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Notes and Ruminations  
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Refer to two papers by Dianne Rocheleau posted on workshop website for  
additional detail on specific topics

In my first year at Florida Presbyterian College (now Eckerd College) in 1969, I entered with the hope of double-majoring in Biology and Sociology. The reality of each major fell far short of my expectations as I reviewed the options. Introductory life sciences classes consisted of dissecting dead (and live!!!) animals, as well as memorizing plant and animal names in a dead language. Sociology included way too many courses focused on managing labor and people in general. The pantheon of sages in both cases consisted almost entirely of dead (or at least elderly) white men. I quietly declined both paths. My attempt to formulate a self-designed major field focusing on the “subversive science” (Shepard and McKinley, 1969) of human and cultural ecology was sharply rebuked by the academic dean as well as two student peers on the committee. I had proposed to focus on culture, land use, agriculture and forests, including the changing role of fire and other technologies. I also wanted to clear and cultivate a small plot on the very extensive “empty lots” on campus to learn about organic farming. The dean admonished me: “if you want to study agriculture go to a land grant school!...). So I did, but not until years later. In the meantime, I sought asylum in Philosophy and delved into a new world of big questions without fixed answers. While it still involved consorting with a lot of dead white men in print, it did not seem to involve killing living beings, learning dead languages or betraying my social and political conscience. Eventually I went to a state school (USF in Tampa) for my last two years and completed two majors, Philosophy and Geography, followed by an MA in Geography, and a Ph.D. in Geography with a minor in Systems Ecology at UF in Gainesville (a major “land grant” school). The Systems Ecology minor involved taking an extra year of graduate coursework in 7 departments across 5 faculties, and was worth every minute, and every boundary crossed.

Unfortunately, one of the enduring taboos that stayed with me from my first Philosophy class was that the “age of pontificating” was over, at least in the US and UK. [And what young woman in her recovering catholic mind in 1969 wanted to be associated with even a metaphorical reference to papal power?] Philosophy was now all about methods, about ways of knowing, about epistemology. I remember being deeply disappointed, since thinking about *how, and what and why the world is*, had drawn me into it in the first place. There was also that politico-religious impulse to ponder how the world *could* be, which came with roughly equal doses of what Tanya Li calls “The Will to Improve”, and what I would call The Need to Expand Experience ... (with apologies to Jimi Hendrix, Timothy Leary, R.D. Liang, and Carlos Castaneda). On the other hand, Epistemology turned out to be quite an amazing way of seeing, in itself. It was more or less about the politics of knowing. The *politics of being* still fascinated me but there seemed to be no place for it in my corner of the academy, outside of my extra-curricular readings and Prof. Daniel Bassuk’s three exemplary undergraduate classes in Psychology and Religion, Mysticism, and Eastern Religions that I took in the Religion Department at USF (1971-3).

For four decades I have labored under (over, around and between) the prohibition on talking and thinking, in public, about being and experience in existential terms, as if ontology mattered. As if *other beings* mattered. As if *being* mattered. In particular I have repeatedly encountered the powerful taboos against crossing the nature/culture divide in any capacity except that of academic tourist or curiosity seeker, with no license to question the categories or the divide. In life and work within other cultures, and in subcultures of this society, I have been able to think such thoughts and entertain a broader range

of experience, since not everyone on the planet has been so constrained as those of us caught up in the central corridors of modernity. And now, here I stand, a feminist political ecologist, dancing on the sharp edge of the actually existing fence between two not-really-existing categories (nature~culture). Yet, they have been reified into a virtual duality that permeates our very being, or at least the shape of our neural networks, and our perceptions of our bodies, ourselves, our world(s) and all *other* bodies, selves and worlds.

It is as if we are all the deceived wife of R.D. Laing's story. She descends the staircase of her home to find her husband in *flagrante delicto* locked in embrace on the couch with another woman. He looks up, tells her "It's alright, everything's fine. Just go back upstairs." And she does!!!! As political animals we are in denial, incapable of seeing our adulterous husband (science) on the couch with another version of politics, cooking up mutually self-serving stories about a world based on essential differences between nature and culture, in which we are all small (minded), content, and powerless. It seems a bit like the politics of manufacturing consent. Likewise, as flesh and blood biological beings, we encounter the husband (politics), on the couch with a human counterfeit, a fleshie female cyborg, the two of them spinning parallel stories of the nature and culture duality, raising toasts to the wonders of *real men* and *real women*. In each case, as we descend the stairs he looks up, says, "It's alright, it's nothing, go back upstairs." And we do, time after time, never acknowledging the stark violation of the relationship, the falsification of our life stories, and our very lives. As Laing [whose problematic sexual politics I do acknowledge] noted, we are all put in a double bind by the institutions of the dominant "western" culture, by a steady stream of conflicting demands, commands, and expectations. He recognized (in spite of his own practices) that this applied even more so to women.

As a woman in a society where 11.4% of women in the "non-institutionalized population" are taking prescribed antidepressants, I can definitely see his point about something being rotten in Denmark that is poisoning the minds of the gendered body politic. And maybe the poison pill (or one of several) at the center is the gender-infused mind/body and nature/culture dichotomy (see Val Plumwood, 1991). So in this spirit, I suggest we walk down the staircase, stare dominant science and politics straight in their lying eyes, and pitch a fit (see Sandra Harding and Donna Haraway). But what then? Should we leave? Sue for divorce (or in this case for re-integration of our worlds)? Or should we simply get on with our own re-enchantment of the world? (see David Abram, 1996; Brian Goodwin).

#### Ordinary Experience Rendered Extraordinary

So, what is it with science and politics? Mario Blaser, Marisol De la Cadena, and Arturo Escobar have posited that modernity has been enforced largely through the parallel disciplining of nature by science and of culture by politics. To follow and build on this, I would say that the sharpest and strictest, yet most invisible line in the quicksand is about who gets to operate at the interface and cross it with impunity, without acknowledgement. The systems of authority in each of these domains and the hierarchies that wield it, take great pains to cover up their own very regular transgressions of these supposedly fixed boundaries. Yet, much of their power derives from the covert manipulation of the categories themselves as all manner of beings are routinely subjected to policing from both sides of the manufactured nature/culture divide.

The governmentality at work in this zone is a virtual factory of double binds that keeps us from following the entwined threads of Logos and Eros in us, using all our faculties to discover that these elements are not separate and opposite (Liang, Marcuse circa 1969, Plumwood, 1991), and neither are culture and nature (Sandra Harding 1986; Donna Haraway, 1991). Just as Cynthia Enloe observes that gender, and both masculinity and femininity, are major resources for the work of militaries, so are these stories about the inviolable and essential differences between nature and culture a major resource for entrenched regimes of knowing and being that circumscribe our lives, our bodies and ourselves. Social science is one of the major products of this ruse, and surely constitutes a case of politics by other means, as some have described economics (ref?). Yet social science is also one of several sites of reflection and reflexive analysis on the forbidden frontiers of the nature/culture borderlands. Likewise, human ecology can be a technocratic exercise in environmental and social engineering, but can also be a subversive science (Shepard, 1969) simply by virtue of its mandate to understand humans as part of a web of life that is simultaneously social and biological (and much more).

So where is the evidence and how does it all relate to chaos, complexity, networks and webs?

First the evidence (or gossip, often one and the same)

#### Betrayal at the Borderlands

With respect to science and politics, two very simple examples occur to me. The first is that of the many wildlife and conservation organizations that are science-based in their claims to legitimacy and in their research efforts to document the conditions of wildlife or to manage them. Science is the bedrock of their claims to legitimacy and authority. Most of these organizations are also committed to the separation of nature and culture and the spatial segregation of wildlife from human beings. Yet, the membership and fund raising drives on the web and through the mail depend in large part on appeals to ordinary peoples' emotional attachment to animals and empathy for them in situations of threat and endangerment. My own parents, working class people who live on social security, defying all the stereotypes of "environmentalists", have repeatedly sent contributions to at least two such organizations, based on their heartfelt response to polar bears with no habitat left, trapped on isolated ice floes, drowning in the Arctic waters. This is based on an inextricable mix of biologically and culturally based affinities.

The scientists and organizations who received these donations often disparage human ability to co-exist with animals, and advocate parks and reserves free of humans as the only path to wildlife protection and conservation. Yet they depend on those very same basic emotional connections to raise funds for their own work. The actually existing connections between humans and non-humans, and nature and culture, are manipulated to serve the interests of the existing hierarchies, in this case the scientific management of Nature and the disciplining of Culture(s) to protect a specific segregated vision of Nature.

A second example is a close but covert encounter with a variant of science/culture wars at a conference held at the World Bank in 1990<sup>1</sup>: The Ecological Economics of Sustainability: Making Local and Short-term Goals Consistent with Global and Long-term Goals. In response to the title I submitted an abstract with a title meant as a retort: Indigenous Ecological Economics: Projecting the Long Term View from Local Space. When I arrived and began to attend the lectures I noticed that the audience consisted of two groups who seemed to have expected each other's presence, the ecologists and economists who had convened it and the other ecologists and economists they had explicitly invited or accepted, as well as an unanticipated third group. The latter was equal in number to each of the other two groups, and included social scientists, political ecologists, human ecologists, development field workers, and some *other* ecologists and economists, most of them women and/or from the global south. I noticed this because I watched and listened to the crowd, with a kind of ethnographic gaze and ear. I also raised my hand, raised questions and made comments from the back of at least three rooms, only to be explicitly thanked by members of this unexpected third group for having spoken their concerns aloud.

That first morning a renowned resource economist presented a discussion of the long term perspective and its application to the Chesapeake Bay. After a crisp scientific start he moved into a strong preservationist stance and then shed slow, quiet but unmistakable tears as he noted that he wanted to leave the Chesapeake Bay for *his*<sup>2</sup> grandchildren to enjoy. His talk was met with reverence and appreciation by the audience, except for the third of us who were the "surprise" constituency. We squirmed in silence. Later, in response to the meeting up until the point of my own presentation, I scrapped my script and delivered a heartfelt plea for recognition of the social and ecological realities of everyday life in the many local places where sustainability was often undermined by the tyranny of science and politics emanating from this very building, and others like it. Using snippets of peoples' life stories, landscapes and experiences, with the images I had prepared, I called for a self-critical, reflective and more humble ecological economics grounded in a wide range of local experiences and insights. These perspectives might well be more long term than the 5 year planning frame of most development agencies.

The next afternoon, in a discussion with the only two women in the large sea of plenary presenters, one of them noted that she had been in the cafeteria line behind one of the meeting's conveners when the resource economist said to him, "Who are all these *women* and why are they so *emotional* about *development*"? The resource economist had spoken of intergenerational [distributive] justice and we (actually a combination of mostly white women and a substantial group of men from the global south)<sup>3</sup> were talking about present and future global distributive justice. But the implication was that the resource economist/grandfather was not emotional, and we were, that he did not mix emotion and

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<sup>1</sup> [The Ecological Economics of Sustainability: Making Local and Short-term Goals Consistent with Global and Long-term Goals, being the First International, Interdisciplinary Conference of the International Society for Ecological Economics\\*](#), held at The World Bank, Washington, DC, USA, 21–23 May 1990

<sup>2</sup> Emphasis mine.

<sup>3</sup> This is another problematic topic in itself, but I won't go into it here.

analysis, and we did. He had invoked an emotionally laden reference to a very closely held patriarchal value, the beauty, bounty and wonder of the Chesapeake Bay *as a legacy to his lineage*, his heirs. His emotional attachment to the bay and to his grandchildren were not unwelcome, but the framing of privilege and legacy was problematic and embodied (literally) entanglement of nature/culture, man/woman, them/us and science/emotion/politics on multiple levels. The emotion was strong and present, the connections between these separate domains were abundant, yet cloaked in denial, and the other (my) side of this debate was painted as “tainted” with emotion and as hopelessly non-objective. This epitomizes the way that the bridge between logos and eros, nature and culture, and science and politics is reserved for covert use by the upper echelons of the hierarchies on both sides of the fictional duality. Moreover, their own bridging is often invisible to them, and hyper-visible when done by others outside their circles of authority and privilege.

Finally I cannot help but mention a fictional example that portrays the enforcement of human/non-human and nature/culture dichotomies as a tool to create a more compliant populace. The Golden Compass by Philip Pullman is a fantasy and/or children’s novel about the combined role of State and Church in a conspiracy to surgically separate children from their unique animal daemons – symbiotic companions bonded to them at birth. This takes place in a society in a faraway time and place, in the far north. In this case the church and state actors discuss among themselves in whispered tones the need to sever this connection to create a more complacent and docile citizenry, with less passion and zest for life, and hence less disposed toward independence and rebellion. They proceed to kidnap children, to keep them in boarding schools, surgically remove their connection to their animal companions and raise them to be good little economically rational, yet church-going citizens (if they survive the separation). The parallel to colonization, conversion, domestication and modernization is quite pronounced and the daemons (manifest as animals) call to mind totem animals, Manitou, and the secret/sacred names conferred on children in various indigenous cultures. The Catholic Church has explicitly criticized and banned the book and the film in various venues.

Given our interests in this meeting it is significant that Pullman raises the concepts of pan-sentience and multiple worlds as well as multiple ways of knowing. There is also a rather fascinating treatment of Dark Matter and “Dust” and specific mention of the multiverse. Dust, or Dark Matter is defined as pan-psychic particles of self-awareness. Dust is both created by and nourishes life, which has become self-aware.<sup>4</sup> The nature and scope of consciousness, with the meshing of animal and human sentience, is what is at stake. This trilogy has been absorbed into popular culture as well as public debate, and has been adapted for film.

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<sup>4</sup>For an entertaining brief description of Pullman’s treatment of dust, see [http://en.wikipedia.org/wiki/Dust\\_\(His\\_Dark\\_Materials\)](http://en.wikipedia.org/wiki/Dust_(His_Dark_Materials)). For more on the series and Philip Pullman, search for his name and The Golden Compass (book 1 title in the US), as well as the name of the series, His Dark Materials.

## **Beyond evidence and gossip of betrayal, are other worlds possible?**

[ So we've descended the staircase, and we've pitched our fit. What else is to be done? ]

### **What can Complexity and Networks Contribute?**

First, there is the job of coming to grips with Chaos and Complexity as Postsystems Science, and *beyond that* as an opportunity to expand our ability to sense and to experience the living worlds in which we are immersed. Second there is the chance to bring a complex vision of Rooted Networks into the study of ecology, and of humans and other beings in ecologies, and to move from Resistance and Resilience in ecosystems to discussions of Conservative and Transformative Resilience, in applications from ecologies to social movements. Third, the Nature/Culture borderlands are where networks and systems meet, entwined in complex relations, including power of multiple kinds. In the short editorial paper (5pp) that is posted under my name in the extra readings, I suggest that network and complexity theories and models have much to offer to Human, Political and Cultural Ecology as well as to ecology and social science more generally. Complex network thinking provides a number of opportunities, including:

1. **Meshing of Nature/Culture** (Taken here as a given, post-Latour, but this requires heavy lifting in theory, methods and empirical research across fields (see my two background papers)

#### **2. Powers of Connection: Complicating Notions of Power and Bringing Power into Networks**

Geometries and Degrees of Connection (Taken as given; see Melanie Mitchell on Complexity; scale free or not; hierarchical or not)

**Terms and Characteristics of Relations** (the **Politics of Connection**, see below)

#### **3. Reconciling Networks, Systems and Territories**

Where networks meet energy, matter, blood, sweat and soil, as well as space and place

See posted background papers by Arturo Escobar and by me, and below

#### **4. Methods for Learning/Knowing/Sensing/Being in the Pluriverse**

**Situated Science: Seeing Multiple in Polycentric Networks**

Complicating Categories (Elements, Assemblages, Relations, Power, Territories)

Some cross-cutting issues that warrant consideration include: the contingency, fluidity and mutual co-construction of categories; the discretionary choice of categories, scale and boundaries of networks, systems and territories.

Following some of the conceptual openings and insights from technocratic/formal analysis of networks and complexity, combined with the dissolution of nature/culture boundaries, we can illuminate some of the areas that have previously been off-limits.

I propose to pursue three main avenues of exploration of culture~nature and networks:

**Situated science and polycentric networks** (Zambrana chapter and Sketches);

**Relational Webs: Power in networks and the terms and characteristics of relation**

(Sketches in attached figures and refer to Geoforum editorial and chapter)

**Rooted Networks: reconciling social life with the animate world and territories**

(Background papers, especially diagrams in the book chapter)

I have included some notes and illustrations for each of these topics in the appendix as well as a section on Ruminations on Resistance and Resilience and applications of complexity and network thinking. There is also a single page with suggested links to other work, both long past and recent, on some related concepts and authors we may wish to bring into our discussion.

## **Appendix 1**

### **Rooted networks\***

Root is a verb as well as noun and rooting is a part of being, for people, plants and animals. Rooting does not imply the tap root model of the pine tree, but connotes a wider variation. To illustrate that point I cite an example at the far end of the spectrum. A baleen whale that filter feeds has territories of circulation that relate to conditions of temperature and salinity as well as sources of plankton that vary seasonally, usually following the pathways of specific currents. In this case the whale is rooted in a series of pathways, and patterns of circulation within and between them. Rooting refers to connections to territories (of sustenance, in this case, and also of production, extraction, exchange, consumption, residence, refuge, and circulation, among others).

\*This is elaborated in my book chapter posted on the web, as well as in my Spanish language text posted on the web for the Bogota meeting.

### **Applications of chaos and complexity to resistance and resilience in rooted networks**

When we see bifurcation, cascading bifurcations, and eventually chaos, order is not gone, it's just no longer embodied, beyond certain parameters, in the same actors/categories we have been following. E.g. when you hit a certain temperature and rainfall range you will no longer be counting trees, but that doesn't mean there's nothing there, it's called desert vegetation. This has a temporal dimension as well. You might have to wait for rare and episodic rains to see the flowers, but it doesn't mean they aren't there. Or at certain depths in the ocean you may find bifurcations as life regroups into distinct clustered categories, and then seems to lose all coherence. You might need to be looking for different life forms and at different scales. Or you might be tracking specific social movements and suddenly they are gone or they "failed" or "faded away". It doesn't mean that all social movement and social organization has disappeared, it has regrouped, it is now embodied in different form(s).

As Raquel Gutierrez writes, social movements post-uprising are simply in a different stage of cyclical development, where daily life has been changed (in subtle or dramatic ways) and life goes on, but differently, with new potentials for future upwellings of energy and realignment of the social and political context. Wendy Wolford has noted something similar about the MST (Landless People's Movements in Brazil), in the sense that a perceived drop in the numbers and support in the Northeast signified to some the rejection of the movement by one time members and the failure of the movement in an entire region. She suggests that it is another stage and also that people in the cane fields and cane processing factories may have gotten what they wanted or needed in the way of land for their settlements and small plots. She quotes several activists who were never interested in the next stage of mixed farming villages as envisioned by the founding, core membership of peasant farmers from the south. On a graph this might well present a bifurcation, not success and failure, but difference in aspirations and in expressions of liberatory outcomes. With new subsidies and agrarian reforms coming from the government throughout the country, that bifurcation could well yield to cascading bifurcations and eventually a chaotic pattern with no apparent order. However, this does not mean that there will be no connection and organization. It simply implies that the relevant entities that embody and mediate

connections may not be the same and may or may not be visible to various groups of social movement observers who have noted the ups and downs in membership and/or activities of a given movement at particular scales.

I would add that legibility and comprehensibility of connections and entities is a major issue to consider across fields of theory and practice. What we can recognize as social movements, organizations and groups of people, or what we can recognize in the way of plant and animal communities or assemblages, or combinations of the two, may be only a small fraction of the significant assemblages that join together various categories of beings at any given place and time, and across places and times. New groupings, from emergent ecologies to social movements, may be embodied in different entities or in different locations and configurations, all of which may be less legible than, or simply diverge from, the expected manifestations we are seeking.

This is a perennial problem and subject of debate in social movements as well in ecology (especially with respect to conservation and biodiversity). A case in point is the failure to count reforestation and secondary forest in calculations of deforestation. At this point, in the reports on deforestation from various conservation NGOs, government agencies and UN offices, there is no calculation of net deforestation or forest loss, there is simply a counting of the forest newly removed, as indicated by closed forest canopy. Dispersed trees, clumped trees and emerging new forests, even if based on “natural” succession, are not counted. The dominant paradigm of forest assessment and monitoring, using imagery from space, does not account for forest re-growth, nor does it deal with planted forests<sup>5</sup> and complex assemblages such as agroforests co-created by farmers and forests throughout the world.

The flip side of this is that we can change the patterns we recognize as well as the terms of pattern recognition, literally re-grind the lenses we use to know and learn. Collaborative research on social movements, agroforestry and biodiversity in the Yamasa Hills of the Dominican Republic resulted, to my delight and surprise, in the identification of a species-rich regional agroforest. A repeating pattern of species assemblages emerged from tree surveys as well as interviews and sketch maps. Specific assemblages of species were related to particular groups of people and practices, as well as landforms, soils, drainage, dominant crops. The regional agroforest was shaped in large part by a land struggle movement based in a mix of Liberation Theology, traditional Catholic Church communities and Afro-caribbean religious vision and practice, as well as cultures of resistance and resilience that date back to slavery and colonization. [For more on the ecological, political and cultural insights from the agroforest communities of Zambrana-Chacuey, see the extra readings section on the Pluriverse website, my 2010 paper that is Chapter 11 of an edited volume in press. For more on complex networks applied to both ecologies and social groupings see the short paper posted on the web, and my contribution in Spanish to the Bogota meeting.]

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<sup>5</sup> Counting planted forests is a double edged proposition. In this case I am noting that even a biologically diverse planted forest with indigenous species or a restoration of a primary forest would not be counted. The flip side is that in some cases, e.g carbon forests and energy forests, industrial monocrops of woody plants are being treated as forests in some calculations where they should NOT be. Above I refer to diverse and/or native forests that are not counted because they are either “second growth” or a “degraded succession” or partially planted/maintained by people.

The broader question is, does change in the main entity of interest always mean degradation, dilution, loss? Can we learn to see multiple manifestations of continuity and even discontinuity and continuing value within transformed social and biological assemblages, and of course, assemblages that cross the nature/culture line, as do most of those in which we participate each and every day of our lives? If we allow ourselves to think more in terms of assemblages and, of networked ecologies, with dynamic and complex connections to territories of various kinds, then maybe we can learn to appreciate actually existing and complex forms of connection in a greater variety and diversity of forms. A simultaneously humbler and more ambitious approach to human ecologies might allow us to consciously perceive and participate in a much wider range of ecologies/networks that join together species, social groupings, landscape features, technologies, and artifacts, with ever-unfolding collections of new entities/elements/beings in constantly changing assemblages. This could allow us to break free of the current paradigm of “purity tests” in both biological and cultural “conservation”, unable to recognize, value and support the changing, living assemblages arising under new pressures and opportunities.

## **Recent Ruminations on Resilience**

### **Resistance and Resilience: Conservative and Transformative Resilience and Cyclical Worlds**

One persistent political ecological challenge is how to deal with change without simply accepting degradation. Abrams suggests not to postulate a future utopia, but to enter into what IS HERE NOW and start working to heal the rifts between ourselves, other humans and the beyond-human living worlds we are part of. The periodic making of new worlds over time, resonates with chaos theory and complexity, and the transition into new frameworks of order, with new categories of actors or beings. The “items” change in scale and type, yet self-organizing processes continue and new orders emerge.

I’ve included a few examples of “transformative resilience” below.

New Orleans provides one example in the case people who have **voluntarily** formed new neighborhoods in parts of old ones, in order to cluster with other survivors rather than live in dispersed remnants on half-empty streets. They have recreated community and what they valued most in their old neighborhoods, sometimes at the cost of leaving behind specific elements of the landscape, the houses or social life that they valued. They have walked into the actually existing landscape, made choices and transformed it and themselves, since all the old elements were no longer available as part of a whole community under new conditions.

Another example is the adaptation of landscapes to either fire or to fire suppression. Sometimes the arrested succession fostered by either human suppression of “natural” fires, or by human setting of periodic fires, may actually support communities of indigenous people and a rich assemblage of plants, animals, people, technologies, and constructions that are **well attuned to each other**. The fact that it is not the “authentic, original” forest or even the “original, authentic” textbook culture may not be an issue except to external arbiters of ecological or cultural purity (see Lily Ray on Alaskan forests and government fire suppression policy).

In the case of urban forests under attack by insect pests in Worcester MA, the forest includes exotic as well as native maple trees and many other species. The recognition of the urban forest as a forest may need to expand to the actually existing urban forest, with all (or at least some) of its non-native species. A situated science perspective might help to make sense of the relationships between various elements of the urban forest, from particular tree species and insect disease vectors, to residential housing and landscape types, to groups of people, to various animal species (pets, wildlife, “feral”). Instead of focusing on the original forest’s resistance to the Asian long-horned beetle, and its resilience (ability to return to the original mix), foresters can consider the possibility that a change in overall composition might better cope with the pest outbreak and prevent a recurrence. Survival of a diverse forest canopy trumps restoration of susceptible native Maple species previously dominant in the “original” forest.

### **Situated Science**

One possible practical approach is to practice situated science in polycentric networks... that is to think in assemblages and networks and in any given network to view the viability and desirability of each other node **and connection** from each node in turn. To start we visit all the potential nodes in a network, based on how we initially perceive, postulate or hypothesize it from outside, or as it is self defined. Then as we visit each, we may see that some nodes and connections fall out, and some new ones add in, based on the specific view from each of our original nodes. Are we talking about multiple worlds or are about one world? Perhaps it is only a series of connected nodes, and the specific, contingent networks of each. In either case we can complete a more inclusive and radically empirical exercise by viewing the elements, the connections and the assemblage as a whole, from the perspective of each node point. We can do this in a number of ways, from interviewing people to measuring indicators of the status of particular human and other beings as individuals or in groups treated as single nodes. How does the frog “see” or experience the network and its various elements, as best we can surmise from indicators? And what of the river, the elder woman farmer, the young man fishing, the rice crop, and the road? How does each tree species in the agroforest “see” the other tree species, the crops and animals, and the various groups of people that make up the agroforest network? How does each tree species “sense” the existing relationships to each of these, and other possible alternatives? See the attached figures for a rough approximation of formal ways to portray the **type and terms of relationship**.

Is this just about epistemology once again, and worse yet reductionist/mechanistic models of relationality? Yes and no... it is about epistemology but also about ontology. As Diana Gomez pointed out in the Bogota workshop, the polycentric network might still be about multiple centers that are treated as essential and fixed units. I would say yes, but they are not treated as permanent and representative categories. They are momentary. It’s very analogous to using a digital computational base for an analog model, so you have to use time steps, but it lets you simulate simultaneous solutions of multiple differential equations (or in this case a simultaneous fusion of the views from each and every node).

There is also a certain moral basis for multiple or polycentric vision. Each is still in a connected context and yet each may also have a different vision (explicit or implicit) of the scale and composition and boundaries of their own networks. The extent, shape and character of the various networks/worlds and their overlap may be quite distinct when viewed from distinct positions. There are also multiple possibilities of what constitutes an entity or a node and some may be collective while others are individual. But it also mirrors an ontological sense of the nature of networks/communities/ecologies and relations between multiple beings across scales. It is somewhat of a **kaleidoscope**, but it is also about M.C. Escher's All Possible Worlds... and the contingent and relational nature of each and all connections/relationships.

## **Appendix 2**

There are also some philosophical precedents listed below that deal with various questions raised in the main paper and in the terms of the workshop. Some have been marginalized or set off limits or have hit brick walls, only to be reworked later into acceptable, innovative or even "new orthodoxy" propositions. Some of these include:

Noosphere/Infosphere (Teilhard de Chardin): vis a vis noosphere and networks view

<http://www.youtube.com/watch?v=z6h2DHwsab0>

Systems/Chaos/Complexity (Isabelle Stengers, Melanie Mitchell, Brian Goodwin)

Food Chains/Food Webs/Communities/Networks (B. Patten, and Fath, articles; Manahatta Project of Wildlife Conservation Society/Bronx Zoo, book and traveling exhibit)

Gaia/ Global Ecosystem (Lovelock; Margulis, Botkin and many others)

Species Coalitions and Mergers/Endosymbiosis (Konstantin Mereschkowsky 1905, Lynn Margulis (1970)

Pan-Sentience, (Arturo Escobar, Brian Goodwin, Philip Abram)

Formative Causation, (Rupert Sheldrake)

Epigenetics and Epigenomics (Stuart Kauffman)

References (Incomplete, see citations in text)

David Abram. 1996 *The Spell of the Sensuous*.

Paul Shepard. 1996 *The Subversive Science*. "Ecology is sometimes characterized as the study of a natural web of life. It would follow that man [sic] is somewhere in the web or that he in fact manipulates its strands..."

*The Ecological Economics of Sustainability: Making Local and Short-term Goals Consistent with Global and Long-term Goals*, being the First International, Interdisciplinary Conference of the International Society for Ecological Economics\*, held at The World Bank, Washington, DC, USA, 21–23 May 1990

<http://www.youtube.com/watch?v=z6h2DHwsab0> Noosphere Ultimate Om BrainPaint

<http://www.nature.com/nature/journal/v466/n7307/full/nature09182.html>