

Development ‘Sin Techo, Sin Muros’¹

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Introduction

It occurs to me that we are like people at a big birthday party, each of us recognizing only a few of the other guests and asking each other, so how do you know Francisco? By saying a bit about what it could mean for development to occur without ceiling or walls, I’ll be showing how I came to be at his party. I’ll also offer some thoughts on the relationship between Francisco’s approach and my own, and finally, I’ll touch on a couple of contemporary social issues that may be approaching their limits

¹ This paper is based on talks given at two conferences in 2004. The first was *From Autopoiesis to Neurophenomenology. A Tribute to Francisco Varela. Session 1: Autopoiesis and Enaction*, La Sorbonne. Paris, France, June 18-20; the second was *Scientific Representation*, Instituto de Investigaciones Filosóficas, Universidad Nacional Autónoma de Mexico. Coyoacán, Mexico, November 15-16. In addition, several passages were adapted from my paper, “Boundaries and (constructive) interaction,” in Christoph Rehmann-Sutter and Eva M. Neumann-Held (Eds.) (2006), *Genes in development. Rereading the molecular paradigm* (pp. 272-289). Durham, NC: Duke University Press.

of conceptual coherence, presenting us with the question, “What will happen if common understandings of life, body, and mind change in the directions many of us have been advocating?”

Roofs and Walls

Amy Cohen has written: “An old friend of Francisco’s once told me ‘Francisco no tiene techo’. He has no roof. I [Amy continues] always liked this metaphor because it invokes the notion of a construction, but a paradoxical one. The foundations are there, the structural walls and beams, but without a roof it is unfinished and thus presents unlimited possibilities; it is exposed to the elements and thus necessitates inventiveness and flexibility.”

Keep these ideas of exposure, inventiveness, and flexibility in mind for the duration of this talk. They bear on what I want to say about development ‘sin techo.’

You’ll notice I made our roofless house even odder by removing its walls. I’ll try to justify that move in a moment, by distinguishing between the boundaries of an organism and those of its developmental system, but first I want to mention another sense of wall-lessness. Some time after I had submitted my title for this talk, I heard about a Professor of Environmental Science who was embroiled in a tenure dispute. Some claimed that he was paying for having criticized his university’s lucrative intimacy with corporate biotechnology. At one point the embattled

professor held office hours in the open, on a campus plaza. He contrasted this decision with University's secretiveness, but it also dramatized his impending loss of shelter. Moved by this gesture, I appropriated the idea of office hours without walls, to go with the one of Francisco without a roof over his head.

Like other boundaries, ceilings and walls are symbolically resonant. They simultaneously indicate kinship and difference, inclusion and exclusion, containment and escape. Think of "glass ceilings" in the employment place, or walls, visible or not, around neighborhoods. Or think of quarantines. The professor without walls was apparently a vocal critic of the massive planting of genetically modified corn in Mexico. These variants were claimed to be safely sequestered in their own plots, but in the end, of course, they were not so easily contained. The professor's office, in any case, became coextensive with the plaza—or with the entire campus—or, for that matter, the whole world.

One could say we all have office hours without walls, indeed, careers without walls, whatever our own tendencies to compartmentalize. Once "out there" our acts and work can be used and misused in ways we can't control. We are open, often in spite of ourselves, to a wide variety of influences, we make do in altered circumstances, and we change, again often in spite of ourselves. Exposure, inventiveness, flexibility. Though the professor's gesture was ingenious and provocative in its own context, office hours on the plaza can also be taken simply as life. We're here to celebrate Francisco's life, after all, and, as Amy suggested in the passage

I quoted, his was a signal example of a life lived in constant challenge to limits and boundaries of all sorts.

In the more general sense I wish to develop, however, a certain kind of unboundedness characterizes the lives of other organisms as well. This is not to say that possibilities are infinite (as hostile questioners often insist, an ant probably won't become an elephant), but that there is a way of conceptualizing these processes that does justice to the contingencies we encounter, and that doesn't perpetuate problematic dualities. I'm also thinking of the richly reciprocal exchanges between science and common understandings, a matter about which Evelyn Keller has insightfully written, and to which I return at the end. We not only celebrate Francisco's life, we can't help living it, perhaps in ways of which we are not aware, and with which he would have disagreed, just as we were present in his life and work.

That said, my task now is to make sense of this odd, by now overloaded metaphoric construction, of development without ceiling or walls. Let me briefly sketch the framework on which, and within which, I have worked for the last several decades.

Developmental Systems

My work has often been about what I've called the politics of the boundary. "Politics" here includes many kinds of influence, but especially the power to define and privilege, include and categorize. Any theory legitimates some entities and distinctions while making others

unthinkable. My own approach to development and evolution is based on the idea of a developmental system. This is a changing complex of heterogeneous elements, including the organism itself, but also all those aspects of its surroundings—biotic and abiotic, social, ecological--that affect its development and survival. Note that the system here is not identified with the organism itself. The organism is part of a larger system that produces, maintains, and changes it. The makeup of such a developmental system varies over time and across individuals. I call it a system because its constituents, or interactants, are causally interconnected and interdefined. What counts as an interactant, and how it works, as well as what effects it has, is contingent on the larger complex, and on the point of view of the investigator. This is a minimal notion of system: it doesn't assume causal autonomy or homeostatically tight regulation, though some regularity is necessary for there to be an organism at all. One of the reasons I have been engaged with the nature-nurture complex (biology-culture, genes-environment, etc.) is that it has so often been used to prejudge stability, which helps to explain why people are quick to deploy it in moral and policy arguments, and also why it is unwise to do so.

Causal interdependence in a developmental system hardly makes it unanalyzable. An interactant's impact on an organism, or its association with variation among organisms, can be evaluated, but no interactant is privileged a priori as the bearer of form or the locus of causal control. A plant or animal isn't explained by encoded representations in its

chromosomes. And the phenotype isn't merely an appearance--a manifestation of an underlying essence that generates it but that it can misrepresent. This means that an organism's nature is just the organism itself, in whatever worlds it lives.

Never static, a nature emerges in time and space. Nature thus has no existence prior to or separate from the concrete living organism in its concrete, often living, surroundings: no Platonic ideals here, no underlying reality more basic than the being itself, no instruction manuals or tiny engineers in the cell nucleus.

Perhaps it's already clear why, during a certain period, Francisco and I tended to find ourselves on the same panels at conferences, but you can also see the way in which my having begun my scholarly journey with the nature-nurture problem (biology-culture, innate-acquired, etc.) has led me to certain emphases and insistences that are different from his, at least during the period when we saw each other most often, at those conferences and at meetings of the Lindisfarne Fellowship

A Turn through Time

Faced with this polymorphous and sometimes perverse opposition between nature and nurture, I've refused the usual reasonable compromises and "resolutions" (both are important, it's really a continuum, etc.) and done something rather more peculiar. Consider the Möbius strip: it acquires its weird characteristics by taking a turn through the 3rd dimension. More outrageously, a Klein bottle is theoretically

produced when a regular vessel takes a turn through a 4th spatial dimension: a wondrous object whose inside is also its outside. Now imagine taking the ‘nature’ end of the nature-nurture dimension and giving it a turn through time. (See www.kleinbottle.com/whats_a_klein_bottle.htm , a commercial site, for some explanation and visuals.)

The result is no longer two poles at opposite ends of a line, or two causal loci, one inside and one outside, alternative sources of form and function—all versions of what I’ve called developmental dualism. Instead we have a nature that is fully developmental, fully embodied and lived, enacted, if you will. It is multiple, contingent and changing—the organism moving through its life and its worlds, a phenotype in time. It is at once the moving product of nurture, that is, of development, and an important part of the processes that constitute development. Nurture, then, becomes all developmental interactions over that lifetime, development construed here as continuous with life.

No longer associated with the arbitrary, the learned, the "acquired" or the malleable, nurture is nothing less than the ongoing processes of development that produce both the typical and the variable aspects of the organism, the phylogenetically conserved and the novel, the stable and the fluid. Instead of being restricted to the “transmission” of genes, evolution becomes, in one definition I have used, the derivational history of these organism-environment complexes. Here’s another, perhaps more pithy: Evolution is change in the constitution and distribution of

developmental systems. These definitions restore a vital fullness to the processes that the formalizations of population genetics reduce to an abstract "gene flow." It is a flow that tends to instrumentalize mere organisms, while effacing everything that makes possible the repeated life cycles that allow the formalizations in the first place.

Once nature is pulled through the dimension of developmental time, it can't be contrasted with nurture, because they are not of the same logical type. They are related as product and process. Organisms contribute to their continued development by their own form and function, even as form and function are being developmentally transformed, in ways so nicely described in Steven Rose's (1998) *Lifelines*.

Such a system has no distinct boundaries, not only because it changes constantly, but also because it extends out indefinitely from the organism itself, to encompass climate, other organisms, habitat, and other developmentally important aspects of the niche, much of which they seek or construct. In addition, as Varela, Thompson & Rosch (1991, p. 148) and Hendriks-Jansen (1996, p. 55) argued, the world isn't "pregiven"; it doesn't appear on our doorstep conveniently labeled or "preregistered." The organism's world is co-constructed with it, and the scientist can draw only a pragmatically tentative line to limit the scope of the study, giving it a provisional definition. Hence development without walls.

What I've just said applies to roofs as well. In addition, though, the idea of constraints, limits, or indeed, of ceilings is often associated with the genetic control of developmental outcomes. Scientists admit that the

conditions of development may affect the organism, but they often insist that the genotype determines the limits of such effects, that a good environment, for instance, may allow a child to reach its “full potential” but that the maximum is written in the genes (perhaps the child has a ceiling of 120 IQ points). But if the effect of any constituent in the system is dependent on the others, what sense does it make to say that potential or limits reside in just one set of elements, far less that those limits are fixed at conception? Any interactant limits possible outcomes given the rest of the system at that time.

Possibilities are never really unlimited, of course, but neither are they somehow encoded in the center of a cell. For me, potential is a deeply developmental, historical notion—possibilities emerge, change, and disappear, as a function of changes both inside and outside us. Actions may alter the possibilities for further action.

Ceilings and walls imply construction, which is central to developmental systems work. But it is a particular kind of construction: There’s no constructor, no prior plan, not even the much-loved genetic blueprint. Regularity, when it is found, is accounted for not by central control, but by linked interactions that must be investigated. Developmental factors can be inside or outside the body, but we can’t partition that body or its behavior according to degrees of internal and external causation. Some behavior may be traceable through evolutionary relatives, for instance, or universal in a species, or appear without training, but this doesn’t mean that the genes were more important than

its environments in making it, or that it is somehow more “biological.” Especially odd are the occasional claims that some phenomenon is biological, and therefore “physical” or even “real.” I always want to ask, “as opposed to what?” We are fully embodied beings, and this is as real as it gets.

Having sketched this systems approach to development, and having made it clear that system here refers to an extended causal complex, let me distinguish explicitly between drawing a line around an entity and drawing a line around the causal system that produces and includes it. Thinking back on my discussions with Francisco, I wonder whether this was a reason for the difficulty we, or at least I, sometimes felt in moving beyond our evident sympathies to a satisfying discussion of our differences. We seemed to be making many of the “same” points in different ways, but Varela, preoccupied as he was with self-production and identity, and with the elaboration of an interior point of view, focused on bounded internality. Although he described the relations between entity and its surround as intimate and mutually constituting in ways I found very congenial, my own history with the nature-nurture problem rendered problematic both those boundaries and the asymmetrical relationships across them.

Delineating Entities

I make this contrast, between bounded entities and bounded systems, as a way of comparing Varela’s approach and my own, but neither line, around a biological entity, say an organism, or around its developmental

system, is easy to draw. Think of clones, colonial organisms and symbionts, or the splendid slime mold. Think of conjoined twins and multiple personalities, or of organ transplantation, about which Francisco wrote with such subtlety and humanity. In fact, think of the infinitely long coastlines described by mathematicians who point out that shifting scales, from bays and peninsulas to inlets and promontories, and then to smaller features, stones, pebbles, and sand, inexorably increases the distance one must trace between two locations (Mandelbrot, 1983, ch. 5). If we follow an animal's skin to its transition to the mucous membrane of the mouth and throat and beyond, in a kind of topological analogy to the coastline, we can ask whether our gut symbionts are inside or outside of us. A particle of food could be considered inside once it has been chewed, swallowed, absorbed into the blood stream, or into a cell; but one of our cells similarly resolves, if we look closely enough, to a maze of structures, channels and pores, constantly changing their configurations and traversed by frantic traffic. Again it becomes difficult to say what's absolutely inside and what's outside.

Delineating Causal Complexes

As I've already indicated, the boundaries of a developmental system are no more fixed or clear than those of the organisms themselves. The extent of a system changes over time and, again, with the investigation. The number of causally relevant factors will differ according to the project and the stage of the investigation. From the developmental

systems point of view, whether we are speaking of cells, organisms, or groups, however they are individuated, we must include the context in the explanatory complex, and not only as a container or a causally secondary set of modulators or materials, but as constitutive of the processes and products in question.

Selves and Developmental Construction:

Exposure, Inventiveness, Flexibility

The distinction between the strategies—between delineating self-defining entities on the one hand and self-organizing developmental systems on the other—is useful, although the pragmatics of line drawing may not be easy. One could draw a Venn diagram, for instance, looking for shared features and commitments of the two approaches. Yet a friend recently reminded me that such sets of partially overlapping spaces have no representation of time, and I have already shared my intuition that history, in this case personal/intellectual history, is an important ingredient in any such comparison. It might be interesting to see to what extent my description of a self-organizing developmental system, reconstituting itself more or less faithfully across many generations, maps onto the definition of autopoiesis. The self in “self-organizing,” of course, is in one case the entity in question and in the other, the larger system of which that entity is a part.

Rather than pursuing that exercise, though, I want to turn back to developmental construction and look at two issues recently in the news.

They are related; both have to do with the ways our conceptions of ourselves and others are informed by our assumptions about the processes by which we come into being. Selves are often thought to have an essential core, and we have seen that a certain essentialism tends to accompany notions of biological bases, innate evolutionary legacies, in short, nature, but the notion of a developmental system helps unravel the fabric of beliefs about biological essences.

This is not a constructivism, then, that assumes a “biological base” and then claims that more is constructed than we thought. Instead, it shuns developmental dualism and points out that any "biological base" has a developmental history rich with interactions among heterogeneous resources. Some of these life courses will be hard to perturb; some features will be so common as to be typical of the species; some will appear in a very reliable sequence. None of these observations requires a hidden center of preexisting representations or instructions. We can have reliability, stability, and typicality without preformed essences. And we can be exposed, inventive and flexible and still be biological and ... real.

It's routine to treat preformationism in biology with a dismissive smile. (How naïve those early scientists were, to think an entire human nestled in each egg or sperm!) Yet its modern counterpart, genetic instructions or information, has become scientific dogma. The association of biological nature with preexisting essence is entangled with questions of identity, freedom and constraint, normality and disease, which gain urgency and some perplexing complication in this age of rapid

technological and social change. Both of the examples to come can be celebrated as personal and political victories. And yet, especially looked at from the perspective on development I've been describing, they raise some questions about human variation, identity and action. The first has to do with changes in the position of homosexuals. I mean position both as social location and as political stance. Largely gone are the days when gay people resisted biological explanations as stigmatizing; today it is very common in the US to find the claim that sexual orientation is innate. (It is the politically and socially conservative, especially the religious right that more often insists it is chosen—and thus, like other sins, can be renounced.) Current claims of biological homosexuality are tied to the particulars of US law, which protects certain groups from discrimination (see Oyama, 2000b, ch. 10; see also Lewerenz, 1995, for an opinion). In this context it can be advantageous to invoke a predetermined and fixed sexual essence, and this in turn fits well with narratives of self-discovery, often painful and inspiring stories of early denial, humiliation, and attempts at correction, followed by the acceptance of the true self—the coming-out story. Without denigrating these histories or minimizing the vast improvement in life circumstances they often involve, I want to ask some questions.

In today's social landscape, people not only discover that they are really lesbian or gay, but that they are really bisexual, or transgendered. A transgendered person may discover not only a female true self trapped in a male body, but a lesbian true self. There are people who have come out

as gay only to find that they are really bisexual or straight after all. The case of the transgendered is particularly intriguing, because there seems to be an incongruence between the historical association of self with the body (recall the innate as biological, physical, real), and the common description of the transgendered person as being trapped in a body that is deeply alien to the essential self. I wonder whether the proliferation of essences, and to a lesser extent, the drama of the misidentified essence, will be self limiting, as more and more kinds of real identities are embraced and as fluidly redefinable identities undermine narratives of the discovered true self... and if so, what will come next.

There is not necessarily a “next,” of course; people are always discovering that they were “really not an entrepreneur at heart” or “not cut out to be a teacher after all,” and such stories generally entail no conceptual acrobatics. Still, these latter stories are not typically underwritten by the notion of biological foundation, as many accounts of sexual orientation are, and we are more used to the idea of many personalities or talents than with many sexualities. Certainly someone with my theoretical leanings would be inclined to describe these life changes without invoking preexisting determinative essences, but my leanings are rather beside the point; these are quite broad social changes, with all the variation and unruliness such changes bring with them. If the idea of a static, biologically encoded true self is eventually destabilized, partially by our own efforts, what will be the consequences? How will we, as societies, encourage decent, fair treatment of these still often

despised groups? (And who are *we*?) The notoriously slippery but stubborn notion of will or free choice, of “could have done otherwise” is central to my country’s law, and biology enters these discourses precisely because it is so closely associated with instinct, not reason, impulsion, not choice. The ancient split between mind and body runs like a fault line through the nature-nurture debates. The emotions, for instance, are conventionally “biological” and thus of the body in ways that the intellect is not, an absurdity that has been strongly challenged by a number of participants in this meeting. And yet these categories are dissolving before our eyes. What next, indeed?

This brings me to my second issue. The New York Times ran an article entitled *Neurodiversity Forever: The Disability Movement Turns to Brains* (Harmon, May 9, 2004). It describes the movement among people with disabilities to demand acceptance of their “behavioral quirks.” A visitor to a website on Asperger’s syndrome, a kind of autism, asks whether a certain person was “unwilling” or “truly incapable” of behaving appropriately. A man speaks of the “relief” of a diagnosis of Attention Deficit Disorder (ADD), whereas his family views it as just another excuse for irresponsibility. The article fairly vibrates with the tension between moral and medical judgment of behavior and, much the same thing, between willed and symptomatic behavior. Uneasily (and unreliably) mediating these alternatives is the question of the bodily reality of the disability or disease. The article’s author observes that the quest for acceptance is made more difficult by the fact that “the biological

basis of many brain disorders can't be easily verified." Yet the availability of astonishing imaging techniques makes it increasingly likely that behavioral differences will be correlated with brain differences. Antonio Damasio, in fact, comments in the article on the growing diversity of wiring diagrams. The more such "diagrams" are found, the more difficult it will be to point to the brain as a way of deciding what's normal and what's not.

This all goes to the heart of our conception of persons, including ourselves. Was the body responsible, or the mind? Could the person have done otherwise? The first query, I contend, whether the body or the mind is responsible for some behavior, is difficult to make sense of, but it persists in large part because it's thought to shed light on the second. As I have just pointed out, that second question, whether there was an alternative action, a "could," is famously recalcitrant. Yet the vain hope that disputes about nature and nurture can shed light on it helps keep these debates going.

What do these developments demand of us? We have never had roofs, after all, just as we have never been modern, as Latour (1993) has reminded us, but who knows, perhaps it would be refreshing to acknowledge this exposure openly and to draw on the full measure of our inventiveness and flexibility to face what's coming.

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