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Dancing with Ambiguity

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Introduction

For us humans ambiguity is, I think, a necessary concomitant to complexity. Since we are living systems living systemically, in a complex systemic network of relations, complexity is a given. Thus ambiguity is also a given, though at times we would like to dispose of it or ignore it. In this paper I will approach the topic of ambiguity via some common metaphors, a parable, and through my understanding of biology, language, culture, cybernetics and systems.

I began working with simulation models in the late 1960s, using punch cards and one-day batch processing at the University of California Berkeley campus computer center. As the complexity of our computing systems grew, I like many of my colleagues, became enchanted with this new possibility of dealing with complexity. Simulation models enabled us to consider many interrelated variables and to expand our time horizon through projection of the consequences of multiple causal dynamics, that is, we could build systems. Of course, that is exactly what we did, we built systems that represented our understanding, even though we may have thought of them as mirrors of the systems we were distinguishing as such. Like others, I eventually became disenchanted with what I came to regard as a selected concatenation of linear and quasi-linear causal relations.

As I continued to discuss systems and eventually teach systems courses, I became acquainted with the work of Donella Meadows; and found myself deeply respectful of her insights and clarity. In particular I liked her paper "Dancing with Systems"[2] where she claims "We can't control systems or figure them out. But we can dance with them!" (Meadows, 2008, p. 170).[3] I like the notion of *dancing with* as it implies both an ongoing coordination with another, or a group, and a coherence with something

1. SelfDesign Learning Foundation. Email: life.works@mac.com
2. "Dancing with Systems" was originally published in the journal *Thinking in Systems* (Meadows, 2002).
3. The paper eventually became the last chapter of the posthumously compiled book *Thinking in Systems*. To my disappointment, the title of the chapter was changed to "Living with Systems."

beyond the dancer: for example the space, and the music together with the perceptions and mood that are evoked. Hence I have borrowed the dancing metaphor from Meadow's original title for this paper.

There is another metaphor that I wish to allude to, and that is the well known parable of the blind men and the elephant. There is an assumption implicit in this story that I have only recently realized. We use the metaphor to indicate that if only we could see in a manner that incorporated all the various perspectives, we would see the whole elephant. In practice this has not always worked. We bring people together and have them discuss their perspectives. Sometimes their view is broadened, sometimes they simply learn to tolerate each other as different. However, the assumed elephant itself remains elusive. Is there really an elephant there to be seen, or is the view we have simply one option of how we compose meaning? This for me brings up Maturana's fundamental question, namely "how do I do what I do as I operate as an observer?" (Maturana, 2005, p. 57). What is it that we humans do that brings us to believe that there is a reality, a particular elephant that all of us can see, for us to discover?

I would like to put my experience with modelling, and hence dancing with systems, together with my experience in facilitating groups with diverse perspectives of "the elephant" into the context of enabling constraints. Though this is a term coined some time ago (e.g., Hayles, 2001) I was brought to reflect on this phrase as I was reading Lissack's (in press) discussion of *uceps* (un-critically examined pre-suppositions) as enabling constraints in his paper "Second Order Science: Examining Hidden Presuppositions in the Practice of Science."

The concept of constraints enabling action is not at all new. Games have rules that enable the play. Focus on any one thing enables effective action through excluding what we might consider distractions or irrelevancies. Creating a computer simulation model enabled us to consider the implications of some relations by explicitly choosing them and not others. However, on thinking about uceps as enabling constraints I came to see them as a way of pointing at something fundamental to us as biological beings living in language and embedded in a culture. I wish to address the idea of constraints that serve as possibilities in this paper. I will discuss how cognition, language, and culture all serve as constraints that enable action in given contexts, while at the same time obscuring other possibilities that we could be dancing with.

Living Systems as Cognitive Systems

Maturana's work on cognition, as for example summarized in the Origin of Humanness (Maturana & Verden-Zöller, 2008), shows that living systems are cognitive systems. In order for an organism to respond to changes in its medium the dynamics of the organism must shift in a manner that enables a viable response. Organisms with nervous systems are able to respond in far more complex ways than those without this increase in internal complexity. This of course is a simple example of Ashby's law of requisite variety. However, the nervous system does not replicate

the medium, it is not a representation of the medium. Rather a nervous system changes according to how it is perturbed, and it detects those internal changes in configuration. *Detection* in this context can mean anything from a direct response to, in humans, a thoughtful reflection. Though we tend to think about thinking as that part of our cognitive response that we are aware of (and can refer to in language) the nervous system is not limited to that. Rather cognition happens in a systemic dynamic that one could refer to as hyper-dimensional but is, I think, better thought of as a-dimensional. Dimensionality is a notion (in language), a referent we have invented, that we use to try and understand and speak about complexity. The consequence of how a cognitive system is constituted is that we cannot claim access to "reality"—we can only claim that our responses and reflections are adequate to our living.

Since no organism, including ourselves, replicates the medium internally, what the nervous system composes is a selection of possibilities. The nervous system creates sensory effector correlations, that is, it responds to aspects of the medium that are relevant to the living of the organism. This constraint has been enacted through adaptive structures as they have been influenced by both the evolutionary and the experiential history of the organism. However, even though there is a process that simplifies from the complexity, it works. As Maturana puts it, "biology is our possibility"—or in the context of this paper, I can say that cognition, as it is biologically constituted, is an enabling constraint.

Some, but by no means all, of human cognition takes place in language. Language is only the aspect that we can be explicitly aware of. What is however relevant to note here is that systemic cognition and languaging cognition are structurally coupled. Namely how we think in language influences the fine level structure of our nervous system, and hence its systemic dynamics. Reciprocally, this systemic dynamic is continuous, and it influences how we language. For example, under most conditions when we wish to speak, we just do so, the appropriate phrases arise unbidden out of the deeper systemic of our cognitive system. Or, as we stop trying to resolve a complex issue, a little time later we suddenly know what to do. This recursive influence between systemic and languaging cognition has operated for many million years of human evolution, and has likely been a major factor in the expansion of the human brain (e.g., Maturana & Verden-Zöller, 2008). I think that by retaining complexity our systemic cognition enables us to operate with what would be labeled as ambiguous if we were to constrain ourselves only to what is expressible in language. Systemic cognition expands our ability to dance with ambiguity.

Language as Lineages of Distinctions

My understanding of languaging is deeply grounded in Maturana's work, thus much of what I say here he has published elsewhere (e.g., Maturana, 1987). Language arose, and continues to arise, through the consensual coordination of behavior. As a self-referential recursion of consensual coordination is applied to the original consensual coordination, a new phenomenon arises. I have chosen to refer to this first recursion as

a signifying configuration. From the perspective of beings living in language, we may refer to this as languaging; but for the beings living in that alone, it is simply a further coordination.

It isn't until we apply a third recursion that we are able to distinguish that signifying configuration as a something that can be named. Now naming that something, whether it be a tangible object, an action, a relationship (anything relevant), evokes that something into awareness and hence a coordination as appropriate. Further, once the name is in use, the process whereby it arose is no longer relevant. The name endures and the manner and circumstances of its arising is lost. As Krippendorff puts it

> We speak of the meanings of words, having forgotten the history of using these words. Using language habitually is part of being a predictable member of a speech community that values consensual coordination of the body, speech and actions of its members. (Krippendorff, 2008, p. 4)

Further distinctions are readily created grounded in those that are already existing. Again, as the new name endures, the manner of its arising is obscured. Each distinction, each name, arises in a manner that enables coherent interaction in some particular domain of doings—whether tangible or conceptual.

As each distinction arises, it reveals some regularities in our living, and obscures others. In this sense a distinction is an abstraction or eduction from a complex systemic of our living, of some regularity relevant to our living. The regularity is apprehended through systemic thinking and made explicit through the process of distinction. A distinction is thus in essence an enabling constraint; a simplification that affords appropriate action.

Furthermore, a domain in which a distinction is valid or relevant, co-arises with the distinction. Hence the distinction enables, it serves to focus attention and action to the domain that is relevant in the circumstance. However, there are attendant ambiguities. Not all moments of referring to a distinction are equal, and not all persons attending to a particular distinction implicitly evoke quite the same referent domain. The resultant ambiguities can frustrate or confuse; but they also afford space for our dance within a complex systemic.

There is another interesting aspect to how language evolves. Once a name exists, we readily import it into some other domain that we are also engaged in. As conversations and co-ordinations of action ensue in that other domain, the meaning of the name shifts. Indeed meanings of words are always domain dependent, or as people usually say, context dependent. Consequently a distinction used in another domain is not likely to be quite the same distinction. Consider words like *system* or *experience* or even common usage words such as *hello*. This, of course can lead to confusion, especially if people believe words have specific meanings. In the desire of minimizing ambiguity, we are enjoined to provide definitions where precision matters. However if we implicitly or explicitly accept that meaning is situation dependent we are enabled to retain flexibility.

In practice, languaging enables us to remain in a dance with ambiguity.

Now I would like to return to the parable of the blind men and the elephant. If indeed each perspective is not just a different location from which we view the same thing, and is instead a uniquely coherent domain of relationships, in a community of people coordinated through conversations that have meaning in that domain, then different domains are non-commensurate.

Yet, we do manage to navigate through various incommensurate domains within our own lives while retaining some sense of continuity and coherence. How do we do that? I think that again it has to do with systemic cognition which does not depend on logic in the way languaging thinking requires. Living beings developed the ability to compose coherence at least in part through navigation in complex landscapes. Without a map, or any other external reference, living systems compose a sense of a landscape through moving in that space. Any set of single snapshot views would be unconnected, but moving through a landscape results in a dimensionality of comprehension. The spatial awareness is not so much constructed as constituted through movement.

You can demonstrate our automatic retention of this ability by projecting a series of snapshots from a three dimensional data array. The series of snapshots doesn't appear related, but a three-dimensional representation that is rotated becomes almost instantly comprehensible. Dimensionality grows through the dynamics of lived experience.

In human relationships, we create depth of dimensionality through engaging with others over time in various ways. In language we can for example generate dimensionality through storytelling. Additionally we create various concepts for integration, ranging from the notion of dimensionality and specific orthogonal coordinates, to intersecting sets, to metaphors and an awareness of alternative meanings. Thus, again, we retain an ability to dance with ambiguity through generating motion within and between domains. In language, we can dance through domains as we dance them into existence.

Thus the enabling constraints implicit in language occur on top of the biological enabling constraints of cognition; and together act in a manner that enables all the richness of living in language.

Cultures as Lineages of Reality

Cultures differ in many ways. Some of these differences can be attributed to the way cultures reduce some dimensions of variety for the workability of collaboration among its members. We can discern these differences through comparing the distinctions that have arisen in different cultures. Anyone who has had the task of translation from one language to another, particularly between unrelated language groups, will be aware that languages don't simply consist of different sounds for the same things. Distinctions are often cleaved in fundamentally different ways; particularly in the naming of intangible or dynamic notions.

I will present my visualization of the process that leads to such differences in meaning. As one draws distinctions from a hyper or a-dimensional space of possibilities, in accord with densities of occurrence and relevance to action within a cultural group, the analogue of spaces that are inside or outside of the distinction are created. The core of such a space can be taken as the archetype for the notion. The archetype begins to serve as a center of gravity that attracts surrounding alternatives to be treated as if they were the archetype. This eventually leads to the behaviors attendant to the notions beginning to cluster closer and closer to the manner they are responded to. Thus, children growing in a culture learn to act as appropriate to the typical notions and the conversations that preside in that culture. As the people in the culture act in accord with distinctions of that culture, the artifacts and behavior of that culture create an extended context that validates the lived ideas and manners of acting. The notions become validated or reified, and persist as if they had an ontological existence (Figure 1). One of the consequences of this dynamic interplay between language and culture is that the people who live these distinctions have no easy way of being aware what their particular sets of distinctions have obscured.

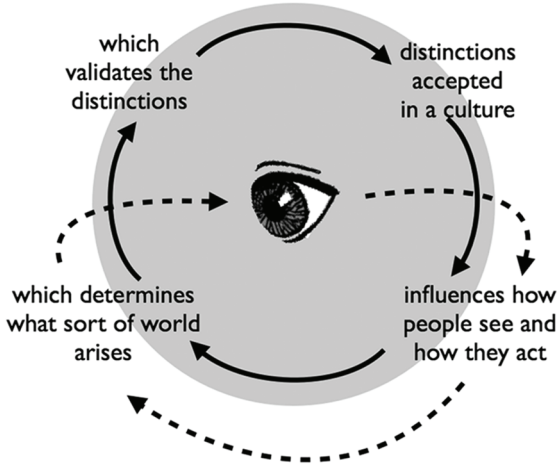

Figure 1. Circularities that conserved cultures. The solid line represents the normal path, the dashed line represents the possibility of shift through observation and reflection, discussed below.

A good example of this might be the concept sad. Though there is a huge variance in how people may actually feel, sadness has a characteristic signature that differs from culture to culture. How a Japanese person lives sadness is different from a how a British person lives it; and neither fully sees the differences unless they have had the opportunity to become fully conversant in both cultures. When this takes place, they find themselves inevitably left with the difficulty of translating adequately from one to another. Further, they find themselves being slightly different beings, with different ways of seeing and thinking, as they immerse in one or other culture. Such has been my experience, and all my conversations with people who are fluent in languages from different language families reveals that they too find this to be the case.

Thus, cultures are coherent networks of conversations that conserve some dimensions of continuity in that culture. They serve as a set of constraints that enable appropriate action within that culture. In this sense cultures comprise coherent networks of enabling constraints.

I shall not here address the concerns with changes in circumstances and the dynamics of adaptation to change, especially as cultures interact and global conditions change. However, there is one aspect of culture I do wish to address; namely the culturally conserved concept of reality. As Maturana has written:

> we have made the notion of objective reality a reference to something that we deem universal and independent of what we do, and which we use as an argument aimed at compelling another when we do not want to use brute force. (Maturana, 1988, p. 1)

Thus a culture that distinguishes its particular notions as "real; this is the way it really is" (where *it* is an ontological referent to everything) has a unique dynamic which not only ensures compliance with its norms, but also constrains possibilities. The constraints take place in a manner that promotes or even only enables those observations, actions and ideas that are part of that culture's "reality." Reality spoken thus, excludes, or at least dramatically restricts, ambiguity. Within an ontologically defined reality dancing with ambiguity is severely restrained.

This brings me back to Maturana's question of "how do I do what I do as I operate as an observer?" Maturana (1987) proposes two explanatory paths, the first of which considers the question irrelevant, as "in this explanatory path it is assumed that the observer can make reference to entities that exist independently of what he or she does" (Maturana, p. 50). Alternatively,

> if we operate in the explanatory pathway of objectivity in parentheses, scientific explanations and the observer appear as components in a single closed generative explanatory mechanism, in which the properties or abilities of the observer are shown to arise in a different phenomenal domain than the one in which its components operate. (Maturana, 1987, p. 50)

It appears to me that people often innocently, through cultural habit, assume the first path and hence accept reality as given. In this situation the ambiguities afforded by language are severely constrained as the premise of reality reifies and thus evokes a certainty about "what really is" (see also Figure 3, below.) The consequence is that the ability to act in accord with the complexities of systemic existence is curtailed. Admitting, or worse dancing with, ambiguity is minimized or vilified, or at best relegated to fringe "artistic" communities.

As I noted (Bunnell, 2005), people are not necessarily trapped in certainty, as curiosity or pain may lead to reflection and hence expansion. Through reflection (dashed line Figure 1) which is often triggered by non-aggressive engagement with other cultures, one may become aware that what is named reality comprises a particular alternative configurations for cultures; with different consequences to how one relates to other humans and the rest of one's world. As one accepts that what we

sense is our composition, and that what we distinguish is grounded in what has become relevant in our particular language and culture,[4] one may also realize that there is no possibility of an omniscient look, that there cannot be any sort of ultimate uberculture that explains them all. This realization provides an explanation that encourages acceptance of the validity of other cultures, and though a genuine acceptance enables a depth of conversation that tolerance cannot offer. Nevertheless, even with acceptance of difference, there are aspects of other cultures that remain incomprehensible unless one lives that culture. Some distinctions, and the ensuing networks of conversations are incommensurate between cultures. Yet reflecting on this leads to an acceptance of ambiguity, and the possibility of expanded understanding and appropriate engagement.

So What, What Can We Do?

I have discussed three sets of enabling constraints; the biological, the languaging, and the cultural. For us humans who live in all three, I imagine an interplay between breadth and depth (Figure 2). In this view, the specific actions enabled by a culture are more extensive and intricate than those provided by languaging alone, which in turn offers more possibilities for the domains that arise in language than cognition alone. I am not suggesting that cognition is not entailed in language and culture, or that culture doesn't include language. Rather I consider what can be done in language that cognition alone doesn't enable.

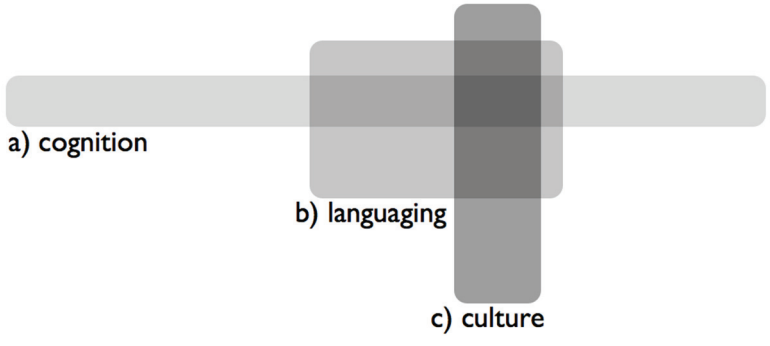

Figure 2: As constraints are narrowed, action in the relevant dimension is enabled at a grater extent with greater intricacy a) cognition is an enabling constraint operationally adequate for living b) language is an enabling constraint for living together in complex co-ordinations of doings c) cultures constrain in ways that enable some doings and curtail others.

It is easy to observe how language has expanded human possibilities for artifacts and how cultural networks have expanded the human reach through technologies and infrastructures. Yet each increasingly limits the field of awareness and possibility

4. These notions are summarized as a *constitutive ontology* by Maturana. I think they entail both an epistemology and an ontology (Bunnell, 2005). The notions are parallel to those of constructivism; a rich field with many authors that I cannot claim a thorough enough understanding of to review and compare substantively.

through what is excluded. As each level of constraint reveals regularities in some domain of doings, and thus enables particularities, it also obscures others.

In conceiving Figure 2 I had not considered what the areas of overlap might suggest. Perhaps the deep grey area where culture, language and cognition all overlap leads to inertia; everything works so coherently that reflection isn't triggered. Conversely, perhaps it is the place where we can most readily become aware of the existence of all three domains. However, this figure is intended as a metaphor for one idea, and extending any metaphor beyond its original intent can be misleading. The figure is that draws attention to an area of overlap that may signify nothing. On the other hand, the ambiguity does invite reflection, so in this sense it may be self-referential.

Even as we live in a culture, languaging continues to enable conversation and reflection that is not culturally constrained, and our systemic cognition remains operational in ways that are experienced as mysterious, emergent, and creative. Further to the notions of curiosity and pain mentioned above, we are readily evoked into our acceptance of more than we know, and act in manners that are effective in ways that we cannot fully explain. I believe that an emotional orientation of wonder serves as an enduring invitation to apprehend more. Rachel Carson, in her 1956 essay *The Sense of Wonder* (Carson, 1998, p. 56) wrote "it is not half so important to know as to feel. If facts are the seeds that later produce knowledge and wisdom, then the emotions and the impressions of the senses are the fertile soil in which the seeds must grow." In wonder, one apprehends the unknown without fear, thus accepting the existence of more than any culture may have realized or any language distinguishes. Thus a sense of wonder can restore an acceptance of ambiguity, and enable us to dance with more of the systemic complexity of living (Figure 3.)

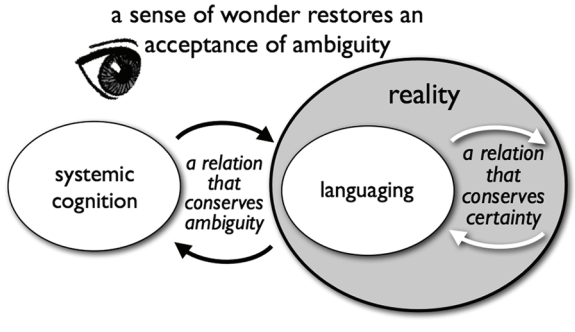

Figure 3: The dynamic relationship between systemic cognition and languaging conserves the possibility of ambiguity. However, in a cultural premise that reality has an ontological existence, certainty is conserved and ambiguity is denied. A sense of wonder can serve to restore an acceptance of ambiguity, which in turn evokes reflection, curiosity and exploration.

Since children appear to easily experience the emotion of wonder, and since in my experience it can be evoked in all humans, I am proposing that this attitude or emotion is another fundament of humanness. In other words, I think the propensity to wonder has been part of our human constitution for a very long time in our evolutionary

history. Since the sense of wonder also appears to be overwhelmed by the complexities of adult life, especially in the modern age, I would like to consider a possible relationship between wonder, complexity and the acceptance of ambiguity (Figure 3.)

Since what I imagine is a much more nebulous notion than a drawn graph implies, I propose that this figure is best viewed with an acceptance of ambiguity quite improper to most science. First I have suggested that the time axis can represent either maturation or the development of a more complex anthroposphere, and the time axis is not necessarily linear or proportionally the same for ontogeny and evolution. The notion is simply that initially the acceptance of ambiguity is greater than the experience of complexity, thus a sense of wonder easily and appropriately arises. I suggest this stage can be considered an innocent acceptance of not knowing—without judgment, prejudice or the desire to control. As complexity increases, anxiety over operating appropriately readily leads to the desire for notions and frameworks that simplify, for certainty, which in turn represses the acceptance of ambiguity. In this situation one can experience stress, and the experience of wonder is simply overlooked or it is denied. However, in my experience people can accept that the unknown is greater than the known, that there is an immensity at both the miniscule and the cosmic scale, and that everything cannot be fully apprehended or analyzed. As people give up the desire for certainty, the possibility for wisdom arises.

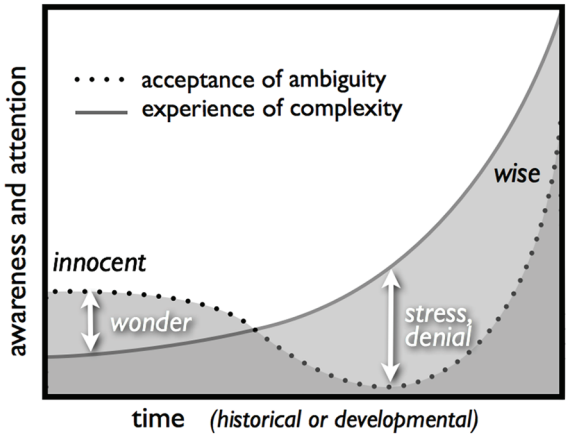

Figure 4: A hypothetical relationship between the awareness of and acceptance of ambiguity and complexity over time. (see text)

What is wisdom, then? I think that in order for us to attribute the quality of wisdom to someone, we are implicitly considering their ability to regard situations without judgment, prejudice, or the desire to control (Maturana & Bunnell, 1997; Bunnell & Forsythe, 2001). This is equivalent to living in love, as Maturana has abstracted the fundamental dynamic that underlies all interactions we would consider as loving. Unless some action results, direct or conversational, one would not attribute wisdom, nor would one do so if that action is not in care for the consequences to the

other. Furthermore, if an action is proposed with certainty of outcome, it would be seen as manipulative or controlling. Thus ambiguity is inherent in the awareness that perception and action are always only potentially workable engagements with the world. Wise persons are seen to accept ambiguity, and I think that we often refer to this as their humility.

Implicit in Figure 4 there is a movement from innocent to wise. This corresponds to the suggestion that we humans arose not just as *Homo sapiens*, but as *Homo sapiens-amans*,[5] the wise loving hominid. Perhaps in the last 10,000 years, since the advent of large scale agricultural settlements we have started to diverge as subspecies that would be better named *Homo sapiens-amans arrogans*, or *Homo sapiens-amans aggressans* (formerly referred to as *Homo sapiens arrogans* and *aggressans*, respectively in Bunnell, 1997). If we have lost our acceptance of ambiguity in the pursuit of certainty, we are on the path towards becoming *Homo sapiens-amans arrogans*.

What if we were to either consider our original constitution as *Homo sapiens-amans* as still proper to us, now? If so, how would we recover that fundament? I think we need reflection, and further we need reflection in an attitude of care; that is, we need to move towards wisdom. Perhaps we could see ourselves evolving towards the recursion of lovingly reflecting on our living. Since that reflection requires both sapience and love, would we want to think of ourselves, then as *Homo sapiens-amans sapiens-amans*, a new subspecies? However, we don't generally name species according to the dynamics that constituted them, so I would be quite content to think of myself belonging simply to the lineage of *Homo sapiens-amans*.

Thus I would prefer to think of ourselves recovering a fundament of intelligence and care, to become a reflective species that is able to live appropriately in the current circumstances of complexity. This will, I think, require us to explicitly dance with ambiguity, which I think is most gracefully achieved through evoking the sense of wonder.

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5. My original suggestion in 1995 had been *Homo sapiens amans* for the species and subspecies, with the subspecies *Homo sapiens aggressans* and *Homo sapiens arrogans*. Maturana proposed the amendment of *Homo sapiens-amans* as the original form, where the hyphenated *sapiens-amans* refers to the arising of languaging under the emotioning of love in the original small family group.

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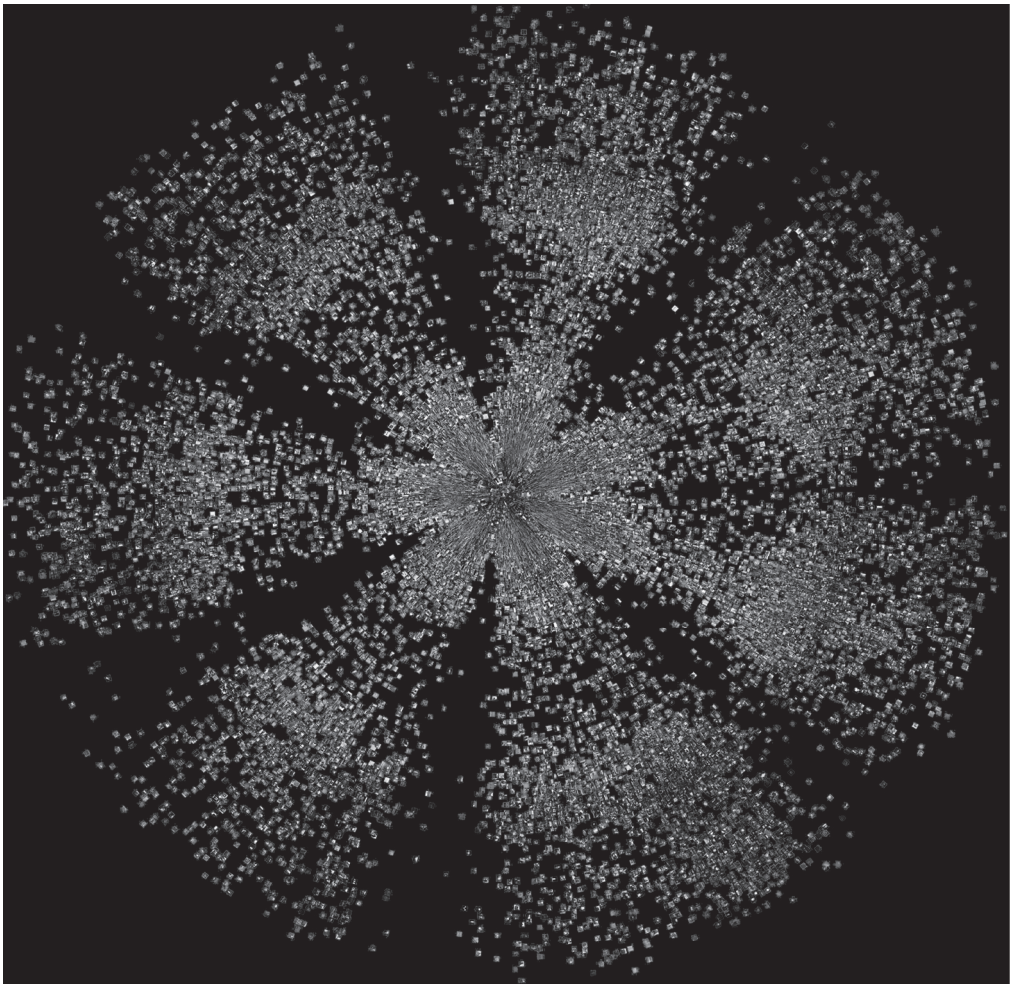

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