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"Now it is impossible 'simply to continue along previous lines'--

Incomplete and unrevised notes on Enactable Social Theorizing and Open Spaces"

for New England Workshop on Scientific and Social Change

Peter Taylor, 5 May 2012, updated 26 July 2012

1.

It is one thing to know that people are not passive recipients of life forces. But it is another thing to identify [people's multiplicity of] initiatives, and to contribute to a context that is favorable to their endurance. It is one thing to know that the totalizing and invariably pathologizing accounts of people's lives are social constructions that sponsor highly negative conclusions about their identities. But it is another thing to identify initiatives that might provide a point of entry to the sort of rich story development that brings with it more positive identity conclusions and new options for action in the world
(White 2011, p.29)

2.

My sense of critical thinking is [that] it depends on inquiry being informed by a strong sense of how things could be otherwise. I want students to see that they understand things better when they have placed established facts, theories, and practices in tension with alternatives. Critical thinking at this level should not depend on students rejecting conventional accounts, but they do have to move through uncertainty. Their knowledge is, at least for a time, destabilized; what has been established cannot be taken for granted. Students can no longer expect that if they just wait long enough the teacher will provide complete and tidy conclusions; instead they have to take a great deal of responsibility for their own learning. Anxieties inevitably arise for students when they have to respond to new situations knowing that the teacher will not act as the final arbiter of their success. A high level of critical thinking is possible when students explore such anxieties and gain the confidence to face uncertainty and ambiguity
(Taylor 1995a).

3.

Why write about social theory? Three answers to start with:

a) I am critical of the complementary *depressive* and *fantasizing* modes of most left-leaning social theory. In the depressive mode, the dynamics of capital (or fractions of capital, such as the finance sector) dictate what is possible, as if no-one could assume a role within the structured system that could alter the dynamics and as if the human actors were, either blind to the real dynamics or act unwittingly to provoke the powerful into trumping their actions. In the fantasizing mode, the talk centers on building or aligning with mass movements (or at least with emergent social movements) in order to resist and one day overturn these dynamics. In the meantime, discussions often flip to, for example, what Obama should do (or should have done), what U.S. policy should be etc., as if the speaker (or the listener) could be transported into a decision-making position and act true to their principles without having been changed by the process of assuming this role in the structured system. (Why "fantasizing"?--In fantasy, people envisage worlds and mentally inhabit them, escaping the practical difficulties of action. Achieving some result in the material world requires human agents to be engaged with materials, tools, and other people.)

b) I have a proclivity for making what I now call "[design sketches](#)" —Design is about intentionality in construction, which involves a range of materials, a sequence of steps, and principles that inform the choice of material and the steps. Sketch denotes the incompleteness of the designs—there is often a gap between the principles I lay out and their realization in practice or established knowledge; and

c) I want to see if I can create a design sketch about *enactable social theorizing* to provide an alternative to the depressive and fantasizing modes. I want to place my own personal proclivities for design sketches in tension with complexities of interactions that are involved in social continuities and changes. In this spirit, I provide introductions to a number of tools, processes, and perspectives that readers might adopt or adapt so readers can take something away even if the design sketch as a whole is not compelling.

(* See [blog post and schema](#) for carrying over tools and processes from the here and now of a workshop.)

4.

There is, however, a significant tension even in speaking of tools that others "might adopt or adapt." When I inquired on a listserv for facilitators about what is known about conditions that influence uptake and application of skills learned in workshops, one response was: "I would say, unfortunately, that little transfer between workshops of a classroom nature and on-the-job behavior is likely to occur unless the "workshop" is tied to the actual work itself and, indeed, embedded within the practice." This workshop seeks to find ways around this stricture--ways to support translation, that is, uptake and application. Yet, the very framing of this workshop topic begins by citing commentators on the spread of innovations [who] have noted the challenge of moving beyond the enthusiasm of early adopters--Innovations have to be translated so that they address the pragmatic and particular concerns of other potential adopters ([Wikipedia n.d](#)). In this vein, researchers on educational technology, such as Barry Fishman, are interested less in "scaling up" after a successful piloting of a new learning technology as much as "digging in deep." That is, spend time in a school working with all-comers, not only those teachers eager to try out new technologies. Digging in deep requires attention to the school as an organization and to the demands placed on teachers. The early majority needs those who come bearing innovations to recognize the other demands, such as boosting students' test scores, that shape teachers' work. (The current label for educational research that combines innovations with examination of school organization is "design-based implementation research," Penuel et al. 2011.) To what extent then are NewSSC workshops a retreat from digging in deep or a retreat to prepare us to go home and dig in deep? To what extent is my proclivity for making design sketches reconcilable with support for translation and digging in deep?

5.

[S]elf-care is never a selfish act -- it is simply good stewardship of the only gift I have... Anytime we can listen to true self and give it the care it requires, we do so not only for ourselves but for the many others whose lives we touch. [As] the poet Rumi [stated] in his piercing observation: "If you are here unfaithfully with us, you're causing terrible damage." If we are unfaithful to true self, we will extract a price from others. We will make promises we cannot keep, build houses from flimsy stuff, conjure dreams that devolve into nightmares, and other people will suffer...

(Palmer 2000, 31)

6.

In the late 1980s Roberto Mangabeira Unger laid out a "constructive social theory," which centered on "institutional and imaginative frameworks of social life [that] supply the basis on which people define and reconcile interests, identify, and solve problems." He went on to note: "These frameworks cannot be adequately explained as mere crystallized outcomes of interest-accommodating or problem-solving activities" ([1987, p. 4](#)). Unger sought to present a view of how these "contexts [or frameworks] stick together, come apart, and get remade" (1987, p.5). Although I was attracted to his efforts, I found his work too theoretical; it seemed too difficult to translate into practical implications. In my thinking about scientific activity at that time I was exploring a notion of "representing-engaging," that is, modeling or *representing* of phenomena cannot proceed without multiple choices about practice and action in society, that is, *engaging*. (*) In contrast, Unger seemed to be giving readers a representation of our "society-making powers" from a position outside of what he was representing. Writing in that way was, of course, not out of line with how social theory is done.

(As a broad brush example, Francis Galton collected copious data about similarities among relatives, but none about the nurture side of how people's traits develop. His choices of data collection were bound up, in [my interpretation](#) , with his concerns about whether exceptional individuals [of his own ilk] could rely on biological heredity to ensure that their offspring would be part of the next generation's exceptional individuals.)

7.

I freely concede that the same tensions are evident—not resolved—in my book *Unruly Complexity: Ecology, Interpretation, Engagement* (U. Chicago, 2005) when the thematic endnotes address social theory in relation to environmental change and the relation of agency and structure(dness). These endnotes are excerpted below (#qq). The tensions also run through my more recent thinking about combining an *intersecting processes* view (which has an outside representational emphasis) with an *historical scan* activity (produced by a particular group at a particular time) to generate enactable, group-specific praxis. These notes explicate and extend that thinking and these tensions. Let me orient the reader to what is to follow through five brief points:

a) I am interested in social theory (but critical of what I call *Social Theory*). I think that intersecting processes provides an approach that improves on the well-known structure-agency duality (i.e., actions of social agents are enabled and constrained by social structures and, in acting, social agents imperfectly reproduce those structure).

b) At the same time my preliminary notes on these issues (#qq) take more of the representational stance I note above in Unger's work.

c) I am also interested in people's problem-solving and path-charting abilities in well-facilitated collaborative processes (which Unger might criticize as putting too much stock on "crystallized outcomes of interest-accommodating or problem-solving activities"). At the same time, I have wanted to find ways to inject understandings of structures (or Unger's structure-making) into these processes

(#qqr).

d) I am critical of the complementary depressive and fantasizing modes of most left-leaning social theory (see #3a). Discussions of the dynamics of capital—or, similarly, of deep forces or structures that are the determinants of social change—don't address well the *heterogeneity* of things people do and say, nor the *shifting associations* and how, to borrow Unger's words, they "stick together, come apart, and get remade," nor the shifts in what any one person does and say from one micro-context to another.

e) I am interested in social theory that addresses the preceding heterogeneity, shifting associations, and contingency—that brings the multiple strandedness of changing social life into the center (as against being the variation or noise around the deeper [more essential] Social Dynamics [capitalization deliberate here]). That's what motivates the combining of intersecting processes and historical scan mentioned above and detailed below (#qq). This move aims to shift the focus from shaping a better social theory to allowing for social theorizing, as well as from representing social dynamics to enacting social theorizing in the form of repeatedly defining and pursuing engagements in the heterogeneous dynamics that intersect in all kinds of society-making. Enactable, contingent social theorizing maybe unsettled and unsettling, but should social theorizing be something all that much easier to grasp than society-making?

In order to move systematically towards explicating the points above, let me introduce three ideas—unruly complexity (notes #8-11), heterogeneous construction (#12-13), and mapping (#14-17)—before getting to intersecting processes (#20-21) and moving on from there.

8.

A question: What if I think that everything is already *unruly complexity* (Taylor 2005)? What do I do?

One step would be to define for whoever is reading what I mean by that term. Unruly complexity, as I use the term, refers to situations that

- consist of heterogeneous components;
- are built up over time and subject to ongoing restructuring; and
- are embedded in wider dynamics.

Equivalently, for situations of unruly complexity:

- definite boundaries are lacking;
- what goes on "outside" continually restructures what is "inside"; and
- diverse processes come together to produce change.

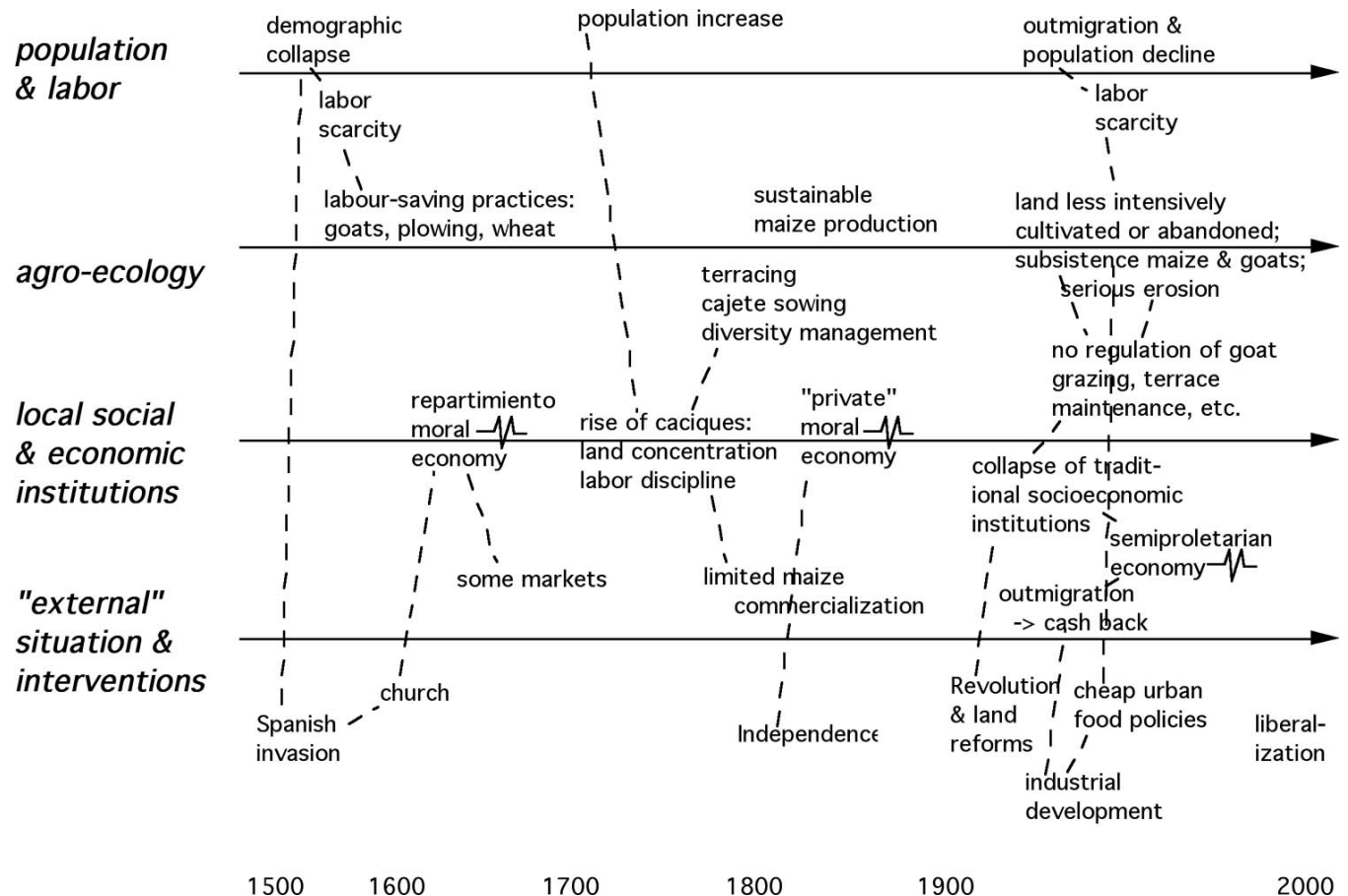
9.

A related step would be to illustrate this abstract definition. Consider a case of soil erosion in a mountainous agricultural region in Oaxaca, Mexico, which I have based on the analysis of Mexican colleagues Raúl García-Barrios and his brother Luis (García-Barrios and García-Barrios 1990).

The severe soil erosion evident now in the municipality of San Andrés is not the first occurrence of such a problem in the region. After the Spanish conquest, when the indigenous population collapsed from disease, the communities abandoned their terraced lands, which then eroded. The remaining populations moved to the valleys and adopted laborsaving practices from the Spanish, such as cultivating wheat and using plows. As the population recovered during the eighteenth and nineteenth centuries, collective institutions evolved that reestablished terraces. Erosion was reduced, soil dynamics were stabilized, and perhaps some soil accumulation was stimulated. But this type of landscape transformation needed continuous and proper maintenance. If a terrace were allowed to erode the soil would wash down and damage lower terraces; there was the potential for severe slope instability. What made the necessary maintenance possible were collective institutions, which first revolved around the Church and then, after independence from Spain, around rich Indians called *caciques*. These institutions mobilized peasant labor for key activities—not only maintaining terraces, but also sowing corn in work teams and maintaining a diversity of maize varieties and cultivation techniques. The *caciques* benefited from what was produced, but were expected to look after the peasants in hard times, a so-called moral economy (Scott 1976). Given that the peasants felt security in proportion to the wealth and prestige of their *cacique*, and given that prestige attached directly to each person's role in the collective labor, the labor tended to be very efficient. In addition, peasants were kept indebted to *caciques*, and could not readily break their unequal relationship. The *caciques* insulated this relationship from change by resisting potential laborsaving technologies and ties to outside markets in maize.

The Mexican revolution ruptured the closed system of reciprocal obligations and benefits by taking away the power of the *caciques* and opening the communities to the changing outside world. Many peasants migrated to industrial areas, sending cash back or bringing it with them when they returned to the community for periods of time. Rural population declined; transactions became monetarized; and prestige no longer derived from one's place in the collective labor. With the monetarization and loss of labor, the collective institutions collapsed and terraces began to erode. National food-pricing policies favored urban consumers, which meant that corn was grown only for subsistence needs in this area. Little incentive remained for intensive agricultural production. New laborsaving activities, such as goat herding, which contributes in its own way to erosion, were taken up without new local institutions to regulate them.

What follows is a diagram I drew to help me narrate this story to others and to highlight a number of themes, which I will articulate in due course (notes #20-21).



Historical processes leading to soil erosion in San Andrés, Oaxaca (from Taylor 1997c). The dashed lines indicate connections across the different strands of the schema. The zig-zag lines indicate institutions that rely on relationships of inequality. See notes #9 and qq for discussion.

10.

A quite different response to the question in #8 would be not to mention the term unruly complexity at first, but to motivate certain themes connected to it through, for example, a [dialogue such as what follows](#) :

Reso (a researcher who analyzes natural resources issues): Consider this simple scenario (Taylor 1997). There are two countries. Each has the same amount and quality of arable land, the same population size, the same level of technical capacity, and the same population growth rate, say 3% per year. Country A, however, has a relatively equal land distribution, while country B has a typical 1970s Central American land distribution: 2% of the people own 60% of the land; 70% own just 2%. Both countries double their populations very rapidly, but five generations (120 years) before anyone is malnourished in country A, all of the poorest 70% in country B would already be—unless they act to change their situation.

Ecolo (natural and human ecologist): But sooner or later in both countries everyone reaches the carrying capacity of their land.

Reso: This is not just an issue of when the crisis occurs in the two countries. B's poor would probably first experience what others call population pressure in the form of food shortages. They would link these shortages to inequity in land distribution (see Durham 1979; Vandermeer 1977). They might attempt to take over the underutilized land of the wealthy. The wealthy, anticipating this possibility, might fund paramilitary operations that target leaders of campaigns for land reform. Or build factories that employ the land-starved poor. The availability and nature of foreign aid would influence the actual choices in specific instances. The island's government might encourage emigration to more affluent countries and hope for remittances back to families that stay on the island. And so on.

Activo (who asks what one can do on the basis of claims): Does this mean that we should support land reform and abandon population control programs? Or are you saying that we should back up these programs by boosting military aid to countries like B?

Reso: I would have to ask to whom "we" refers. People are never all part of a uniform "we;" no real country is like country A. The important thing to understand is that the crises to which actual people have to respond come well before and in different forms from the crises predicted on the basis of aggregate population growth rates and ultimate biological and physical limits to growth. Indeed, in a country like B the poor would be justified in viewing anyone who focuses on population control policies as taking sides with those who benefit from the inequitable access to productive resources.

Ecolo: I have always stressed that affluent countries and people have disproportionate effect on the environment because of their higher per capita consumption of resources and the corresponding higher production of pollutants.

Reso: But I'm not just saying that in any district, country, or ecosphere there are richer and poorer people. My point is that groups with different wealth and power exist, change, and become involved in crises because of their dynamic interrelations.

Ecolo: OK, but even if the dynamics of population growth are more complex, it is still true that the greater the population, the greater the environmental effects.

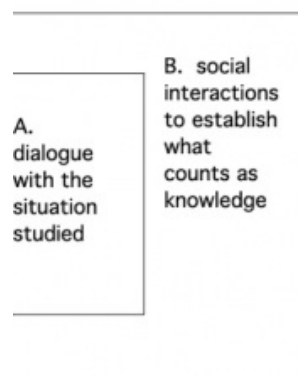
Reso: Not necessarily. The case of soil erosion in a mountainous agricultural region in Oaxaca, Mexico presents a different picture [see note #9]...

Reso is advancing the theme that the analysis of causes and the implications of the analysis change qualitatively if uniform units are replaced by unequal units subject to further differentiation as a result of their linked economic, social and political dynamics. The two islands scenario also illustrates an expository or conceptual theme, namely, when using simple themes or scenarios that are readily digested design them to undermine simple, system-like formulations (such as "population growth leads to environmental degradation"). Design these themes or scenarios to open up issues, pointing to greater complexity and to further work needed in particular cases (such as the case of soil erosion in a mountainous agricultural region in Oaxaca, Mexico). These *opening-up themes* call for or invite work based on dynamics that develop over time among particular, unequal agents whose actions implicate or span a range of social domains. This last sentence is quite a mouthful, but, once the recommendations are digested a little, they can become tools to adopt or adapt in the reader's research and teaching about socio-environmental change.

11.

What if everything is already unruly complexity? The answer in the previous note is that there's a qualitative difference in analysis of causes and in implications drawn from such an analysis. But implications *for whom*? Suppose we consider the implications for the *researchers*. If we start with the simple well-bounded system of researchers in dialogue (using evidence and models) with phenomena in the world, a simple theme that opens things up is that researchers are also social beings. This means that there must be a dialogue with other social agents to establish knowledge as significant--funders, audience, technicians, etc.

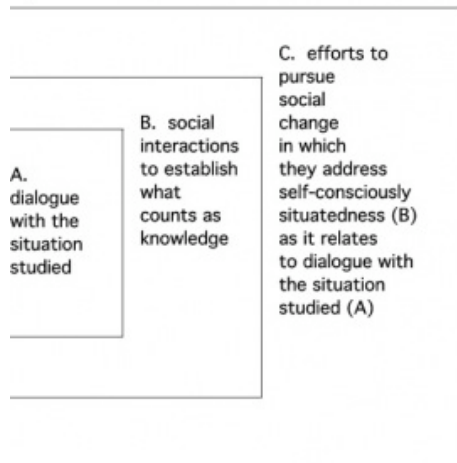
practice of researchers



Once we recognize that research involves two simultaneous dialogues, this invites us to examine how this plays out in particular instances. Researchers must always already be aware of the simultaneous dialogues, so what would it mean for them to address this duality *more*

self-consciously? When would their interactions with diverse social agents *stabilize* and when would they be subject to *ongoing restructuring*? Answering this question would, we might expect, entail attention to the particularity of the knowledge-making situations that concern us.

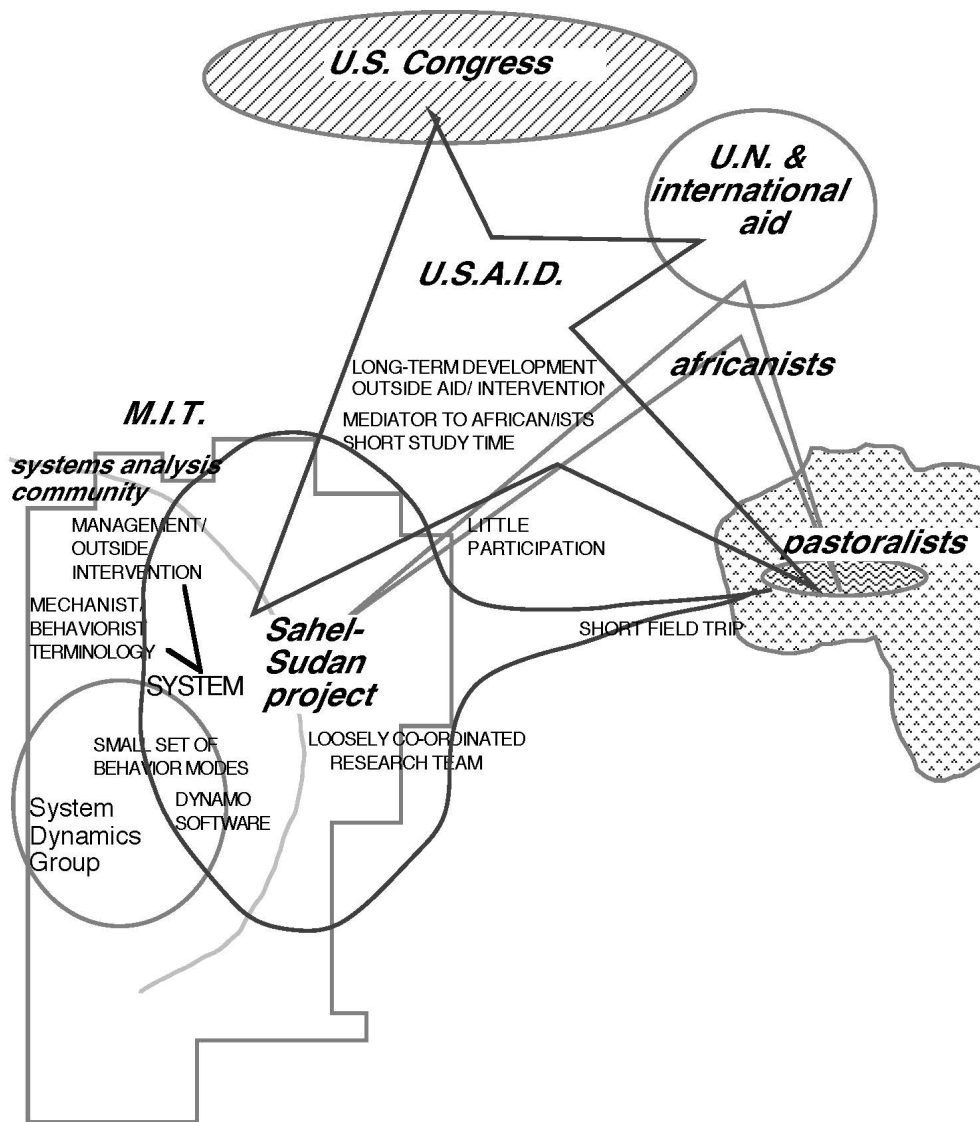
practice of researchers



12.

What if knowledge-making situations are already unruly complexity? In other words, there is an on-going process of building from diverse components, just as a house is built over time using plans and measurements, laborers and contracts, concrete and concrete mixers, wood and saws. This is what I call [heterogeneous construction](#) --scientists mobilize a diversity of resources and, in so doing, engage with a range of social agents. The following extract and figure from Taylor (2005, Chapter 4) provides a glimpse of this picture:

[M]any interdependent resources helped Picardi to represent [nomadic] pastoralism [in sub-Saharan Africa] as an enduring, integrated, well-bounded system. The mechanist and behaviorist language of the strong SD [system dynamics] view of system privileged the outside, superintending agency. This complemented the interventionist position Western nations and international bodies assumed at that time when designing policy for the development of former African colonies. USAID dictated the study time to be short, which limited the research and engagement that might have revealed possible restructurings of pastoralist arrangements. Picardi did not see the need to model restructuring; this facilitated his use of SD to represent pastoralism in clearly characterizable long-term projections. These clear projections, in turn, fulfilled USAID's terms of reference, at least, with respect to the pastoralist sector of the region. And so on. No one resource or domain in this heterogeneous web stood alone—language, tools, work organization, and social relations beyond the work site reinforced each other, that is, rendered each other harder to modify.



An impressionistic schema depicting diverse agents and selected resources involved in the construction of Picardi's system dynamics models. The size of the elements signifies their relative importance (Taylor 2005, 130).

13.

Abstracted away from any particular case, the framework of heterogeneous constructionism holds that:

- a) many heterogeneous components are linked together in webs, which implies that
- b) the outcome has multiple contributing causes, and thus
- c) there are multiple points of engagement at which the course of development could be modified.

In short,

- d) causality and agency are distributed, not localized.

Teasing out this framework leads me also to note that:

- e) construction is a process, that is, the components are linked over time,
- f) building on what has already been constructed, so that
- g) it is not the components, but the components in linkage that constitute the causes.

Points b and e-g together ensure that

- h) it is difficult to partition relative importance or responsibility for an outcome among the different types of cause, e.g., mostly "scientific" but partly "social."

Generally,

- i) there are alternative routes to the same end, and
- j) construction is "polypotent" (Sclove 1995), that is, things involved in one construction process are implicated in many others, and

thus

k) engagements within a construction process, even very focused ones, will have side effects.

Finally, points e, j and k mean that

l) construction never stops; completed outcomes are less end points than snapshots taken of ongoing processes.

This framework carries over into my ideas about intersecting processes and social theory (notes #qq). Within this framework, scientists in action should be thought of as imaginative agents, working knowledgeably and capably within intersecting domains of action, cross-linking heterogeneous resources over time in order to represent-engage, that is, to build, and to build on, heterogeneous webs. The outcomes of their scientific work—theories, readings from instruments, collaborations, and so on—are accepted because they are difficult to modify in practice. If we interpret science in terms of its heterogeneous construction, we, the interpreters, need to tease out the webs of resources and expose their causal significance.

14.

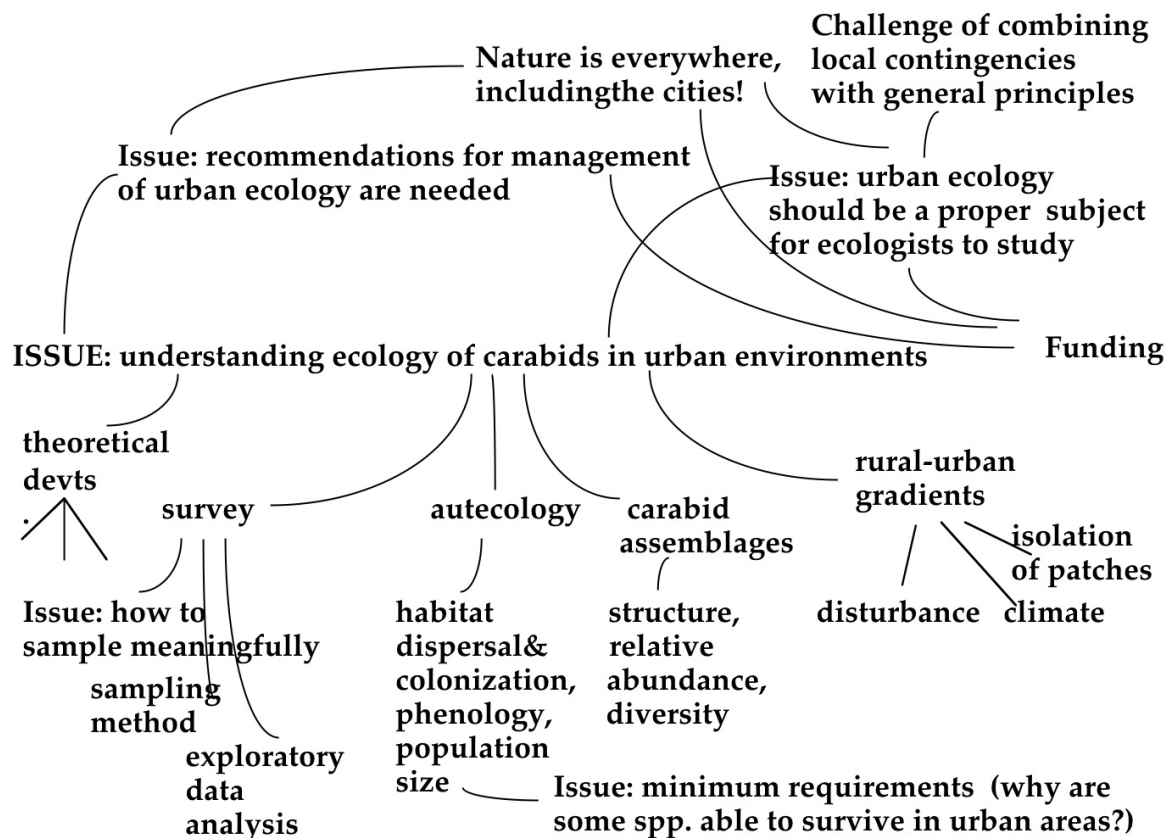
What if knowledge-making situations are already unruly complexity? What can be done with interpretations in this spirit? One thing is that the perspective of heterogeneous construction also means that interpreters of science, when they delimit the resources and agents that they consider relevant to some instance of science-in-the-making, also mobilize resources and engage with diverse social agents (Taylor 2005, Chapter 5, section A). Historians, sociologists, philosophers and other interpreters of science who recognize this might then reflect explicitly on the practical conditions that enable them to build and gain support for their interpretations. Moreover, when interpreters are able to apply the same interpretive framework to their own research, it should enhance the plausibility of their reconstructions of the work of scientists. A more direct way, however, that heterogeneous constructionist interpretation might influence science productively is that, instead of relying on some second party—the interpreter of science—to do the reconstruction, scientists—or indeed any researchers—could interpret their own heterogeneous webs. They could reflect explicitly on how their own dialogue with other social agents affects their ability to study the situations that interest them. They might attempt to identify multiple potential sites of engagement and change for themselves.

To explore this possibility with a number of ecologists and natural resource researchers, I convened two *mapping workshops* in the late 1980s—the first in Helsinki, co-led with ecologist-philosopher Yrjö Haila; the second in Berkeley. These workshops were designed to proceed as follows. Each researcher would focus on a key issue—a question, dispute, or action in which the researcher was strongly motivated to know more or act more effectively. All researchers would identify *connections*—things that motivated, facilitated, or constrained their inquiry and action. These might include theoretical themes, empirical regularities, methodological tactics, organisms, events, localities, agents, institutional facilities, disputes, debates, and so on. Researchers would then draw their *maps*—pictorial depictions employing conventions of size, spatial arrangement, and perhaps color that allow many connections to be viewed simultaneously. The map metaphor was meant to connote not a scaled-down representation of reality but a device that shows the way—a guide for further inquiry or action (Taylor and Haila 1989; Taylor 1990).

Over a series of sessions the workshop participants presented these maps and were questioned by other participants. The expectation was that they would clarify and filter the connections and reorganize their maps so as to indicate which connections were actually significant resources. The hope was that researchers would go on to self-consciously modify their social situations and their research together, perhaps in collaborations formed among the workshop participants.

15.

One map from the workshops illustrates the map making that resulted. The figure below, by a Finnish ecologist I will call “E,” was the most orderly of the maps, having been streamlined and redrawn on a computer. As such it does not do justice to the real-time experience of its production during an actual workshop. Indeed, when viewed on their own all the maps appear schematic; valuable history, emphasis, and substance were added verbally when the mapmakers presented their maps to other workshop participants.



Redrawn outline of E's map about how to conduct research on the ecology of carabid beetles in the city of Helsinki (from Taylor and Haila 1989 or Taylor 2005, 150)

The central issue on E's map is very broad, namely, to understand the ecology of carabid beetles living in the leaf litter under trees in urban environments. Below this issue on the map are shown many theoretical and methodological sub-problems, which reflect the conventional emphasis in science on refining one's issue into specialized questions amenable to investigation. Placed above the central issue are various background considerations, larger and less specific issues, situations, and assumptions that either motivated work on the central issue or were related to securing support for the research. E's research alone would not transform the urban public into recognizing that "nature is everywhere—including in the cities," but by combining the upward and downward connections, he reminded himself that work on the background issues, not only refining a working hypothesis, would be necessary to be able to keep doing his research.

In narrating his map, E mentioned some additional history. Many of the ecologists with whom he collaborated had been studying a forest area, but the group lost their funding when the Forestry Department asserted that forest ecology was its domain. It did not matter that animals are barely mentioned in the ecology of forestry scientists. The ecologists self-consciously, but of necessity, turned their attention to the interconnected patches of forest that extend almost to the center of Helsinki, and explored novel sources of funding and publicity, including a TV documentary. The upward connections were thus a recurrent, if not persistent, influence on E as he defined his specific research questions.

16.

To what extent, recalling the goals of mapping workshops, did the workshops lead participants to "clarify and filter the connections and to reorganize their maps"? It took considerable time to prepare maps, and the mapmakers did not devote more time to redraw their maps in response to interaction during the mapping sessions. To what extent then did researchers realize the ideal of "self-consciously modify[ing] their social situations and their research together, perhaps in collaborations formed among the workshop participants"? Several participants,

at the Helsinki workshop in particular, claimed that the mapping workshop had expanded the range of influences, both theoretical and methodological, that they would bring into planning their future work. One workshop participant commented that mapping made it impossible "simply to continue along previous lines." Nevertheless, although the workshops provided the opportunity to link up with others around revealed affinities, no new coalitions emerged; changes in the researchers' work were not so dramatic. Given that mapping was an experiment and the workshop was of limited duration, this outcome was not surprising. Taking into account the positive features as well as the limitations of these initial workshops led me on a path of expanding my toolbox, workshop-convening opportunities, and experience in facilitating processes that "encourage students and researchers to contrast the paths taken in science, society, education with other paths that might be taken, and to foster their acting upon the insights gained" (citing my [faculty webpage](#) ; see also [2011 review of service and institutional development work](#) , Taylor et al. 2011; [Taylor and Szteiter 2012](#)).

17.

We return to processes that foster reflective practice in due course (note #qq). But first I build on two other observations about the mapping workshops:

- a) the maps were centered on the individual mapmaker, tended to be idiosyncratic, and were not explicit about theory about the researchers' situatedness in society and its implications for their scientific practice. The two workshop leaders wondered what might happen if, say, they urged a standard format, offered models from analogous situations, or promoted various theories or propositions about micro- and macro-social change? Would some idiosyncrasy still have to be encouraged to ensure that scientists reflect freely on and consider changes in their own *particular* research settings?
- b) the workshop participants were self-selected and by no means representative of researchers.

Combining these observations about mapping workshops with the heterogeneous constructionist perspective that knowledge-making entails mobilization of heterogeneous resources and engagement with diverse social agents leads to a programmatic answer to the earlier question. Anyone thinking that everything is already unruly complexity faces the challenge... of using their "knowledge, themes, and other awareness of complex situations and situatedness to contribute to a culture of participatory restructuring of the distributed conditions of knowledge-making and social change." That challenge cannot be addressed alone, nor primarily through our accounts of the world (Taylor 2005, 203 and 201).

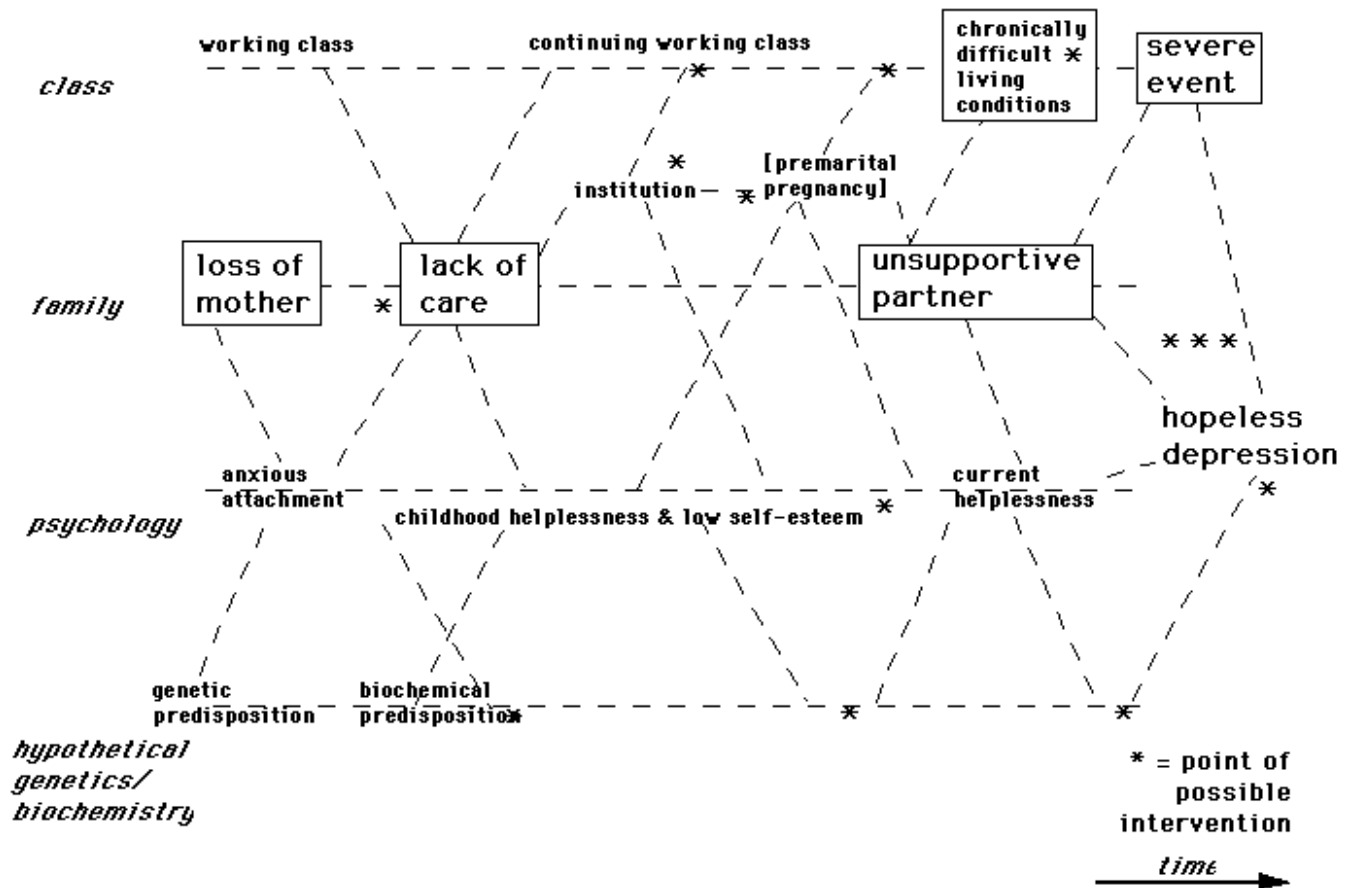
18.

Someone who thinks that everything is already unruly complexity and decides to address the challenge just enunciated might wonder if there are ways to discipline without suppressing the unruliness of complexity. And, given the subject of these notes, they might want to see how unruly complexity, heterogeneous construction, and mapping compare and contrast with published approaches to social theory. Here I find it helpful to introduce the idea of intersecting processes and to review an account from the 1970s by the British sociologists Brown and Harris of the development of severe depression in a sample of working class women. I also work in the extensions of their findings and generalized narrative contributed by Bowlby, a psychologist who focused on the long term effects of different patterns of attachment of infants and young children to their mothers (Bowlby 1988).

Four factors are identified by Brown and Harris as statistically more common in women with severe depression: a severe, adverse event in the year prior to the onset of depression; the lack of a supportive partner; persistently difficult living conditions; and the loss of, or prolonged separation from, the mother when the woman was a child (under the age of eleven). Bowlby interprets this last factor in terms of his and others' observations of secure versus anxious attachment of young children to caregivers. In a situation of secure attachment the caregiver, usually the mother, is, in the child's early years, "readily available, sensitive to her child's signals, and lovingly responsive when [the child] seeks protection and/or comfort and/or assistance" (Bowlby 1988, 167). The child more boldly explores the world, confident that support when needed will be available from others. Anxious attachment, on the other hand, corresponds to inconsistency in, or lack of, supportive responses. The child is anxious in its explorations of the world, which can, in turn, evoke erratic responses from caregivers, and the subsequent attempt by the child to get by without the support of others.

The top three strands of the figure below--class, family, psychology--combine the preceding observations to explain the onset of serious depression. The factors are not separate contributing causes, like spokes on a wheel, but take their place in the multi-stranded life course of the individual. Each line should be interpreted as one contributing causal link in the construction of the behavior. The lines are dashed, however, to moderate any determinism implied in presenting a smoothed out or averaged schema; the links, while common, do not apply to all women at all times, and are contingent on background conditions not shown in the diagram. For example, in a society in which women are expected to be the primary caregivers for children (a background condition), the loss of a mother increases the chances of, or is linked to, the child's lacking consistent, reliable support for at least some period. Given the dominance of men over women and the social ideal of a heterosexual nuclear family, an adolescent girl in a disrupted family or custodial institution would be likely to see a marriage or partnership

with a man as a positive alternative, even though early marriages tend to break up more easily. In a society of restricted class mobility, working-class origins tend to lead to working-class adulthood, in which living conditions are more difficult, especially if a woman has children to look after and provide for on her own. In many such ways these family, class, and psychological strands of the woman's life build on each other. Let us also note that, as an unavoidable side effect, the pathways to an individual's depression intersect with and influence other phenomena, such as the state's changing role in providing welfare and custodial institutions, and these other phenomena continue even after the end point, namely, depression, has been arrived at.



Pathways to severe depression in a study of working class women. The dashed lines indicate that each strand tends to build on what has happened earlier in the different strands. See text for discussion and Taylor 1995. This figure is adapted from Bowlby (1988, 177). His schema is, in turn, adapted from Brown and Harris (1978, 265). The hypothetical genetics/biochemistry strand is my addition.

19.

Suppose now, quite hypothetically, that certain genes, expressed in the body's chemistry, increase a child's susceptibility to anxiousness in attachment compared to other children, even those within the same family. Suppose also that this inborn biochemistry, or the subsequent biochemical changes corresponding to the anxiety, rendered the child more susceptible to the biochemical shifts that are associated with depression. (This hypothetical situation is given by the bottom strand of the figure.) It is conceivable that early genetic or biochemical diagnosis followed by lifelong treatment with prophylactic antidepressants could reduce the chances of onset of severe depression. This might be true without any other action to ameliorate the effects of loss of mother, working-class living conditions, and so on. There are, however, many other readily conceivable engagements to reduce the chances of onset of depression, for example, counseling adolescent girls with low self-esteem, quickly acting to ensure a reliable caregiver when a mother dies or is hospitalized, making custodial institutions or foster care arrangements more humane, increasing the availability of contraceptives for adolescents, increasing state support for single mothers, and so on. If the goal is reduction in depression for working-class women, the unchangeability of the hypothetical inherited genes says nothing about the most effective, economical, or otherwise socially desirable engagement—or combinations of engagements—to pursue. Notice also that many of these engagements have their downstream effect on depression via pathways that cross between the different strands. For example, if self-esteem counseling were somewhat effective then fewer unwanted pregnancies and unsupportive partnerships might be initiated; both effects could, in turn, reduce the incidence of single parenthood and difficult living conditions.

20.

The Brown-Harris-Bowlby depiction of the multi-stranded life-course development of severe depression in a sample of working class women led me to begin using the term *intersecting processes*, of which heterogeneous construction is a particular instance. Indeed, all aspects of the framework of heterogeneous constructionism (note #13) hold for intersecting processes. The astute reader might also notice that the García-Barrios-García-Barrios-Taylor account of case of soil erosion in a mountainous agricultural region in Oaxaca (note #9) analyzes social and environmental change as something produced by intersecting economic, social and ecological processes that operate at different scales (Taylor and García Barrios 1995; Taylor 2001, 2005). Understanding such cases requires attention to the ways these processes transgress boundaries and restructure “internal” dynamics, thus ensuring that the psychosocial or socio-environmental situations do not have clearly defined boundaries and are not simply governed by coherent, internally driven dynamics. Clearly the term intersecting processes addresses the same terrain as unruly complexity; the only reason to use the former term is to suggest that different strands can be teased out in a somewhat disciplined fashion. In this spirit, let me review the soil erosion case to tease out the implications of an intersecting processes framework—and, by extension, a heterogeneous constructionist framework.

a) ***Intersecting processes involve inseparable dynamics.*** Processes of different kinds and scales, involving heterogeneous elements, are interlinked in the production of any outcome and in their own on-going transformation. Each is implicated in the others (even by exclusion, such as when caciques kept maize production during the nineteenth century insulated from external markets). Notice especially the relationship between environmental degradation and the population decline shown in the top strand. This association can be used to grab the attention of environmentalists who identify population growth as a major environmental issue. However, it is neither population decline nor growth, but labor that was important in this case. Labor is something defined by the technologies of production (the second strand) and the social institutions that govern it. Such institutions operate both locally (the third strand) and at places distant from where the erosion occurs (the fourth strand). In short, the relationship between population and environmental change was highly mediated, depending on the technologies used and the local and national social and economic institutions through which labor and production were organized. No one kind of thing, no single strand on its own, is sufficient to explain the currently eroded hillsides. (This theme can be extended to call into question other explanations for environmental degradation that center on a single dynamic or process, e.g., climate change in erosive landscapes; increasing capitalist exploitation of natural resources; or modernization of production methods.)

The theme of inseparable dynamics can be teased out into four aspects:

b) ***In intersecting social-environmental processes, differentiation among unequal agents is implicated.*** Sustainable maize production depended on a moral economy of cacique and peasants, and the inequality among these agents resulted from a long process of social and economic differentiation. Similarly, the demise of this agro-ecology involved the unequal power of the State over local caciques, of urban industrialists over rural interests, and of workers who remitted cash to their communities over those who continued agricultural labor.

c) ***Heterogeneous elements and scales are involved.*** The situation has involved processes operating at different spatial and temporal scales, involving elements as diverse as the local climate and geo-morphology, social norms, work relations, and national political economic policy;

d) ***Historical contingency is significant.*** The role of the Mexican revolution in the collapse of nineteenth-century agro-ecology reveals the contingency that is characteristic of history. The significance of such contingency rests not on the event of the revolution itself, but on the different processes, each having a history, with which the revolution intersected; and

e) ***Structuredness is not reducible to micro- or macro-determinations.*** Although there is no reduction to macro- or structural determination in the account of soil erosion, the focus is neither on local, individual-individual transactions nor on the complex patterns produced by multiple simple transactions. Regularities, e.g., the terraces and the moral economy, persist long enough for agents to recognize or abide by them. That is, structuredness is discernable in the intersecting processes.

21.

The synopsis of a case of soil erosion in Oaxaca (#qq) has, in addition to the themes of the previous note, a number of implications for thinking about the agency of the people studied and, reflexively, of researchers reconstructing intersecting processes:

f) The account represents agency as distributed across different kinds of agents and scale, not something centered in one class or

place (Thompson 2002). In the nineteenth-century moral economy caciques exploited peasants, but in a relationship of reciprocal norms and obligations. Moreover, the local moral economy was not autonomous—the national political economy was implicated, by its exclusion, in the actions of the caciques that maintained labor-intensive and self-sufficient production. Although the Mexican revolution initiated the breakdown in the moral economy, the ensuing process involved not just political and economic change from above, but also from below and between—semi-proletarian peasants brought their money back to the rural community and reshaped its transactions, institutions, and social psychology.

g) The account has an intermediate complexity—neither highly reduced, nor overwhelmingly detailed. The elements included in my synopsis and in the diagram are heterogeneous, but I tease out different strands. The strands, however, are cross-linked; they are not torn apart. By acknowledging this intermediate level of complexity, the account steps away from debates centered on simple oppositions, e.g., ecology-geomorphology vs. economy-society, or ecological rationality vs. economic rationality. Similarly, by placing explanatory focus on the ongoing, intersecting processes, the account discounts the grand discontinuities and transitions that are often invoked, e.g., peasant to capitalist agriculture, or feudalism to industrialism to Fordism to flexible specialization.

h) Intermediate complexity accounts favor the idea of multiple, smaller engagements linked together within the intersecting processes. My synopsis and diagram of the García-Barrios' more detailed account can be read as an engagement with current scholarly discourses in an effort to promote the concept of distributed agency. This concept has implications not only for how environmental degradation is conceptualized, but also for how one responds to it in practice. Intersecting processes accounts do not support government or social movement policies based on simple themes, such as economic modernization by market liberalization, sustainable development through promotion of traditional agricultural practices, or mass mobilization to overthrow capitalism.

i) This shift in how policy is conceived suggests a corresponding shift in scholarly practice. On the level of research organization, intersecting processes accounts highlight the need for trans-disciplinary work grounded in particular locations. They do not underwrite the customary multi-disciplinary projects directed by natural scientists, nor the economic analyses based on the kinds of statistical data available in published censuses.

j) Finally, the intermediate complexity of the figure preserves a role for some kind of social scientific generalization. The synopsis and diagram abstract away an enormous amount of detail, a move that suggests that the particular case described by the García-Barrios might be relevant to other cases. The account does not provide a general explanatory schema, but at least could serve as a template to guide further studies. Such a template would be elaborated in new research projects once researchers began to address the particularities of the situation they are studying. In other words, the particularities of each case would not warrant starting from scratch when attempting to understand and engage in socio-environmental change. The intermediate complexity of my account also means—and here I am applying some reflexivity to my own representational work—that I have deflected attention away from the need to examine the particular institutional and personal resources, agendas, and alliances that people like me would have to cultivate to gain support for the desired trans-disciplinary research or policy interventions.

22.

What if I think that everything is already *unruly complexity* (Taylor 2005)? I want more people to think in terms of intersecting processes, which means being able to read the diagrams I present, appreciate the theoretical implications of the concept, start to make their own accounts and diagrammatic depictions, and teach others to do the same. Thus I developed an activity for a biology-in-society course (which I practiced at the first NewSSC workshop in 2004). The goals for students were:

- a) to understand the development of biomedical and social phenomena in terms of linkages among processes of different kinds and scales that build up over time—genetics, treatment, family and immediate social context, social welfare systems and economics, wider cultural shifts,
- b) to use graphic organizers to help them visualize such “intersecting processes” and to identify places where detail is missing and where further inquiry is needed.
- c) [depending on level of students and prior preparation] to contrast the implications of thinking in terms of direct causation (like spokes going to a hub) with “heterogeneous construction” [notes #12-13].

Students would read in advance [Paul's 1997 account](#) of the history of newborn phenylketonuria screening in the U.S. and my discussion of Brown, Harris, and Bowlby's work [as in notes #qq], then follow instructions to produce an intersecting processes account of one of two phenomena:

a) *the life-course of a female with PKU detected by neo-natal screening:*

- * Identify important connections mentioned in the article (from p. 7ff) between things in the following categories or strands

(open to adaptation): Condition of person with PKU; Diagnosis and care; Social support; and Wider social context.

* Arrange the things as well as you can given the information available on parallel strands according to age of the person.

b) the routinization of neo-natal screening for PKU in the United States:

* Identify important connections mentioned in the article between things in the following categories or strands (open to adaptation): Experience of persons with PKU (condition, care, social support); Advocacy (pro + con); State mandates & regulation; Research; and Wider social context.

* Arrange the things as well as you can given the information available on parallel strands according to year (from 1930s to 1990s allowing more space for 1960 through 1980).

For both a) and b):

* Draw dotted lines to show connections between things.

* Identify connections about which you want to know more. Use the ideas under goal 3 as a checklist.

Example of a connection for a): mandated test (social support) and neo-natal initiation of special diet (diagnosis & care).

Example for b): enthusiasm for biomedical prevention of mental retardation over education/social support/rehabilitation of retarded persons (wider social context) and promotion of PKU screening in advance of research on effects of diet (state mandates & regulation/ research).

* Note where these instructions were hard to put into practice.

I haven't had an opportunity to run and then refine this activity since NewSSC 2004, but some issues that arose then included:

- a) What do arrows mean? Mechanisms, material connections; Increase in probability; Makes possible; or Makes significant
- b) Some participants wanted to focus on explaining a specific outcome.
- c) Technologies of representation to help, e.g., colors for countervailing processes.
- d) Are we representing an individual or a population or a generic individual plus variation?

23.

While intersecting processes accounts are produced by an outside observer, they have a complement in a participatory group processes called a [Historical scan](#) , which is used either to review a group's evolution over time or to set the scene in which a project is to be undertaken. The script below for such an activity uses three strands to organize relevant events.

"As you consider your involvement in this workshop, let's paint a picture of the context in which we will be operating. Let's think about this context having a past and a possible future and operating on three levels: "local," "regional," and "global."

The "global" is the largest view relevant to the project, here, the world. The "local" is the personal perspective gained in the immediate unit of family, workplace, and community. The regional is the specific arena in which the project operates, here, study and engagement in the area of science and its social context.

Take a moment to jot down significant events at each of the levels over the past 10-30 years or a future event that you hope will be in the 5 years ahead.

Now choose 5* of them and write them in on the large post-its in as large block letters as will fit.

Select one from early on in this period. [Put them on the wall, consulting the group to keep them in order]

... from the middle... from the later part of the period.... others [including those covering the whole period]

When were you excited?... discouraged?

What do these events remind you of?

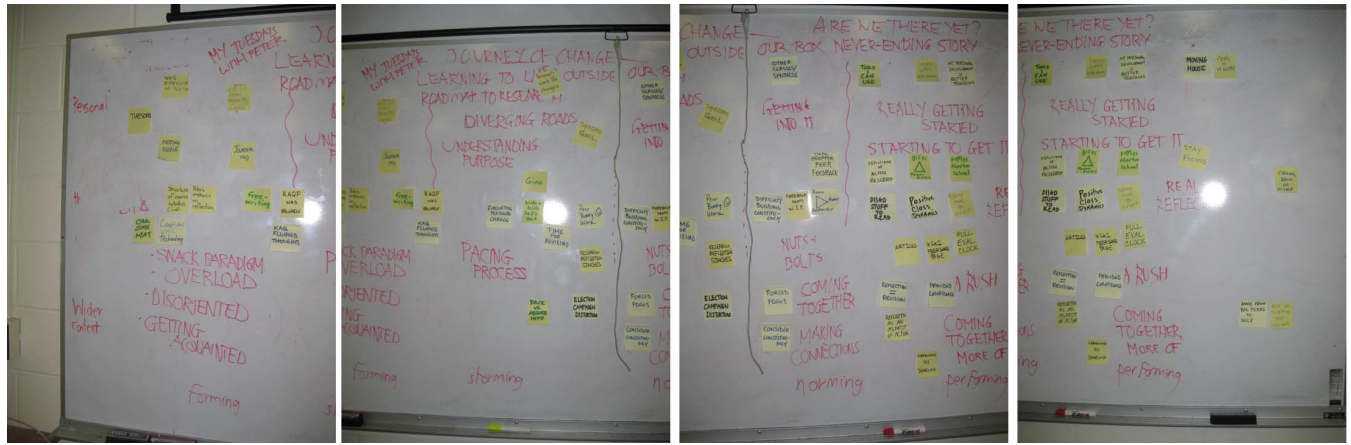
When were there transitions?

If this were a book, what name would you give for the "chapters" between the transitions?

...name for the whole "book"?

What have you learned about a diverse group of people coming together to "read this book"? [Remind participants to be telegraphic -- avoid speeches.]

What have you learned about the context in which your planning and action/thinking and learning will take place?



A historical scan at the end of a graduate course on Action Research, December 2010.

24.

Like mapping (notes #14-17), historical scans tend to be idiosyncratic, unsystematic with respect to theory, and transient (i.e., differ markedly if the same participant[s] repeated the activity at another time). Yet, again also like mapping but in ways that are less individual-centric, historical scans are rich in—often generative of—meaning for the participants and in guidance about what to do next. In light of this I designed an experiment in collective construction of intersecting processes that took place at the [April 2010 meeting](#) of the New England Workshop on Science and Social Change. The steps are captured in the box to follow:

- a) Participants had given 15-minute autobiographical introductions that explained how they came to be someone who wanted to participate in a workshop on "Where social theory meets critical engagement with the production of scientific knowledge."
- b) Drawing on these introductions, participants undertook a historical scan to synthesize and contextualize autobiographical narratives so as to set the scene for the remainder of the workshop [as in note #23].
- c) Thinking of the three levels as strands of an intersecting processes account, identify gaps in each of our understanding of cross-scale linkages.

This first experiment did not generate much active involvement of the participants in the synthesis in step b) and I'm not sure we even had time for the forming of questions about cross-sale linkages in step c). Possible modifications to address this shortcoming would include:

- a) Allow for friendly amendments to correct and supplement the post-its on the wall and their placement in time.
- b) Make copies of the post-its (or photograph and print the wall) and allow each participant to process the items on their own, starting from "When were you excited" and going through to naming for the whole "book."
- c) Follow this with [freewriting](#) to allow participants to translate the experience into what they have learned and what they will do on the basis of what they have learned (see the last three questions of the historical scan in note #23).
- d) Share something clarified by the process with one partner and then in a whole-group discussion.

The result of such an activity would always be idiosyncratic—or group-specific—and probably time-specific (a year or so later the same group might generate a different picture—just think of December 2008 in the USA versus November 2010!). The cross-scale linkages would not be based on the depth of analysis that some historical political economists are capable of (e.g., [Robert Brenner](#)). However, as stated earlier, accounts of the larger political economy do not often clarify for an individual what to do short of joining in building a mass movement for revolutionary change. In contrast, this activity, especially if repeated in different groupings, projects, contexts, might be enactable. The idea is to provide meaning for the participants and guidance in what to do next at the same time as developing a deeper understanding of cross-scale linkages. Such group-specific praxis is a central aspect of the idea of the "enactable social theorizing" foreshadowed in the title and note #3.

25.

Group-specific praxis—the idea of providing meaning for the participants and guidance in what to do next—has informed my "Future Ideal Retrospective" experiments since 2010 (but not, as will be addressed later, the understanding of cross-scale linkages). In this activity participants collaboratively contribute to generating a practical vision for future developments based on evaluations or on statements,

questions, and/or reservations concerning a certain challenge, such as learning from what has happened before (e.g., in a course, at a conference, etc).

Preparation:

a) Either assemble written evaluations from, say, a conference, or ask a defined group (e.g., students in a course) to compose five statements, questions, and/or reservations that are important to them concerning a defined challenge (e.g., supporting each other to complete the course project by the end of the semester).

Session Proper (which may only include a subset of those who composed the evaluations or statements, questions, etc.)

b) Circulate the sheets. Digest them one by one and make notes on what you read with a view to representing not only your own views but also those of others (who may or may not be present at the session).

Future ideal retrospective:

c) Imagine yourself some time in the FUTURE looking back with a sense of accomplishment on how far the group (e.g., conference organizing group, the students in the course) have come in response to the challenge (e.g., the issues raised the evaluation) = the IDEAL. Construe accomplishment broadly so it can include your own reflection and growth. RETROSPECTIVE: What happened to make this so?—What different kinds of things do you envisage having contributed to the positive developments? These things can span the mundane and inspiring; tangible and intangible; process, as well as product; relationships as well as individual skills. Prepare 5 items (in large block letters on 8.5" x 3" sheets of paper).

d) Silent Grouping of the items. (Feel free to move any single item or group of items, even breaking up someone else's group, but take time to notice the clusters that emerge—don't rush.) [While this is happening, an assistant types up the items so each participant can view their own copy of the items during step h.]

e) Naming of the clusters (together as a group). (Avoid nouns and categories. Instead, invent a phrase that captures how the cluster moves us towards the future ideal, e.g., not "humor" or "scramble," but "Kept humor about the scramble needed to keep things going.")

f) Repeat steps d) and e).

g) Review of a previous [F.I.R.](#) to provide guidance for the next step.

h) Individually group items and name clusters (including discussion in pairs of initial attempts). Group these groups and name them, until you arrive at a descriptive active name for the practical vision post-its as a whole. [See my [clusters](#) from a 2011 workshop.]

i) Review the different clusterings and namings.

Goals:

Collaboratively contribute to each participant generating a practical vision of future steps.

Use post-it brainstorming (incl. clustering and naming) to rapidly assess a complex situation in a way that creates an experience of creativity.

Experience post-it clustering as a fruitful way for participants to clarify their future and thus go on to complete the activity after the session is over.

(It might even be possible to extend beyond this first Future Ideal phase to identify the underlying obstacles and eventually strategic directions.)

26.

The Future Ideal Retrospective approach, but not by this name, is used in Strategic Participatory Planning as developed by the Institute for Cultural Affairs (ICA) in Canada. ICA's techniques (which also include the Historical Scan) have been developed through several decades of 'facilitating a culture of participation' in community and institutional development in many countries. Their work anticipated and now exemplifies the post-Cold War emphasis on a vigorous civil society, that is, of active institutions between the individual and the state and between the individual and the large corporation (Burbidge 1997). ICA planning workshops involve a neutral facilitator leading participants through four phases—practical vision, underlying obstacles, strategic directions, and action plans (Stanfield 2002). The ICA workshops aim to elicit participation in a way that brings insights to the surface and ensures the full range of participants are invested in collaborating to bring the resulting plans or actions to fruition.

Such investment was evident, for example, after a community-wide planning process in the West Nipissing region of Ontario, 300 kilometers north of Toronto. In 1992, when the regional Economic Development Corporation (EDC) enlisted ICA to facilitate the process, industry closings had increased the traditionally high unemployment to crisis levels. The EDC wanted specific plans, but it also sought significant involvement of community residents. Twenty meetings with over 400 participants moved through the first three phases—vision, obstacles, and directions. The results were synthesized by a steering committee into common statements of the vision, challenges, and strategic directions. A day-long workshop attended by 150 community residents was then held to identify specific projects and action plans, and to engage various groups in carrying out projects relevant to them.

Vision 20/20			WEST NIPISSING VISION			February 1993		
STRONG DIVERSIFIED ECONOMIC BASE			EXCITING ATTRACTIVE COMMUNITY TO LIVE IN			ACTIVELY INVOLVED POPULATION		
WIDELY PROMOTED TOURISM BASE	EXPANDED BUSINESS DEVELOPMENT	APPROPRIATE NATURAL RESOURCES DEVELOPMENT	WELL MAINTAINED EXPANDING INFRA-STRUCTURE	COMMUNITY BASED SERVICES	RESPONSIVE ACCOUNTABLE UNIFIED GOVERNMENT	ACTIVE INVOLVED COMMUNITY	IMPROVED RECREATION OPPORTUNITY	LIFELONG EDUCATION FACILITIES
Broad Based Tourism Promotion	Modern Recycling Facilities	Forestry Development	Improved Transportation Network Locally/Area	First Response Teams	Effective Cooperation Between Municipalities	Active Involvement of Citizens in All Community Developments	Youth Activities Promoted and Supported	Accessible Expanded Adult Education
	Northern Ontario Service Industry Centre			Community Based Services for Mental Health & Physically Challenged				
Improved Four Season Accommodation	Appropriate Natural & Resource Based Industry	Expanded Local Agricultural Market		Ongoing Citizen Involvement in Local Government		West Nipissing Team Cooperation	Improved Access to Lake Nipissing	
Accessible Waterways and Waterfronts	Incentive Programs to Attract Businesses		Well Served Community	Expanded Local Access to Specialized Clinics		West Nipissing Friendly Welcoming Community		Focused Job Training Programs
		Fish Hatcheries		Coordinated Integrated Services under One Roof	Local Service Boards in Unincorporated Municipalities	Rural Residential Development	Broadened Leisure Activities and Facilities	
Packaged Tourist Attractions & Tours	Francophone Bilingual College		Environment-ally Responsive Community	Expanded Vibrant Senior Citizen Community		Open Communication across West Nipissing		Enhanced Post Secondary Education
	Local Businesses meet all needs				Re-evaluate Land Use By-laws			
Expanded Coordinated Community Festivals	Attract Government Offices	Clean Lake Nipissing		Restructured Social Assistance System		Youth Involved in Planning All Activities	Improved Organized Sports	

A follow-up evaluation five years later found that it was not possible simply to check off plans that had been realized. The initial projects had spawned many others; indeed, the EDC had been able to shift from the role of initiating projects to that of supporting them. It made more sense, therefore, to assemble the accomplishments under the headings of the original vision and strategy documents. Over 150 specific developments were cited, which demonstrated a stronger and more diversified economic base, and a diminished dependence on provincial and national government social welfare programs. Equally importantly, the community now saw itself as responsible for these initiatives and developments, eclipsing the initial catalytic role of the EDC-ICA planning process. Still, the EDC appreciated the importance of that process and initiated a new round of facilitated community planning in 1999 (West Nipissing Economic Development Corporation 1993, 1999).

When I learned about the West Nipissing case, I could not help contrasting it with my early experience in applied social research (see Taylor 2005, 94ff). In that research we undertook detailed scientific analysis of an agricultural region at some distance from those directly affected by the problems of salinization and economic decline. Projections of the economic and ecological future were straightforward as long as they preserved the basic structure of the situation. When innovative possibilities, such as reforestation of abandoned land, were considered, the analysis became difficult. The audience for the final analyses was small and attention to the report short-lived. The Ministry was unable to implement the policy change it desired and nothing more then became of the two or three person-years of research.

The West Nipissing plan, in contrast, built from straightforward knowledge that the varied community members had been able to express through the facilitated participatory process. The process had been repeated, which presumably allowed them to factor in changes and contingencies, which might have included the impact of the North American Free Trade Association and the decline in the exchange rate with the USA. And, most importantly, the process has led community members to become invested in carrying out their plans and to participate beyond the ICA-facilitated planning process in shaping their own future.

Some difficult questions for me were opened up by this contrast, given that my own environmental research has drawn primarily on my skills in quantitative methods. What role remained for researchers to insert the translocal into participatory planning, that is, to contribute analysis of changes that arise beyond the local region or at a larger scale than the local? For example, suppose that I had moved to the agricultural region we studied and participated directly in shaping its future. I would still have had translocal knowledge about the government ministry's

policy-making efforts, the data and models used in the economic analysis, and so on. Indeed, the local for professional knowledge-makers cannot be as place-based or fixed as it would be for most community members. How, then, can researchers take seriously the creativity and capacity-building that seems to follow from well-facilitated participation, but not to conclude that we have to go local and focus all their efforts on one place?

My reflection on these questions around 2000 led me to coin a term, "flexible engagement." The term seemed to capture a process challenge, rather than content challenge for researchers in any knowledge-making situation: How can we connect quickly with others who are almost ready to foster—formally or otherwise—participatory processes and, through the experience such processes provide their participants, contribute to enhancing the capacity of others to do likewise. The term plays off the flexible specialization that arose during the 1980s, wherein transnational corporations directed production and investment quickly to the most profitable areas and set aside previous commitments to full-time employees and their localities. Would flexible engagement constitute resistance to flexible specialization, or an accommodation with it? This remained an open question for me as I gradually developed tools for engaging flexibly (Taylor et al. 2011, Taylor and Szeiter 2012).

27.

My thinking about tensions between the local and the trans-local has been informed by the writing of the cultural analyst Raymond Williams. In the years just before his death in 1988, Williams wrote two books that built directly upon his experience of moving from a childhood in the English-Welsh borderlands into a cosmopolitan world of intellectual exchange: the novel *Loyalties* (Williams 1985) and an unfinished set of episodes of environmental-historical fiction, *People of the Black Mountains* (Williams 1990, 1992). I was led to both these works through an essay by the geographer, David Harvey, 'Militant Particularism and Global Ambition' (Harvey 1995). Williams's *People of the Black Mountains* resonates strongly with the project of analyzing change in terms of differentiated agents situated in intersecting processes—in this case, socio-environmental change—but it was the novel *Loyalties* that kept me thinking about how to relate social structure and human agency. Through its central characters, in particular the Welsh Gwyn and his English birthfather Norman, *Loyalties* explores the tension between solidarities forged through working and living together in particular places—militant particularism—and the application of trans-local perspectives or abstractions. Moreover, it adds a temporal, trans-generational dimension that is especially significant given my interest in 'self-conscious knowledge-making and social changing' or, in Williams's words, in 'looking, in [an] active way, at the whole complex of social and natural relationships which is at once our product and our activity' (Williams 1980, 83).

When the middle-aged Gwyn and elderly Norman finally meet, Norman pushes Gwyn to acknowledge that his scientific career has taken him away from his birthplace and enabled him to see more about ways the world is changing than people who remained in the Welsh towns. Political involvement, Norman argues, cannot be a simple matter of Gwyn staying loyal to his roots. Given the 'powerful forces' that shape social and environmental change, we can 'in intelligence' grapple with them 'by such means as we can find' and take a deliberate path of action, but 'none of us, at any time, can know enough, can understand enough, to avoid getting much of it wrong' (Williams 1985, 357-8). Or, in the words of Norman's close intellectual and political colleague, Monkey Pitter, if we 'go on saying the things we learned to say and it will be just strange talk, in a strange land' (161). People may try to align their work and lives within the prevailing social infrastructure, but they should expect to become misaligned as the infrastructure changes around them.

28.

Questions about the significance of flexible engagement (note #26) became more difficult when I learned that, in late 2002, a major employer in the West Nipissing region, Weyerhaeuser, closed its containerboard plant. A local newspaper article (Haddow 2003) quoted a Weyerhaeuser spokesperson: "[T]he decision to close the facility is not a reflection on the employees of Sturgeon Falls and their abilities and efforts... It was made for economic reasons beyond their control." The spokesperson went on to explain that "the company's preference would have been to keep all facilities running, but the market changes and current economic conditions forced their hand... If we as a company do not adapt, then we will not survive and none of our employees will have jobs." The community sprang into action and threatened lawsuits, but the plant closure was not reversed.

There is more to learn about the community's response but discussion with colleagues involved in regional economic development led me to adjust the militant particularism—trans-local contrast. The translocal side is not only about perspectives or knowledge, but can also encompass resources that could be brought to a locality or withdrawn and withheld from it. There is room to think about and to explain which aspect of the translocal comes into play—knowledge or resources; contributed or withheld—and how they interact with solidarities forged through working and living together in particular places.

29.

Cross-scale linkages feature strongly in these last two notes, even if in the previous one (note #25), I remarked that the understanding of cross-scale linkages was not central to my "Future Ideal Retrospective" experiments. Weyerhaeuser's action clearly links West Nipissing into

transnational or global economic changes. Discussions of globalization tend to highlight the increasing extent of economic and cultural connections or, complementarily, their increasing speed. In social studies of science and technology, the icons of extent and speed are the internet and the ever accelerating project of genome sequencing. Such discussion reminds me of William Cronon's (1991) widely read account of the nineteenth century emergence of a 'Metropolis of Nature,' namely, the city of Chicago. The picture he presents is of ever increasing speed and expanding extent. What he doesn't highlight, however, is that the motor of the changing capitalism he describes is not simply speed and increasing extent, but differential speed and extent. The futures market, for example, takes off not simply because telegraphic communication connects the world more rapidly, but because some people in Chicago have access to that information well before and in greater detail than, say, farmers in the hinterland. It could be said that exploitation of differentials, or uneven development (Bond 1999), is a driver of political economies. In this vein, capitalism depends on moving on and leaving others behind, displacing costs in space and time, and avoiding accountability. In this sense, flexible specialization is not a novel development, but another instance of the fundamental dynamic of capitalist political economics. This might be called the superstructure, in which any new technological infrastructure, such as those developed in biotechnology, can be built and can be unbuilt.

Shifting attention from speed and extent to differentials in speed and extent points to a more general theme of looking for second-order effects hidden behind or implied by any direct relation or process. For example, as the anthropologist Eric Wolf shows in *Europe and the People Without History* (1982), the history of Western Europe since 1400 is totally bound up with the history of regions and peoples who are given no agency in this history. The idea that there are always groups hidden, but dynamically present, in dominant historical narratives is spelled out by historian Geoff Eley (2007) when, in discussing what is distinctive about our current era of globalization, he questions the standard histories of capitalist progress and of the formation of an organized working class:

under any particular capitalism wage labour has in any case always continued to coexist with various types of unfree and coercive labour. The salience of such simultaneities—of the temporal coexistence inside a particular capitalist social formation of forced, indentured, enslaved, and unfree forms of work with the free wage relationship strictly understood—needs to be carefully acknowledged. Such simultaneities become all the more salient once we begin conceptualizing capital accumulation on a properly global scale by integrating the forms of surplus extraction occurring in the colonial, neocolonial, or underdeveloped worlds. The West's privileged prosperity, including precisely the possibility of the social-democratic improvements associated with the three decades after 1945, has been founded, constitutively, on horrendous repertoires of extraction and exploitation on such a world scale.

The meaning of the social-democratic layer—indeed of any layer—of a globalized political economy emerges in relatedness--[synonymously](#): in cross-scale linkages or intersecting processes.

30.

These last few notes seem to have strayed from group-specific praxis. However, before I can flesh out the idea of "enactable social theorizing," I want to spend more time in the terrain of theory in STS and sociology. [The next few notes include approaches I appreciate and theorizing I am critical of.](#)

The STS scholar whose work most resonates with these notes is our own Atsushi Akera. This note reprises a 2007 review of his work. *qq--needs streamlining*

David Hounshell characterizes Akera's book [Calculating a Natural World](#) well when he says, as quoted on the book's cover, that it "takes many of the familiar developments in the early history of digital electronic computing and recasts them so as to reveal the 'ecologies of knowledge' that gave rise to them, were transformed by them, and, in turn, further shaped these artifacts and practices... Akera thoughtfully relies on—and contributes to—constructivist and post-constructivist social theory, all the while basing his narrative on detailed historical research." The strength of the book—and of the articles that precede it—lies in the dialogue between the shaping of historical narrative and the representation of the complexity of interactions that link institutions, occupations/professions, organizations, knowledge, artifacts, and actors. This dialogue presses at the limits on (or limitations of) both narrative and theoretical representation, especially with respect to: avoiding the determination of any layer of (or slice through) the complexity; capturing the interpretative openness (as against hermeneutic closure) for actors; and conveying the contingency and indeterminate quality of changes and of failed initiatives.

Consistent with this framing, Akera proposes that "the immense productivity of research during the Cold War era resulted from the productive tensions between institutions" (CANW, p. 4). In contrast to the "relatively smooth process" by which the co-production of technology and social context has often been portrayed, Akera is interested in the "often-friction-ridden interplay of institutions, ideas, artifacts, and practices" (p.7). His cases studies of Cold War research show that "[t]ensions and differences often produced redundant, over-ambitious, and incoherent research programs" (p. 10). History of technology, he contends, needs to value the study of failure and to "make the notion of failure relative if one's goal is to document the less linear paths of innovation" (p. 338). In the spirit of symbolic

interactionist sociology, Akera draws “attention to the contingent and indeterminate nature of institutional change” (p. 339), thus counterbalancing the functionalist emphasis he sees in some broader-brush historical sociology of technology. Formation of new professions and forms of organizing technology “often occurred at the intersection of multiple institutions and disciplines,” and involved “recombining prior knowledge and preexisting institutional forms,” and various actors “letting go” of some commitments in order to forge new associations (p. 343).

Such theoretical themes are evident from the earliest of Akera's essays. “Engineers or Managers” (2000) describes post- World War II engineers venturing into marketing, operations research, and project management, re-engineering computers to “meet the needs of administrators as opposed to scientists” (p.191-2). The National Bureau of Standards was involved in a variety of initiatives along these lines, but was never able to take a commanding position. The detailed historical narrative in this essay allows Akera to build up to theoretically informed discussion in which he notes how, on one hand, the flexibility of this history resonates with a symbolic interactionist (or social worlds) emphasis on “specific sites of interaction where social reproduction and transformation occur” (p. 212), while, on the other hand, the persistence of some ideas and distinctions in the narrative provides an opportunity to reintegrate the social structure that is un(der)theorized in symbolic interactionism. The [Technology and Culture](#) article (2001) similarly narrates a non-deterministic development of professions and organizational change. The 1950s IBM user group, Share, originated as an attempt to reduce programming costs, but contributed to the development of occupational identities among the recruits, who had been drawn from a variety of established occupations. Moreover, Share required corporate collaboration in contrast to the conventional expectation of competition for resources. The [Business History Review](#) article (2002) shows how the research specialists who made up IBM's Applied Science department developed as “agents of their customers rather than agents of IBM” (p. 795) and, while their initiatives were not always being successful, the result was that “a firm situated outside the traditional defense industries forged new institutional alliances between business and government and between science and industry” (p. 767).

The [Social Studies of Science](#) article (2007) on ecologies of knowledge builds wonderfully on the historical-theoretical work of the book and earlier essays. It gives a stronger analytic purchase to the idea of ecology of knowledge (EoK) and lays the basis for a practical methodology. Often EoK has been used to refer in general terms to the heterogeneous complexity of factors, resources, and relationships implicated in the production of knowledge. This paper gets more specific. It explores a layered representation for an EoK in which layers correspond to different representational scales, e.g., actors,... occupations,... institutions,... historical events. This approach focuses on the whole-part relationship (metonymy) and facilitates the study of the dynamic relationships among the layers as they develop over time. The more encompassing entities can be seen as metonymically instantiated through local practices, a move that avoids imputation of causality “to entities that reside on one side or the other of the sociotechnical divide” (p. 417). This is not an abstract schematization but is well illustrated through diagrammatic and textual reconstructions of historical case studies, such as Vannevar Bush's research program centered around the differential analyzer and the emergence of systems programming as an occupation after World War II.

Akera advances four main uses of this multi-layered representation of EoK: 1) visualizations (or diagrammatic depictions) of EoK can help in elaborating on the relationships described in historical and sociological narratives and in pointing to relationships that were not evident or explicitly stated; 2) questions posed within any one layer can be illuminated, e.g., concerning the development of technical professions; 3) more precise understandings of concepts in STS can be produced, e.g., “technoscience”; and 4) through mapping the different methodologies employed in the various areas of STS—especially as they relate to the broader scope of social analyses—more reflexive understanding of the use of these methodologies can emerge.

Akera claims that this representation of EoK is a phenomenological not epistemological project (p. 415), but I believe he is overly cautious or modest here. After all, he is asking us not simply to note the existence of heterogeneous, scale-spanning complexity, with its associated contingency and indeterminacy, but to struggle with its analysis and visualization. Philosophy of science and theory in SSS does not yet have a strong handle on this. As Akera notes, each of his suggested uses of the EoK representation brings “historical evidence into sociology [not] by pitting the particularism of history against the generalizations of social theory, but by encouraging the use of the empirical wealth of history, as mediated by the representation, to support a more grounded approach to social theory” (p. 435). This essay is careful, thoughtful, and thought-provoking and I look forward to future rereadings—as well as to re-viewings of the [innovative flash animations of his case studies](#) from his publications. I believe other readers who have followed the STS scholarship on heterogeneous complexity, actor-network theory, ecologies of knowledge will be greatly stimulated by this contribution. Akera refers to this project as a parallel line of inquiry to research on his book projects, but I expect (or hope) it will not move onto the backburner as he and others, including myself use it to stimulate the thinking and inquiry of our graduate students and colleagues.

31.

In social studies of science it has become popular to invoke non-human agency, a move initiated by Latour and Callon when they used the semiotic label actants for human, other living beings, and non-living things alike in their descriptions of how scientists secure support for their

theories (Callon 1985; Latour 1988; 1999). The playfulness of the resulting anthropomorphic accounts seems to animate the discussion of the non-human resources, but in practice Latour's and Callon's accounts reduce agency to a lowest common denominator, namely, resistance to the agency of others. Human purposes, motivations, imagination, and action do not enter the analysis, except that humans have to attempt to overcome resistance. Taylor (1993) interprets this move as follows: If scientific agents are viewed as acting with a minimal psychology—almost without mental representations—then this ensures that inborn dispositions, cognitive constraints, individual creativity, and so on, cannot determine action and belief. This absence preempts the analyses of others who invoke the internal cognizing mind to resist the social construction of science. It also leaves no place for interests or other external influence to reside inside the scientist's head, and thus counters earlier analyses in social studies of science that allowed social context or social forces to determine scientists' beliefs or actions. In short, invoking non-human agency can be interpreted as promoting a particular view about social causality and the character of human agency in the production and reproduction of social structuredness. (See Downey and Dumit 1997 for alternative perspectives on non-human agency, which begin from observing anthropologically the routine practices in which people—not only interpreters in social studies of science—treat technologies and other things as agents.) (Extracted from Taylor 2005).

32.

insert resistance of mine to naming, breaks and crisis talk in sociology?

33.

Traditional, big "S" Social theory seeks to account for the structure and dynamics of Society as a whole (Münch 1987; see also edited collections Bottomore and Nisbet 1978; Giddens and Turner 1987). Although such theory is a possible source of propositions to inform researchers' accounts of their situatedness in society, modern Social theory itself provides grounds for critique of its own project.

Illuminating this point Goldblatt (1996) examines the contributions that Social theorists Giddens, Gorz, Habermas, and Beck make to shaping plausible, politically appealing and practical institutional alternatives and innovations in the context of environmental degradation and the rise of environmental concerns in Western politics. Among many respectful criticisms Goldblatt makes of the theorists' work, he observes that the globalization of capitalism and (following Giddens and Beck) reflexive modernization mean that: "[t]oo many decisions about economic rationality have to be made by reflexive agents on the ground, on the basis of tacit practical knowledge, to make the transfer of decision making powers to the centre effective. No state, however flexible, can gather enough information, process it quickly enough or embody the essentially local knowledge and skills required in a rapidly changing economy" (Goldblatt 1996, 193).

It follows, I believe, that no theory about the dynamics of Society as a whole could provide sufficient resources for reflexive researchers. Researchers may find it helpful to consider multiple, partial social theories, but the challenge remains of weaving those theories together so that researchers do not allow simple propositions about overarching or underlying processes to govern their accounts of social situatedness (Taylor 1997, 211ff).

(Extracted from Taylor (2005. For other accounts of social theorizing in the context of environmental change see Harvey 1993; Peet and Watts 1996; and Redclift and Benton 1994.)

34.

There has been a long history in social theory of discussion of how to relate social structure and human agency (Dawe 1976; Giddens 1981; Sewell 1992; Vogt 1960; see Taylor 1996 for bibliography in context of interpretation of science). Concepts introduced in Unruly Complexity (Taylor 2005) provide the basis of a framework for moving beyond the structure-agency dualism. [Playing off Sewell's dual dual, what follows I call the "triple-triple."](#)

In brief: Envisage agents operating within intersecting processes (IPs) that are interlinked in the production of any outcome and in their own on-going transformation. Let these IPs be teased out into three sets of three IPs: the Personal, which connect the IPs of cogitation, body, and unconscious; the Local, which connect discursive themes, materials at hand, and local rules; and the Social, which connect Discourse, Materiality, and Rules. Agents heterogeneously construct a variety of projects at any time. In doing so, they imaginatively mobilize discursive themes, materials at hand, and local rules. Their cogitation involves some thematic framework that simplifies their actual and possible heterogeneous construction as it is constrained and facilitated by their unconscious and body. The Local IPs evolve as an outcome of what different agents are able to do in response to each other is doing. The Social IPs evolve as the linkage of many Local IPs, and are, in turn, drawn on or invoked through discursive themes by interacting agents in Local IPs (see reflection on vibrating agency in Taylor 2005, 198-9).

Such a framework makes conceptual room for a view of distributed agency in relation to social structuredness. There is no reduction to macro- or structural determination. Nor is the focus on transactions among concentrated individual agents. Even if agents tried to stay focused on following some principle of morality or rationality, or sought to optimize some metric, such as their profit, they could not avoid

contributing to many projects, given the intersections among Personal, Local and Social IPs. The view of human nature implied by the framework is similar to that of Dervin (1999) in which agents try to bridge "gaps" opened up by the inherent incompleteness or unboundedness of reality and by their movement in time-space. Contingency is unavoidable, even necessary, in psychological development and construction (Hendriks-Jansen 1996; Urwin 1984).

The framework also resists the subordination of the material to the mental or discursive that is effected, for example, by sociologist of knowledge Barnes, when he equates social order to "shared knowledge and aligned understandings" that confer "a generalized capacity for action upon those individuals who carry and constitute it" (Barnes 1988, 32, 57), or by social epistemologist Fuller, when he analyzes the rhetoric of promoting "public understanding of science" and calls for experimentation in widening public participation in debates over scientific claims (e.g., Fuller 2000). (Markus 1986 provides a general analysis of the difficulties that philosophers and social theorists have reconciling the paradigms of "language and production".) Of course, my framework specifies nothing about the particulars of any situation or how different agents should engage within those particularities, leaving most of the work still to be done.

35.

possible activity that connects triple triple with group-specific praxis

36.

support circles (to bring us back to the issue of "support for translation")

37.

return to narrative work (note #1)

38.

return to self-care

39.

exercises for the reader

- a) identify tensions not so labeled
- b) list the tools and processes introduced
- c) open question: where is there is a place for strategic action

References

to be completed & alphabetized

Atsushi Akera.

2000. Engineers or Managers? The Systems Analysis of Electronic Data Processing in the Federal Bureaucracy, " in *Systems, Experts and Computers*, ed. Agatha Hughes and Thomas Hughes. Cambridge, MA: MIT Press.

2001. [/Voluntarism and the Fruits of Collaboration: The IBM User Group, Share/](#) . *Technology and Culture* – 42(4): 710-736

2002. [IBM's Early Adaptation to Cold War Markets](#) : Cuthbert Hurd and His Applied Science Field Men, *Business History Review* 76: 767-802.

2007. [Calculating a natural world:](#)

[scientists, engineers, and computers during the rise of U.S. cold war research.](#) Cambridge, MA: MIT Press.

2007. [Constructing a Representation for an Ecology of Knowledge](#) : Methodological Advances in the Integration of Knowledge and its Various Contexts, *Social Studies of Science*, 37(3): 413-441

Peet, R. and M. Watts (Eds.) (1996). [Liberation Ecologies: Environment, Development, Social Movements](#). London: Routledge.

Penuel et al. (2011) "Organizing Research and Development at the Intersection of Learning, Implementation, and Design," *Educational Researcher* 40:331–337.

Taylor (1990). "Mapping ecologists' ecologies of knowledge." [Philosophy of Science Association](#) 2: 95-109.

Taylor and Y. Haila (1989). "Mapping Workshops for Teaching Ecology." [Bulletin of the Ecological Society of America](#) 70(2): 123-125.

- Barnes, B. (1988). The Nature of Power. Urbana, IL: University of Illinois Press.
- Callon, M. (1985). "Some elements of a sociology of translation: Domestication of the scallops and the fishermen of St. Brieuc Bay," in J. Law (Eds.), Power, Action, Belief: A New Sociology of Knowledge? London: Routledge & Kegan Paul, 196-233.
- Dawe, A. (1978) 'Theories of Social Action', pp. 362–417 in Bottomore, T. and R. Nisbet (Eds.). A History of Sociological Analysis. New York: Basic Books.
- Dervin, B. (1999). "Chaos, order, and sense-making: A proposed theory for information design," in R. Jacobson (Ed.), Information Design. Cambridge, MA: MIT Press, 35-57.
- Downey, G. and J. Dumit (Eds.) (1997). Cyborgs and Citadels: Anthropological Interventions in Emerging Sciences and Technologies. Sante Fe, NM: School of American Research Press.
- Fuller, S. (2000). Thomas Kuhn: A Philosophical History for Our Times. Chicago: University of Chicago Press.
- Giddens, A. (1981). "Agency, institution, and time-space analysis," in K. Knorr-Cetina and A. Cicourel (Eds.), Advances in Social Theory and Methodology. Boston: Routledge & Kegan Paul, 161-174.
- Hendriks-Jansen, H. (1996). Catching Ourselves in the Act. Cambridge, MA: MIT Press.
- Latour, B. (1988). "Mixing humans and non-humans together: The sociology of a door-closer." Social Problems 35(3): 298-310.
- (1999). Pandora's Hope: Essays on the Reality of Science Studies. Cambridge, MA: Harvard University Press.
- Markus, G. (1986). Language and Production. Dordrecht: D. Reidel.
- Sewell, W. H. (1992). "A theory of structure: Duality, agency and transformation." American Journal of Sociology 98: 1-29.
- Taylor (1993). "What's (not) in the mind of scientific agents? Implicit psychological models and social theory in the social studies of science." Paper presented to Society for Social Studies of Science, West Lafayette, Indiana. http://www.faculty.umb.edu/peter_taylor/4s93.html (viewed 1/8/01).
- (1996). "Science and Social Theory (theme: structure and agency): Syllabus for STS662, Cornell University, Spring semester." http://www.faculty.umb.edu/peter_taylor/662a-96.html (viewed 12/20/00).
- Urwin, C. (1984). "Power relations and the emergence of language," in J. Henriques, W. Holloway, C. Urwin, C. Venn and V. Walkerdine (Eds.), Changing The Subject: Psychology, Social regulation and Subjectivity. London: Methuen, 264-322.
- Vogt, E. Z. (1960). "On the concepts of structure and process in cultural anthropology." American Anthropology 62: 18-33.
- Bottomore, T. and R. Nisbet (Eds.) (1978). A History of Sociological Analysis. New York: Basic Books.
- Giddens, A. and J. Turner (Eds.) (1987). Social Theory Today. Stanford: Stanford University Press.
- Goldblatt, D. (1996). Social Theory and the Environment. Oxford: Polity Press
- Harvey, D. (1993). "The nature of the environment: The dialectics of social and environmental change." The Socialist Register (1993): 1-51.
- Münch, R. (1987). "Parsonian theory today: In search of a new synthesis," in A. Giddens and J. Turner (Eds.), Social Theory Today. Stanford: Stanford University Press, 116-155.
- Peet, R. and M. Watts (1996). "Liberation Ecology: Development, sustainability, and environment in an age of market triumphalism," in R. Peet and M. Watts (Eds.), Liberation Ecologies: Environment, Development, Social Movements. London: Routledge, 1-45.
- Redclift, M. and T. Benton (Eds.) (1994). Social Theory and the Global Environment. London: Routledge.
- Taylor (1997). "Afterword: shifting positions for knowing and intervening in the cultural politics of the life sciences," in P. J. Taylor, S. E. Halfon and P. N. Edwards (Eds.), Changing Life: Genomes, Ecologies, Bodies, Commodities. Minneapolis: University of Minnesota Press, 202-224.

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