

On ANT and Relational Materialisms

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An Introduction to Actor-Network Theory

Since the mid-1990s, and particularly since September 11, 2001, Bruno Latour has looked more towards politics, political ecology, and sociology.¹ Perhaps agreeing too much with Horkheimer and Adorno² that science has trumped philosophy within modernity, Latour has long seen technoscience as politics by other means.³ His primary position has been that technoscience undergirds politics (far more than politics grounds technoscience.) As Latour has looked more at social rather than natural science, he has sought to define societies as “associations”—stabilized relations between humans and non-humans—or actor-networks. At the same time, his approach to political ecology seeks to undermine the inordinate power of Science in environmental Politics. Both Science and Politics are referred to here in the reified singular, but Politics represents the objective competition of competing and discrete social interests.

In both cases, he favors a parliamentary move that emphasizes democratizing the many *sciences* and often-incommensurable *interests* brought to bear on the diverse *natures* of and in environmental problems.⁴ Furthermore, given the generally irresolvable technical uncertainties and political difficulties associated with contemporary “social” and “natural” problems, Latour has sought to prioritize “matters of concern” over and above “matters of fact.”⁵ The desire is to focus on what the issues and vagaries are in socio-techno-natural problems, rather than the technoscientific determination of what it is the facts tell us to do. The idea is to interrogate the “states of affairs” of and between facts and concerns, the ground where both are produced (or, better, negotiated), simultaneously.⁶

More interestingly, however, his position has recently shifted from one most often interpreted as arguing that we have never been modern,⁷ to one suggesting that ANT applies best to instances of new, innovative associations, the boundaries, stability, and enrollment of which is emergent or uncertain. The earlier position was essentially that modernity misunderstood its own

¹ E.g., Bruno Latour, “When Things Strike Back,” *British Journal of Sociology*, 51, 1, 2000, pp. 105-23; Bruno Latour, *War of the Worlds: What About Peace?* (Chicago: Prickly Paradigm Press, 2002); Bruno Latour, *The Politics of Nature* (Cambridge, MA: Harvard University Press, 2004); Bruno Latour, *Reassembling the Social* (New York: Oxford University Press, forthcoming 2005).

² Max Horkheimer and Theodor W. Adorno, *Dialectic of Enlightenment* (New York: Continuum, 1988).

³ Bruno Latour, *Science in Action* (Cambridge MA: Harvard University Press, 1987).

⁴ See Latour, 2004, *op. cit.* This project is well reviewed in Joel Wainwright, “Politics of Nature: A Review of Three Recent Works by Bruno Latour,” *Capitalism Nature Socialism*, 16, 1, 2005, pp. 115-22.

⁵ See, in particular, Bruno Latour, “Why Has Critique Run out of Steam?” *Critical Inquiry — Rough Cut*, 30, 1, 2004, pp. 225-48.

⁶ What is frustrating about this move is that it derives from an argument Latour makes about his own overemphasis on the generation of facts/technoscientific networks relative to political concerns. Where one would expect him to respond to this asymmetry by at least looking back at the generation of social or political positions relative to technoscientific concerns, Latour has proposed a formulaic and obscurantist parliamentary mechanism for working out collective concerns and differences.

⁷ See Bruno Latour, 1993, *op. cit.*, and Bruno Latour, *Pandora's Hope* (Cambridge, MA: Harvard University Press, 1999).

“constitution”—as laws and process—in that nature and society were not the predicates of objects and subjects but the products of their networkings, their relations. The (contestably) new position is that we were modern, given that networks were actively made by means of the modernist constitution,⁸ but that an amodern ontology is necessary to illuminate the processes and products of the ever-more “hybrid” conditions of the present—conditions, when problematic, not amenable to modernist modes of address, redress or resolution.

His new argument is that a “sociology of the social,” as he terms the modernist tradition of the discipline, made sense in an earlier epoch, but no longer, since the proliferation of hybrids has become too widespread, immediate and undeniable.

It’s true that in most situations resorting to the sociology of the social is not only reasonable but also indispensable, since it offers convenient shorthand to designate all the ingredients already *accepted* in the collective realm. It would be silly as well as pedantic to abstain from using notions like “IBM,” “France,” “Maori culture,” “upward mobility,” “totalitarianism,” “socialization,” “lower-middle class,” “political context,” “social capital,” “downsizing,” “social construction,” “individual agent,” “unconscious drives,” “peer pressure,” etc.⁹

However, under contemporary conditions of accelerated change and destabilized institutions, the “sociology of the social” embraces an ontology and has generated epistemic methods that can only re-purify phenomena into “social” or “natural” boxes. And it does so in a manner directly parallel to the contradictory ontology and epistemologies that Latour described in his technoscientific critiques of the 1980s and 90s. Latour puts it this way:

... in situations where innovations proliferate, where group boundaries are uncertain, when the range of entities to be taken into account fluctuates, the sociology of the social is no longer able to trace actors’ new associations.... Using a slogan from ANT, you have “to follow the actors themselves,” that is try to catch up with their often wild innovations in order to learn from them what the collective existence has become in their hands, which methods they have elaborated to make it fit together, which accounts could best define the new associations that they have been forced to establish.¹⁰

⁸ Latour’s “modern constitution” refers to both the conceptualization, by moderns, of what they are doing and the active processes by which modernity is constituted. The key for Latour is that the nature-society dualism at the heart of the modern constitution is semiotically paradoxical, and the constitution of modernity is materially contradictory. Modernity contains two paradoxes. The first is that nature is transcendent—not a social construct—and yet nature is constructed in the laboratory and through science. The second paradox is that society is immanent in our actions and yet it, too, is transcendent, not our construct. In these ways structure and agency, and science and objectivity, are all obfuscated by the separation of nature and society, construction from transcendence. Not only is the constructed and transcendent character of nature and society ever-present and always denied, but the work of maintaining those divisions is always made invisible by the separation of the semiotic placement of entities in either the nature or society box from the material engagement with hybrid relations and phenomena. Perhaps most importantly, God was banished from both nature and society in this process, making it possible to critique science and politics from religious standpoints while, at the same time, making sure that science and politics had nothing to do with God (and therefore religion held no necessary meaning beyond pragmatic instrumentality for scientists or politics). For Latour, the greatest contradiction of these paradoxes and purifications is that they generate ever-greater numbers of mediators and hybrids, just the things the modern constitution—and constitution of modernity—cannot countenance. See Latour, 1993, *op. cit.*, pp.30-34.

⁹ Bruno Latour “How to Resume the Task of Tracing Associations.” Draft introduction to *Reassembling the Social* (Oxford: Oxford University Press, 2005) available online at: <http://www.ensmp.fr/~latour/livres/xii.chapter%20intro%20ANT.html>

¹⁰ *Ibid.* This is simply another way of arguing a Marxist crisis theory—a crisis being a situation where innovations may proliferate, where what actors do matters in a way that is different from non-crisis conditions. See James O’Connor, *The Meaning of Crisis* (New York: Basil Blackwell, 1987). From this perspective, a crisis is an opportunity for generating variously coherent, extensive and durable associations... when the old associations, the old society, may be helped to

Here, a modernist “sociology of the social” is newly found to be viable as a means of studying those extensively durable associations of humans and non-humans. This is in direct contrast to Latour’s historical argument that the key to actor-network analyses is the opening of the black-boxes of modernity.

Relational Marxist Commentary on Latour’s Actor-Networks

There are a series of major issues that arise from a Marxist perspective when it comes to the Actor-Network Theory (ANT), in general, and Latour, in particular.¹¹ All of the issues are associated with the practice that Donna Haraway deems boundary work and Ollman referred to as the materialist abstraction of relations of identity/difference and quantity/quality. Latour and ANT conflate the historically contingent relation between Cold War politics and technoscience with the core of modernity in much the same fashion postmodernists have done.¹² If the question at hand is not about the temporal term, modernity—or the material constitution of modernity as Latour would have it—but with the praxis of modernism, then changes in the relational tensions, the political problems, and even the economic contradictions of the kinds of space-time that modernism produces come to the fore. Here, rather than a Weberian and quantitative growth in the spatial extension and temporal durability of ever-proliferating networks of socionatural hybrids, the Marxist problematic of qualitative changes in the dynamics of the (re)production of ecologies, sciences, people, technologies, cultures and spaces is the key. In both cases neither nature nor objects are overly pacified, neither society nor subjects are overly activated, neither stability nor structure is assumed to be determinate, and neither innovation nor agency is presumed to be contingent. However, in the Marxist case, difference is assumed but not presumed. The concern is not with a prepolitical collapse of human and non-human activity into a single arena of acting actants, but with the politically non-innocent determinations and relative transparency of the political categories of difference and differentiation one uses in research and political activity.

Latour’s ANT, which abhors dualism, fails because it can’t escape dualism, pursuing as it does the description of a metaphoric middle ground that doesn’t and can’t exist without the poles. This situation holds as much for the questions of nature and society in Latour’s work on technoscience as it does for his more recent sociopolitical concerns with stable vs. innovative assemblages and assemblies. Latour’s pursuit of the innovative middle, rather than his opposition to the analysis of stabilized natures and institutions, is what allows Latour to suspend disbelief when it comes to the differences between human and non-human action. Without this concern with this now homogenized middle ground, Latour could not coherently refuse to interrogate the

birth of a new one, whether that new one be within the quantitative range of similarity relative to the old one or qualitatively different. The key lies not in the newness of associations but in being able to tell whether the changes are qualitative or not.

¹¹ It should be noted that ANT has been reified more by those who subscribe to it in the U.S.—perhaps particularly in the arena of agrifood and consumption studies—than by those who have developed it in France and the U.K. The work of Latour, Law and Callon and their respective appreciation and utilization of ANT has diverged and changed over time. For this reason primarily, I will focus on Latour rather than Law and Callon.

¹² Harvey has argued that postmodernists treat modernism (and, by extension, modernity) as the equivalent of structuralism rather than as the exploration of the lived and irresolvable tension between the dual intensification of social structures and social chaos. In this light, however, for Marxists, the nature-society dualism supposed (by structuralists, postmodernists, and amodernists alike) to reside at the heart of modernism makes more sense as the irresolvable tension between the dual labor processes of naturalization and socialization—which sounds an awful lot like ANT. See David Harvey, *The Condition of Postmodernity* (Cambridge: Blackwell, 1989).

fundamentally political and normative questions of the historical materialization of stabilized social and political forms of partial self-reflexivities. Marxists, while having historically worked with dualistic approaches to forces and relations or bases and superstructures, have—since Gramsci—struggled within dialectical arenas fleshed out with three (or more) terms. As always, however, the key, political move lies in distinguishing categories and establishing the boundaries of the relations with which a researcher concerns herself.

For Marx and Marxists, Labor mediates that Nature-Society relation, and, as such, it was to the labor process that Marxists have turned. Similarly, the rise of socialist feminism can be seen as the extension of concern with labor beyond the realm of commodity production to that of social reproduction.¹³ Socialist feminism had a close cousin in the development of Cultural Studies where “unproductive” labor processes—and the cultures of laboring (waged or otherwise) and consumption (commodified or not)—became the focus. For all of these efforts, there were extensive debates in the literature on development with respect to the politics of subaltern movements and subjectivities across the global South as they related to the analyses of production, reproduction, and consumption in the global North. The key to all of these exchanges has been the generation of analytic means for discerning similarity and difference, not by formulaic approaches to the dialectics of thesis-antithesis-synthesis (which remain unfortunately too prevalent) but via relational and situated processes of triangulation, at least, and indeterminacy, at most.

Here, a critical triangulation at the heart of political ecology is O'Connor's differentiation of the traditionally singular and natural “environment” into relations between ecological, personal and communal conditions and liberal capitalist political economies.¹⁴ Similarly, but on a different plane, Haraway's material semiotics queries the partial and contradictory articulations of “coyote” natures, “cyborg” actors, and “companion” cultures.¹⁵ Where both have a leg up on Latour and ANT is in the Marxist, or socialist, background. This history leads them to be more concerned with boundary practices and materialist abstraction—what Ollman has described as relations of *identity/difference*, *interpenetrating opposites*, *quantity/quality*, and *contradiction*¹⁶—than with ANT's never clearly or provisionally, much less politically, bounded networks of actants.

Within Latour's own work lies the ground for a superior alternative to ANT, one that does not collapse actors into a heterogeneous middle ground between the modern poles of Nature and Society. In the late 1970s and through the 1980s, Latour stressed the centrality of black-boxed devices and networks. As such, it is the relation between human and non-human actions differentially enabled and constrained by unevenly accreted black-boxed phenomena—whether object-ively purified of their social content or subject-ively purified of their natural content—that needs to be unpacked. Were this done stabilized socio-natural networks would come to the foreground in their contribution to the differentiation of human activity as subjects and non-human

¹³ Of course, socialists have not been alone in these concerns; anarchists have often led the way in the context of the politics of individual and community reproduction.

¹⁴ Triangulation is, of course, as problematic as dualism in terms of its appeal to modernist reifications of mathematics, topographic surveys, etc. At the same time, it is advanced here in an agential, technoscientifically-mediated, and dialectical practice that decenters without advocating central middlings or continua that depend on dualistic poles.

¹⁵ Haraway's term is actually “companion species.” See Donna J. Haraway, *The Companion Species Manifesto: Dogs, People, and Significant Otherness* (Chicago: University of Chicago Press, 2003). However, the argument she is making is about the coterminality and coincidence of processes of sociocultural and socio-natural production. Our landscapes, bodies, sociality and non-human companions are seen to have all coevolved.

¹⁶ Bertell Ollman, *Dialectical Investigations* (New York: Routledge, 1993).

activity as objects— however much both are dependent, enabled and constrained by the others. Nevertheless, Western Marxist concerns with the dialectical and coincident, historically materialist production of natures, human natures, and societies provide a superior, non-totalizing relational ontology—though not one that has been sufficiently developed at present. This form of relational ontology allows for a recognition, without reification, of differences between humans and non-humans without suggesting that social or natural scientific explanations in and of themselves are sufficient for political ecological or technoscientific analysis.

Modernities, Dualisms and Human Natures:

In a 1997 speech, Latour modeled modernity in the following way:

The whole theory of society is enmeshed into a much more complex struggle to define *a psychology*—an isolated subjectivity still able to comprehend the world out there; *an epistemological question* about what the world is like outside without human intervention; *a political theory* of how to keep the crowds in order without them intervening with passions and ruining social order; and finally *a rather repressed but very present theology* which is the only way to guarantee the differences and the connections between those domains of reality. It is this whole package that is in question.¹⁷

This passage, diagrammed below in Figure I, lays the modernist dualisms of micro-macro, realist-postmodernist and subject-object on top.

Latour's critique of modern dualisms is excellent, but finding the solution in the middle is a problem. A core weakness with Latour's project—and all studies that draw on ANT in a way that doesn't suborn its ontology—is that the Object-Subject, Science-Politics, and Micro-Macro dualisms don't map directly onto the Nature-Society and Realism-Idealism dualisms (if, in fact, it is true that those two dualisms map meaningfully upon one another.¹⁸ There are three middles in Latour's model of modernity, and his work has only ever operated in one of them—that between Nature and Society, Epistemology and Politics.¹⁹

One form of Marxist critique of Latour's approach to modernity might follow a tack developed by John Bellamy Foster and Paul Burkett in response to environmentalists' claims that Marx's analysis and politics are anti-ecological.²⁰ As argued by Gareau in this symposium, these kinds

¹⁷ Bruno Latour, "On Recalling ANT," <http://www.lancs.ac.uk/fss/sociology/papers/latour-recalling-ant.pdf> paragraph 20, emphasis added.

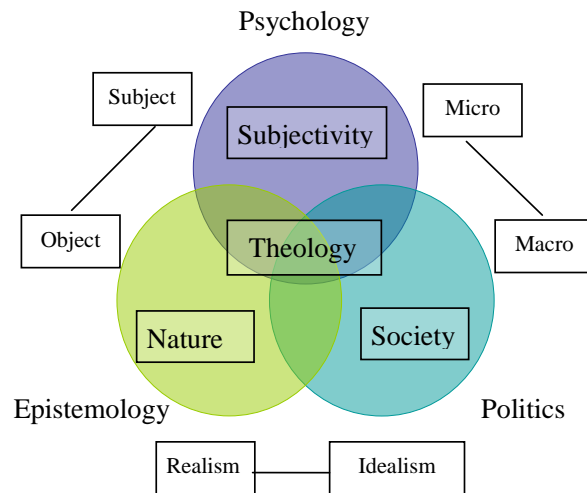
¹⁸ Many scholars who use ANT uncritically appeal to modernist sociological categories like race, gender, equity, alternative consumption, individual agency, ecological sustainability, etc. without any sense of the contradiction of using fundamentally modernist terms while claiming to do amodern work.

¹⁹ Latour's model of a three- or four-fold modernity, in fact, fits well with both Haraway's menagerie of coyote natures, cyborg actors, and companion cultures and O'Connor's conditions of production/life. See Donna J. Haraway, "The Actors Are Cyborg, Nature Is Coyote, and the Geography Is Elsewhere," in C. Penley and A. Ross (eds.), *Technoculture* (Minneapolis: University of Minnesota Press, 1991), pp. 21-26; Donna J. Haraway, *Simians, Cyborgs and Women* (London: Free Association, 1991); Donna J. Haraway, *Modest_Witness@Second_Millennium.Femaleman[©]Meets_Oncomouse* (New York: Routledge, 1997); Donna J. Haraway, "For the Love of a Good Dog," in A. Goodman, M. Linde and D. Heath (eds.), *Genetic Nature/Culture* (Berkeley: University of California Press, 2003), pp. 111-31; James O'Connor, *Natural Causes* (New York: Guilford Press, 1998); Martin O'Connor, "The Material/Communal Conditions of Life," *Capitalism Nature Socialism*, 2, 3, 1991, pp. 1-8.

²⁰ John Bellamy Foster, "Marx's Theory of Metabolic Rift," *American Journal of Sociology*, 105, 2, 1999, pp. 366-405; John Bellamy Foster, *Marx's Ecology* (New York: Monthly Review Press, 2000); Paul Burkett, *Marx and Nature* (New York: St. Martin's Press, 1999).

of studies show that the project ANT sets for itself is at least presaged by Marx's theorization of the labor process. While Foster, Burkett, and others who focus on labor processes and value theory are better able to deal with the coincident black-boxing (as both reification and fetishization²¹) of natural-ized objects, individual-ized subjects and social-ized institutions than is ANT, they generally don't do so. Such studies have a tendency to trap socionatural negotiations within labor processes of (commodity) production, thereby holding on to more or less realist approaches to scientific

Figure I: A Latourian Model of Modernity



factuality. Here, the materialist constructivism of relational science studies is an advance, as is Latour's as-yet-unexplored opportunity to research the relation between realist takes on nature and society and the contradictory assumptions of modernist psychology and theology.²² Nevertheless, and properly so, Marxists treat questions of psychology, subjectivity, and human nature as related to but distinct from questions of nature/epistemology and society/politics. What it is to be human is too multivalent and historical a condition to collapse into "the middle" as a means of flattening the

²¹ On reification and fetishism in science studies, see Dick Pels, Kevin Hetherington and Frederick Vandenberghe, "The Status of the Object: Performances, Mediations, and Techniques," *Theory, Culture & Society*, 19, 5/6, 2002, pp. 1-21.

²² I am basically arguing that Latour has not followed up on his own insights as developed in the passage quoted on the previous page. In his work on Iconoclasm and Making Things Public, Latour has treated psychological and theological iconography as if they were technoscience rather than treating them, simultaneously as products of spatio-temporally differentiated and, therefore, politically black-boxed agencies. With respect to Figure I, rather than "drop" or return Subjectivity and Theology as qualitatively discrete moments in and products of networked actions into the middle ground where everything happens, Latour collapses Subjectivity and Theology into the mix, thereby deproblematizing them and making them invisible. See Bruno Latour, "What Is Iconoclasm? Or Is There a World Beyond the Image Wars?" in B. Latour and P. Weibel, (eds), *Iconoclasm: Beyond the Image Wars in Science, Religion and Art* (Cambridge, MA: MIT Press, 2002) available at: http://www.ensmp.fr/~latour/livres/cat_ico_no_chap.html, 2002 and Bruno Latour, "From Realpolitik to Dingpolitik—or How to Make Things Public," in B. Latour and P. Weibel, (eds), *Making Things Public—Atmospheres of Democracy* (Cambridge, MA: MIT Press, 2005) available at: <http://www.ensmp.fr/latour/articles/article/96-DINGPOLITIK2.html>.

difference between active materiality and agential subjectivity.²³ A political ecological focus on labor processes must not only research production relations and conditions but also those of science, politics, and socionatural modes of reproduction—the always political material, semiotic generation of natures, people, and communities.

In relation to ANT, another Marxist critique might take off from Raymond Williams' famous note that the "idea of nature contains, though often unnoticed, an extraordinary amount of human history."²⁴ Less famously, however, Williams also found that: "What is often being argued, it seems to me, in the idea of nature is the idea of man; and this not only generally, or in ultimate ways, but the idea of man in society, indeed the ideas of kinds of societies."²⁵ Marxists—at least those like Williams and most who regularly read this journal—are concerned with relational triangulation of the always changing materialization and conceptualization of nature, "man," and society in a manner that critiques the reified and fetishistic—the naturalization of situated forms of processes and the homogenization of specific modes of action. ANT's network or rhizomic imagery is supposed to deal with this kind of complexity, yet it remains derivative of a critique of dualism and a failure to engage relational Marxist ontologies.

Subjectivity, or better subjectivization, is the labor process by which humans objectify themselves and negotiate with the socio-natural/socio-technical/socio-cultural world, the (always partial and imperfect) objectification of their (equally partial and imperfect) thoughts, plans, desires, and needs. Under capitalist modernity—the hegemonic black box of the last 150 years or more—the process of subjectivization is inextricable from the material alienation of labor from the means of production, the resultant centrality of social labor, uneven modes of productive and reproductive cooperation, and the wage-commodity form of need satisfaction.²⁶ At this point, at least in the Marxist tradition, one gets a Nature-Laboring Subjects-Society relation where Laboring Subjects—*homo faber*—always make their own lives (not just use-values and commodities, and not just under the wage form), but not under ecological, technoscientific, personal, medical, spatial or cultural (much less political economic) conditions of their own choosing. It is critiques of the objectification, or the desubjectification, of human beings laid out by ANT's symmetrical position on "the middle" that undergirds the majority of the fair (and most often, feminist) criticisms of Latour and ANT. In short, ANT lacks any meaningful discussion of the history of human natures.

The closest thing to a statement about human nature that I have found in ANT is in Latour's article "Good and Bad Science: The Stengers-Despres Falsification Principle." He writes:

An inarticulate subject is someone who whatever the other says or acts always feels, acts and says the same thing. By opposite, an articulate subject is someone that learns to be affected by the others—*not by itself*... a subject only becomes interesting, deep, profound, worthwhile when it resonates with others, is effected, moved, put into motion by new entities whose differences are registered in new

²³ Similarly, if the differences between human agencies and material actancies are network effects, as ANT argues, flattening the two suggests an assumption of a lack of difference between the networks into which human agents, technoscientific instruments, and material objects (flora, fauna or inanimate) are already enrolled.

²⁴ Raymond Williams, "Ideas of Nature," in *Problems in Materialism and Culture* (London: Verso, 1980), p. 67.

²⁵ *Ibid.*, pp. 70-71.

²⁶ James O'Connor, "Historical Materialism Reconsidered: Forces of Social Production or Social Forces of Production," paper presented at Gramsci Institute's Conference Commemorating the 100th Year of Marx's Death, Rome, Italy, November 16, 1983; Robert A. Marotto, "Forces and Relations in Production," unpublished dissertation, Sociology Department, University of California, Santa Cruz, 1985.

and unexpected ways. Articulation thus does not mean ability to talk with authority... but being affected by differences.²⁷

This position resonates well with Latour's recent orientation of ANT to "new" societies—defined as innovative associations of humans and non-humans. It is also what leads reviewers such as Laurier and Philo to criticize the focus on the "flattening out of agency which permits humans and nonhumans to be regarded as "social" equivalents."²⁸

As we have learned from feminist and anti-racist scholarship, a great deal of (always politicized) science has been brought to bear on questions of human nature, as well as—and in regular response to developments in—the sciences of biogeophysical phenomena. In this arena, then, the Science-Politics dualism might seem to fit in the middle between, or to be overlaid upon, the Nature-Society dualism. However, arranging the terms in this fashion increases the sense that, on the one hand, science is a politicized labor process as much as politics is a scientized labor process. By over-emphasizing the "circulating" character of subjectivity, Latour regularly fails to investigate the former in light of the latter. The idea that the personal is political, that the scientific is personal, is lost on Latour. Subjects may circulate and their subjectivity is always situated, but this does not mean that socially self-reflexive subjectivity can be materially abstracted from the bodies of persons.

It is not only that technoscientific black boxes and modernist purifications constrain the sciences that ground modern politics. The politics of technoscience has enabled certain deeply political relations to be black-boxed and others to be ex- or pre-cluded from social politics. Abstracting these political moments in technoscience brings into view the historical constraints on the specific research trajectories that have been developed and the foreclosure of others. It brackets the issues of power, funding, and institutional momentum that Latour and Woolgar started to explore at the end of *Laboratory Life*²⁹ but have since dropped altogether. ANT's strong methodological commitment to a symmetrical recoding frame cannot generate a theory of the negative ontological and political space it produces for itself outside the middle where associations are developed.

By refusing the "mono-naturalism and multi-culturalism, one nature interpreted by many cultures—that is, one unifying nature, the common world, primary qualities, and many divided and

²⁷ Originally intended to be a book chapter, the article, updated, has been published as Bruno Latour, "How to Talk About the Body? The Normative Dimension of Science Studies," *Body & Society*, 10, 2-3, 2004, pp. 205-29. The original is available at: <http://www.ensmp.fr/~latour/Articles/77-BERG.html>. Latour has elsewhere argued that "[s]ubjectivity, corporality is no more a property of humans, of individuals, of intentional subjects, than being an outside reality is a property of nature.... Subjectivity seems also to be a circulating capacity, something that is partially gained or lost by hooking up to certain *bodies of practice*." Bruno Latour, "On Recalling Ant," in J. Law and J. Hassard, (eds.), *Actor Network Theory and After* (Oxford, Blackwell, 1999), p. 22, emphasis added. As above, simply because subjectivity and corporality are dependent on entering into sociotechnical bodies of practice does not mean that our subjectivities and bodies are not our own.

²⁸ Laurier and Philo, 1999, *op. cit.*, p. 1047. Along these lines, Kerry H. Whiteside jumps to French personalism and questions of human nature/spirit/agency immediately after discussing Latour, who he describes as politicizing nature. The juxtaposition is remarkable—and set the stage for this paper. See Kerry H. Whiteside, *Divided Natures* (Cambridge, MA: MIT Press, 2002).

²⁹ Bruno Latour and Steve Woolgar, *Laboratory Life: The Construction of Scientific Facts* (Princeton, NJ: Princeton University Press, 1986).

divisive cultures”³⁰ of modernity—Latour hopes to re-instantiate conditions wherein the kinds of normative, or theological, questions about the kind of common world, or worlds, to pursue can be reintroduced. However, theological questions about the common world have always hinged on conceptions of human natures, not a multinaturalism/multiculturalism, but questions of what it is to be human, to be different, and how to make, produce or generate acceptable commonality and difference. Without the risk of qualifying what subjectivity is, or at least ought to be, Latour’s neo-theological project is of middling utility at best and politically useless at worst.

Boundary Practices, Materialist Abstraction and Agencies

The key to all of the above is that ANT in general, and Latour in particular, falls desperately short in its/his refusal of materialist abstraction, what Haraway refers to as the deeply political work of autocritical boundary practices, conditions, projects, making, and maintenance.³¹ Latour’s methodology pursues locally descriptive explanations based on a “strong theory of the recording frame”—methodological strictures focused on summing up associations between actants and connections between networks—rather than theorizing boundary practices of inclusion/exclusion, materialist abstraction, and quantitative/qualitative difference/change.³²

Boundary Practices: Inclusion and Exclusion

Lenoir, clarifying the relationship between ANT and the more traditionally sociological approach to science studies, notes that:

Latour proposed this new ontology, you all recall, in order to get out of the apparent asymmetry of the symmetry principle in the original Strong Program for the Sociology of Knowledge. The first symmetry principle proposed to apply the same sorts of explanation (sic) to good and bad science.... The problem with this, according to Latour, is that the only actors are human actors. Nature or other non-human actors, such as machines, never enter in as co-participants and allies in the debates. The second symmetry principle, the generalized symmetry principle due to Callon, overcomes this problem by not privileging the social; nature and society are explained in the same terms through some well-known and entertaining Janus-faced acrobatics.³³

The problem arises, however, that a third symmetry principle isn’t added or included in the methodology of ANT. The third symmetry principle would focus on inclusion and exclusion, studying not only good/successful and bad/controversial science, not only human and non-human actions in the generation of technoscience, but also the positive and negative space of technosciences.

³⁰ Bruno Latour, “Body, Cyborgs and the Politics of Incarnation,” Darwin Lecture given at Darwin College, Cambridge University, February 19, 1999. Available at <http://www.ensmp.fr/~Latour/artpop/P-80CYBORGS.html>. A later version is in S. Sweeney and I. Hodder (eds.), *The Body* (Cambridge: Cambridge University Press, 2002).

³¹ Haraway, in this context, focuses on both the historical reification and regular violation of reified and oppressive boundaries. See, in particular, Donna J. Haraway, “The Promises of Monsters,” in L. Grossberg, C. Nelson and P. Treichler (eds.), *Cultural Studies* (New York: Routledge, 1992), pp. 295-337; Donna J. Haraway, “Mice into Wormholes,” in G. Downey and J. Dumit (eds.), *Cyborgs & Citadels* (Santa Fe: School of American Research Press, 1997), pp. 209-44.

³² “Explanation is ex-plicated, that is unfolded, like gravity in Einstein’s curved space; it is still there as an effect, but it is now indistinguishable from the description, the deployment of the net.” Bruno Latour, “On Actor-Network Theory,” *Soziale Welt*, 47, 4, 1996, pp. 367, 69-81. For a rather infuriating defense of descriptivism see: Bruno Latour, “A Dialog on Actor-Network Theory,” in C. Avgerou, C. Ciborra and F. Land (eds.), *The Social Study of Information and Communication Study* (Oxford: Oxford University Press, 2004), pp. 62-76.

³³ Timothy Lenoir, “Was That Last Turn a Right Turn?” *Configurations*, 2, 1994, pp. 119-36.

In this vein, Star asks the question: “Who carries the cost of distribution, and what is the nature of the personal in network theory?”³⁴ As she sees it:

A stabilized network is only stable for some, and that is for those who are members of the community of practice who form/use/maintain it. And part of the public stability of a standardized network often involves the private suffering of those who are not standard—who must use the standard network, but who are also non-members of the community of practice...³⁵

For Latour, the question relative to technoscientific actor-networks has long been one of enrolment without a sense of exclusion. Power is said to come from the stabilization of extensive and durable actor-networks, and yet the question of power over whom (defined in relational/network terms) and with what consequences for others, has tended to go unasked. The consequences of power for other natures, sciences, bodies, medicines, spaces, cultures, politics and economics are never explored.³⁶

By contrast, Haraway, Star and other feminists have stressed that:

...bodies as objects of knowledge are material-semiotic generative nodes. Their *boundaries* materialize in social interaction. Boundaries are drawn by mapping practices; “objects” do not pre-exist as such. Objects are boundary projects. But boundaries shift from within; boundaries are very tricky. What boundaries provisionally contain remains generative, productive of meanings and bodies. Siting (sighting) boundaries is a risky practice.³⁷

Here, materialist feminists emphasize the generative and tricky activity of objectification and boundary making in a manner that stresses the riskiness of boundary projects rather than foregoing differentiation of objects and subjects. It is this reflexive concern with the politics of their own vision, what it enables and what it constrains, that is so much more deeply political than Latour’s work, whether on technoscience, political ecology or sociology.

Boundary Practices: Materialist Abstractions/Difference

For the feminists, modern political categories have continuing efficacy and necessity, reasonableness and indispensability, even as technoscientific articulations proliferate in ever-more provocative and innovative forms.³⁸ Some of this sense—at least on the socialist feminist side of

³⁴ Susan Leigh Star, “Power, Technology and the Phenomenology of Conventions: On Being Allergic to Onions,” in John Law (ed.), *A Sociology of Monsters* (London: Routledge, 1991), p. 44.

³⁵ *Ibid.*, p.42.

³⁶ In *Science in Action*, however, Latour (1987, *op cit.*) developed an argument that powerful technoscientific networks generate and rely upon black-boxed “immutable mobiles” that facilitate the extension of networked actants, a position that suggests opportunities for symmetrically opening interdependent technoscientific and sociopolitical black boxes. Opening the sociopolitical black boxes of technoscience remains outside of Latour’s project despite his ever greater focus on politics, political assemblies, and his parliament of things.

³⁷ Haraway, 1988, *op. cit.*

³⁸ Given Latour’s latest modification of the matters with which Actor-Network Theory is concerned, three questions immediately arise. First, how are we to determine what is stable and what is innovative? More important for Marxists, are the innovative changes indicative of qualitative changes in modes of association formally different but functionally the same kinds of relations? The second question pertains to the consequences for the critique of the natural/physical sciences for the interpretation of the social/cultural sciences. Latour argues that there are stable, mundane, “normal” forms of technoscientific (and sociopolitical) practice that ANT would (should) not have been (seen as) appropriate as a means of analysis. This has severe consequences for most of the applications of the theory by sociologists, anthropologists and geographers who have applied the method to categories of stabilized relations. Third, if the intensification and extension of modernist technoscience is coincident with the rise of capitalism and the growth of the

these issues—resides in the recognition that modernity is being (re)negotiated, at least in part, due to the reinscription of new forms of old relations, whether these relations are in the form of capitalism, nationalism, patriarchy, racism, or xenophobia, etc. But rather than advance a project that seeks to *describe* the proliferation of *new* associations, the feminists are more likely to draw on work that stresses the dual and coincident movements towards homogenization and differentiation. They do so precisely because of the coincidence of neoliberal reinscriptions of the power of capital and the rise of a modern uncertainty about nature, science, our bodies, their health, space and culture, rather than the political institutions of high modernity.³⁹

Instead of operating in a world that juxtaposes the nature-society, science-politics, and object-subject dualisms, Haraway, Smith, and O'Connor work with an alternative relational ontology, one more in line with Ollman's approach to dialectical investigations.⁴⁰ For Ollman:

Dialectics restructures our thinking about reality by replacing the common sense notion of "thing," as something that *has* a history and *has* external connections with other things, with notions of "process," which *contains* its history and possible futures, and "relation," which *contains* as part of what it is, its ties to other relations.⁴¹

Ollman goes on to stress that Marx says that what needs to be explained is the appearance of stability and independence, NOT change and coevolution. Here, modernity's "immutable mobiles" and "black boxes" are stable material relations, the explanation of which is necessarily more about their history and production than their durability.⁴²

In order to proceed with an analysis that stresses relations, Ollman finds it necessary to abstract, not reify or dichotomize, four kinds of relations. These are: *identity/difference*—which takes the qualities of certain relations as given; *interpenetrating opposites*—which assumes that the qualities of identity/difference involved are mutually interdependent; *quantity/quality*—which stresses forms of change and boundary generation; and *contradiction*—which emphasizes the incompatibility and interference, enablements and constraints of different kinds of coincident relational developments.⁴³

Reality may be in one piece when lived, but to be thought about and communicated it must be parceled out. In each case, a focus is established and a kind of boundary set within our perceptions distinguishing what is relevant from what is not.... The mental activity involved in establishing such boundaries, whether conscious or unconscious,... is the process of abstraction.⁴⁴

nation-state, does the proliferation of hybrids really destabilize existing relations? Put another way, is modernity both crisis-ridden and crisis-dependent in a manner parallel to that of capitalism?

³⁹ On homogenization and differentiation, see Neil Smith, *Uneven Development* (New York, Blackwell, 1984). On the relation between neoliberal economics and a modernity, see Harvey, 1989, *op cit.*; James O'Connor, "The Red and the Green and the State," *Capitalism Nature Socialism*, 12, 2, 2001, pp. 1-2, pp. 163-72; and Erik Swyngedouw, "Authoritarian Governance, Power, and the Politics of Rescaling," *Environment and Planning D*, 18, 1, 2000, pp. 63-76.

⁴⁰ Ollman, 1993, *op. cit.*

⁴¹ *Ibid.*

⁴² Further, the Marxist tradition—particularly in its development by geographers over the last 30 years—insists on a focus on space as well as extent. History, space, and space-time are terms that necessitate the integration of both quantitative difference and qualitative change. ANT has a long history of insisting on the immediacy of the former and the immateriality, or ungeneralizability, of the latter.

⁴³ Ollman, 1993, *op. cit.*, pp. 13-15.

⁴⁴ *Ibid.*, pp. 24-25.

Here, each bounded entity may be materially abstracted from others by means of emphasizing different relations of identity/difference, interpenetrating opposites, quantities/qualities, and contradictions. This is the politics of emphasis—of presence/absence—that Haraway is so concerned with.

Comment [SS1]: But you start this logic with Star, so include her in the end as well.

It is the refusal of Latour's descriptive method to engage in materialist abstraction that obviates his ability to deal with the politics and political implications of the boundary practices of his own research. Latour tends to stress the "one-piecedness" of human/non-human relations in a world where those relations are reproduced by black-boxed means, processes that continue to naturalize and hold invisible the material semiotic histories, inclusions and exclusions of standardized associations. ANT provides no suggestions—much less a means or theory—to help a researcher decide which of the many relations that the newly innovative and actively material processes of, say, global warming, acid rain, environmental diseases, GMOs, nanotechnology, or organic food production are most important to analyze.

These sorts of questions have long been a part of Western Marxism, a literature that has worked to explode nature-society dualisms and the hegemonic practices of reification tied to them. Without claiming that Marxism has a good history of transcending dualisms—much less consistently practicing a materialism that engages the diversity of human agency or non-human activity—many strands in the tradition have separated themselves from the scientific objectivism and sociological subjectivism Latour so rightly criticizes. The key to doing so, however, lies in its materialism—more or less shared with Latour—and its relational emphasis on the history of human natures as the mediation and product of historical relations between coevol natures and societies, an issue pushed aside by Latour in his heuristic flattening of agency in actor-networks.

Conclusion: O'Connor, Haraway and Conditional Politics

Many internal critics have quite correctly suggested that Marxist political ecology needs to better engage contemporary science studies. Rather than pursuing ANT, viable connections are more likely to lie in the area of materialist feminist science studies, in particular that of Donna Haraway. Haraway's material semiotics is post-structural in its refusal of totalizing metanarratives but relational in a fashion that consistently—some would say, too consistently and ironically—interrogates its own abstractions, the politics of its own boundary practices. Where Latour flattens human agency and fattens non-human activity in "the middle" of Nature and Society, Haraway is more deeply concerned with a nature she cannot not want, feminist subjectivities that are discrete from and yet comprised in relation to contingent technoscientific engagements with natures and cultures, and processes of territorialization significantly driven by the contradictions of global capital.

Where O'Connor's theory of capitalism's second contradiction is explicitly objectivist⁴⁵ and tends towards critical realism, Haraway's work tends towards the subjective and critical semiotic. Where O'Connor has abstracted from "the environment" interdependent and mutually constitutive ecological, personal and communal moments, Haraway has developed a cyborg political subjectivity appropriate to the embodiment of feminists in their inextricably animal, human, and technocultural inner-connections.

⁴⁵ O'Connor, 1998, *op. cit.*

In each case, a historically relational materialism is being brought to bear on the problems of contemporary politics. In O'Connor's case these problems have been developed in largely political economic terms. In Haraway's corpus, they have been articulated in material semiotic forms expressed through the transgressive appropriation of technoscientific referents. Bringing the two together, ecological conditions are most dynamically known and politicized through naturalizing technosciences; personal conditions by and through medicalizing technosciences; and communal conditions by and through over-socializing cultural studies. Furthermore, no one could argue that natural, medical and sociocultural research exists independent of the complex politics of capital accumulation, social legitimation, and fiscal crises—much less the technoscientific needs, demands and priorities of various sectors of capital and the military.

A core concern of Marxist political ecology must therefore be a critical engagement with technoscience, including querying the technoscientific character of political economics and our own politics. Here, soon after the development of the second contradiction thesis, Martin O'Connor flipped the analysis of capital's conditions of production to that of the material/communal conditions of life.⁴⁶ It is this latter approach to the conditions of reproduction that are embodied in Haraway's coalition politics. At the same time—and this is almost universally missed in readings of O'Connor—the second contradiction thesis stresses the necessity that new social movement coalitions focus not only on reproduction and civil society but also on the politics of the state and production. This work has the potential to flesh out Haraway's repeated and repeatedly underdeveloped appeals to de/re-regulation and capitalism with respect to the democratization of life, social movements, technoscience, the state and production.

Bringing O'Connor and Haraway together suggests that contemporary technoscience contributes to an objectification of the “wild” ecologies and “working” landscapes. Contemporary medical and social institutions contribute to an objectification of the body and individualization of persons. And contemporary development programs objectify natures and spaces and reify peoples and cultures all in the process of re/de-territorialization. Here, territorialization, individualization, and objectification are interdependent and, it can be argued, are ever-more governed by (neo)liberal capitalist space-time compression.

The overreaction Latour and ANT has generated relative to structuralist, social constructivist, and postmodernist science studies ought not to discourage political ecologists from taking science studies seriously. Though the work of Haraway and other feminist science scholars is notably superior to ANT, Latour and others provide close analyses of the immediate material enablements, constraints and (re)negotiations that are always a part of technoscientific worlds of production, reproduction, basic research, and applied engineering. Extending this sort of analysis in the face of the continuities, changes, and crises of modernism, liberalism, and capitalism must be central to red-green politics. One place to generate such a synthetic extension is in the space produced when O'Connor's political ecology and Haraway's material semiotics are engaged.

⁴⁶ M. O'Connor, 1991, *op. cit.*