

# Cosmological Politics: Towards a Planetary Balance of Power for the Anthropocene

Written by Jan-Ole Adolphsen

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It pains me ever so slightly to give yet another Covid based introduction. But the pandemic, with its multitude of natural and social causes, entangled and amplified through feedback mechanisms, is yet another 'mesh' (Morton 2010) that defies legibility. There is a sense that our concepts are not made for this kind of world. International Relations (IR) is out of balance, with "an overall intellectual inability to address these existential ecological questions" (Agathangelou 2016: 329) that goes back at least *three decades* (see Smith 1993). Recently, the Anthropocene – a new geological epoch marked by human activity (Crutzen and Störmer 2000) – has tried to capture this condition. Proponents argue that a fundamental separation between Nature and Culture underlies modernity, preventing IR from engaging with the ever-increasing entanglement of beings and things (eg. Harrington 2016, Burke et al. 2016).

I try to clarify the history of that nature/culture divide, how it plays out in IR theory, what it sustains and how it might be overcome. First, I draw on French anthropologist Phillippe Descola for a genealogy, and on Bruno Latour for its practises and politics. I conceptualise these as *cosmological politics*, building on Bentley Allan's (2018) recent historical work in IR. I then trace these politics in the Balance of Power (BoP), a cosmologically rich concept in two of IR's more traditional theorists, Hans Morgenthau and Kenneth Waltz. I find curious cosmological openings and turns in their realisms, despite the BoP's roots in a Newtonian imaginary allegedly dominant in IR. Unfortunately, the critical side of the discipline enacts a different version of the nature/culture divide to defend against positivist scientism, leading to complicated questions of the philosophical status of the divide. Lastly, I attempt to conceptualise a planetary BoP that moves beyond the divide and IR's anthropocentrism, drawing on new materialisms, Earth System Science and the concept of the Anthropocene.

### The Politics of Nature and Culture

IR's engagement with the nature/culture divide has been cursory. What little there is centres around Latour's work (see Salter and Walters 2016), who places Thomas Hobbes – foundational to the discipline (Jahn 2000) – at the origin of that divide (Latour 1993). But Descola offers an arguably richer and more complete genealogy, based on actually existing nature-culture relations, or cosmologies, from an anthropological perspective. In *Beyond Nature and Culture* (2013), he emphasizes the specificity of the Western distinction. It is far from universal, historically and in the present. Descola traces its beginnings to Christian notions of stewardship over the planet, but key was the birth of modern natural sciences: "The Scientific Revolution of the seventeenth century legitimated the idea of a mechanical nature in which the behaviour of every element can be explained by laws, within a totality seen as the sum of its parts and the interactions of those elements" (2013: 68). Nature became an autonomous ontological sphere, "a field of inquiry and scientific experimentation, an object to be exploited and improved" (ibid.: 69). The rational subject of the enlightenment is the sole actor (ibid.: 70). In contrast, "(h)enceforward mute inodorous and unseizable, nature has been emptied of all life" (ibid.: 105). Yet the idea of a cultural and social totality on the other side of the divide comes quite late. In the 19<sup>th</sup> century, Durkheim's sociology and the developments described by Foucault's *Archaeology of Knowledge* (1966) produced *society* as the sphere opposed to nature. A definitive separation was only really in place in the early 20<sup>th</sup> century (Descola 2013), and soon destabilised by new developments in physics.

In short, the difference between nature and society "does not lie in things themselves" (ibid.: 77). It is constructed

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through “classifications based on identity and similarity [that] come to seem-self-evident, (...) consigning different categories of beings to separate spheres of existence” (ibid.: 233). The nature/culture divide is essentially about *cosmology*, in that it negotiates the human place in the world, produces categories and distinctions between beings/things and assigns them to different spheres. The Western[1] cosmology – confusingly termed ‘naturalism’ (ibid.: 172-4) – is but one of four.[2] Framed this way, the nature/culture divide is neither stable nor all-encompassing or universal, even in the present.

As a cosmology, naturalism is inherently contradictory but successful: “The fact that dualism masks a practice that contradicts it does not eliminate its directive role in the organization of the sciences” (ibid.: 87). Latour focuses on these very contradictions. The two spheres of nature and culture “serve as counterweight to one another, as checks and balances. They are nothing but the two branches of a single new government” (1993: 31). What makes this ‘modern constitution’ so powerful “lies in this double language: they can mobilize Nature at the heart of social relationships, even as they leave Nature infinitely remote from human beings” (ibid.: 37). By continuously separating them through the work of ‘purification’ into distinct ontological spheres, both can be mobilised for the other. Yet scientific and technological work always produces *hybrids* of both categories, and with ‘progress’ the contradictions increase exponentially (ibid.: 10). Purification needs ever greater effort to maintain the modern constitution. International order is such a hybrid, and Bentley Allan’s *Scientific Cosmologies and International Order* (2018) an historical analysis of the modern constitution. Allan demonstrates how conceptions of human’s place and purpose in the world, taken from the natural sciences, underlie ideas of politics and international order. Yet he cares relatively little about IR *theory*, and does not embed his work in an underlying nature/culture divide. I take the politics at work to sustain, negotiate and at times challenge the nature/culture divide as *cosmological politics*.[3]

IR is deeply influenced by such politics. First, both arms of the modern’s constitution are constantly mobilised to uphold the other: Jahn (2000) demonstrates how a culturally specific account of nature, through the concept of the ‘state of nature’, constitutes the heart of the traditional discipline. It universalises a specific construction of the ‘international’ in reference to an unchanging, stable ‘natural condition’. Second, Kavalski (2015: 17) writes that – especially in the discipline’s mainstream – the “ontological purview of IR has been underpinned by the perception that human/socio-political systems (such as civil society, states, international organizations, etc.) are both detached from (not only conceptually, but in practice) and in control of the “nonhuman” natural/biophysical systems.” This dominant cosmology has been called *Newtonian*. Ruggie demanded of IR-positivism to wake up from its “deep Newtonian slumber” (1993: 170). Newtonianism involves an imaginary of linear movements of discrete objects, interacting in mechanical cause-effect relationships against an unchangeable background, while the rationalist subject is in control (Coole and Frost 2010; Bousquet and Curtis 2001; Kavalski 2012; Kurki 2020). Yet very little work has been done on the dominance and stability of Newtonianism in IR.[4]

I wager that the BoP concept in IR theory is particularly rich in cosmological meaning.[5] In the realist universe, it signifies the possibility for order and stability in an otherwise anarchic state of nature. Wight (1966: 150) referred to its “plasticity”, and Little (2007) interprets it as ‘mythopoeic’, a metaphor with generative effects. Kurki (2020: 3-5) hints at the concept’s central role in Newtonian IR. In his analysis of the 1815 Congress of Vienna, Allan (2018) highlights the central role of a mechanistic, Newtonian natural philosophy for the BoP in post-Napoleonic Europe. Delegates at Vienna constructed “a rationalist system in which political officials could harness and control the laws of nature. (...) In particular, materialism and measurement made possible the new practice of finely tuning the balance of power” (2018: 117). Novel in contrast to 17<sup>th</sup> century conceptions of ‘harmony’ is the role of man, consciously intervening into the order of things. Scientific techniques used by the statistical commission allowed such an *arrangement* (ibid.: 124-35). This echoes Descola’s (2013) account of the construction of a social totality above. So, while the BoP of 1815 is designed according to a profoundly Newtonian worldview, Allan’s account already hints at the cosmological openings that the notion of *designing* entails. Turning to Morgenthau’s and Waltz, the role of man[6] in the BoP is central to illuminate the gaps and openings in IR’s supposedly monolithic Newtonian cosmology.

## Cosmological Politics of the Balance of Power

Hans Morgenthau places the BoP at the centre of his realism (1988 [1948]). However, he specifically criticises Metternich’s statistical commission, arguing that the BoP cannot be arrived at by scientific principles and a

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“mathematical exercise” (ibid.: 46). The comment is part of Morgenthau’s larger attack on ‘scientism’, whose false rationalism he saw intimately wedded to liberalism (1946: 93; 1988: 43-51). Commentators usually attest a deep nostalgia, in-line with his general conservatism (eg. Bessner and Guilhot 2015: 92). Little recognised is that in *Scientific Man vs. Power Politics*, Morgenthau grounds his aversion to modern scientism in a sophisticated discussion of quantum physics (1946: 108-32). There, he questions the prevalent view of science and Newtonian cosmology (ibid.: 126).[7] Quantum physics represents an extremely counterintuitive way of how the world works, thus its relatively small political influence (Allan 2018: 267-9). Its challenges to Newtonianism involve causality at a distance, and uncertainty inherent to all matter.[8] For Descola, quantum physics represented the first serious challenge the dualism (2013: 85).

Morgenthau argues that “[m]odern scientific thought [quantum physics] re-establishes the unity of the physical and social world to which the modern age aspired in vain” (1946: 126).[9] Rationality is “no longer reason pure and simple but reason surrounded, interspersed, and underlaid with unreason” (ibid.). In quantum physics, neutral observation is impossible; the act of measurement intervenes and influences the state of matter (Wendt 2015: 46). In this very context, Morgenthau develops what is later interpreted as “proto-constructivist” (Little 2007: 125):

“[T]he relationship between mind and nature is not exclusively cognitive even when the human mind confronts nature only for the purpose of perception. It cannot do so *without intervening* in its course and thus disturbing it” (Morgenthau 1946: 123; my emphasis), and “Nature as the object of human knowledge is, therefore, somehow the product of human action. (...) The social world itself, then, is but an artefact of man’s mind as the reflection of his thoughts and the creation of his actions”

(ibid.: 124).[10]

Both Morgenthau’s constructivist element and his aversion to traditional scientism is based on the quite revolutionary cosmology of quantum physics.

Morgenthau is aware and critical of the Newtonian conceptions of the BoP, arguing it imagined “the picture of society and the whole universe as a gigantic mechanism, a machine or a clockwork” (1988: 223) and led the flawed idea that power is quantifiable. In reality, the BoP is *inherently uncertain and unquantifiable* (ibid.: 225). What makes the actually existing BoPs[11] work is not mechanics; these are responsible for instabilities (ibid.: 222-40). It is a constructivist argument that *agreeing to believe* in the BoP makes it work: “However much they [states] desired to alter the distribution of the weights in the two scales, they had to agree in a silent compact, (...) that, whatever the outcome of the contest, the two scales would still be there at the end” (ibid.: 239). He favourably quotes Mill: “In politics as in mechanics, the power which is to keep the engine going must be sought for *outside* the machinery” (ibid.: 237; my emphasis). Morgenthau’s BoP is *social*, indebted to a worldview in which every observation interferes.

In the complex international, interfering is best left to diplomats, those with the “moral strength of the statesmen” (1946: 10). His scientific worldview ends up underpinning his conservative and anti-liberal politics. Sociological reasons play a role, too. Guzzini (1998) highlights how Morgenthau reformulated 19<sup>th</sup> century European diplomatic practises into more scientific language to sway the new hegemon. *Politics among Nations* was written with a clear pedagogical angle to keep the United States from succumbing to liberal fallacies (Little 2007: 125-6; Bessner and Guilhot 2015: 92-3). Quantum cosmology limits rationality and thus, liberalism, and provides justification for the exceptional role of an elite in steering the BoP.

This entails a clear nature/culture dualism, especially in his concept of power. Morgenthau separates power into two different ontological spheres, saying that he means not “man’s power over nature” – as scientism would do – but “man’s control over the minds and actions of other men” (1988: 32). At the same time, human nature with its struggle for power determines international politics as an “eternal law” (1946: 187; see Brown 2009). Like scientists would create nature, “the statesman creates a new society out of his knowledge of the nature of man” (1946: 187-8). For him, nature is nothing but a potential resource for power, actualised when “bringing together means and ends” (1988: 32-4). Morgenthau’s nature/culture dualism is produced in the mind, by the constructivist power of the individual justified by a quantum cosmology. Despite the dualist result, Morgenthau’s BoP is not mere Newtonianism.

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This complicates IR's standard narrative, where Kenneth Waltz charges Morgenthau and his BoP as not scientific enough. Waltz states: "Among political scientists, Morgenthau and Kissinger are considered to be traditionalists-scholars turned toward history and concerned more with policy than with theory and scientific methods" (Waltz 1979: 62). His main concern is that "definitions of human nature such as those of Spinoza and Hobbes are arbitrary and can lead to no valid social or political conclusions" (Waltz 2001 [1959]: 166). Classical realist 'thought' is upgraded to 'theory', by the title of his 1990 essay. Instead of Morgenthau's historicism, *Theory of International Politics* (1979) erects a systemic-structuralist model. The BoP is downgraded to the status of 'result' of self-help, "which may not accord with the intentions of any of the units whose actions combine to produce that result" (ibid.: 119). Waltz's BoP is essential automatic; the *only* two requirements are an anarchic order and units wishing to survive (Waltz 1979: 120). Morgenthau's statesman becomes redundant, and the abstract formalism of the theory invites the classic Newtonian imaginary of the 'billiard-ball' metaphor.

Against later associations of Waltz with neopositivism, microeconomics and rational choice theory (see Jackson 2011: 123-6), he explicitly states that "the theory requires no assumptions of *rationality* or of constancy of will on the part of all of the actors" (Waltz 1979: 118; my emphasis).[12] Unlike billiard-balls, the BoP as a potential state of the system it to self-organise, becoming more than the sum of its parts and their interactions. Ashley mocked this move away from reductionism as "heroic" (1984: 233), while Cudworth and Hobden (2013) are more optimistic, relating it to Durkheim's notion of the social as emergent. But Descola (2013: 80-5) reminds us that this conception of social systems in Durkheim was an integral part of separation of society from nature.

The interesting opening lies in the removal of the human decision maker, a move indebted to Waltz adoption of cybernetics, as Bessner and Guillhot (2015) convincingly argue.[13] To enable democratic societies effective decision making, Waltz turned to cybernetic system theory to "replace anthropocentric decisionmaking with abstract, large-scale organizational processes that did not rely on individual capacities or rationality" (Bessner and Guillhot 2015: 113). Waltz does not just eject human nature, but the human subject. Cybernetics segments the world into discrete and modellable objects within closed systems. The idea of an equilibrium is central.[14] As cosmological politics, human separation and mastery over nature is produced by unprecedented modelling (*purifying*), resulting in unparalleled claims of human mastery over nature (Grove 2019: 8, 31; Bousquet 2009). For Waltz, "[t]he subject matter of the social and natural sciences are profoundly different" (1979: 68).

As with Morgenthau, the lens of cosmological politics offers valuable insights. While Morgenthau's BoP functioned through a nature/culture divide in which the observer and statesman constructs the modern constitution, Waltz's cybernetic BoP models politics in equilibrium without the need for such steering. Both digress significantly from standard Newtonianism, but their BoP's still offer demarcation, graduality and predictability through linear interactions, implying an unchanging background on which international politics plays out. Waltz's units are detached from nature, while simultaneously conceptualising the 'anarchic' international via a state of nature that universalises cultural particularities (Jahn 2000; Walker 1993).

With the nature/culture distinction, their balance hides nature theoretically while relying on it practically. Ashley asks "(u)nder what historical social, economic, and *environmental* conditions is it possible for the balance-of-power regime (...) to maintain silence?" (1984: 176; my emphasis). Nuclear weaponry – a central component of the Cold War BoP (Little 2007: 158-60) – was particularly significant, as "it demonstrated the power and reach of human control over the forces of nature" (Allan 2018: 208). Such weapons had to be tested, as "(t)he perceived strategic necessities of the Cold War power balance outweighed many environmental concerns" (Merlin and Gonzalez: 168). In 2019, the Anthropocene Working Group proposed the spikes left by these nuclear tests as official markers for a new geological epoch, the Anthropocene, where nature is no longer in balance (Subramanian 2019; Steffen et al. 2018).[15]

Nature/culture dualism was a key part of the colonial and imperial project (see Jahn 2000). "Colonial empire after colonial empire, the poor premodern collectives were accused of making a horrible mishmash of things and humans, of objects and signs, while their accusers finally separated them totally" (Latour 1993: 39). The BoP contributed, as it constructed Europe as a closed system (Little 2007: 116), which could draw on the essentially empty, natural outside to stabilise the balance among the great powers. Morgenthau is thus able to talk of a peaceful and gradual expansion of the European BoP into empty spaces (1988: 180, 190, 348). To concentrate on the way nature is written out of IR

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should and cannot be thought of separate from debates about Eurocentrism and racism (see fn. 1).[16]

## Towards a Planetary Balance of Power

I draw three points from the above analysis. First, even IR's supposedly traditional and ahistorical theories have surprisingly fluid cosmological politics (see Ashley 1984).[17] The nature/culture divide manifests itself in ways more diverse than simple Newtonianism. Second, this emphasizes that "the articulation of new cosmologies is an important political task" (Allan 2018: 284), in which ideas about how the world works are mediated and negotiated. Third, IR as a social science should actively, albeit critically engage the natural sciences – where cosmological ideas tend to originate.[18]

The latter is contested. In critical IR and social theory generally, the 'linguistic-turn' has reproduced the nature/culture divide by retreating into culture (Latour 1993: 62; Corry 2017). William Connolly has called this 'cultural internalism' or 'sociocentrism': "[T]he tacit idea that one set of social processes and changes can be explained (...) almost solely by reference to more fundamental social processes" (2019: 5-6). Ontologically, Bousquet argues that such a language-centred approach constitutes an "anthropocentric ontology that renders material objects into passive conduits of human intentionality" (Bousquet 2019: 76). In practice, the focus on communication, speech acts or intersubjectivity "has encouraged a de facto neglect of more obviously material phenomena and processes" (Coole and Frost 2010: 3). At best, nature appears as passive object to be managed or (de-) securitised (Corry and Stevenson 2017).

The enmity towards natural sciences goes back to the second debate (Bull 1966) and the issue of 'scientism'. This reproduces an image of the natural as 'hard' sciences that has been in retreat for a long time. That IR's positivism operates on the outdated methodology of the 1920 Vienna Circle must not constrain the rest of the discipline (Jackson 2011: 71-2). Even in physics – the "heartland of modernity" (Pickering 2006: 37) – "matter has become considerably more elusive (one might even say more immaterial)" (Coole and Frost 2010: 5). The hard sciences are increasingly soft.

Somewhat counterintuitive, in Jackson's (2011) typology of philosophical ontologies, most 'cultural internalism' is monist in his Cartesian sense, and yet heavily related to a nature/culture dualism.[19] On the other hand, IR critical realists (dualists in Jackson's terms) are arguably most engaged in overcoming the nature/culture divide.[20] The easy answer is to classify nature/culture as scientific ontology (see Jackson 2011: 28-35). Allan's notion of cosmology is clearly analyticist, as a "composition or cultural construct" (2018: 11). In Morgenthau's quantum conception, the scientist as observer literally stands "in the streams of social causation" (1946: 125) – the 'hook-up' to the world is monist, from where the nature/divide is produced.

Still, it is curious that the nature/culture divide – after all, clearly related to Descartes (Descola 2013: 118) – correlates so little with Jackson's dualism (apart from neopositivism). Maybe, critical realists, so engaged in bridging the Cartesian mind/world gap, are simply more sensitive to the nature/culture gap. However, cosmology is about how humans relate to the world writ large, which sounds like Jackson's 'hook-up', or philosophical ontology. Additionally, Jackson's typology is a complicated fit for speculative realism (Srnicek 2011). I sense that the problems are related to the analyticists character of the typology's set up, where the question of monism/dualism is decided at the outset and cannot be influenced by what happens on other levels.[21] Whether that tension is resolvable or essentially falls back to issues of incommensurability (Jackson 2011: 230-5) I cannot answer, but emphasize that the status of cosmological politics needs further elaboration.

To circle back to the need for new cosmological politics, various strands of new materialisms in IR have tried to move beyond cultural internalism. Now that the Anthropocene has "deprived [the Moderns] forever of the fundamental distinction between Nature and Society" (Latour 2013: 10), things are to become more than empty canvas for meaning. Rather, nonhuman entities "transform, translate, distort, and modify the meaning or the element they are supposed to carry" (Latour 2005: 39). Kurki (2020: 132) argues that "(i)n the mesh, wars, markets, and global epidemics all involve mediations and negotiations of multiple sets of relations, human and non-human."

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In this context, a BoP looks radically different. I would draw from the planetary boundary model developed by Earth System Science (ESS) and the planetary boundary model[22] (see Hamilton 2017)[23] to reconfigure the BoP in the sense of a *planetary balance of power*. First, complex systems theory underpinning ESS with its notion of open systems, non-linearity, emergence and feedbacks presents profound ontological and epistemological challenges to reductionism (see Mitchell 2009; Kavalski 2015; Bousquet and Curtis 2011; Jervis 1997).[24] Cosmologically, the intertwined and co-dependent spheres of ESS entail the complex entanglement of life and non-life, essential to “support long-term human and planetary well-being” (Lenton 2015: 122). The end of nature as background has a temporal side as well: In Chakrabarty’s (2018) words, the Anthropocene represents the convergence of natural or geological with human history.

In a planetary BoP, humans are not the only ones balancing; nature is not passive, and balances back. Here, the question of nonhuman agency looms. Arguments for it come from various perspectives: new materialism (Bennet 2010), assemblage theory (Acuto and Curtis 2014), actor-network-theory (Latour: 2005), complex system theory (Kavalski 2015) and posthumanism (Hobden and Cudworth 2013, 2014). All call on IR to relax its anthropocentrism. Whether that is an ontological statement or are an analytical tool is often unclear.[25] Bennet (2010), for example, derives nonhuman agency by making a (scientific) ontological claim that all matter is made of the same ‘vibrant’ materiality. More often, the argument refers to nonhuman things making a *difference* (Connolly 2019, Grove 2019, Kurki 2020). For Latour (2005), we need to agnostically recognise all kinds of assemblages that have effects or impacts.

However, the extreme flatness of such an ontology has evoked scepticism (Corry 2019). There is a logical jump from an ability to generate meaning to human-like agency. Human agency, especially in IR, is not a well-defined concept, and it is rarely clear what it means to exercise it (Wight 2006: 178). Debates on agency heavily centre around issues of intentionality and rationality; both already contested by *Waltz*. There is a danger to re-create the human subject and its historically deeply problematic ideas of agency, including the question of who gets to be human. Rather, I would focus on how the Anthropocene destabilises humanity’s own agency, as influence without intentionality or control: Situated in an ever-complexifying planetary ecology, humans can control less despite unprecedented influence (Burke and Fishel 2019).

Let me reformulate *Waltz’s* (1979: 120) two requirements for the BoP (anarchy, will to survive), now on a planetary scale: One, the Anthropocene as structural conditions that collapses nature/culture. Two, I sympathise towards Cudworth and Hobden’s argument that the key ability for the second requirement is to alter systemic conditions (2010). This allows all kinds of beings (from viruses to humans), things (from tectonic plates to nuclear bombs) and processes like climate change to participate in the planetary BoP. There is self-organisation, but it is fragile, and tipping-points a constant danger to any balance (see Steffen et al. 2018). This way, two important differences are maintained. Quantitatively, human systems tend to have more capacity to self-organise (Cudworth and Hobden 2010: 174-6). Qualitatively, humans possess a capacity for self-reflexivity, moral reasoning and responsibility (Burke and Fishel 2019: 99). Thus, anthropocentrism can be questioned and relaxed without solving the illusive and historically problematic agency-question and maintaining important analytical divisions.

## Conclusion

I offered an analysis of and brief attempt at the cosmological politics of the BoP in IR theory. The BoP proved a rich concept through which larger theoretical questions are negotiated. Its specific cosmological politics vary widely with the tensions and contradictions they encounter. Developments from the natural sciences prove influential, but politics matter. As an analytical tool, cosmological politics yields interesting insights: I relate Morgenthau’s more or less well known proto-constructivist element on encounters with quantum physics –the disciplining power of the modern’s constitution is at play. *Waltz’s* cybernetic side and self-organising BoP strengthens the claim that “no book in the field has been as profoundly *misunderstood*” (Jackson 2011: 123; original emphasis) as *Theory of International Politics*.

Vis-à-vis the Anthropocene and New Materialisms literature, my analysis shows that the nature/culture divide is not as clear cut. General assertions of Newtonianism cannot capture the contingent nature of cosmological politics, so important to understand the unquestionably substantial theoretical challenges that exist. And as I sketched out,

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concepts with cosmological significance could be adapted – if radically so – rather than discarded. Despite its disciplinary pessimism, IR has foundations to work with (Harrington 2016) – if it can get beyond the nature/culture divide. A planetary BoP or similarly overhauled concepts can creatively combine cosmological meanings from existing IR and scientific developments. However, the issue of nonhuman agency should not be the hill for new materialists to die on. Neither should IR become a subdiscipline of ESS but rather engage the softness of the ‘hard’ sciences and their cosmological implications. Whatever one thinks of its usefulness, the status of the Anthropocene as both natural and social scientific mirrors its claim of the intersection of human and geological history.

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## Notes

[1] Historical IR emphasises the colonial and imperial co-constitution of modernity (Buzan and Lawson 2015). Yet there is little focus on the nature/culture distinction. Allan (2018: Ch. 4) touches on cosmological notions of progress and British colonial rule in India, but otherwise remains focused on the West.

[2] The other three are animism, totemism, naturalism and analogism. For an anthropological critique of this classification, see Sahlins (2014).

[3] Another recent work in IR is Kurki (2020), who tries to build a new relational cosmology for IR.

[4] Foley (1990) argues that the United States (US) constitutional system with its notions of checks and balances is indebted to a mechanistic, Newtonian worldview. Jervis (1997: 142) draws similar parallels, claiming that in the US “balance of power dynamics are built into the basic forms of domestic politics.”

[5] The BoP literature is vast. For an overview, see Little (2007) and Nexon (2009).

[6] This notion of ‘man’ in control of nature is gendered in ways too complex to do justice here. Donna Haraway’s has focused on this (1988; 1991).

[7] I have found no specific analysis in IR of the quantum cosmology role Morgenthau’s writings. Allan’s (2018: 267-9) discussion on quantum physics misses him, as does Wendt’s (2015) attempt at quantum ontology. Morgenthau (1946: 118) even engages Whitehead, a central figure for the minor philosophical tradition in which Connolly (2019) bases Deleuzian new materialism.

[8] Wendt (2015: 1-66) offers a great overview.

[9] Next to Wendt’s (2015) recent attempt, Barad (2007) develops a unified quantum science.

[10] On the same page, he cites a discussion on uncertainty by Eddington that bears clear resemblance to the ‘butterfly-effect’ of later chaos-theory.

[11] See Morgenthau (1988: 192-7) for the four meanings of his BoP.

[12] In an interview, Waltz (2011) claims to “not even know what ‘rational actor’ means empirically” (...) “Let alone, that *states* could be rational?” (original emphasis)

[13] Allan (2018) identifies a cybernetic cosmology after World War II but does not engage Waltz on it. For an overview over cybernetics, see Geroulanos and Weatherby (2020 and Pickering (2010).

[14] Ashby’s *homeostat* is the quintessential cybernetic machine (Bessner and Guilhot 2015: 116).

[15] The ‘start-of-the-Anthropocene-debate’ parallels that of IR: 1610 representing the conquest of the Americas and early colonialism (see Grove 2019), the Industrial Revolution the long 19<sup>th</sup> century (see Buzan and Lawson 2015) or the post-1945 acceleration and World War II (see Phillips 2013).

[16] Chandler et al.’s answer (2017) to Burke et al.’s ‘planetary manifesto’ (2016) makes such accusations. See Kurki (2020: Ch. 7) for a constructive discussion.

[17] E. H. Carr might offer similar openings. He engaged the early complexity mathematics and explicitly argued against Newtonian reductionism (Grove 2019: 71-2)

[18] That does not make cosmological ideas natural or scientific, as Descola (2013) shows. For example, Rothe

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(2019) hints at remnants of Christianity in possible Anthropocene-cosmologies.

[19] Including Waltz, for whom “a theory is a picture, mentally formed” (1979: 8).

[20] Most explicitly, Coole and Frost (2010), Wendt (2015), Grove (2019) and Kurki (2020).

[21] Descola’s 2x2 typology of cosmologies contains elements of both ontologies.

[22] For an overview over ESS and the planetary boundary model, see Röckström et al. (2009), Lenton (2015), Steffen et al. (2018).

[23] To endorse the term ‘planetary’ instead of global, proposed by Latour (2016), Burke et al. (2016) and Kurki (2020). See the latter (Ch. 7) for a discussion.

[24] Deuchars (2010) points to the similarities of complexity and Deleuzian assembly approaches.

[25] Jackson’s own (analyticist) relational approach could allow nonhuman agency (Jackson and Nexon 1999).

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