capture membrane formation, as in Zhabotinsky reactions, “it is still a matter of investigation how well the differentiable-dynamics approach can accommodate, in a useful way, the spatial *and* the dynamic view of a system” (204). Beyond the molecular level we reach our cognitive limits, set by the state of knowledge at the time: “But it is in going beyond the molecular level, where we cannot rely on a strong physico-chemical background of knowledge, that the insufficiency of the differentiable framework appears, and thus the need to have a more explicit view of the autonomy/control complementarity, and an extension of differentiable descriptions to operational/algebraic ones” (205).

In other words, at the time of *Principles*, Varela thought that cellular autopoiesis could be thought dynamically, and that, while neurological and immunological processes are “borderline cases” (205), higher level processes, organismic and social, could not be.<sup>3</sup> The key question is the ability to represent metastable (changeable, creative) systems.

That is impossible in 1979 with the algebraic approach; we are left with a series of questions for further research:

Clearly, both approaches cover somewhat *non*-overlapping aspects of systemic descriptions. Thus, it is necessary to have a way of dealing with plasticity and adaptation. Natural systems are under a constant barrage of perturbations, and they will undergo changes in their structure and eigenbehavior as a consequence of them. There is no obvious way of representing this fundamental time-dependent feature of system-environment interactions in the present algebraic framework. In contrast, the question of plasticity is a most natural one in differentiable frameworks because of the topological properties underlying this form of representation: hence the notions of homeomorphism and structural stability in all their varieties. To what extent can the experience gained in the differentiable approach be generalized? How can notions such as self-organization and multilevel coordination be made more explicit in this context? Is category theory a more adequate language to ask these questions? These and many more are open questions. (205-206).<sup>4</sup>

The political question in this first period is the extension of autopoiesis as a model for enacting social being, the question of the body politic in its classic sense, what we call the macro-scale of political physiology. Varela will reject all attempts at such an extension. The tension with Maturana on this point is evident in the 1980 English publication of *Autopoiesis*, where the authors note that they are unable to agree “on an answer to the question posed by the biological nature of human societies from the

vantage point” of autopoiesis (Maturana and Varela 1980: 118). Varela’s departure from Maturana is apparent in “On Being Autonomous,” where autopoiesis is said to suggest a “universal feature” shared by many other types of systems, to wit, “organizational closure,” which extends beyond physical systems to “informational” systems (Varela 1977: 79). In “Describing the Logic of the Living,” Varela is crystal clear: “autopoiesis is a particular case of a larger class of organizations that can be called *organizationally* closed, that is, defined through indefinite recursion of component relations” (Varela 1981: 37; italics in original). After insisting on some concrete sense of “production” to define autopoiesis, Varela drives home his point: “Frankly, I do not see how the definition of autopoiesis can be *directly* transposed to a variety of other situations, social systems for example” (38; italics in original).

In a late interview, “Autopoïese et émergence,” Varela gives his reasons for resisting an extension of autopoiesis to the social:

It’s a question on which I have reflected for a long time and hesitated very much. But I have finally come to the conclusion that all extension of biological models to the social level is to be avoided. I am absolutely against all extensions of autopoiesis, and also against the move to think society according to models of emergence, even though, in a certain sense, you’re not wrong in thinking things like that, but it is an extremely delicate passage. I refuse to apply autopoiesis to the social plane. That might surprise you, but I do so for political reasons. History has shown that biological holism is very interesting and has produced great things, but it has always had its dark side, a black side, each time it’s allowed

itself to be applied to a social model. There's always slippages toward fascism, toward authoritarian impositions, eugenics, and so on. (2002; my translation)

What is the key to the “extremely delicate passage” necessary to think social emergence while avoiding the “dark side” of the slide into fascism? First we should note the complete rejection of autopoietic social notions, while the notion of social emergence is less strongly condemned. I would argue that the difference lies in Varela's conception of autopoiesis as synchronically emergent, which locks out the sort of diachronic emergence we will study in the next section. If one could think the formation of civic bodies politic using dynamic systems modeling (something that for Varela at the time of *Principles* was considered impossible, as we have seen), if one could see them as resolutions of the differential relations inherent in a dynamic field (again, something crudely analogous to crystallization in super-saturated solutions or lightning as the resolution of electric potential differences in clouds or weather systems as resolution of temperature differences in air and water), then we would at least have the possibility of an “extremely delicate passage” in thinking political change. But without that possibility of novel production, modeled by dynamic systems means, autopoietic social systems, once formed and mature, construct a world only in their own image, and, when locked in conflict with another such system, cannot ascend to an “observer” status that would see them both as parts of a larger social system. Instead, the two conflicting systems are locked in fratricidal combat, producing a torn civic body politic, producing civil war.

Let us turn here to “Reflections on the Chilean Civil War” (1979b), for some historical detail about Varela's worries about the political misuse of “biological holism,” or a misapplication of autopoiesis in enacting the macro-scale of political physiology, the

formation of a society or body politic. In this discussion, “epistemology” is not a matter of neutral understanding, but of enactment, of the bringing into being of a way of social living. The stakes are the highest possible for Varela in this deeply personal and emotional piece: “epistemology does matter. As far as I’m concerned, that civil war was caused by a wrong epistemology. It cost my friends their lives, their torture, and the same for 80,000 or so people unknown to me” (19). Varela’s analysis shows that Chile had become polarized into two separate worlds without communication, that is, one could claim, two “autopoietic” systems with no sense-making overlap, no means of mutual recognition, but only a concern with physical boundary maintenance: “the polarity created a continual exaggeration of the sense of boundary and territoriality: ‘This is ours; get out of here’” (16). I read this as Varela indicating the dangers of extending autopoietic notions to the social. The danger lies not in using autopoiesis as a means of understanding the social, but in using autopoiesis as a model in enacting a way of social being. An autopoietic social being is one focused on boundary maintenance, and this focus can create a fratricidal polarity.

The key to understanding Varela’s prohibition on extending autopoiesis to social systems, that is, his move “beyond autopoiesis” – but not beyond neocybernetics as concern with organizational closure of informational systems – is to appreciate his warning against enacting the concern with physical boundary protection, which carries along with it the risk of falling into “polarization.” Varela recounts his moment of insight when he overcame that polarization: “polarity wasn’t anymore this or that side, but something that we had collectively constructed”; political worlds, previously autonomous, had to be considered merely “fragments that constituted this whole” (18).

The problem, of course, is establishing the “observer” position which can use the notion of the interaction of organizationally closed informational systems to appreciate this larger whole encompassing the autonomous and mutually blind systems. Varela finds this position in Buddhist practice, with its necessity of stressing the “connection between the world view, political action and personal transformation” (19). To avoid the fratricidal polarization of competing autonomous systems, relativistic fallibility is the key to the construction of a political world: “we must incorporate in the *enactment*, in the projecting out of our world views, at the same time the sense in which that projection is only one perspective, that it is a relative frame, that it must contain a way to undo itself” (19; emphasis added). Such flexibility, as we will see next, is available to a system producing a “virtual self” out of a multiplicity of coping resources, out of a repertoire of behaviors, but is foreclosed to the physical cellular systems to which Varela consigns autopoiesis. For that reason, the autopoietic model of cellular systems is disastrously mis-applied when used to *enact* the macro-scale of political physiology, as in the brutally violent “epistemology” (*qua* way of social being) enacted by the conflicting sides in the Chilean Civil War. To summarize Varela’s position: *enacting* autopoiesis as a way of social being (as distinguished from using the concept of organizationally closed informational systems to *understand* a social situation) turns a social field into a polarized confrontation of systems seeking physical boundary maintenance; focused on synchronic emergence or part-whole relations, which it sees in zero sum terms (“this is ours; get out of here”), such autopoietic enactment cannot foster the conditions for the diachronic emergence of historical novelty.

## THE VIRTUAL SELF AND DIACHRONIC EMERGENCE

With this invocation of the key term “enactment,” we can move to the second period of Varela’s work, the late 1980s and early 1990s, in which the recursive models of systems Varela used in *Principles* under the acknowledged influence of Spencer-Brown’s *Laws of Form* drop away as dynamical systems modeling makes progress, especially in connectionist work in cognitive science. Here we see that Varela’s work develops a notion of “diachronic emergence” (emergence as the production of novel structures).<sup>5</sup> In this period, Varela broke into his own with a series of fundamental works on Artificial Life, immunology, and the status of the organism. This period culminates with his second most well-known work, *The Embodied Mind* (with Evan Thompson and Eleanor Rosch), the manifesto of the “enactive” school in cognitive science; this approach has been modified and developed in the work of, in particular, Thompson,<sup>6</sup> Andy Clark,<sup>7</sup> and Alva Noë.<sup>8</sup>

In this second period of his work, Varela deals with three “cognitive” registers: immunological; neurological; and organismic (which includes the previous two). We will concentrate on the intersection of the neurological and the organismic, but should not forget Varela’s groundbreaking work theorizing the immune system as a network, which rejects the military metaphor of protection of interiority, and which resolves the paradoxes of self versus nonself recognition which beset the classic concept (see, for example, Varela and Coutinho, 1991).



The inflection of emergence in the period of enactment or the virtual self is diachronic emergence, which operates at two temporal scales in both neurological and organismic registers. On the fast scale in the neurological register, we find resonant cell assemblies, which arise from chaotic firing patterns; on the fast scale in the organismic register we see the arising of behavioral modules or “micro-identities” from a competition among competing modules. We can see that both these modes of diachronic emergence on the fast scale are resolutions of a dynamic, metastable differential field. While Varela concentrates on the fast scale, we will examine the slow scale, the acquisition of behavioral modules in those registers, for here we intersect the political question of leisure and access to training for acquisition of skills. The differential field here is the field of formation of “somatic bodies politic,” the meso-scale of “political physiology.”

Working from connectionist models, but rejecting their representationalist assumptions, Varela looks to resonant cell assemblies (RCA) as the neurological correlate for “micro-identities.” The latter concept comes from phenomenological reflection on the concrete life of the everyday. Following Heidegger and Merleau-Ponty in opposing a Cartesian heritage privileging self-conscious, reflective, and verbal reasoning as the essence of cognition, Varela will claim that most everyday life (of competent adults, to be sure), is accomplished in skilled, non-reflective compartments. Disruptive social encounters, however, lead to “breakdowns” in such everyday coping, and can lead to reflective decision-making or to the adoption of another skilled compartment (Varela 1991;1992). The neurological correlates of breakdowns are a fall into a background of chaotic firing, out of which emerges a new RCA. This resolution of the differential field

of widely distributed chaotic firing forms the basis for creativity in the arising within the organism of a triumphantly emergent comportment. There is no “choice” here, as the process of arising of an RCA is too fast for conscious reflection, which occurs in temporal chunks, so that RCA formation occurs “behind the back” of reflective consciousness. An RCA is the neurological correlate of what is described in other registers as a skill or agent or module, and the creative emergence occurs on the basis of the historical formation of a repertoire of behavioral modules.

We see here two important concepts: the virtual self and the enactment of world. As this repertoire is a distributed and modular system, both at the behavioral as well as the neurological level, Varela will talk of a “virtual self” or “meshwork of selfless selves,” as the subtitle of Varela 1991 puts it. The correlate of the virtual self, with its multiplicity of micro-identities, is the enacted world. The laws of physics, or the regularities of the environment (the epistemological niceties that might distinguish these phrases need not concern us here), form only loose constraints for the worlds each organism brings forth or enacts in a process of “surplus signification.” Here we see echoes of the sense-making at the heart of the autopoietic notion of “structural coupling,” but with more ability to flesh out the neurological processes at work.

With these two concepts, as well as Heidegger and Merleau-Ponty, in mind, Varela and colleagues write in *The Embodied Mind*:

The challenge posed by cognitive science to the Continental discussions, then, is to link the study of human experience as culturally embodied with the study of human cognition in neuroscience, linguistics, and cognitive psychology. In contrast, the challenge posed to cognitive science is to question one of the most

entrenched assumptions of our scientific heritage – that the world is independent of the knower. If we are forced to admit that cognition cannot be properly understood without common sense, and that common sense is none other than our bodily and social history, then the inevitable conclusion is that knower and known, mind and world, stand in relation to each other through mutual specification or dependent coorigination. (1991: 150)

At this point I would like to shift from exposition to critical engagement by extending this series of challenges so that enaction is in turn challenged to examine the unconscious social grouping hiding in the “our” of “our bodily and social history.” The challenge is to examine the historical and political system that distributes leisure and the access to training for learning of behavioral modules. A further challenge is to disabuse ourselves of the naïve notion that all those modules are beneficial to the body that incorporates them, rather than beneficial to the power structure of the society. In other words, many people incorporate behavioral modules that hurt them, although they help reproduce inequitable social dynamics.<sup>9</sup>

We see the contours of this problematic in *Ethical Know-How*, published in the *Embodied Mind* period. The “constitution” of the “cognitive agent” is “a matter of commonsensical emergence of an appropriate stance from the entire history of the agent’s life.... The key to autonomy is that a living system finds its way into the next moment by acting appropriately out of its own resources. And it is the breakdowns, the hinges that articulate microworlds, that are the source of the autonomous and creative side of living cognition” (Varela 1992: 11). Once again, we have to distinguish two temporal scales of diachronic emergence: “the moment of negotiation and emergence when one of the many

potential microworlds takes the lead . . . the very moment of being-there when something concrete and specific shows up . . . within the gap during a breakdown there is a rich *dynamic* involving concurrent subidentities and agents” (49). This is the fast dynamic. If we are to critically engage Varela’s work, we also need to thematize how the behavioral repertoire that provides the scope of those many potential microworlds has emerged over the slow-scale of development, maturation, and learning. In other words, we must think the slow dynamic of structural coupling leading to the ontogenesis of the embodied subject, a process that must be analyzed politically as the differential access to training. To bring out all its potential, Varela’s insistence on autonomous organisms needs to be supplemented with an analysis, using social / political categories, of the distribution of access to training that allows differential installation of modules / agents / skills in a population of organisms.

The important thing is not to confuse autonomy and competence. A corporeal subject with a limited repertoire of capacities, or with a repertoire of disempowering habits, is still autonomous in the Varelean sense, as producing behaviors on the basis of environmental triggers or endogenous fluctuation. No matter how wide or narrow your repertoire of skills, no matter how powerful or weak you are in enacting them, you are no more autonomous than is any other organism in any one action. However, there is a difference in competence, how well your actions enhance your survival and flourishing and those of others, as well as a difference in the range of environmental differences you can engage and survive, thus preserving your autonomy for future encounters.<sup>10</sup> But you have to be trained to acquire many of these skills. As Varela puts it in *Ethical Know-How*: “the world we know is not pre-given; it is, rather, enacted through our history of

structural coupling, and the temporal hinges that articulate enaction are rooted in the number of alternative microworlds that are activated in each situation” (17). Again, in order to develop more fully Varela’s insight and thus to reach the full concrete reality of our social life, we have to analyze politically that history of structural coupling in terms of access to training to greater or lesser number and greater or lesser quality of skills opening microworlds.

The key to thematizing this meso-scale of political physiology is to think of downward causation in social emergence, the macro-scale of the body politic we referred to above. Picking up here on a contemporaneous essay written with Jean-Pierre Dupuy (Varela and Dupuy 1992), Varela describes in *Ethical Know-How* the way upward causality allows for the emergence of social regularities: “interactions with others . . . Out of these articulations come the emergent properties of social life for which the selfless ‘I’ is the basic component. Thus whenever we find regularities such as laws or social roles and conceive them as externally given, we have succumbed to the fallacy of attributing substantial identity to what is really an emergent property of a complex, distributed process mediated by social interactions” (62). But here Varela is working with a formal model of synchronic emergence, and has neglected the downward causality of these regularities, whether institutionalized in disciplinary intervention or distributed as modulating “control,” as they work in the slow temporal scale of the diachronic formation of somatic bodies politic in the context of a particular constellation of a civic body politic. As generations go by, we see a patterned differential social field, channeling perception, action, and affect, along lines of social “roles.” Varela has only demonstrated that laws, rules, institutions, etc are emergently produced by upward causality in a

synchronic emergence; he has neglected to show the downward causality effected by these regularities (which we could model by tracking the formation of attractors in a social space representing social “habits”) and the way this socially enacted world structurally couples with, and guides, the ontogeny of the individual person. It’s the pre-personal social field that needs to be thought, as persons are resolutions of the differential social field, concretions that form the affective topology of the person: the patterns, thresholds and triggers of basic emotions or affective modules of fear, rage, joy and so on as they interact with the cognitive topology of the person, the cognitive modules or basic coping behaviors that make up the everyday repertoire of the person.

#### NEUROPHENOMENOLOGY AND TRANSVERSE EMERGENCE

In developing the practice of “neurophenomenology,” a concept he produced in 1996, Varela begins his late period. It is in this period that the point of contact with politics appears in the question of concrete and affective social perception, the formation of the “evental” body politic or the political encounter, what we will call “transverse emergence.” This latter term indicates the formation of a functional structure involving organic systems and environmental objects, including technological items, as we see in “extended cognition” involving the use of physical marks, ranging from simple scratches in clay tablets to calculators, computers, and the like.<sup>11</sup>

In a late and very important article, collaborating for the last time with Evan Thompson, Varela writes: “Neural, somatic and environmental elements are likely to interact to produce (via emergence as upward causation) global organism-environment

processes, which in turn affect (via downward causation) their constituent elements” (Thompson and Varela, 2001: 424). There is a slight terminological nuance here, as Varela has always distinguished “environment” (as objectivist or realist) from “world” (as enactive). We are to read this distinction as maintaining that the “environment” (= “laws of nature” or physical regularities) provides constraints on world-making, but constraints only, and don’t optimally specify those worlds. Thus, to use the classic example from *The Embodied Mind*, light obeys laws of physics, but that only provides constraints on the construction of many different enacted color-worlds, which track lines of natural drift. The precision is that we do not see structural coupling between organism and world, but between organism and environment, with the latter coupling being the process of the enactment of world. With this in mind, we note that Thompson and Varela specify three dimensions of “radical embodiment.”

(1) Organismic regulation in which affect appears as a “dimension of organismic regulation . . . the feeling of being alive . . . inescapable affective background of every conscious state.”

(2) Sensorimotor coupling, where “transient neural assemblies mediate the coordination of sensory and motor surfaces, and sensorimotor coupling with the environment constrains and modulates this neural dynamics. It is this cycle that enables the organism to be a situated agent.” Insofar as “situated agent” means “that which enacts a world,” we see that coupling with the environment constrains and enables world-making.

(3) Intersubjective interaction, whereby “the signaling of affective state and sensorimotor coupling play a huge role in social cognition . . . higher primates

excel at interpreting others as psychological subjects on the basis of their bodily presence (facial expressions, posture, vocalizations, etc) . . . Intersubjectivity involves distinct forms of sensorimotor coupling, as seen in the so-called ‘mirror neurons’ discovered in area F5 of the premotor cortex in monkeys . . . there is evidence for a mirror-neuron system for gesture recognition in humans, and it has been proposed that this system might be part of the neural basis for the development of language” (Thompson and Varela 2001: 424).

We should note here that the thought of intersubjectivity in Varela’s late period stems from the notion of “the other” as developed in the theory of the recognition of the alter ego, based on Husserl’s 5<sup>th</sup> Cartesian Meditation (although supplemented by the recognition of recent research into mirror neurons). For example, Varela writes in a popularizing article from 1999:

It is best to focus on the *bodily* correlates of affect, which appear . . . as directly felt, as part of our *lived body*. . . This trait . . . plays a decisive role in the manner in which I apprehend the other, not as a thing but as another subjectivity similar to mine, as alter ego. It is through his/her body that I am linked to the other, first as an organism similar to mine, but also perceived as an embodied presence, site and means of an experiential field. This double dimension of the body (organic/lived; *Körper/Leib*) is part and parcel of empathy, the royal means of access to social conscious life, beyond the simple interaction, as fundamental intersubjectivity.<sup>12</sup>

To see how the problematic of the “other” is an abstract “philosopher’s problem,” let us note that in *The Embodied Mind*, Varela and his collaborators, Evan Thompson and



Eleanor Rosch, cite Rosch's research into categorization, where, in a 1978 article, she poses a "basic level" of perception / action / linguistic naming in a hierarchy of abstraction. This basic level is, in her example, "chair" rather than "furniture" or "Queen Anne." In the same article Rosch proposes a "prototype" theory for internal category structure – rather than an ideal exemplar, we have concrete prototypes by which we judge category membership by how close or far an object is to our prototype, not whether or not it satisfies a list of necessary and sufficient conditions that we carry around with us. If we adopt Rosch's model, in concrete social perception we are never faced with the Husserlian problem, "is this just a thing or is it an alter ego?" which we resolve by distinguishing between things and subjects. Rather we are always confronted with other people at "basic level" social categories appropriate to our culture: for us today, the famous age, size, gender, race, class system. So we never see another "subject"; instead, we see over here, a middle-aged, small, neat, fit, professional black woman (Condoleeza Rice, let's say), or an elderly, patrician, tall white man (George H. W. Bush, let's say).

So we have to say that Varela's discussion in "Steps" is abstract, which is revealed by his use of "his/her." In our society, we never *perceive* a "subject" we can call "his/her": we can posit such a creature, but that's a refined political act of overcoming our immediate categorization process, by which we perceive gendered subjects, to construct an abstraction we can call a non-gendered "intersubjective community" or "humanity" or some such. While this might be a worthy ethical ideal for which we can strive, it's just simply not what we perceive "at first glance."

It's not that we are completely without guidance here regarding social perception. In their "At the Source of Time" article, Varela and Depraz mention what would need to

be fleshed out: among the five components of affect the first is: “a precipitating *event*, or trigger that can be perceptual (a social event, threat, or affective expression of another in social context) or imaginary (a thought, memory, fantasy ...) or both” (Varela and Depraz 2000: page?). In other words, the social trigger has to be recognizable, based on the ontogeny of the perceiving subject. As we claim above, this ontogeny has to be thought as a resolution of a pre-personal dynamic differential social field. After learning our mid-level social categories,<sup>13</sup> we never immediately encounter an “other,” only concrete people we locate in complex social categorization scheme. The encounter with the “other” is the result of an abstraction, a working up of the initial encounter, abstracting away from the “midlevel” categories of concrete social perception.<sup>14</sup>

Let us conclude this article by returning to “Reflections on the Chilean Civil War,” where Varela provides an example of midlevel categories in concrete social perception and affect (1979b: 18): “I remember very well that the soldier, whom I saw machinegunning the other fellow who was running down the street, was probably a 19-year old boy from somewhere in the South. A typical face of the people of the South.... I could see in his face what I had never seen, a strange combination of fear and power.”

Varela’s reminiscence rings true to concrete social perception. He didn’t see a neutral “subject,” an “other”; he saw a Southern Chilean boy of 19, a concrete person who is gendered, aged and racially or at least ethnically marked. In that marking, and in the perception of a new affective state on the soldier boy’s face, that “strange combination of fear and power,” we engage all scales of political physiology: the macro-scale of a civic body politic torn apart in civil war; the meso-scale of the development of the repertoire of behavioral modules, as the boy is marked by this affective combination;

and the micro-scale of political encounter, mediated by affect and cognition on Varela's part as this assemblage or momentary transversal emergence arises: street, gun, soldier, shooting, running, dying, observing. Our challenge is to negotiate the "extremely delicate passage" of social emergence which would let us to think through the interchanges of all levels of political physiology in this haunting scene, civic, somatic, and evental at once.

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## NOTES

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<sup>1</sup> In “Not One, Not Two” Varela also notes the synchronic emergence of wholes from the interaction of parts [1976: 63]).

<sup>2</sup> I am not claiming that *all* systems of organization closure, for instance those that are in Varela’s terms informational, are dangerous social models. Thus I’m not arguing that Varela’s warning holds against all social systems, which Luhmann terms “autopoietic.”

<sup>3</sup> Advances in computer simulation will later allow for the dynamic modeling of co-operation and competition in the formation of resonant cell assemblies, as we can see by 1991 in *The Embodied Mind*.

<sup>4</sup> Robert Rosen takes up category theory (cf. *Life Itself*); Varela drops the formalization as more adequate dynamical models appear.

<sup>5</sup> In a dialogue with Cornelius Castoriadis, Varela specifies that such emergence is neither aleatory nor calculable (Castoriadis 2000: 113).

<sup>6</sup> *Mind in Life: Biology, Phenomenology, and the Sciences of Mind* (Cambridge MA: Harvard, 2007).

<sup>7</sup> *Being There: Putting Brain, Body, and World Together Again* (Cambridge MA: MIT, 1997).

<sup>8</sup> *Action in Perception* (Cambridge MA: MIT, 2004).

<sup>9</sup> Iris Marion Young’s “Throwing Like a Girl” is a classic critique of the privileged and empowered masculine corporeal subject presupposed in Merleau-Ponty’s analyses. She shows how many feminized corporeal subjects experience parts of the world as anxiety-

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producing obstacles, the “same” parts that a competent masculinized subject will encounter as amusing occasions for the demonstration of competence.

<sup>10</sup> Students of philosophy might wish at this point to take up the connection to Spinoza: “what can a body do? How can it be affected?”

<sup>11</sup> Regarding the emergent functions in the interplay of animal physiology and the structures they build, see *The Extended Organism*. Regarding human – technology interfaces, see Clark, *Natural Born Cyborgs* and Hansen, *Bodies in Code*.

<sup>12</sup> “Steps to a Science of Inter-Being,” p. 81; see also “At the Source of Time” (Varela and Depraz 2000), where we read of “a primordial duality, a rough topology of *self-other*.”

<sup>13</sup> Rogers and Hammerstein, in *South Pacific*: “you’ve got to be taught . . . carefully taught!”

<sup>14</sup> This is where we need more empirical work on humans and mirror neurons. With monkeys we know that it is simply intra-specific. What I want to ask is if that’s the case for humans or if our historical-cultural bodily formation (what I’m calling “political physiology”) doesn’t set even our mirror neuron empathizing at socially constructed “mid-level” categories? Do we “dehumanize” enemies in warfare (we can kill them because they’re inhuman vermin, insects, rats, etc) or is “simple” racialization enough? Is it that the inferior races are humanly liminal, at the border of animals?