Critical realism in political ecology: An argument against flat ontology

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Abstract

This theoretical article takes issue with how 'new materialisms' have been employed in political ecology, and it explores the 'depth ontology' of critical realism developed by Roy Bhaskar as an alternative to the 'flat ontologies' of new materialism. While political ecology was initially informed by political economy, the field has become much more heterogeneous and includes various post-structuralist, socio-constructivist, and new materialist approaches. Most, though not all, of these approaches typically destabilize science, try to break with problematic dichotomies (especially nature-society), distribute agency, and sometimes entertain the idea that multiple realities may exist. This contribution argues that new materialism, in Bhaskar's language, may be characterized as 'actualism' and identifies its associated problematic implications. While critical realism has occasionally been invoked in political ecology to give credibility to the external reality of nature, I argue that the full potential of critical realism for political ecology has yet to be explored. Holding that the world is stratified, with the 'real' not limited to events and interactions, creates the possibility of exploring 'unseen' mechanisms and trends.

Keywords: New materialism, actor network theory, Roy Bhaskar, depth ontology, tragedy of the commons, social constructivism

Résumé

Cet article théorique s'interroge sur la manière dont les "nouveaux matérialismes" ont été employés dans l'écologie politique (la political ecology) et explore "l'ontologie de la profondeur" du réalisme critique développée par Roy Bhaskar comme une alternative aux "ontologies plates" du nouveau matérialisme. Alors que l'écologie politique était initialement informée par l'économie politique, le domaine est devenu beaucoup plus hétérogène et comprend diverses approches post-structuralistes, socio-constructivistes et néo-matérialistes. La plupart de ces approches, mais pas toutes, déstabilisent généralement la science, tentent de rompre avec les dichotomies problématiques (notamment nature-société), distribuent l'agence (agencement) et entretiennent parfois l'idée que des réalités multiples peuvent exister. Cette contribution soutient que le nouveau matérialisme, dans le langage de Bhaskar, peut être qualifié d' "actualisme" et identifie les implications problématiques qui lui sont associées. Alors que le réalisme critique a été occasionnellement invoqué en écologie politique pour donner de la crédibilité à la réalité externe de la nature, je soutiens que le plein potentiel du réalisme critique pour l'écologie politique n'a pas encore été exploré. Le fait de considérer que le monde est stratifié, et que le "réel" ne se limite pas aux événements et aux interactions, offre la possibilité d'explorer des mécanismes et des tendances "invisibles."

Mots-clés: Nouveau matérialisme, théorie du réseau d'acteurs, Roy Bhaskar, ontologie profonde, tragédie des biens communs, constructivisme social

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Acknowledgements: I am indebted to Eldar Bråten for his expert advice concerning critical realism, to Connor Cavanagh for helping me position my arguments within political ecology, and to Isabelle Hugøy for her comments on structure as well as attention to details. Thanks also to the two anonymous reviewers for comments that helped me improve the text. Progress on this text was made possible by a research stay in Vienna during spring 2022. The Department of Social and Cultural Anthropology at the University in Vienna provided facilities and a conducive environment, while the Meltzer Foundation in Bergen generously funded the stay.

Resumen

Este artículo teórico cuestiona la forma en que se han empleado los "nuevos materialismos" en la ecología política y explora la "ontología profunda" del realismo crítico desarrollada por Roy Bhaskar como alternativa a las "ontologías planas" del nuevo materialismo. Aunque la ecología política se basó inicialmente en la economía política, el campo se ha vuelto mucho más heterogéneo e incluye diversos enfoques postestructuralistas, socioconstructivistas y del nuevo materialismo. La mayoría de estos enfoques, aunque no todos, suelen desestabilizar la ciencia, intentan romper con dicotomías problemáticas (especialmente naturaleza-sociedad), distribuyen la agencia y, en ocasiones, contemplan la idea de que pueden existir múltiples realidades. Esta contribución sostiene que el nuevo materialismo, en el lenguaje de Bhaskar, puede caracterizarse como "actualismo" e identifica las implicaciones problemáticas asociadas a él. Aunque el realismo crítico se ha invocado ocasionalmente en ecología política para dar credibilidad a la realidad externa de la naturaleza, sostengo que aún no se ha explorado todo el potencial del realismo crítico para la ecología política. Sostener que el mundo está estratificado, y que lo "real" no se limita a los acontecimientos y las interacciones, crea la posibilidad de explorar mecanismos y tendencias "invisibles."

Palabras clave: Nuevo materialismo, Actor Network Theory, Roy Bhaskar, ontología profunda, tragedia de los comunes, constructivismo social

1. Introduction

This theoretical article takes issue with how new materialisms have been employed in political ecology and explores the depth ontology of critical realism (Bhaskar, 2008 [1975]) as an alternative to the flat ontologies of these positions.

While political ecology was initially informed by political economy, the field has become much more heterogenous and includes various post-structuralist, socio-constructivist, and new materialist approaches. Most, though not all, of these approaches typically destabilize science, try to break with problematic dichotomies (especially nature-society), distribute agency, and sometimes entertain the idea that multiple realities may exist. This contribution aims to elucidate the ontological and epistemological differences between theoretical positions and specifically argues that new materialism, in Bhaskar's language, may be characterized as 'actualism.' Critical realism has occasionally been invoked in political ecology, especially among geographers, to give credibility to the external reality of nature and as defense against social constructivism or postmodernism. However, this engagement with critical realism has overall been imprecise, misunderstood, or superficial, leaving untouched the rest of Bhaskar's thinking about epistemology and ontology. I will argue here that the full potential of critical realism for political ecology has not been explored.

The article is organized as follows: After a short review of the development of the field, I sketch the main outlines of the critique of political ecology, especially as articulated by new materialists such as Latour. I identify a series of problems with this critique and review what I consider to be unsuccessful attempts at merging new materialism with political economy. The second half of the article engages with critical realism, notes the superficial and incorrect ways it has been mobilized in political ecology, and gives a sketch of what implications the depth ontology of Bhaskar can have for thinking about agency, dichotomies, structures, and social critique. I use the thesis of the Tragedy of the Commons as an example to show that the flat ontology of new materialism implies an 'actualism' that amounts to a superficial view of reality. Holding that the world is stratified, with the 'real' not limited to events and interaction, critical realism opens the possibility of exploring 'unseen' mechanisms and trends. This has implications for both our theories and research practices.

2. What is political ecology? A short review

Political ecology is neither a theory nor a clearly defined school or program, but a multidisciplinary agenda that, put very simply, aims to investigate, simultaneously and in connection, environmental and distributional issues. Whereas Eric Wolf (1972) used the term *political ecology*, Piers Blaikie and Harold Brookfield (1987a) are among those credited with formulating the agenda and approach of political ecology. In the introduction to the landmark book, *Land Degradation and Society*, Blaikie and Brookfield defined political ecology as a combination of "the concerns of ecology and broadly defined political economy. Together

this encompasses the constantly shifting dialectic between society and land-based resources, and also within classes and groups within society itself" (Blaikie and Brookfield, 1987a, p. 17). The authors consistently differentiate between physical reasons and social causes, only the latter of which is the task of social science to address.

Political ecology was political in the sense also of being concerned with injustice. Without being explicitly Marxist, Blaikie and Brookfield's conceptual framework (1987a, 1987b) includes institutions, history, labor, the state, and class structure. This approach was developed in more or less conscious opposition to the use of ecological concepts and models in cultural ecology, systems ecology, and so on. Michael Watts (2015) – another of the early originators of political ecology – in criticizing the re-emergence of the language of adaptation in climate change mitigation policies, argued that "it was precisely the *limits* of adaptation as a form of thought which constituted the very ground on which political ecology emerged in the 1970s and 1980s" (Watts, 2015, p. 21, emphasis in the original). The primary strategy in moving away from ecological models and language was to engage Marxist approaches to labor and seeing "nature and society as dialectically constituted" (Watts, 2015, p. 32). Thus, political ecology emerged as a critical approach, resisting positivist renderings of nature and resources.

It did not take long before the dialectical – or dichotomic – framing of nature and society came to be developed or challenged. Since the mid-late 1990s, works in political ecology started to adopt new approaches, which may generally be considered social constructivist, new materialist, or poststructuralist. These were not positions developed within political ecology itself. Rather, with post-structuralism, post-modernism, and the emergence of STS (Science and Technology Studies), there developed new takes on the relation of humans to their environment that were subsequently incorporated into political ecology. This new trend included Foucaultian approaches (e.g., Brosius, 1999; Escobar, 1999), post humanism *à la* Haraway (e.g., Rocheleau, 1995), new materialism (e.g., Whatmore, 1999), and phenomenology, especially as developed by Ingold (e.g., Ingold, 1993). Common among all these approaches was that they destabilized scientific knowledge, called for more reflexivity, and acknowledged the constructed and hybrid character of our study objects. Political ecology also came to be impacted by research on environmental conflict, resistance, and environmental social movements. This contributed to further questioning of the authority of Western and scientific knowledge, especially when indigenous groups were involved.

It was not as if classical political ecology was directly challenged as such (however, see below) by these new approaches, as practitioners of political ecology had become inspired by and had taken up new approaches. I was myself among those practitioners when I did my doctoral work during the late 1990s (Knudsen, 2009). Political ecology has indeed become an increasingly heterogenous field with sizable overlaps but also distinct differences. My definition of political ecology here is wide and inclusive, and many approaches and scholars, who would not necessarily self-identify as political ecologists, are also included in my broad sweep. It is also worth noting that the study object of political ecology has expanded significantly from the classical focus on land and resources, to include urban and industrial contexts and more (see Bridge, *et al.*, 2015).

For heuristic purposes, I divide the positions that inform current political ecology into three main strands:[2] political economy, social constructivism, and new materialisms (which includes actor-network theory (ANT), material semiotics, post-humanism, multispecies ethnography, and vital materialism). The main distinction between the latter two is that new materialisms tend to rely on relational or flat ontologies and non-linguistic models. While social constructivist approaches are primarily concerned with showing that knowledge is culturally formed and thus political (deconstruction being the primary strategy), the new materialisms argue for the need to expand the scope of research to include non-humans and their agentive power. The practitioners of political ecology informed by social constructivism and new materialism are distributed across several disciplines, such as geography, political science, anthropology, and STS.

[2] We may add systems theory and CHANS (Coupled Human AND Natural Systems), but they are more peripheral to my concerns here.

While I will address social constructivism to some extent,[3] my main concern in this article will be with new materialism. One reason is that the challenge concerning social constructivism is well-known, moving around the issue of whether or to what extent the non-human world has an independent, stable existence outside of the linguistic, meaning-bearing activities of humans in society. This is not to say that this is a *simple problem*, but it is one I will come to discuss in the context of new materialism. There is certainly not a clear line distinguishing new materialisms from social constructivism. Further, and more importantly, I chose to concentrate my discussion on new materialism since I consider it to currently be much more influential than social constructivism in political ecology[4], probably because it claims to be able to better account for non-human agency.

3. Critiques of 'classical' political ecology

There has been a tendency in political ecology for the study of the 'ecology' (or the material/nature) to gravitate towards relational/flat[5] ontology and methodological individualism, but for the study of 'politics' (or power, structure) to gravitate towards neo-Marxism or post-structuralist discourse studies. This pulling of ecology and politics in opposite directions has fostered a long running debate about "where is the politics?" (Walker, 2007) and "where is the ecology?" (Walker, 2005) in political ecology. Vayda and Walters (1999) were among the most articulate critics of what they saw as a development towards "politics without ecology." They argue that researchers holding "*a-priori* assumptions" about "political factors" results in their failure to explore actual ecological processes (Vayda and Walters, 1999, p. 167) and criticize political ecology for assuming *too much* about social structures and their causal effects: "…the existence or non-existence of systems and structures is something to be determined through the process of research investigation and causal inquiry, *not in advance of it.*"[6] However, they seem neither to have comprehended nor related to the post-structuralist critiques that, at their time of writing, started to inform political ecology – they ignore critical or reflexive questions, such as "what makes something into a resource?", "what is the environment?", "who has the right to represent Nature?", "what are the politics of knowledge relating to the environment?"

These are the kinds of questions and issues that were squarely addressed in a somewhat related (both being distinctly methodological individualist) yet more fundamental critique of political ecology by Bruno Latour in his book, *Politics of Nature* (2004).[7] His main argument is that it is a dangerous mistake to let Science represent Nature and that the ecology movement makes this mistake in relying on Science when advocating for the rights of Nature. He claims that a strength of political ecology, as he envisions it, is that "[i]t *does not know* what does or does not constitute a system. It does not know what is connected to what" (Latour, 2004, p.21, emphasis in original); "…it is crucial that enquires do not in advance, and *in place* of the actors, define what sort of building blocks the social world is made of" (Latour, 2005, p.41, emphasis in original). To avoid giving science the authority to represent nature, to be able to see the complex networks, Latour thinks it important to ignore totality. Moreover, in setting out how he thinks the environmental movement should work, he says that "[p]olitical ecology is incapable of integrating the entire set of its localized and particular actions

[3] It is beyond the scope of this paper to give a comprehensive account of the debates concerning social constructivism, even as they pertain to political ecology. I will refer the interested reader to Andreas Malm's *The Progress of This Storm* (2018) which discusses in more detail what is at stake.

[4] While relatively few recent articles published in this journal can be considered new materialist, I find that roughly one third of articles in the 2022 volume of *Environment and Planning E: Nature and Space* are heavily influenced by new materialism.

[5] *Relational ontology* is often used to designate the kinds of ontologies underlying new materialism. But since historical materialism also embodies a relational ontology, I find that *flat ontology* is the more appropriate term to use. Flat ontology also stands in more apparent contrast to depth ontology.

[6] From EANTH-L discussion list, post by Brad Walters, 12 January 2011. Emphasis in original.

[7] The book's title may be slightly misleading. Although it is marketed (on the back cover) as a book that will "establish the conceptual context of political ecology," it does not explicitly address the academic field of political ecology. In its French original, it was conceived rather as a book about green politics. However, since Latour is so widely drawn upon in political ecology, this book can be considered his most explicit statement about issues pertaining to political ecology.

into an overall hierarchical program…this ignorance of totality is precisely what saves it" (Latour, 2004, p. 22).

While this constitutes Latour's specific take on political ecology, *Politics of Nature* mobilizes what otherwise has become the core of his conceptual framework. Tracing the distribution of agency across multiple undifferentiated actants in heterogenous networks has become an especially powerful source of methodological and analytical experimentation, also in political ecology.[8] Explaining facts or contestations by referring to systems or totalities (such as, capitalism, ecosystems, the state) is, in this view, untenable since it will blind us to what is actually taking place, the messy (Law, 2004) relations and interactions which will need close-up attention and a high degree of descriptive specificity to be adequately accounted for.

Latour's work has been drawn on for inspiration in an emerging new materialist, neo-realist[9] position within anthropology, geography, and related disciplines. Castree noted 20 years ago that "ANT is today vying for paradigmatic status in the greening of left geography" (Castree, 2002). New materialisms can be considered part of the *ontological turn* in the social sciences whereby, in seeking to overcome the nature-culture dichotomy, active roles are ascribed to nonhumans, which participate in the construction of different realities through associations[10] (Latour, 1993). In these variants of relational ontology, reality is considered as constructed not of essences but through events or in the relations of manifold actants that form networks[11] (Latour, 1993). Agency is accorded to whatever has an impact in a network. Thus, reality is what comes to be through the interplay among actants, or enactments, and we cannot expect the reality thus constructed to be layered or structured. It is flat.

A related critique of political ecology concerns the way animals have been analyzed as objects and not subjects. Rosemary-Claire Collard observes that there have been "…three dominant (and sometimes interconnected) ways that animals have appeared in political ecology: as resource, as object of conflict, and as social representation" (Collard, 2015, p. 131). This is echoed in much of the recent ethnographic work that attempts to draw non-human life into ethnographies (Tsing, 2015; Lien, 2015; Kohn, 2013), sometimes under the label multi-species ethnography and often inspired by the work of Donna Haraway. Although he is not directly addressing political ecology, Ingold's phenomenological approach (see e.g., Ingold, 2021) also plays into this by focusing on, for instance, similarities in the way in which humans and animals relate to their environment through direct perception unmediated by culture.

Thus, a shared rallying point for many of the new materialist approaches is their critique of the continued importance of the Cartesian dichotomy for ordering our knowledge and politics. This is to be challenged and substituted by a symmetry approach that strives to avoid any a priori *Great Divide* distinction between the West and the rest, between science and other knowledges, between subject and object, and between nature and society. We should study and compare natures-cultures, without trying to stipulate the relative weight of nature and culture. Descriptions should start from the center, with the phenomenon. For example, the following sentence: "Plantiness…invites us – as humans, and political ecology as a discipline – to re-examine our relations with other than human actors such as plants, to challenge human-centric onto-epistemologies, and, ultimately, to more fully comprehend the serious ecological repercussions of human exceptionalism" (Durand and Sundberg, 2022, p. 190) is illustrative of contemporary new materialist writing.

In sum, the new materialist approaches are concerned with the nature-society dichotomy, with dethroning science, accounting for non-human agency, and avoiding explanations that emerge from totalities.

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[8] In his later work, Latour modified his position, to among other things better support the authority of science. However, I do not relate that here since it is primarily the 'middle' Latour that is drawn upon in recent political ecology. In this Journal, references to Latour in articles published from 2018 onwards include 3 references to his pre-1993 works, 17 to his publications from 1993 to 2005 (primarily Latour 1993, 2004 and 2005), and only 5 to his post-2005 publications.

[9] It should be stressed that new materialism's empiricist realism is very different from the realism of Roy Bhaskar.

[10] Other scholars use alternative concepts for basically the same idea: "relations" (De Landa, 2006), "enactments" (Law, 2004; Mol, 2002) or "performance" (Abram and Lien, 2011).

[11] Here several concepts meaning roughly the same are in use: "collectives" (Latour, 1993), "assemblages" (De Landa, 2006; Tsing, 2015), or "modes of ordering" (Law, 2004).

Post-structuralist social constructivism's agenda partly overlaps with new materialism in its critique of science and the nature-society dichotomy (less so when it comes to non-human agency and totalities), but the strategy is different in that these approaches place more stress on the importance of uncovering and deconstructing hegemonic discourses and giving voice to subaltern, marginal or indigenous voices and stories. This involves a reflexive critique of culture and power:

> …political ecology is more properly understood as a merger of political economy with cultural studies, itself an outgrowth of post-Marxist frameworks founded on a critique of traditional Marxism's inadequacy as cultural critique and as a manifesto for cultural politics per se. (Biersack, 1999, p. 10)

While many of these perspectives find their way into political ecology, environmental anthropology, green geography, and so forth, there are only a few beyond Latour who directly "challenge the conceptual context for political ecology."[12] Anna Tsing (2015), whose agenda can be said to be associated with new materialism, embraces "assemblages" as a key analytical concept and considers that "this turns out to be a method that might revitalize political economy as well as environmental studies. Assemblages drag political economy inside, and not just for humans" (Tsing, 2015, p. 23). From within anthropology, political ecology has additionally been explicitly challenged by political ontology (Blaser, 2009) and indirectly by perspectival multinaturalism (e.g., Viveiros de Castro, 2014; De la Cadena, 2010). For these authors, the concern is less with giving new authority to non-humans and more with challenging the authority of scientific and Western knowledge. Blaser, for instance, considers that:

> …while political economy and political ecology mostly operate within the modern "multiculturalist" understanding that we exist in a power-laden world of one nature and many culturally situated perspectives of it, the political ontology framework builds on the "multinaturalist" understanding that there are many kinds of "natures." (Blaser, 2009, p. 11)

This perspective has also influenced recent thinking about ontology in political ecology, such as that of Sian Sullivan who, referring to Blaser, argues that "ontologies…are *made* through interactions between human and other-than-human agencies" and that "sensitivity to the ontological politics…may be key to recognizing with more depth the sometimes significantly different 'natures' being struggled over in [environmental] conflict" (Sullivan 2017: 224, 217, emphasis in original).

Common to all the critiques of conventional political ecology is their displacement of political economy from the core of political ecology. Although there clearly are overlaps between political ontology and some strands of new materialism, the political ontological challenge is of such a character that I cannot address it here.[13] My major concern will be with new materialism and its flat ontology.

4. Critique of the critique: Initial discussion

I am sympathetic to much of the critique I have outlined above. I find it important to consider the role of science in environmental conflict, to understand the value and power of stories, to regard animals as agentive individuals, and to avoid making causal analysis in case studies by reading directly from (totalizing) theory. Not having from the outset, for example, a Marxist focus on capitalism makes it possible to see *other things going on*. I am, however, worried about some implications flowing from new materialism's flat ontology:

[12] Quote from back cover, Latour (2004). It may be more correct to say that, rather than challenging political ecology, he outlines how he thinks political ecology should be practiced.

[13] For a critic of perspectival multinaturalism from a critical realist position, see Bråten (2022).

- It is a weakness of social science not to be able to account for structure and power, for trends, shifts and patterns.
- It makes little sense to me to accord in-animate objects, animals, and humans the same kind of agency.
- The eagerness to deconstruct dichotomies (especially the so-called Descartian one on mind:body/society:nature) makes us blind to manifest ontological differences.
- By placing all knowledges at the same level (or indexing it according to identity), flat ontology gives us little basis for assessing what is sound knowledge.
- The view that multiple realities can be enacted is not congruent with a realist position that holds that the world is prior to and external to the mind.
- New materialism has unclear implications for social critique.

Below I discuss these issues in more detail.

Structure, power, and generalized tendencies

In political ecology, the most articulate and direct critique of new materialism (especially of the ANT version) has come from Marxists, such as Damian White, Alan Rudy, and Brian Gareau (2016) who have argued that ANT "tends…to be silent about the ways that power is reproduced and hidden by the reproduction of normalized stable networks" (White, *et al.*, 2016, p. 134), thus leaving power to be only a "network effect" (Rudy and Gareau, 2005, p. 89). The Marxist critique here is especially concerned that ANT fails to acknowledge the "specific generalities of capitalism" (Fine, 2005, p. 92), for not accepting the "notion of generalized tendencies in capital" (Gareau, 2005, p. 129). ANT is unable to explain the workings, for instance, of the state, of capitalism, money, and market.

While the *tabula rasa* approach to observation may seem attractive to anthropologists, I think we should aim to register regularities in social life, to compare cases, and ultimately develop theory. ANT's dismissal of social theory, regularities, and comparison (Fine, 2005, p. 96) as well as its aversion to so-called *totalities* and history makes this difficult. Every new study will be required to start from scratch, so to speak. How, if at all, can we *discover* capitalism, or the circulation of value, through an ANT-inspired analysis?

Although I find this critique of ANT and new materialism generally cogent and important, I also think that it at times becomes too focused on ANT's unwillingness to engage with and understand capitalism. The issues of distributed agency, symmetry, dichotomies, and multiple realities are less pronounced in this Marxist critique of ANT.

Distributed agency

It is important to be aware of how radical the proposition of distributed agency is. Agency is reduced to the capacity to make a difference, to have an effect in a network. A realist social science should not, however, ignore the distinctions between capacities/properties (which a stone might have), motivations or purpose and semiotic capacities (which animals may have), and intentions guided by imaginations and symbolic language (which only humans possess) (for an elaboration of this, see Hornborg, 2017a, 2021; Malm, 2018; White, *et al.*, 2016, p. 11, 133; Svensson, 2021). This does not deny agency to nonhumans but acknowledges that there are different preconditions for how agency can be enacted. The linguistic capacities of humans afford a qualitatively very different capacity for intentional and imaginative agency than that which nonhumans possess (Soper, 1995). The flattening of agency has engendered an analytical language whereby nonhumans are, for example, invited to *cooperate* in projects initiated by humans. However, to register scallops (Callon, 1986) as uncooperative in a research project is to misplace explanation: the real properties and capacities of the scallops can be left unexplored while the practitioner of ANT can be credited with an elegant analysis.

The evil dichotomies

That dichotomous thinking engenders 'violence' and must be avoided at all costs, so to speak, has become a truism in much of current social science, including many versions of political ecology. However, removing the distinction between nature and society means ignoring the fact that society, while relying on and possessing most of the qualities of nature, is comprised of processes that do not exist in nature, such as symbolic language and imagination. This has enabled humans to build arrangements and institutions, such as states and corporations, that did not exist before the emergence of human society and which depend on human linguistic activity for their reproduction (Hornborg, 2017a, 2021). Yet, as Malm (2018) convincingly argues: to hold that society and nature have different properties does not mean that we think they are totally separate: "only by keeping them analytically distinct can we differentiate between those aspects of the world that humans have constructed…and those generated by forces and causal powers independent of them" (Malm, 2018, p. 75; see also Rosa, *et al.*, 2021, p. 9). Another implication of its monist approach is, as White and his colleagues (2016, Chapter 6) as well as Soper (1995, p. 13) have warned, that new materialism tends to make us oblivious to critical distinctions among humans.

Flat ontology and multiple realities

The mostly implicit ontology of new materialism is sustained by a particular view of the 'real', a view which makes it possible to maintain this ontology's stance on dichotomies, agency, and 'totalities.' What is considered real in this position is the observable event, action, enactment, performance, or becoming. What is real is what is present (to an observer). Becoming is real, not being. This position becomes very evident in, for example, Annemarie Mol's (2002) rendering of what she considers to be the appropriate method: Praxiology. What is real is that which (we can observe) happens in practice, not a force that gives direction to what is enacted. "[F]or Latour, people, objects and relationships beyond his immediate experience are forbidden from entering into analysis" (White, *et al.*, 2016, p 134). The kind of presentism that flat ontology represents has a primary trajectory reaching back from Latour via Isabelle Stengers (2011) to the philosopher A. N. Whitehead who, in an argument against essentialism, developed an "ontology of creative material effervescence" (White, *et al.*, 2016, p. 28) which held that reality was made up of actions or events only. Another trajectory focusing on 'becoming' can be traced from the collaborative work of Holbraad and Pedersen (2017) via Viveiros de Castro (e.g. 2014) and Arturo Escobar (2008) back to Deleuze (and ultimately to Spinoza's imminence). It is precisely the identification of reality with enactments, becoming, and so forth, that makes it seem likely that objects may be multiple, that there exist several similarly real but different versions of an object, and that an object has no essential core (see e.g., Mol, 2002; Lien, 2015; for an argument for pluriversality within political ecology, see Schulz, 2017, p. 132). This thinking obviously has consequences for what we consider relevant and good knowledge. New materialists are, for instance, not inclined to pursue knowledge about power beyond 'network effects.'

Political ecology as social critique

A final worry that I have with new materialism and social constructivism concerns the kind of social critique these approaches can engender. While their main contribution seems to be a vigilant critique of Western hegemonic thinking, especially as it manifests in science, the world is awash with fake news, conspiracy theories, and so called 'climate skeptics' and 'vaccine skeptics.' Certainly, critical perspectives on science are totally in place, but then what? What more has social science to say, about, for instance, climate skeptics? Must our contribution be limited to telling stories (Tsing, Haraway) or holding up different versions of a fact/object and say that it is impossible to choose between them, or – most radically – pursuing a "permanent exercise in the decolonization of thought" (Viveiros de Castro [2014, p. 47] cited in Bråten, 2022, p. 9), as Schulz (2017) seems to suggest?

Hornborg characterizes the writing of main figures, such as Latour, Haraway, and Tsing, as "hazy and elusive dithering" which "dismantles any chance of politically challenging the destructive forces ravaging our planet" (Hornborg, 2017b, p. 75; 2017a, p. 68); the philosopher Kate Soper is worried that "Deleuzian-influenced ecocritical approaches…reverts to…a comprehensive but somewhat scholastic mapping of practices and subjectivities attached to a messianic and hence ultimately evasive politics" (Soper, 2020, p. 23). Below I

will draw on the depth ontology of Roy Bhaskar to argue that the 'presentism' of new materialism can be characterized as a form of 'actualism' that limits new materialism's capacity to identify and thereby criticize problematic social arrangements.

5. Fumblings in the middle

Theoretical synthesis?

Some scholars have made calls for synthesis between new materialism and political ecology (see e.g., Karlsson, 2018). The most ambitious of the attempts at synthesis has been made by Noel Castree who argues for the possibility, and desirability, of merging 'soft' ANT and green Marxism.[14] He notes how attempts to merge ANT and Marxism (by Harvey, Smith, and Swyngedouw) fail since they "insist on talking about capitalism as a 'totality' …or 'structured system'" (Castree, 2002, p. 131) and he sets out to formulate ways in which a more "modest" green Marxism "can both draw from and inform ANT" since "Marx's value categories…can be interpreted in a way that evades criticisms of ANT" (Castree, 2002, p. 137).

I think Castree fails. In his long outline (Castree, 2002, pp. 137–141) of what this modest green Marxism may look like, he – quite understandably – refers to concepts or notions, such as "tendencies" and "values as a real force", and reviews characteristics of "capitalist societies." This can never sit well with an ANT approach however 'soft' it is, and Castree admits as much when it comes to "values as a real force" (Castree, 2002, p. 140). The ontological and epistemological differences between these theoretical positions are simply too fundamental to be merged.

Some political ecology scholars have argued that Haraway's approach – one of the main inspirations for post-humanism and sharing many core propositions with ANT (accounting for the material, include non-human agency, critique of binary thinking and of science) – can add what ANT misses: notably, power, politics, and history. The most extensive discussion of Haraway in the context of a realist and loosely Marxist-inspired political ecology is provided by White and colleagues (2016). Echoing Rudy's earlier work (2005) they criticize ANT for, among other things, making "it very difficult to differentiate power relations within and between networks or assemblages" (White, *et al.*, 2016, p. 133). They acknowledge that there are significant overlaps between Latour's and Haraway's approaches (*ibid*., 136), yet argue that "the greatest strength of Haraway's critical hybrid worldview in contrast to Latour is that power, capitalist accumulation, racism, sexism and imperialism are not only present but driving concerns of her whole body of work" (*ibid*., 135). Alan Rudy finds Haraway's material semiotics to be "much more deeply political than Latour's work" (Rudy, 2005, p. 121).

Rebecca Lave likewise argues that a synthesis between ANT and political ecology is beyond reach (Lave, 2015, p. 218). She provides a very comprehensive critique of ANT and suggests (in one very short section in which she does not acknowledge Rudy's move in the same direction) that Haraway's approach includes non-humans in a useful way while also insisting on "the classed, raced, gendered, and deeply historical co-production of the human and nonhuman" (Lave, 2015, p. 221).

I find it difficult to get a clear grip on Haraway's position as she is not consistent on some major issues. On the one hand, she eschews dichotomies and criticizes human exceptionalism. In some formulations she is close to Latour: "In its scientific embodiments as well as in other forms, nature is made, but not entirely by humans; it is a co-construction among humans and non-humans" (Haraway, 1992, p. 297). On the other hand, she obviously does not embrace a flat ontology as her agenda is essentially about how our thinking and politics concerning nature have informed our humanness. She holds, for example, that "it is people who are ethical, not these nonhuman entities" (Haraway, 2000, p. 134). Furthermore, she seems to waver between an eagerness to accord non-human entities independent existence and agency and a more conventional social constructivism: "Nature cannot pre-exist its construction"; "Nature is…a powerful discursive construction" (Haraway, 1992, pp. 296, 298). It is thus unclear whether she would subcribe to an ontology which accepts the existence of a mind-independent reality: "The approach I am recommending is not a version of 'realism', which has proved a rather poor way of engaging with the world's active agency" (Haraway, 1991, p. 199) (in characteristic fashion

[14] See also Lave (2015, p. 218).

she clearly does not feel the need to define 'realism'). Her handling of reality is never disentangled from vision, language, and politics: reality is always cyborg.

To me, her denial of the existence of a mind-independent nature does not seem to deserve Lave's distinction of her approach as being among those who "re-embrace the material" (Lave, 2015, p. 220). The way in which Haraway includes politics does not avoid the issues discussed above concerning dichotomies and agency. Moreover, it is unclear how Haraway's creative provocations "might be materialized and institutionalized"; "the means through which this vision might move towards more concrete forms has remained rather elusive" (White, *et al.*, 2016, p. 137). Thus, neither a synthesis between ANT and Marxism nor Haraway's approach solve the problems I identified in Section 4 above.

Uneasy mix of approaches

While the new materialist approach has in principle found wide acceptance within political ecology (see footnote 4), its practice seems to be more difficult. Case studies typically nod or gesture towards new materialism in ways that seemingly make the studies progressive without, however, consistently applying the framework. This becomes manifest in several ways. First, it is very common to combine a new materialist approach with other, more structural and historical approaches and concepts (i.e., without conscious effort at theoretical synthesis, as above). Examples abound. I focus here on one of the major figures within political ecology. In his ambitious book, *Territories of Difference* (2008), Arturo Escobar writes that "…the notions of actor network, assemblages, flat ontology, and flat sociality push one to think about the real in relational and contingent, not structural and law-driven terms" (Escobar, 2008, p. 11). In my opinion (elaborated in Knudsen, 2014), he not only fails to provide a fine-grained description along new materialist lines, but he also regularly invokes untheorized underlying forces or totalities, such as 'capitalism', 'neoliberal globalization', and 'imperial globality', as unspecified explananda in his analysis. Escobar's book is in practice as far from a new materialist analysis as you can possibly get.

Second, contrary to the explicit ambition to include non-human agency, studies inspired by new materialism often fail to do so in practice. Again, Escobar can serve as an example. He claims that "there are no separate biological and social worlds, nature and culture" (Escobar, 2008, p. 29), but in a chapter entitled "Nature", he basically articulates the conventional social constructivist view that "nature is culturally constructed" (Escobar, 2008, p. 112), and in his story there is no role for non-human agency (Knudsen, 2014, p. 87). Even more than Escobar, Stephanie Lavau expresses an ambition to account for "agencies of non-humans" (Lavau, 2011, p. 44) in her study of fish species in an Australian river, but in practice, agency is accorded to no one except humans. Her own summary of the actors is accurate: "In this article, I tell of the negotiations by river managers, scientific researchers, local residents and policy-makers…over which fish belong in the river" (Lavau, 2011, p. 45). For a final example I return to the study of 'plantiness' by Durand and Sundberg (2022) which I mentioned in Section 3. Although they repeatedly stress the importance of the agency of the plant, all their observations – their evidence or empirical material – is constituted by human representations of the plant. They concede that they failed to even see the plant themselves (Durand and Sundberg 2022, p. 202). We don't really get to learn how the plant enacts its agency, and I find the weight of plant agency relative to the different kinds of human agency involved is exaggerated. This is not to deny that the properties of the plant and its active dynamic within its habitat have a real impact on the way humans know and relate to the plant: you do not need a monist perspective to see that "the plant did/does its own things" (Durand and Sundberg 2022, p. 204).

Third, and strongly related to the two points above, it is not uncommon that new materialist studies retain dichotomous thinking, as in Escobar's book where nature and culture remain separate and purified. Such dichotomous thinking is sometimes exposed by a slip of the tongue.[15]

Research purporting to be new materialist is often unable to live up to its claims. Programmatic statements about including nonhumans, for instance, stand in stark contrast to actual engagement with nonhumans in research. And, however difficult a theoretical merging of ANT and more structural approaches

[15] Malm (2018, p. 40) mentions several examples.

might be, in practice, attempts at combining ontologically incompatible positions are pursued. Researchers engaged in new materialist studies, such as Escobar (see Knudsen, 2014), are apparently inclined to, after all, include structures, power, and history in their analyses, in effect falling back on conventional analysis or an uneasy *mélange* of new materialism and political economy. They find it difficult to purify their own practice and to succeed at descriptions that satisfy the criteria as set forth by Latour and the other guides into the flat landscape. It is not easy to let go of the often-implicit assumption that the world is layered and that there exist tendencies not always readily observable.

There may be different reasons for this. One could be a wish to latch on to the latest (presumptively progressive) academic fads. More importantly, I think this suggests that there is significant but largely unarticulated resistance against letting go of assumptions that the reality is mind-independent and 'layered', that there can be unseen causes, and that there are some good reasons to think that society and nature are to some extent qualitatively different. If this is the case, we need an ontology that can help us conceptualize and fathom this layered world and how we can study it.

6. Basics of critical realism

The observations above about the practice of new materialist political ecology indicate to me that the field of political ecology is ripe with uncertainty, internal contradictions, uneasiness, paradoxes, and – after all – a quest for ways to ground knowledge without invoking the big Truth. I contend that it will be useful to pay closer attention to what implications critical realism has for our theories and methods. By engaging with critical realism and its depth ontology, I intend to help clarify what kinds of differences between positions we are talking about. Time for the 'basics' of critical realism.

Bhaskar's concern has been to explain what makes science possible; his initial discussion (Bhaskar, 2008 [1975]) took issue with the ways that the philosophy of science has explained how it is that we can learn from scientific experiments. Criticizing, especially, positivism[16] but also the idealism of neo-Kantianism, the first move Bhaskar made was to insist on a fundamental distinction between an *intransitive dimension* – the mind-independent reality – and a *transitive dimension* – the knowledge facilitated by antecedent tools, language, and models in science. If we are to understand Bhaskar's contribution, it is crucial to acknowledge that he, unlike most modern philosophers, engages quite explicitly not only with epistemology but also with ontology. In this ontology, the independent existence of the real, the intransitive dimension, is essential:

> [T]he intransitive objects of knowledge are in general invariant to our knowledge of them: they are the real things and structures, mechanisms and processes, events and possibilities of the world; and for the most part they are quite independent of us. (Bhaskar, 2008 [1975], p. 22)

The intransitive dimension thus comes before and exists independent of our experience and knowledge. The level of carbon dioxide in the atmosphere affected the climate before humans evolved, and did so before humans gained knowledge about its effects. Carbon dioxide has certain properties that are real, constant, and independent of our knowledge of it. We do not have certain knowledge about whether the Earth is the only place which sustains life, but there is a reality ontologically prior to our experience where life is either limited to the Earth or not. Large swaths of the intransitive dimension are unknown to us (i.e., have not become objects of the transitive dimension) and may be unknowable.

Bhaskar stresses the importance of holding the intransitive and transitive dimensions separate so as not to enact what he calls the "epistemic fallacy":

[16] Bhaskar is critical also of Popperian theory of science (critical rationalism) since critical realists, unlike Popper, realize that scientific knowledge cannot be value-free.

> This consists in the view that statements about being can be reduced to or analysed in terms of statements about knowledge; i.e. that ontological questions can always be transposed into epistemological terms (Bhaskar, 2008 [1975], p. 36).

Thus, to observe that there are multiple and/or conflicting perspectives and knowledges (within science, local knowledges, ethno-ontologies, etc.) about an issue or object and from there to argue that different people live in different realities or that the real may be multiple – in short, that the real is contingent on the transitive dimension, our knowledge – is to commit the epistemic fallacy. Experts disagree or are uncertain about how the Covid-19 virus originated and spread (in a Chinese laboratory? from bats?), but the reality of what happened is independent of whatever knowledge eventually prevails. That knowledge may be wrong, but then it is wrong relative to the intransitive dimension, reality. Our knowledge does not create reality (except, to some extent, in the social domain). Truth and the real are not the same.

It is important to note that Bhaskar considers scientific knowledge to be always incomplete and fallible. But he also thinks that science can progress, and that knowledge can be more-or-less good or correct. He describes his position as ontological realist and epistemological relativist. To enable us to make sense of observations, we need an ontology that distinguishes between an empirical phenomenon and the processes or mechanisms of which it is a manifestation. The real is not only what happens, the actual (the apple falling), but the generative mechanisms causing it (the law of gravity). In this ontology, "real structures exist independently of and are often out of phase with actual patterns or events" (Bhaskar, 2008 [1975], p. 13). Moreover, there is a crucial distinction between the actual, what happens, and the human experience of it: The apple can fall unobserved, or the observer can 'misidentify' what happens. Bhaskar makes the following categorization (Figure 1):

	Domain of real	*Domain of actual*	*Domain of empirical*
Mechanisms	*X*		
Events	*X*	*X*	
Experiences	*X*	*X*	*X*

Figure 1: Domains of the real. From Bhaskar, 2008 [1975], p. 13

The analytical categorization of domains of the real constitute one crucial dimension of depth in Bhaskar's ontology. Another dimension is provided by the assertion that the real is layered or stratified, not undifferentiated but representing an integrative pluralism. In this substantive ontological layering, each level has emerged out of and is rooted in entities at lower levels but is not reducible to them. And each emergent level has unique properties and tendencies or generative mechanisms. Hydrogen and oxygen can form durable relations, which in the emergent form of water have new and unique proper dynamics that cannot be reduced to the properties of the constituent parts. Since each emergent layer has unique proper dynamics, different tools and theories will be appropriate for studying each layer (and we therefore have, for example, the scientific branches, physics, chemistry, and biology). Thus, Bhaskar's ontology is non-reductionist and by implication therefore also non-mechanistic.

An ontology that only acknowledges the actual as being real will not be able to differentiate between events and the generative mechanism producing the events; it will also be ignorant of an emergent system with proper dynamics and, often, considerable stability and reach. Insofar as such a flat ontology only includes within the real "undifferentiated experience" (Bhaskar, 2008 [1975], p. 67), it can be considered empiricism.

7. Uptake of critical realism in political ecology and related disciplines

The uptake of critical realism has varied across disciplines. While it has found little resonance in social anthropology (but see Bråten, 2016, 2022), sociologists such as Mary Archer (e.g., 1995) and geographer-sociologist Andrew Sayer (e.g., 1999) have engaged more actively with critical realism, especially Bhaskar's

(2015) proposals concerning the study of society (but also to "bring nature back in", see Carolan, 2005). In the political ecology tradition, the implications of social constructivist and new materialist approaches seem to have created some unease among many scholars who are not willing to let go of an external, mind-independent reality. Geographers, who are often in closer dialogue with the natural sciences than other social scientists, seem to have been particularly keen to embrace critical realism. However, this has primarily been to anchor claims about the 'reality' of nature. They thus primarily invoke, often in passing, critical realism as defenses against social constructivism or postmodernism while leaving untouched the rest of Bhaskar's thinking about epistemology and ontology as well as his theorization of society (e.g., Andresson, *et al.*, 2011; Blaikie, 2012; Neumann, 2005; Zimmerer and Bassett, 2003; Galt, 2013).[17]

Piers Blaikie (2012) put forward "a pragmatic argument for a critical realist approach for engaging a wider variety of actors more successfully than the strongly social constructionist approach taken by most 'post-ist' writers" (Blaikie, 2012, p. 234). While he briefly argued on ontological grounds for critical realism (which remains undefined and not anchored in any reference to literature), he was more concerned that political ecology be emancipatory and useful for actors outside of academia. A more thorough engagement with critical realism would have demonstrated the necessity of a depth ontology for identifying possibilities for human emancipation (see end of Section 9), and thereby made his argument more robust.

Although reference to critical realism seems to be commonplace among political ecologists as a shorthand defense of mind-independent reality, or simply 'nature', few studies refer directly to Bhaskar's work but rely on secondary sources[18], especially on Tim Forsyth's (2003) adaptation of critical realism for political ecology. Alas, Forsyth's interpretation of critical realism is imprecise. He relies on secondary sources only and has misunderstood the basic tenets of critical realism (in both Forsyth, 2001, and Forsyth, 2003), essentially transposing Bhaskar's ontology back into the epistemological domain and thereby committing epistemic fallacy. The three "domains of the real" (real, actual, empirical; see Figure 1) in Forsyth's hands become "three levels of knowledge: empiricism (simple experiences); actualism (experiences, and the events that that give rise to experiences): and realism (the underlying ontology and structure that give rise to events and experiences)" (Forsyth, 2003, p. 16). In the same vein, "the critical realist writings of Roy Bhaskar…identify nature as stratified according to various levels of meaning and causality, and the belief that these structures 'emerge' to human observers as the result of scientific inquiry" (Forsyth, 2003, p. 71). He has got things rather upside down, not realizing for instance that emergence is a real dynamic taking place independent of human thought, not a mechanism through which humans come to know structures. Contributing more to confusion than to clarity, this is – unfortunately – not a helpful guide into critical realism.

A few other scholars within a broadly defined political ecology make better use of critical realism. The sociologist Peter Dickens' much earlier and purely theoretical book, *Towards a Green Social Theory* (1992), provides a more precise presentation of critical realism, although he at times replaces ontology with epistemology and does not sufficiently acknowledge the implications of emergence. Despite the book's topic, it does not relate to debates in political ecology and has therefore found little uptake in this field. White and colleagues (2016, p. 9) briefly outline Bhaskar's position but do not really explore ontological distinctions beyond a somewhat simplistic portrayal of realism vs. idealism. Sian Sullivan also dips into critical realism (Sullivan 2017, p. 224), but failing to comprehend the distinction between transitive and intransitive, she is unclear on mind-independent reality. She seems to waver between affirming the existence of "one singular true underlying nature of being" (Sullivan 2017, p. 234) and thinking that epistemological plurality can be equated with the pluriversialist position of Blaser and others.

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[17] There is a more thorough discussion of critical realism in geography beyond political ecology; see Castree (1995) and Hannah (1999).

[18] One example of this very circumambulatory approach to critical realism is found in Karl Zimmerer and Thomas Bassett's book *Political Ecology* (2003: 3): "This philosophical embrace of the environment as having an ontological basis and a dynamic role as an agent in its own right, combined with our understanding of nature's agency as socially mediated, reflects a 'natural turn' in the social sciences that is known as 'critical realism' (Eden, 2001, p.83). One of this book's goals is to elaborate what we consider to be a series of key works distinguishing the focus on the 'natural turn' in political ecology." That is all Zimmerer and Bassett have to say about critical realism. Moreover, the reference, Eden (2001), does not say anything about critical realism except to pass the ball on to Proctor (1998).

Other authors, such Malm and Hornborg, hold that historical materialism is the best alternative to new materialism (and social constructivism). They explore their position through studies of environmental history, artefacts, technology, money, fossil capitalism, and climate change. While they refer to critical realism in grounding their position (Hornborg, 2017a; Malm, 2018), they do not explore in any detail its potential and its implications. A much more comprehensive and effective treatment of critical realism is found in Oscar Svensson's (2021) critique of new materialism in the social science of energy. While not being situated explicitly in debates in political ecology it is still highly relevant to the field, since he outlines the critical relativist perspective on, for example, 'technology' and 'natural resources.' Svensson's excellent text has clear affinities to my discussion and is the only work I can recommend for further reading on critical realism in political ecology.

Svensson's recent contribution notwithstanding, political ecology's engagement with critical realism has, as my review above shows, largely amounted to either superficial or incorrect renderings of Bhaskar's philosophy. The profound implications or potential of the critical realist position have not been taken on board. Epistemic fallacy, emergence, depth ontology, as well as Bhaskar's thinking about society have largely remained outside of political ecology's engagement with critical realism. There is clearly a need to explore this more thoroughly by looking closer at what critical realism really has to contribute.

8. A new ontology for political ecology

I now want to briefly re-visit some of my critiques of new materialism in Section 5 above in light of the realism of Bhaskar. First, the most fundamental one: There is no contradiction between the world being mind-independent and our knowledge about it being social and contingent. That we cannot have total and fully true knowledge, that knowledge is intrinsically fallible, is no proof that external reality does not exist or is plural. To argue otherwise is epistemic fallacy. Contrary to Haraway, we can say that "nature *does* pre-exist its construction." Furthermore, and more pertinent to new materialisms, to identify 'multiple versions' of a fact/object through the enactment of different but related assemblages is only possible if we deny the possibility of mind-independent reality, or a reality beyond what is enacted. The different enactments of, say, salmon (Lien, 2015), are distinct but overlapping transitive objects, and it does not follow that there are different salmon 'out there' in the intransitive domain. The failure of new materialism to distinguish between intransitive and transitive objects, or domains, thus easily leads to the idea that there are multiple realities. Again, this is epistemic fallacy: basing claims about what exists (multiple salmons) on what we can know (multiple versions of salmon).

Critical realism also gives us tools to handle the issues of dichotomies and agency. In the realism of Bhaskar, humans are fully part of nature. Our existence is dependent upon nature, and we are ourselves of nature. Yet, and this should not be controversial, different parts of nature have different qualities or characters. These differences have to a large extent developed through emergence.[19] Human linguistic and imaginative capacities are based on our biological properties but, once set spinning, have created processes not reducible to our biological roots nor seen in other animals. Human society has proper dynamics which we do not find elsewhere in nature; it therefore also makes sense to distinguish society from nature: hence, social science. Once complex human society was a reality, new kinds of institutions could emerge. For example, when limited liability for ownership of shares and personhood status for corporations were inscribed in law, a new corporate-capitalist dynamic was unleashed, or emerged, whereby capitalism decisively changed character.

Thus, humans are not totally different from animals, nor society from nature. In this respect, there is certainly agreement between new materialism and critical realism. However, critical realism denies the flat ontology of new materialism. There are, for instance, differences between animals and humans, and between different animals. The process of emergence explains much of these differences. These differences do not, however, amount to absolute differences that can easily be captured by dichotomies, and we therefore do not accept Latour's (1993) claim that contemporary life is characterized by a modern constitution where hybrids

[19] For a more comprehensive discussion of emergence with relevance for political ecology, see Malm (2018) and Svensson, (2021).

(of especially nature and society) proliferate. We are, rather, talking about distinctions, degrees of difference, different yet related, continuities, and overlaps (Elder-Vaas, 2015). There are obviously similarities and social relations between humans and animals. Relinquishing the flat ontology in favor of a depth ontology, which acknowledges different ontological strata and sees new forms come to exist through emergence, will better account for both distinctions and differences.[20]

It follows that it makes sense to think non-symmetrically, so to speak, about agency.[21] If we hold that reality is structured, stratified, and differentiated through emergence, then we cannot accept the *a-priori* naiveté of new materialisms' flat ontology. A speedbump, a dog, a human, and a state are not entities at the same ontological level. In a pre-animate world, for instance, there would likely not exist intentional, purposeful agency. It is completely to be expected that in a layered world, where different entities and processes have emerged and stabilized over time, that agency is not a universal and invariable capacity shared by all entities. But again, it is a question of degrees. A river may not have agency but force, an animal possesses agency and can in some instances act purposefully, while humans uniquely have the capacity for setting imaginative goals and trying to attaint them, such as creating a nation state out of a linguistic group.[22]

Whereas the dynamics or capacities of higher-level entities cannot be reduced to the properties of their constituent parts, downward causality from such higher-level entities happens regularly.[23] A nation state will often have a strong impact on the lives of the human individuals constituting it and, through warfare in the service of the nation, have devastating effect on both human and non-human bodies.

Finally, an argument can be made that critical realism allows for more independence for non-humans than new materialism, at least in its ANT-version, and is thus more symmetrical. The objects of new materialism – be they assemblages, actor-networks, or collectives – are never independent of the semiotic or discursive work of humans. ANT "claim[s] that the nonhuman exists only insofar as it is bound up with human reference" (Elder-Vaas, 2015, p. 115). Contrary to its claim about symmetry, new materialism is anthropocentric in not allowing anything to exist without the involvement of humans.

My main point is that new materialism is a form of actualism, which underlies and explains all of the above issues. Since new materialism is actualist also about human action and society, I need to briefly account for how the ontology of Bhaskar can be applied to society (Bhaskar, 2015). This has largely been ignored by earlier attempts to mobilize critical realism for political ecology.

9. Critical realism on society

Bhaskar argues that his ontology of nature, with some significant modifications, can be extended to apply to social science. There are also intransitive dimensions in social life (realities existing independent of the interpretative observer). Both the agency of individual actors and social institutions are ontologically real, but they are independent from and not reducible to each other. Society precedes actors but depends on social actors reproducing it. Emergence characterizes the human world as it does the natural world, so that society is more than the sum of individuals, and the study objects of social science are emergent totalities. But since society changes more quickly than nature and does "not exist independently of the conceptions that the agents possess of what they are doing in their activity" (Bhaskar, 2015, p. 38), we cannot talk about laws as in nature but rather an "ensemble of tendencies and powers" (Bhaskar, 2015, p. 39). Thus, knowledge produced by social

[20] Most of my critique here of new materialism would also pertain to Tim Ingold's approach (e.g. 2021), which lacks a depth ontology, sets a parenthesis around the question of mind-independent reality, and tends to ignore politics and social institutions.

[21] I appreciate the non-representative (or non-linguistic) turn of new materialism because it allows for richer descriptions and explanations, including human as well as non-human actors. This is consistent with critical realism. Bhaskar criticizes hermeneutics for ignoring the intransitive dimension and argues for the reality of non-human objects, for a reality beyond what is constituted by language.

[22] For a more extensive discussion making many of the same points, see Malm (2018).

[23] This approach might resemble Piers Blaikie and Harold Brookfield's (1987b) 'chain of explanation.' But while this concept primarily relates to fields nested within each other, with scale being the primary quality differentiating the fields, the emergent levels in critical realism are characterized by having different proper dynamics.

science will be "*historical*, not formal" (Bhaskar, 2015, p. 50), not laws, but "historically restricted tendencies operating at a single level of the social structure only" (Bhaskar, 2015, p. 53). Furthermore, contrary to many objects of natural science which can be studied experimentally in closed systems, society is always an open system. The work of social science can therefore never be predictive, only explanatory.

Like non-human worlds, human society is characterized by depth. In this respect, objects of social science are similar to many objects of natural science. Social interaction, actions, and events (the actual) are created by generative mechanisms from tendencies embedded in social life. A social science which holds that only events or what is enacted are real, can be characterized as actualism (even empiricism, if only what is *observed* enacted is considered real). The tendencies and mechanisms at work in social life are invisible processes that people do not necessarily conceptualize fully or correctly. "Society…is necessarily unperceivable. As such it cannot be empirically identified independent of its effects; so that it can only be known, not shown, to exist" (Bhaskar, 2015, p. 45).

This also implies that beliefs people have of social life can be false. Such false knowledge can be exposed by a critique of ideology. This obviously necessitates what we have now come to label as cultural critique, decolonization of knowledge, and so forth. However, the social scientist's role is not only to *expose* but also to *explain* the existence of such false knowledge in order to make things better, to improve society, to remove 'ills'. Unseen structures may be oppressive, and social science has, in Bhaskar's view, a mandate and responsibility to work for human emancipation. But he warns that actualism can easily mislead us into thinking that to explain or demystify a phenomenon is to dissolve or destroy it (Bhaskar, 2015, p. 7). He rather prefers to think that "concrete utopianism is a key figure for thinking about how to effect a transition to the good society" (Bhaskar [2016], p. 93, cited in Archer, 2019, p. 239).

10. Exploring domains of the real: engaging the tragedy of the commons

New materialists, who often present themselves as realists, represent a realism of a particular kind, a realism that only accepts events or the immediately observable as being real. According to this position, only worlds coming into existence through enactments are real and they may be multiple. An obvious implication is, in line with new materialism's own manifesto, that 'totalities' such as capitalism or tendencies such as 'value in motion' (Harvey, 2018) are not considered real. But, since the real, in the view of critical realism, can be known to exist even though it cannot be shown to exist, it not only makes sense but is imperative for social science to explore unseen tendencies and mechanisms.

A short and relatively simple example may help to show how we can understand tendencies and mechanisms and what the actualism of a flat ontology thus misses. Management of common pool resources has been an important topic within political ecology (especially during the 1980s and 1990s), and the thesis of the *Tragedy of the Commons* (Hardin, 1968) is a contested theory about the tragedy that ensues when the gains of resource extraction from commonly held resources are privatized, but the costs of resource extraction are shared among all users. The thesis describes the tragedy as occurring when this arrangement leads to overexploitation of the resource (when the population is large enough and/or intensity of use is high enough).

Now, many anthropologists and others have shown that communities are often able to avoid overexploitation in the commons through various institutional arrangements (other than privatization or state control, as advised by Garett Hardin [1968, 1985]). Especially in small scale societies, resource users have been shown to be able to monitor, check, and sanction fellow users of a shared open-access resource (see e.g., the collection edited by McCay and Acheson [1987]). This is further developed by Elinor Ostrom (1990), who criticizes Hardin's theory for ignoring history and variations in human motivations and stresses the importance of institutional diversity. Such work has led some to argue that the thesis is wrong, and it has even been claimed that we need to "dispel the myth of the tragedy of the commons" (Cox, 1985).

The claim that the thesis is wrong ignores, however, what I perceive as two important assumptions concerning the relation between the thesis and the observed events: (1) that resource management takes place in open systems where there will usually be forces at play other than the tragedy of the commons dynamic, and (2) that the logic of the tragedy of the commons is not directly observable in events or enactments.

The thesis is composed of a set of simple premises, described above, which results in the tragedy of overexploitation. We can say that this dynamic – communize costs/privatize profits – will have an inherent tendency to move towards tragedy. This tendency is an emergent feature that cannot be reduced to the property of the actors and the resource and is a generative mechanism at work in many commons. We see this being played out, for instance, in the atmosphere's capacity for absorbing greenhouse gases, resulting in global warming (a 'tragedy').

But in other cases, the tendency is not played out to tragedy. That this real tendency does not manifest in certain events is *not proof* that the tendency does *not exist*, only that – in an open system with other forces or tendencies at work – its potential has not been actualized. Sometimes tendencies may not manifest themselves in events. The thesis of the tragedy of the commons can, as very convincingly argued by Ottar Brox (1990), still be a useful analytical tool. If, however, the different levels are conflated or the real identified with only that which is actualized, the independent real tendency of the tragedy of the commons will not be acknowledged. Moreover, since the real tendencies of the tragedy of the commons are not directly observable and usually only one of several generative mechanisms behind observed patterns of behavior in resource commons, the existence and character of this tendency will often not be understood by those involved.

The tragedy of the commons (TC) need not be a totalizing explanation. It might have been in the hands of Garett Hardin, but it makes more sense to regard TC as one of several tendencies that may be at work in situations where common goods (not only 'nature', also, e.g., public space) are considered overexploited. Other mechanisms may be at work, such as biological changes (e.g., introduced species which disrupt an ecosystem), demographic dynamics (population increase), technological change, or mechanisms related to market and capital.

There seems to be no new materialist study of the *tragedy* of the commons, but an analysis of TC inspired by ANT would most likely outline how a case of TC is one historically specific heterogenous network or assemblage, which through contestations and gradual stabilization has come to be enacted as TC. The tragedy of the commons will be the 'result' of this process, not a 'cause' for the observed enactments. Recent new materialist studies of the commons typically ignore the 'tragedy' mechanism and instead emphasize 'becoming.' An introduction to a special issue on 'Commons, Commoning and Co-becoming', after first "dispelling the 'tragedy of the commons' narrative" (García-López, *et al.*, 2021, p. 1200–1201), states that the special issue "seeks to deepen our understanding of 'actually-existing' and 'more-than-human' commons" and suggests that we conceptualize "commons as practices, imaginaries, relations and ways of being" to enable "the potential of commons and communing for worlding – crafting, (re)producing – of a pluriverse of post-capitalist worlds and life in-common" (García-López, *et al.*, 2021, p. 1200–1201). I follow much of the argument here, but also think the position misses something crucial. This new materialist take is only authorized to say something about how commons are enacted, accessible through direct observation, not how dynamics of commons may entail real tendencies not immediately observable. Thus, new materialism's dogmatic denial of structures and totalities blinds it to unseen tendencies and powers that need not be as totalizing as they fear: and be real although unobserved (and not always actualized).

11. Conclusion

Many new materialist studies emphasize human-nonhuman sociality, but the flat ontology of these approaches also have the implication that nuances in relations between humans are ignored (White, *et al.*, 2016). Together with the inability of actualism to consider tendencies and generative mechanisms, this results in new materialism having near to nothing to say about social inequality and distributional issues, which has been and should be at the core of political ecology. Critical realism, I have argued, provides a depth ontology that is better equipped to do this, as well as providing more nuanced takes on dichotomies and agency.

The sustained new materialist and social constructivist critique of scientific knowledge has been an important corrective to the authority of science. Critical realism tries to explain how scientific knowledge is possible. But this does not imply that we should renounce the notion that science is political. The political should be explored not only as embedded in assemblages or hegemonic ideational models but through a

political economy of science. That means looking more closely at the social relations of the production of scientific knowledge.

I think new materialism has had a therapeutic effect in political ecology. While new materialism's dictum of generalized agnosticism resonates well with classical ideals for ethnographic fieldwork, it has also made us sensitive to the possibility of tracing relations in novel ways, to strive for a higher degree of specificity in descriptions. I find that some of the methodology of new materialism can be mobilized usefully in a revitalized political ecology. It remains to be spelled out how some of new materialism's methods may be anchored in critical realism (but see Elder-Vass, 2008, and O'Mahoney, *et al.*, 2017), but it would probably mean mobilizing the 'free associative networks' of new materialism in retroductive explorations of possible explanations for observed phenomena. Such "tracing of the connections at the level of the individual actor have a great deal to contribute" to an understanding of "*the mechanisms* that underlie social structures" (italics in original; Elder-Vass, 2008, p. 466).

Such a move would have to mean that new materialism must forego its implicit actualist ontology, which has made theorizing and social critique more difficult or irrelevant. Critical realism gives us the tools to think about ontology, not only epistemology, and engenders a more ambitious and critical, but also demanding, way of pursuing political ecology. We should try to retain the curiosity and high degree of specificity of new materialist accounts while bringing political economy[24] back into political ecology.

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[24] Broadly speaking, this would mean the relational approaches of historical materialism and moral economy which are much better equipped than critical theory to account for relations and the material.

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