

We Have Never Been Human: Agential Nature, ANT, and Marxist Political Ecology*

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The deepest problems we have to understand and resolve are in these relations of nature and livelihood.... [T]he central change we have to make is in the received and dominant concept of the earth and its life forms as raw materials for generalized production.... But in the equally necessary perspective of ... an apparently unmediated nature—the living world of rivers and mountains, of trees and flowers and animals and birds—it is important to avoid a crude contrast between “nature” and “production,” and to seek the practical terms of the idea which should supersede both: the idea of “livelihood” within, and yet active within, a better understood physical world and all truly necessary physical processes.¹

—Raymond Williams, *Between Country and City*

Marxist political ecology has the potential to link the concept of an agential nature in science studies of the actor-network genre with interrelated conceptions of nature, culture, and relations of production (livelihood) in Marxist political ecology. Some adherents of ANT remain closed-minded to the conception of a capitalistic socionature with overarching tendential characteristics and thus fail to benefit from the *political* ecological aspects of emancipation, resource destruction, and unequal power distribution found therein. Ecological Marxism—and O’Connor’s second contradiction, in particular—contains the tools necessary to benefit from some of ANT’s ontology. Ecological Marxism also provides “ANTers” with a context in which to situate their studies of capitalist networks. Despite ANT’s critique of the obverse, ecological Marxism, particularly O’Connor’s theory, also contains a nearly symmetrical reflection on the importance of nature, culture, and social relations/conditions that is compatible with ANT’s concerns for a “post-humanist” vision of socionature.² Castree’s project of linking the “false antithesis” of ANT and red-green political ecology highlights a potential direction for the future.³ Although mindful of Ben Fine’s hesitancy, in this issue, to “tear ideas out” of ANT—due to ANT’s own internal incompatibilities—the notion of a symmetrical socionatural capitalism could benefit political ecology and the discipline’s concerns with resolving the myriad problems associated with anti-ecological production.

Agential Nature and the Problem of Post-humanism

* I am deeply indebted to Alan Rudy for his support with this manuscript. Thanks also to Jim O’Connor, Ben Fine, Paul Burkett, and the Jessica Roy Reading Group in Sociology at the University of California, Santa Cruz. The concepts in this paper first appeared in Brian J. Gareau, “We Have Never Been ‘Human’: Ontological and Methodological Arguments for and against Science Studies and Its Linking to Marxist Political Economy,” paper presented in Section on Marxist Sociology Session, “Marxism and the Environment,” Annual Meetings of the American Sociological Association, San Francisco, 2004.

¹ Raymond Williams, *Resources of Hope* (London: Verso, 1989), p 237.

² Eric Swyngedouw uses socionature to illustrate “the inseparability of society and nature.” Erik Swyngedouw, “Modernity and Hybridity,” *Annals of the Association of American Geographers*, 1999, pp. 443-465. Noel Castree claims that Neil Smith’s conception of a nature-society dialectic implies that the dualistic approach in O’Connor’s conception of society and nature inhibits O’Connor’s theoretical contribution to the benefits of socionature, which describes the muddled interconnectedness of society and nature. See Noel Castree, “False Antitheses? Marxism, Nature and Actor-Networks,” *Antipode*, 34, 1, 2002, pp. 111-46; and Neil Smith, *Uneven Development* (Oxford: Blackwell, 1984). However, O’Connor’s work is indeed suitable to the conception of socionature. By situating ecological crises in cultural, natural, and social relations/conditions, O’Connor’s Marxian conception contains a quasi-symmetry closely related to Swyngedouw’s socionature, Latour’s hybridity, and Haraway’s cyborg.

³ Castree, 2002, *op. cit.*

As stated in the introduction, Marxism, along with other social theories,⁴ tends to be dismissed by many adherents to ANT,⁵ because it embraces a nature-society dualism.⁶ However, the root of Marxist theory, notably the historically contingent dialectic between use values and exchange value, contains powerful linkages between people and nature that parallel the concern for agential nature in ANT. As Burkett and Foster point out, in Marx's materialist conceptualization of the labor process, both labor and nature "act" as "a social (people-people) and metabolic (people-nature) relation. The dialectic of exchange value and use value is not a simple dichotomy in Marx's conception, but rather a unity-in-difference, or moving contradiction."⁷ This "muddling" between society and nature in the production of commodities, for instance (or machinery and other forces of production), is always based on a mixture of nature with society through labor, which partially parallels ANT's concern with "hybrids"—actors and objects whose formation is a consequence of their relationship with other actor-objects. Basically, the distinction between society and nature is never clear in Marxism.

To alter Latour's idiom, "we have never been human." If we consider Marxism a form of sociology, Latour's claim that "each social science has its natural science counterpart, *except* sociology" is inaccurate.⁸ Perhaps Latour's claim inadvertently notes some faults made by sociologists (the idealist tendencies of Weber and empiricist tendencies of Durkheim) are not present in the historical materialist relations of Marxism. There is no counterpart due to the *internalization* of the natural and the social in Marxism. Perhaps Marx is not a sociologist when sociology is understood as predicated on a modernist separation of nature and society. Specifically, versions of Marxism that draw on spatial, relational and cultural aspects of Marxian analysis⁹ are well suited for ANT's consideration.

Relational Marxists think of social and natural phenomena as relations, an approach not dissimilar from ANT's emphasis on associations. ANTers, however, refuse to accept the notion of generalized tendencies in capital to affect associations, whereas relational Marxists do not.¹⁰ For that matter, some socialists and socialist feminists share commonalities with ANT when it comes to this sort of critique. Noting the relational characteristics of actor-objects, Haraway points toward "generalizations" that "echo and rest on the material social processes of production and

⁴ Bruno Latour, "When Things Strike Back: A Possible Contribution of 'Science Studies' to the Social Sciences," *British Journal of Sociology*, 51, 1, 2002, pp. 107-24; Andrew Pickering, "The Objects of Sociology: A Response to Breslau's 'Sociology after Humanism,'" *Sociological Theory*, 18, 2, 2000, pp. 312-113.

⁵ Michel Callon, "An Essay on Framing and Overflowing," in Michel Callon (ed.), *The Laws of the Markets* (Oxford: Blackwell Publishers, 1998), pp. 244-69; Sarah Whatmore and Lorraine Thorne, "Nourishing Networks: Alternative Geographies of Food," in David Goodman and Michael Watts (eds.), *Globalizing Food* (New York: Routledge, 1997), pp. 287-304; Sarah Whatmore, *Hybrid Geographies* (London: Sage, 2002); Sarah Whatmore, "Hybrid Geographies," in D. Massey, H.J. Allen, and P. Sarre (eds.), *Human Geography Today* (Cambridge: Polity Press, 1999), pp. 22-39; A. Barry, D. Slater and M. Callon, "Technology, Politics and the Market," *Economy and Society*, 31, 1, 2002, pp. 285-306.

⁶ Though perhaps less so by its primary progenitor, Bruno Latour. See *We Have Never Been Modern* (Cambridge: Harvard University Press, 1993), pp. 36, 55, 121.

⁷ Paul Burkett and John Bellamy Foster, "Metabolism, Energy, and Entropy in Marx's Critique of Political Economy: Beyond the Podolinsky Myth," paper presented at the Section on Marxist Sociology Session, "Marxism and the Environment," Annual Meetings of the American Sociological Association, San Francisco, 2004, p 17.

⁸ Latour, 2002, *op. cit.*, p. 120.

⁹ Williams, 1989, *op. cit.*; James O'Connor, *Natural Causes* (New York: Guilford Press, 1998); Bertell Ollman, *Dialectical Investigations* (New York: Routledge, 1993); Bertell Ollman, *Alienation* (Cambridge: Cambridge University Press, 1971); David Harvey, *Justice, Nature and the Geography of Difference* (Oxford: Blackwell, 1996); Swyngedouw, 1999, *op. cit.*

¹⁰ Ollman, 1993, *op. cit.*; Castree, 2002, *op. cit.*; Swyngedouw, 1999, *op. cit.*

reproduction of human life”.¹¹ Basically, socionatural relations, or networks, are generated by and through “black-boxed” abstractions from hegemonic patriarchy, anti-gay ideology, capitalist logic of accelerating production and decreasing costs, etc. ANT’s refusal to address these powerful tendential dimensions influencing socionatural relations in modern, capitalist networks of all shapes and sizes is a refusal to engage in “contests in ideology and practice for who will control the human means of reproduction... and struggles over technical ingenuity and co-operative capacities in family and factory.”¹² The result is that ANT methodology is blind to what these general conditions can do.¹³

ANT’s broad dismissal of Marxism inhibits many ANTErs from recognizing the roles that objects play in determining social activity in Marxism. Conceptions of muddled socionature in Marxism is not limited to the Marxist geographers like Harvey, Smith, or Swyngedouw.¹⁴ For example, Lewontin notes that all organisms “are not simply *objects* of the laws of nature... but active *subjects* transforming nature according to its laws.”¹⁵ Additionally, Williams describes how avoiding the conception of a dichotomy between nature and society is a crucial step towards better, sustainable livelihoods.¹⁶ Foster demonstrates the utility of nature in itself (for human reproduction and the co-evolution of both), and the relation between human activity and “natural processes” as of the utmost importance in Marx’s work in *Capital*.¹⁷ Thus, a reasonable reading of relational Marxist literature escapes the assertion that Marxism is unavoidably “anthropocentric.” Myriad strains of Marxian theory (including Marx’s own work) do not cleave society and nature neatly. In its attempt to deconstruct the false-distinction between the binaries of “facts” and “values,” “nature” and “society,” and “humanism” and “post-humanism”¹⁸ by promoting “non-Marxist” hybrids, ANTErs have homogenized Marxisms and left uninvestigated the relational traditions within Marxism.

¹¹ Donna J. Haraway, “The Contest for Primate Nature: Daughters of Man-the-Hunter in the Field, 1960-80,” in *Simians, Cyborgs and Women* (London: Free Association, 1991), p. 84.

¹² Haraway, 1991, *op. cit.*, p. 94.

¹³ This sort of critical engagement with ANT is, of course, not new. Almost a decade ago, Scott Frickel wrote an influential paper that attempted to utilize the conception of a broader “social context” within an ANT analysis of a submarine thermal reactor. Frickel noted that ANT is exceptionally well-suited for analyzing how actors move in and out of certain relations with other actors and objects (or in ANT lingo, actor-objects, or hybrids, or cyborgs, etc.) in ways that change the shaping and strength of the entire network. However, Frickel, citing Schaffer, notes, ANT also has profound asymmetrical consequences because it “directs our attention toward the term whose action is in dispute... [but] directs our attention away from the forces which help close that dispute. Therefore, Frickel draws upon larger, structural (and institutional) tools to attach causality and context to the network he uses as a case study. See Schaffer “The Eighteenth Brumaire of Bruno Latour,” *Studies in History and Philosophy of Science*, 22, 1991, pp. 174-92, and Scott Frickel, “Engineering Heterogeneous Accounts: The Case of Submarine Thermal Reactor Mark-I,” *Science, Technology, and Human Values*, 21, 1, 1996, p. 31. Of course, strong ANTErs would reject such a move. Yet ANT does acknowledge that associations between actors-objects become “stuck” until they become “unstuck” as enrolling changes. See John Law, *Organizing Modernity* (Oxford: Basil Blackwell, 1994) p. 102; Bruno Latour, *Science in Action* (Cambridge, MA: Harvard University Press, 1987). Frickel uses this point to assert that “invoking social context is, in this sense, simply a way of bringing distant actor networks closer.” It is also a way to usher explanations into actor-network stories.

¹⁴ Harvey, 1996, *op. cit.*; Neil Smith, “Nature at the Millennium: Production and Re-Enchantment,” in B. Braun and N. Castree (eds.), *Remaking Reality* (London: Routledge, 1998), pp. 271-86; Swyngedouw, 1999, *op. cit.*

¹⁵ Richard Lewontin, “Organism and Environment,” in H. Plotkin (ed.), *Learning, Development and Culture* (New York, Wiley, 1982), p. 162.

¹⁶ Williams, 1989, *op. cit.*, pp. 210-237.

¹⁷ John Bellamy Foster, “Marx’s Theory of the Metabolic Rift: Classical Foundations for Environmental Sociology,” *American Journal of Sociology*, 105, 1999, pp. 366-405.

¹⁸ Donna Haraway, “We Have Never Been Human: Companion Species in Naturecultures,” paper read at CU-Boulder, Duane Physics G1B20, February 11, 2005.

This perspective does not mean that relational Marxists have sufficiently considered the active contributions of non-humans in “human” worlds. Nor does it mean that Marxisms have sufficiently considered the socio-material, cultural dimensions of science as more than an extension of capital.¹⁹ However, Marxism need not be abandoned. As Rudy notes in this issue, socialist and interactionist feminists in science and technology studies have developed relational ontologies comparable to, and more political than, ANT.²⁰ Similarly, ecological Marxism has developed diverse, if not always commensurable approaches to relational political ecology.²¹

For Marx and the Marxists cited above, “nature” is not only the primary use value²² of and for human reproduction, it is active both as a force and relation of production.²³ The materialization and conceptualization of nature (or, better, ecological, human and cultural natures) is always situated in particular modes of (re)production. Here, the production of nature is the production of society, a dialectical process that today, is produced by means of uneven capitalist development and its diverse mediations.²⁴ The point here is that Marx’s analysis of a contradictory dialectic between use-value and capitalist exchange value is predicated on the separation of laborers from the technical and natural means of production in order to intensify the production of commodities for exchange. This analysis contains powerful linkages between people and nature that should not be dismissed.²⁵

Marx’s conceptualization of the dialectical human-nature relationship in *Capital*,²⁶ and his later critique of the Gotha Program²⁷ each emphasize the role nature plays as “the primary source of all instruments and subjects of labor.” Under capitalism, then, the value of nature (abstracted from its historical relation in social history), is determined by its relation to historical, culturally-mediated production conditions predicated on the expanded reproduction of capital—value as an abstraction. Marx was fully cognizant that capital treats labor as a “supernatural creative power”—given its assumed activity—when in fact, the land, resources, and nature, which are not passive as is often assumed, provide an additional source of value for the owner. Marx’s conceptualization of capitalism illuminated the effect that systems of knowledge and praxis that emphasize profit over all else can have on the relationships between people as well as between people, objects (various forms of fixed capital) and nature (usually in the form of land). Of course, the specificities of capitalism and its subsequent, indefinite alterations are our concern here. Nevertheless, the root of the power dynamic that takes shape in capitalism should not be ignored.

¹⁹ Robert Young, “Science Is Social Relations,” *Radical Science Journal*, 5, 1977, pp. 65-129.

²⁰ Emily Martin, *Flexible Bodies* (Boston: Beacon Press, 1994); Susan Leigh Star, “Power, Technology and the Phenomenology of Conventions,” in John Law (ed.), *A Sociology of Monsters* (London: Routledge, 1991), pp. 26-57; Karen Barad, “Getting Real,” *Differences*, 10, 2, 1998, pp. 87-128; Donna Haraway, “Situated Knowledges,” in *Simians, Cyborgs, and Women* (New York: Routledge, 1991), pp. 183-201.

²¹ Burkett and Foster, 2004, *op. cit.*; O’Connor, 1998, *op. cit.*; Swyngedouw, 1999, *op. cit.*, pp; Castree, 2002, *op. cit.*

²² Karl Marx, “Critique of the Gotha Program,” in Robert C. Tucker (ed.), *The Marx-Engels Reader* (New York: W.W. Norton and Company, 1972 [1875]).

²³ Marshall Berman, *All That Is Solid Melts into Air* (New York: Penguin Books, 1982), pp. 94-95.

²⁴ Joel Kovel, “The Struggle for Use Value,” *Capitalism Nature Socialism*, 11, 2, 2000, pp. 3-23; Brian J. Gareau, “Use and Exchange Value in Development Projects in Southern Honduras,” *Capitalism Nature Socialism*, 15, 3, 2004, pp. 95-110.

²⁵ The edited volume by Ted Benton takes this argument in interesting and useful directions. See Ted Benton (ed.), *The Greening of Marxism* (London: The Guildford Press, 1996).

²⁶ Karl Marx, “Capital, Vol. I,” in Robert C. Tucker (ed.), *The Marx-Engels Reader*, Second ed. (New York: W.W. Norton & Company, 1978 [1867]), pp. 303-304, 309.

²⁷ Marx, 1972, *op. cit.*, pp. 525-26.

Contrary to what some critics say about the production and human-centeredness of Marx's approach, Marx's analysis is very attuned to the spatially uneven and specifically cultural crisis tendencies of capital. Witness:

The specific economic form which unpaid surplus labor is pumped out of the direct producers determines the relationship of domination and servitude, as this grows directly out of production itself and reacts back on it in turn as a determinant. On this is based the entire configuration of the economic community arising from the actual relations of production, and hence also its specific political form. It is in each case the direct relationship of the owners of the conditions of production to the immediate producers—a relationship whose particular form naturally corresponds always to a certain level of development of the type and manner of labor, and hence to its social productive power—in which we find the innermost secret, the hidden basis of the entire social edifice, and hence also the political form of the relationship of sovereignty and dependence, in short, the specific form of state in each case. This does not prevent the same economic basis—the same in its major conditions—from displaying *endless variations and gradations in its appearance*, as the result of *innumerable different empirical circumstances*, natural conditions, racial relations, historical influences acting from outside, etc., and these can only be understood by analyzing these empirically given conditions.²⁸

This quote brings out the variable, situated, and mobile features of a Marxist analysis of capital. Far from static, or production-specific, relational Marxisms are well aware of the temporal fixation of capital relations.

Eco-socialism, in particular, takes Marxism to a level that recognizes both the internal contradictions of capitalism and the “natural” constraints of production,” not to mention the affect that the whole process has on relations between peoples, and people and nature.²⁹ As Marx makes clear in *The Poverty of Philosophy*, the social relations of capitalism are not “natural” or “eternal” but rather are “historical products” that are reproduced—and whose exploitative tendencies are likewise reproduced—only as long as the relations of capital are reproduced.³⁰

At this point, the connection between the agential natures of ANT and the historically situated natures of Marxist political ecology seem less different than generally believed.³¹ Socionature, in Marxist language, considers nature as a muddled, networked cooperator in the formation of social interaction.³² Furthermore, *capitalist* socionature is an unevenly generated relational space with dynamics of enrollment, translation, mediation, and so on, quite separate from that of other modes of struggle over the cultural materialization of reproduction and its consequences. When it comes to thinking about nature, ANT's primary contribution for Marxists lies in its insistence on close empirical attention to the materiality of social relations between humans and non-humans in technoscientific and sociopolitical processes. What feminism and ecological

²⁸ Karl Marx, *Capital*, Vol III (New York: Vintage Books, 1981), pp. 297-298, my emphasis.

²⁹ Kerry Whiteside, *Divided Natures* (London: MIT Press, 2002); O'Connor, 1998, *op. cit.*; Alain Lipietz, *Towards a New Economic Order* (New York: Oxford University Press, 1992), p. 190.

³⁰ Karl Marx, “The Poverty of Philosophy,” in Karl Marx and Friedrich Engels, *Collected Works*, Vol. XI (London: Lawrence and Wishart, 1979), pp. 24-25 quoted in Bob Jessop, “Capitalism, the Regulation Approach, and Critical Realism,” 2002, available online at: <http://www.comp.lancs.ac.uk/sociology/papers/jessop-capitalism-regulation-realism.pdf>, June 30, 2004, p. 11.

³¹ Castree, 2002, *op. cit.*

³² James O'Connor, “Historical Materialism Reconsidered: Forces of Social Production or Social Forces of Production?” paper presented at the Gramsci Institute's Conference commemorating the 100th year of Marx's death, Rome, Italy, 1983.

Marxism contribute—contrary to the strong claims of ANT adherents—is attention to the reproduction of black-boxed modes of socionatural inequality production.

ANT's position forces us to seriously consider the role played by *all actors*, roles that are never “natural” but interlinked in socionatural activities. Thus, where Burkett and Foster's³³ work demonstrates how capitalist metabolism generates externalities in the form of pollution, ANT urges the analysis to go further, to see the distinction between “nature” and “society” in the metabolism of capitals as pluralistic and internally contrived.³⁴ However, contrary to Callon's assertion regarding overflows in economics, there is no “external,” only different degrees of socionatural relations.³⁵ ANT's ontology strengthens the importance of Marxian critiques of capital, because capital as a mode of socionatural organization is *internally* contradictory due to its internally generated “by-products.” That is, the proliferation of capitalist socionatural hybrids include the production of many effects deleterious to human and non-human reproduction. Marxism takes this last step; ANT generally does not.

Also paralleling ANT, a relational ecological Marxism does not treat nature as primary relative to labor/society's secondary status, as so many “environmental” scientists in natural and social disciplines and movements do.³⁶ Rather, following the environmental history of Williams, the historical geographic materialism of Harvey, the production of nature of Smith, and the political ecologies of O'Connor, Soper, and Swyngedouw, “environmental” use-values are *co-generated* with and by labor processes, and the reproduction of both those use-values and labor processes is incommensurable with the expanded reproduction of capital and the law of value.³⁷ The general tendencies of capitalism deeply situate the political ecology of capitalist socionature. The political ecological question is no longer how does capitalism produce ecological crisis, but what are the dynamics of the coincident production of crises in capitalist socionature?

ANT Ontology/Methodology

The ANT tradition proposes an analysis of “actor-networks” that contain minimal pre-conceived notions of the roles played by either human or non-human actors.³⁸ Given the emphasis on agency—material and social—in contemporary research, ANT has persuaded many social

³³ Burkett and Foster, 2004, *op. cit.*

³⁴ Bruno Latour, *The Politics of Nature* (Cambridge: Harvard University Press, 2004); Latour would likewise encourage the authors to be more skeptical of the “facts” presented by natural science in John Bellamy Foster, *Ecology Against Capitalism* (New York: Monthly Review Press, 2002).

³⁵ Ben Fine, this issue.

³⁶ Whiteside, 2002, *op. cit.*

³⁷ Raymond Williams, “Ideas of Nature,” in *Problems in Materialism and Culture* (London: Verso, 1980), pp. 67-85; Williams, 1989, *op. cit.*; Harvey, 1996, *op. cit.*; Smith, 1998, *op. cit.*; O'Connor, 1998, *op. cit.*; Kate Soper, “Greening Prometheus,” in P. Osborn (ed.), *Socialism and the Limits to Liberalism* (London: Verso, 1991), pp. 217-93; Swyngedouw, 1999, *op. cit.*

³⁸ ANT speaks of non-humans as *actants*: objects that are both shaped by and shape the networks in which they are embedded. Human activity shapes but does not determine how non-human actants perform, while the primary point of ANT is that science studies, and the social and natural sciences more generally, tend to bracket the effects non-humans have on how it is that humans behave. *Representations* of nature and society, then, are only possible as long as the actants upon which the representation depends cooperate. As such, many in the tradition prefer terms that stress relations and circulation—like articulation. The point of this complex interpretation of actor-actant relationships is to give greater purchase to the active role played by objects in network formation. The emphasis on object-ive actancy derives more from the work of Law than Latour, the latter of which stresses the leveling of agency more than the former. See Whatmore and Thorne, 1999, *op. cit.*

scientists³⁹ and natural scientists⁴⁰ to reconsider the human-centeredness of their work and rethink the roles of objects, nature, and other non-human actors. Along these lines, ANT is at least suggestive when it comes to the microphysics of Marxist political ecological materialism as it addresses issues of nature, ecological science, technologies for environmental mediation, public health and epidemiology, and practices of ecological conservation and restoration.

From a theoretical position, however, ANT makes two mistakes: 1) it dismisses Marxism for positing a rigid society-nature dualism; and 2) thereby assumes that relational Marxisms have no role to play in the development of alternative economic theories to neoliberalism.⁴¹

Notions of Agency, Representation and Pragmatic Approaches to Science Studies

Andrew Pickering's contribution provides a potential link between ANT and Marxist political ecology. *The Mangle of Practice* indicates that he has serious problems with ANT's semiotic approach to non-human agency, one where, "in texts, agents (actors, actants) are continually coming into being, fading away, moving around, changing places with one another..., [so that] their status can easily make the transit between being real entities and social constructs, and back again."⁴² If the agency of non-human actors and objects is depicted solely through discourse analysis, it allows nature to be exemplified as little more than a representation. Pickering then introduces his own dialectical treatment of human and non-human agencies. As in ANT, human and material agency are reciprocally intertwined. But the relationship between human and non-human agencies is symmetrical, *not interchangeable*. In Pickering's examples from physics, we see scientists actively constructing new machines and then adopting passive roles to see what manifestation of material agency is captured by the machinery. If the humans' constructions effectively capture the expected non-human agency, then modeling schemes hold. If not, models must be revised through human agency. Here, the mangle of practice is a goal-revising dialectic with two aspects: temporal emergence of human-non-human interactions, which is described as "post-human," and the "constitutive intertwining... between material and human agency."⁴³

The mangle is ostensibly "post-human" because human actors are no longer conceived as "calling the shots." Pickering's depiction of relations between human and non-human agency is

³⁹ B.P. Bloomfield and T. Vurdubakis, "The Outer Limits: Monsters, Actor Networks and the Writing of Displacement," *Organization*, 6, 4, 1999, pp. 625-47; Daniel Breslau, "Sociology after Humanism," *Sociological Theory*, 18, 2, 2000, pp. 289-307; J. Burgess, J. Clark and C. M. Harrison, "Knowledges in Action," *Ecological Economics*, 35, 1, 2000, pp. 119-32; Lawrence R. Busch and A. Juska, "Beyond Political Economy," *Review of International Political Economy*, 4, 4, 1997, pp. 688-708; Margaret FitzSimmons and David Goodman, "Incorporating Nature," in B. Braun and N. Castree (eds.), 1998, *op. cit.*, pp. 194-220; Scott Frickel, 1996, *op. cit.*; David Goodman, "Agro-Food Studies in the 'Age of Ecology,'" *Sociologia Ruralis*, 39, 1, 1999, pp. 18-38; David Goodman and E. Melanie DuPuis, "Knowing Food and Growing Food," *Sociologia Ruralis*, 42, 1, 2002, pp. 6-21; Daniel Lee Kleinman, "Untangling Context," *Science, Technology & Human Values*, 23, 3, 1998, pp. 285-314; Jonathon Murdoch, "Inhuman/Nonhuman/Human," *Environment and Planning D*, 15, 6, 1997, pp. 731-56; Jonathon Murdoch, "Ecologizing Sociology: Actor-Network Theory," *Sociology*, 35, 1, 2001, pp. 111-33; A. Russell, "Actor-Networks, International Political Economy and Risk in Genetic Manipulation," *New Genetics and Society*, 18, 2-3, 1999, pp. 157-79; Keiko Tanaka, Arunas Juska and Lawrence Busch, "Globalization of Agricultural Production and Research," *Sociologia Ruralis*, 39, 1, 1999, pp. 54-77.

⁴⁰ Andrew Pickering, *The Mangle of Practice* (London: The University of Chicago Press, 1995); Brian Wynne, "Scientific Knowledge and the Global Environment," in Ted Benton and Michael Redclift (eds.), *Social Theory and the Environment* (London: Routledge, 1994), pp. 169-189. Both now social scientists, Andrew Pickering received his first PhD in particle physics, his second in science studies. Brian Wynne received his first PhD in materials science, his subsequent MPhil in sociology of science.

⁴¹ Callon, 1998, *op. cit.*

⁴² Pickering, 1995, *op. cit.* p. 12.

⁴³ *Ibid.*, p. 15.

more satisfying than ANT for practitioners interested in placing the struggle over the power of making a difference in the world. In technoscientific research, Haraway's⁴⁴ work comes to mind, as does neo-Marxist political ecological concerns with environmental destruction and exploitation. What makes Pickering's rendition useful is the "temporal emergence of the mangle," which "suggests that whatever political agenda we construct should be situated ones."⁴⁵

What is still problematic, and what might dissuade Haraway, political ecologists, and others from using Pickering's mangle is that it still does not reveal the degree to which different actors are able to obliterate resistance and achieve an accommodating (and self-serving) relationship between actors and objects. Outside the scientist's laboratory, it is not clear how researchers and activists might use the mangle to distinguish the conflicted relationships between human agents and nature or the complex interactions between differentially situated humans, natures, and technologies. If there is material resistance and social accommodation, how does the mangle apply to "softer" sciences in which the hybridity of socionature is truly muddled, as in cultural studies, Marxist political ecology, primatology, etc.?

Actor-networks and Marxism: A Synthesis

Pickering makes the mistake of connecting both Marx and Weber's understandings of human agency to static, generalized notions of "interests of individuals and groups,"⁴⁶ whereas his own use of agency—a post-humanist one—is able to perceive the temporal fixation of individual and group interests, and the interdependence between human interests and their surroundings. This generalized interpretation of Marx's notion of human interests is correct but incomplete. As Castree noted in his influential article, the critique of Marxism as inevitably dualistic regarding nature and society does not hold water.⁴⁷ Castree has described some potential connections between ANT approaches and relational Marxisms. O'Connor's second contradiction (which Castree *does* dismiss as dualistic) is particularly useful for its almost-symmetrical treatment of nature-labor-culture relations.

Taken at a local scale, then, the actor network approach aids in the understanding of *how socionature shapes the specificities of capitalism and thus affects the particularities of socionatural relations* (see Figure 1). If Latour is correct in stating that "most of the features of social order—scale, asymmetry, durability, power, division of labor, role of distribution, and hierarchy—are impossible to define without bringing in socialized nonhumans,"⁴⁸ and relational Marxist political ecologists are correct in stating that capitalism attempts to achieve growth and minimize the adverse affects of its contradictions via regulatory apparatuses that are both spatially and temporally specific (or fixed), then how socionature influences those specificities is, indeed, important.⁴⁹ In fact, O'Connor's second contradiction theory may be tuned to ANT's concern with symmetry.

Figure 1. A Marx-ANT Ontology

⁴⁴ Donna Haraway, *Simians, Cyborgs, and Women: The Reinvention of Nature* (London: Free Associations Press, 1991); Donna J. Haraway, *Modest_Witness@Second_Millennium.Femaleman©_Meets_Oncomouse* (New York: Routledge, 1997).

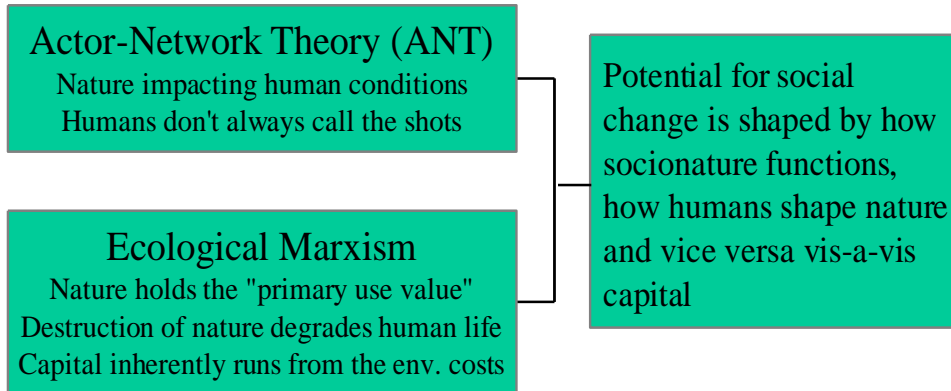
⁴⁵ Pickering, 2000, *op. cit.*, p. 229.

Ibid., pp. 63-64

⁴⁷ Castree, 2002, *op. cit.*

⁴⁸ Bruno Latour, 1993, *op. cit.*, p. 793, quoted in, Whiteside, 2002, *op. cit.*, pp. 129-130.

⁴⁹ Jessop, 2002, *op. cit.*; Bob Jessop, "The Crisis of the National Spatio-Temporal Fix and the Tendential Ecological Dominance of Globalizing Capitalism," *International Journal of Urban and Regional Research*, 24, 2, 2000, pp. 325.



The Quasi-Symmetry of the Second Contradiction

Conjoining ANT’s socionatural associations to green, relational Marxism *extends* the second contradiction of capitalism theory to an analysis of how socionature partially shapes the ideological consciousness and material conditions of people at all socio-economic levels. As O’Connor notes, the conditions of capitalist production are mediated by state institutions, and as every state is different, using only a political mode of mediation, the forms of and relations between conditions of production change from state to state, region to region, locale to locale. Additionally, the relations that ecologies, scientists, bodies, institutions, cultures and spaces generate, relatively autonomously of the state and capital, also change. The “second contradiction” results when capital does not include all the conditions associated with extracting nature, culture and labor from the social and ecological organization and leaves the consequences of material degradation, the inability to reproduce the ecological, scientific, personal, infrastructural and cultural conditions for others to deal with.⁵⁰

At a high level of abstraction, in *Natural Causes* O’Connor notes a juxtaposition between the process of expanding the accumulation of capital, which has a tendency to over-use the ecological, personal, and communal resources that capital relies upon, and the degradation of those conditions of production.⁵¹ This debasement includes tax reduction and infrastructural over-use that degrades the material and institutional phenomena necessary for the healthy reproduction of 1) “nature”; 2) “labor”; and 3) “culture.” Thus, for O’Connor, ecological, personal and communal conditions conjoin in the process of labor in a quasi-symmetrical way (Figure 2). All three conditions have an active agential character that combined, makes up socionature, which is far from dualistic.

Indeed, Castree misinterprets O’Connor when he states:

Here, then, we are urged to see capitalism as a global system that contradicts a nature that is ontologically different from it. Because capitalism is organized according to an abstract logic of growth—measured in labor value terms—it is, for O’Connor (1998: 4), “blind” to nature and ultimately therefore “antiecological.”⁵²

Castree makes the mistake of using this analysis of capitalism to exemplify O’Connor’s dualistic treatment of nature and society. In fact, O’Connor is explaining that this is how *capital* treats nature and society, which is not the vision of the nature-society relation generated in the production

⁵⁰ O’Connor, 1998, *op. cit.*

⁵¹ I.e., pollution, deforestation, low quality of life, and other false externalizations.

⁵² Castree, 2002, *op. cit.*, p. 124.

of the second contradiction thesis. Castree should consider O'Connor's case studies in *Natural Causes* to understand O'Connor's perspective on socionatural relations. For example, revisiting the ecological history of the Monterey Bay in California, O'Connor notes the symmetrical matrix of nature, culture, and social relations in labor. Far from dualistic, his vision combines cultural and ecological landscapes in an inseparable way. The link between nature and culture is labor, which in a Marxian analysis marks the crux of all human existence.⁵³ The logic of capital plays a huge role in modern life over how nature and culture are "mixed" through labor. But the muddling of culture and nature is as old as culture—as old as society itself.⁵⁴

Figure 2: Conceptualizing a Symmetrical Marxism

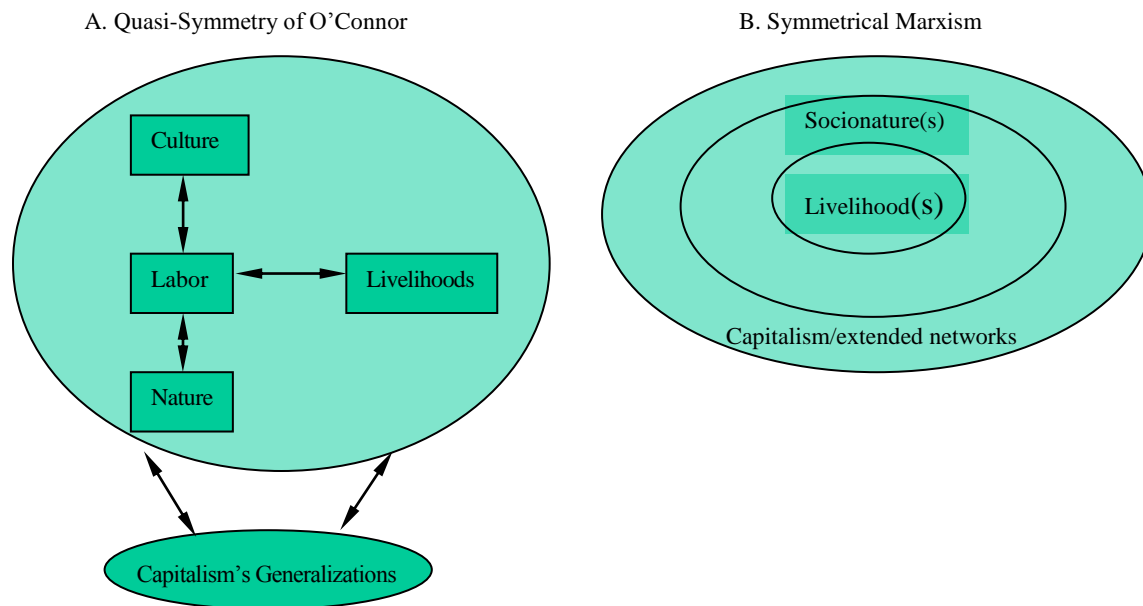


Figure 2 attempts to display how O'Connor's theory plays out conceptually. Briefly, labor is what makes life possible, and it is agency that links all things in myriad ways:

Culture does not provide a living until particular forms of human cooperation are "imported" into the workplace, thus becoming a kind of productive force. Nature yields nothing for human beings until human labor is applied to, or mixed with, the munificence of forest, meadow, stream, mineral deposit, field, or sea, which then also become a productive force. Labor mediates culture and nature, so to speak: labor brings the two together in productive ways, yielding the material means of life.⁵⁵

Therefore, the inner-connection between labor, nature, and culture make up the livelihood of people. Livelihoods are a product of complex mixtures of socionature, not of distinct, separate entities in social or natural forms (see Figure 2). Within this construct, the logic of capital/capitalism acts as a general, uneven force that literally degrades life, overpowering socionatures that are based

⁵³ Young, 1977, *op. cit.*

⁵⁴ O'Connor, 1998, *op. cit.*, pp. 83-89. Indeed, the Marxist rejection of the Baconian dualism of "man" and "nature" is also a plea for the notion that "we have never been modern"; to conquer a falsely external nature is to destroy ourselves.

⁵⁵ O'Connor, 1998, *op. cit.*, p. 83.

upon something other than the logic of efficiency and accumulation (subsistence farming, a high standard of living for workers, social welfare, etc). Thus, the generalizations of capital play a huge role in how livelihoods are constituted, something that O'Connor sees as becoming worse with the passage of time:

What counted in the old days was livelihood, basic commodities; in the 1990's, what's important are more and new consumer goods produced cheaper and cheaper on a world scale, with the aim of reducing the costs of reproducing the labor force and society as a whole.⁵⁶

The difference between symmetrical socionature in Latour's ANT and the culture-nature-labor triad in O'Connor's work is rather slight. The notion of human and non-human agencies in Pickering's work is closer still to O'Connor's work. What ANT does is re-configure the nature-labor-culture relationships to be symmetrical, both "outside" and "inside" human control. There are various forms of agency in socionature, and various forms of livelihoods associated with those agencies, and the effects of these socionatures and agencies are contingent upon the capitalist "network" (Figure 2). "Livelihood" as a driving force both outside of human control and intertwined within human control/labor is important. People's socio-material condition shapes how they perceive their surroundings, opportunities for change, etc., but it is shaped in ways not readily identified as class-based. Socio-material condition is also socio-ecologically (socionaturally) based. As such, socionatural relations and the potential for social change are fundamentally shaped by how socionature functions, how humans *change nature and vice versa*.

Conclusion

One of the major concerns of this journal is the problem with environmental destruction. O'Connor states that Marx never conceived that "natural barriers" may indeed be capitalistically produced barriers, or a second contradiction to capitalism. Whether one agrees that Marx lacked a developed theory of environmental destruction or not, all Marxist political ecologies contain a theory of crisis that leads to social transformation. ANT contributes a more serious vision of how nature—more aptly socionature—impacts that potential. ANT also demonstrates that Marxisms need not consider nature external to the conditions of production until it is transformed into a use value. As capital destroys its own conditions, it affects how nature relates to people and vice versa. How this process works out on the ground (the specificity of the abstraction of capitalist networks) is exactly what ANT can contribute to discussion of the local effects that socionature has on capital-people relations.

⁵⁶ *Ibid.*, p. 85.