



# Law and the Anthropocene

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# Contents

<b>1. INTRODUCTION.....</b>	<b>7</b>
<b>2. THE PLACE OF LAW IN THE ANTHROPOCENE NARRATIVE.....</b>	<b>8</b>
<b>3. INGRAINING NATURE IN LAW.....</b>	<b>14</b>
3.1. Preliminary observations.....	14
3.2. Can the understanding of human action be dissociated from the evolution of the Earth system?.....	15
3.3. The disconnection between law and nature.....	18
3.3.1. Overview.....	18
3.3.2. Law detached from nature.....	18
3.3.2.1. An (un)intended consequence of legal positivism.....	18
3.3.2.2. Illustration: conceptions of property.....	21
3.3.3. The horizon of law in the Anthropocene.....	23
3.3.3.1. Hans Jonas and the horizon of ethics.....	23
3.3.3.2. The task of law.....	24
3.3.4. Revisiting foundational concepts.....	25
3.3.4.1. The external logic of environmental law.....	25
3.3.4.2. Illustrations: conceptions of sovereignty and causality.....	27
<b>4. ACCOUNTING FOR INEQUALITY.....</b>	<b>31</b>
4.1. Preliminary observations.....	31
4.2. A finer-grained analysis of the human variable.....	32
4.3. Law and inequality in the Anthropocene.....	37
4.3.1. Overview.....	37
4.3.2. Legal organisation of production.....	39
4.3.2.1. Organising production for the Industrial Revolution.....	39
4.3.2.2. The law of business organisation.....	40
4.3.2.3. Structuring labour relations.....	41
4.3.2.4. Pollution and third parties.....	43
4.3.3. Asymmetric international exchange systems.....	44
4.3.3.1. The British Atlantic system.....	44
4.3.3.2. The legal organisation of trade.....	45
4.3.4. Operationalising historical responsibility.....	48
4.3.4.1. Level and time-horizon.....	48
4.3.4.2. Industrialisation and the historical debt towards Africans.....	50
4.3.4.3. The legal representation of future generations.....	52

4.3.4.4. Present allocations: common but differentiated responsibilities.....	55
<b>5. LEGAL ORGANISATION OF THE TRANSITION.....</b>	<b>57</b>
5.1. Preliminary observations.....	57
5.2. The transitional narrative in energy studies.....	58
5.3. Law and sustainability transitions.....	62
5.3.1. Overview.....	62
5.3.2. Adaptive legal systems.....	63
5.3.3. Promoting or hindering the transition.....	64
5.3.4. Legitimising the transition.....	68
<b>6. LAW AND THE ANTHROPOCENE: A RESEARCH AGENDA.....</b>	<b>70</b>



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# Law and the Anthropocene

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## 1. INTRODUCTION

To a reader's eyes, the drafting of 'research agendas' may leave the impression of a lazy exercise. After all, an agenda is at best a pure starting-point, with no apparent research actually conducted and no conclusions reached. From a drafter's perspective, the feeling – not just the impression – of developing a research agenda or, more accurately, of framing a research problem can be a frustrating one. The considerable amount of work done upstream may not be fully reflected in the two main results the exercise can hope to reach, namely (a) the identification of relevant research questions (including (i) not just potentially interesting questions, but foundational ones capable of federating other more specific questions, and (ii) for which legal analysis is particularly appropriate), and (b) the development of an overall analytical framework (capable (i) of organising the different questions into a meaningful order and (ii) of linking such questions to problems arising in broader and integrative natural/social science research agendas).

This article aims to provide a research agenda to understand the role of law in prompting, sustaining and potentially managing the Anthropocene, the current era of the Earth system where humans are the driving geological force. More fundamentally, the article aims to frame the vast inquiry on the role of law in the Anthropocene that we, as lawyers, will face in the 21st century and explain why such an inquiry must go far beyond the narrow confines of environmental law and encompass the entirety of law and legal processes, with particular emphasis on some areas where law seems to have favoured and sustained the advent of the Anthropocene.

After recalling the origins and implications of the Anthropocene narrative and the place of law in it (2), I identify three clusters of foundational legal questions raised by this narrative, each arising from broader areas of inquiry in

the humanities, social and natural sciences: the disconnection between human and natural history (3); the profound inequalities implied in the concept of Anthropocene (4); and the trade-offs entailed by sustainability transitions (5). The final section provides a concise statement of the analytical frame proposed in this article (6).

## 2. THE PLACE OF LAW IN THE ANTHROPOCENE NARRATIVE

The advent of the Anthropocene is not a mere topic among others. It does stand apart for at least two reasons. Firstly, despite its many interpretations and uses, the term ‘Anthropocene’ has a common core, namely that humans have become an Earth-shaping force of geological proportions or, more specifically, that they have effected a lasting change in the Earth system.<sup>1</sup> The ‘markers’ of the

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1 The introduction of the concept of Anthropocene in its present understanding was initially made in P. J. Crutzen, E. Stoermer, ‘The « Anthropocene »’ (2000) 41 IGBP Global Change Newsletter 17, and then more assertively in P. J. Crutzen, ‘Geology of Mankind’ (2002) 415 *Nature* 23. The argument was generalised in a number of publications, particularly W. Steffen, P. J. Crutzen, J. R. McNeil, ‘The Anthropocene: Are humans now overwhelming the great forces of nature?’ (2007) 36/8 *Ambio* 614 (expressing the narrative of the Anthropocene since its origins in the 1800s, to the ‘Great Acceleration’ after 1945, to nowadays, using as marker the concentration of carbon dioxide in the troposphere); W. Steffen, J. Grinevald, P. J. Crutzen, J. R. McNeill, ‘The Anthropocene: Conceptual and historical perspectives’ (2011) 369/1938 *Philosophical Transactions of the Royal Society* 842 (making a more general statement of Anthropocene narrative and arguing that it must be recognised stratigraphically as the new geological era in which we live since 1800, replacing the Holocene). It has been extended in a number of ways, e.g. through the definition of planetary boundaries or by the contribution of other disciplines to identify markers: J. Rockstrom et al, ‘A safe operating space for humanity’ (2009) 461 *Nature* 472 (a more action oriented assessment introducing the idea of planetary boundaries – Earth’s biophysical thresholds - within which human action must remain and arguing that three – carbon dioxide atmospheric concentrations, biodiversity loss, nitrogen releases – out of nine such boundaries have already been crossed); L. Robin, W. Steffen, ‘History for the Anthropocene’ (2007) 5/5 *History Compass* 1694 (exploring the implications of the concept of Anthropocene for the writing of integrated ‘world’ and ‘environmental’ historiography); E. C. Ellis, ‘Anthropogenic transformation of the terrestrial biosphere’ (2011) 369/1938 *Philosophical Transactions of the Royal Society* 1010 (arguing that



## LAW AND THE ANTHROPOCENE

Anthropocene are of different natures. In addition to the concentration of greenhouse gases in the troposphere causing climatic change,<sup>2</sup> the appalling rate of biodiversity loss,<sup>3</sup> the level of ocean acidification,<sup>4</sup> the radical alteration of the nitrogen<sup>5</sup> and phosphorous cycles<sup>6</sup> with the resulting eutrophication and hypoxia (asphyxiation) for aquatic life,<sup>7</sup> and other geochemical markers,<sup>8</sup> the Anthropocene can be read through ‘human markers’. The latter expression is complex. It includes not only the traces of human activity on humans (e.g. changes in the chemical composition of human bodies<sup>9</sup> or the total amount and global distribution of human biomass<sup>10</sup>) but also the very human processes, ranging from technologies (e.g. energy production and transportation based on fossil fuels, agricultural production based on agrochemicals, warfare equipment and

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only in the last century has the human transformation of the terrestrial biosphere in to anthropogenic biomes become sufficient to leave an irreversible and unambiguous geological record). There has been significant debate as to when should the Anthropocene be considered to have started: S. L. Lewis, M. A. Maslin, ‘Defining the Anthropocene’ (2015) 519 *Nature* 171; J. Zalasiewicz et al, ‘When did the Anthropocene begin? A mid-twentieth century boundary level is stratigraphically optimal’ (2015) 383 *Quaternary international* 196; Colin N. Waters et al (2016) “The Anthropocene is functionally and stratigraphically distinct from the Holocene’ (2016) 351/6269 *Science* aad2622-1. One important critique of the Anthropocene narrative concerns the role of inequality: A. Malm, A. Hornborg, ‘The geology of mankind? A critique of the Anthropocene narrative’ (2014) 1/1 *The Anthropocene Review* 62 (arguing that using the human species as an analytical category in the Anthropocene narrative obscures the fact that the fossil economy was not created nor is it upheld by humankind in general, but only by part of it. Inequalities must therefore be integrated in our understanding of the ecological crisis). There is now a significant body of literature on the Anthropocene. In addition to two specific journals (*Anthropocene* and *The Anthropocene Review*), several books have been published, including: C. Lorius, L. Carpentier, *Voyage dans l’Anthropocène: cette nouvelle ère dont nous sommes les héros* (Arles: Actes Sud, 2010); B. Glaser, G. Krause, B. M. W. Ratter, M. Welp (eds.), *Human-Nature Interactions in the Anthropocene* (London: Routledge, 2012); M. Whitehead, *Environmental Transformations: A Geography of the Anthropocene* (New York: Routledge, 2014); C. Hamilton, F. Gemenne, C. Bonneil (eds.), *The Anthropocene and the Global Environmental Crisis: Rethinking Modernity in a New Epoch* (London: Routledge, 2015). For two recent overviews of the literature see E. Brondizio et al., ‘Re-conceptualizing the Anthropocene: A call for collaboration’ (2016) *Global Environmental Change*, advance version: <http://dx.doi.org/10.1016/j.gloenvcha.2016.02.006>; and the illumination book-length study of C. Bonneuil, J.-B. Fressoz, *L’événement Anthropocène. La Terre, l’histoire et nous* (Paris: Seuil, 2016).

2 Steffen, Crutzen, McNeil (2007), above n. 1.

3 See Rockstrom et al (2009), above n. 1; S. L. Pimm et al, ‘The biodiversity of species and their rates of extinction, distribution, and protection’ (2014) 344/6187 *Science* 987 (arguing that current rates of extinction are about 1000 times the likely background rate of extinction).

technology) to institutions (e.g. forms of social organisation, capitalistic production and exchange processes, urbanisation, legal systems) to culture (e.g. consumerism, certain religious and cultural views of the world), that have turned humans into a geological force.

Unsurprisingly, whereas the overall relation between, on the one hand, these human activities combined and, on the other hand, the profound impacts on the Earth system is less and less controversial, the specific interrelations between different phenomena are becoming more and more so. To give a sense of how much the debate is shifting towards the controversial specificities, it will suffice to recall

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- 4 See S. Barker, A. Ridgwell, 'Ocean Acidification' (2012) 3/10 *Nature Education Knowledge* 21 (explaining ocean acidification and human impact on it); J. C. Orr et al, 'Anthropogenic ocean acidification over the twenty-first century and its impact on calcifying organisms' (2005) 437 *Nature* 681 (explaining trends in emissions and their consequences for ocean pH and certain marine organisms).
  - 5 See Rockstrom et al (2009), above n. 1; J. N. Galloway et al, 'Transformation of the nitrogen cycle: recent trends, questions, and potential solutions' (2008) 320/5879 *Science* 889 (describing human alterations of the nitrogen cycle as a result of combustion of fossil fuels and demand for nitrogen in agriculture and industry. Noting also nitrogen deficiencies in food-production in some parts of the world).
  - 6 See Rockstrom et al (2009), above n. 1; E. M. Bennet, S. R. Carpenter, N. F. Caraco, 'Human Impact on Erodable Phosphorus and Eutrophication: A Global Perspective' (2001) 51/3 *BioScience* 227 (offering an estimation of the increase in net phosphorous storage in terrestrial and freshwater ecosystems which is 75% higher than in pre-industrial times).
  - 7 See R. J. Diaz, R. Rosenberg, 'Spreading dead zones and consequences for marine ecosystems' (2008) 321/5891 *Science* 926 (charting the expansion of 'dead zones' due to eutrophication and the resulting hypoxia).
  - 8 See Waters et al (2016), above n. 1 (reviewing evidence for a variety of geochemical signatures of human action or 'technofossils')
  - 9 See D. Smith, 'Worldwide trends in DDT levels in human breast milk' (1999) 28 *International Journal of Epidemiology* 179 (tracking contamination of human breast milk by the persistent organic pollutant DDT); QQ Li et al, 'Persistent organic pollutants and adverse health effects in humans' (2006) 69/21 *Journal of Toxicology and Environmental Health/A* 1987 (review article on the state of knowledge on residual levels of persistent organic pollutant concentrations in human adipose tissue worldwide, before moving to the case of Singapore).
  - 10 See S. Walpole et al, 'The weight of nations: An estimation of adult human biomass' (2012) 12/439 *BMC Public Health*, available at <http://www.biomedcentral.com/1471-2458/12/439> (according to whom, in 2005, global adult human biomass was approximately 287 million tonnes, of which 15 million tonnes were due to overweight, a mass equivalent to that of 242 million people of average body mass. North America has 6% of the world population but 34% of biomass due to obesity. Asia has 61% of the world population but 13% of biomass due to obesity).

some of the main questions asked: is the overexploitation of resources that characterises the Anthropocene a result of capitalism? Who has benefitted and who has not? Is there a debt towards the latter or towards future generations? Has the unprecedented development of military capacity led to the Anthropocene? Has science, with the opening of new frontiers and possibilities, resulted in the Anthropocene? Have religious beliefs – placing humans as ‘masters’ of the ‘creation’ – or cultural beliefs – modernity and ‘progress’ – led to the Anthropocene? None of these questions can be fully and definitively answered, but each one can be illuminated to an extent sufficient to enable meaningful change in the relevant human facts.

This leads me to the second reason, namely that the advent of the Anthropocene raises all these questions at once. It calls upon all disciplines, the entire body of human knowledge about the world, to analyse what is happening and how to face it. As noted in a 2016 review article covering a good part of the emerging literature on the Anthropocene ‘[f]ew global change science concepts have enjoyed such a broad and rapid uptake in technical and public discourses despite a long history of scholarship exploring human interactions with the global environment’.<sup>11</sup> This is true of natural sciences but also of social sciences and humanities.<sup>12</sup> However, it is not true of law and lawyers, not yet. The above review article does not even mention legal disciplines as part of the integrative approach, and legal aspects are also neglected or, at best, only mentioned in passing in other major efforts to extend the conversation beyond natural sciences.<sup>13</sup> This is not surprising because law and legal studies have been considered – and institutionally organised – as a separate subject for centuries. Lawyers are partly responsible. We spend far too much time speaking to each other, and our conceptions of interdisciplinarity have remained fairly simplistic.

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11 Brondizio et al (2016), above n. 1, at 2.

12 See G. Palsson et al, ‘Reconceptualizing the ‘Anthropos’ in the Anthropocene: integrating the social sciences and humanities in global environmental change research’ (2013) 28 *Environmental Science and Policy* 1 (overlooking law in its attempt to integrate social sciences and humanities); N. Castree et al, ‘Changing the intellectual climate’ (2014) 4 *Nature Climate Change* 763 (mentioning, as part of the ‘missing human dimensions’, the need to integrate environmental lawyers, but without any further development).

13 See Palsson et al (2013), above n. 12; Castree et al (2014), above n. 12; N. Castree, ‘The Anthropocene and the Environmental Humanities: Extending the Conversation’ (2014) 5 *Environmental Humanities* 233 (mentioning environmental lawyers as those to whom the conversation should be extended, but without any further discussion).

In the last few years, however, the Anthropocene theme has started, albeit timidly, to permeate legal studies. So far, there have been three main sets of contributions from lawyers to the role of law in the Anthropocene, including two books,<sup>14</sup> one issue of a major legal journal,<sup>15</sup> and a small number of articles.<sup>16</sup> They all come from environmental lawyers, and they have mostly appeared in environmentally-minded platforms. This is understandable but problematic. We need to engage more widely with other disciplines, including legal specialties. As I will try to show, the role of law in the Anthropocene is not a matter of ‘environmental’ law. In the founding modern narrative of the Anthropocene, P.

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14 See A. S. Garmestani, C. R. Allen (eds.), *Social–Ecological Resilience and Law* (New York: Columbia University Press, 2014) (focusing on the need for adaptive law making to face the challenges of the Anthropocene); L. Kotze, *Global Environmental Constitutionalism in the Anthropocene* (Oxford: Hart Publishing, 2016) (arguing for a reconceptualization of environmental constitutionalism to face the challenges of the Anthropocene and for its generalisation at the international level).

15 See Yearbook of International Environmental Law (2014) 25 (1) (including four articles specifically focusing on the Anthropocene concept and its relevance for international law – Vidas, Zalasiewicz, Williams - , its constitutional potential – Kotze - , the role of ecological integrity within international environmental law – Bridgewater, Kim, Bosselmann - , and the impact of the Anthropocene concept on the doctrine on international environmental law – Vordermayer)

16 The authors of these articles are recurrent and their different contributions tend to expand on their earlier arguments. See e.g. Nicholas Robinson: ‘Beyond Sustainability: Environmental Management for the Anthropocene Epoch’ (2012) 12 *Journal of Public Affairs* 181 (arguing that sustainable development is insufficient to rise to the challenges of the Anthropocene and that resort to two fundamental principles, cooperation and resilience, is necessary); ‘Fundamental Principles of Law for the Anthropocene?’ (2014) 44 *Environmental Policy and Law* 1 (identifying ways of legally enhancing the concept of sustainability – through environmental rights and several principles such as cooperation, nature stewardship, resilience, foresight, sufficiency, well-being, and justice - in order to manage the environmental challenges of the Anthropocene); Louis Kotzé: ‘Rethinking Global Environmental Law and Governance in the Anthropocene ’ (2014) 32 *Journal of Energy and Natural Resources Law* 121 (attempting to mainstream the Anthropocene concept within environmental law discourse); ‘ Human Rights and the Environment in the Anthropocene ’ ( 2014 ) 1 *The Anthropocene Review* 1 (arguing that the role of human rights in connection with environmental protection must be fundamentally redefined to take into account the Anthropocene); Klaus Bosselmann: K. Rakhyun and K. Bosselmann, ‘ International Environmental Law in the Anthropocene : Towards a Purposive System of Multilateral Environmental Agreements ’ (2013) 2 *Transnational Environmental Law* 285 (arguing that in order for multilateral environmental agreements to become effective they should all be considered to target a single goal, namely the integrity of Earth’s life-support system. This idea is further developed in a subsequent co-authored article in the Yearbook of International Environmental Law); Davor Vidas: D. Vidas, O. K. Fauchald, Ø. Jensen, M. W. Tvedt, ‘International law for

Crutzen situates its origins in the late eighteenth century and links this date to the granting, in 1784, of an intellectual property right (a patent) to the Scottish scientist James Watt on a new version (using a separate condenser) of the steam-powered engine.<sup>17</sup> Such a link is not merely anecdotal. The modern steam-powered engine is considered to be the basis of the ‘thermo-industrial Revolution’ that generalised the massive use of fossil fuels, particularly coal.<sup>18</sup> Nor is the role of law in this symbolic origin anecdotal. Intellectual property rights, hardly a core subject in environmental law circles, are major tools for technology development, but also for technology entrenchment. Rather than looking merely at environmental protection laws to understand the role of law in the Anthropocene, lawyers would do well to look more widely at the laws shaping industrial organisation, working conditions, trade and investment, taxation and wealth distribution, among many others. We should go even further and revisit fundamental legal categories, such as ‘causality’, ‘subject’, ‘obligation’, ‘property’, ‘responsibility/liability’, ‘legal personality’, ‘corporation’, ‘constitution’, ‘sovereignty’ to understand how they may have played (and may still play) a role in prompting and sustaining the Anthropocene as well as how they may be adjusted or perhaps replaced in the law of more resilient and more respectful human societies. But such a wide, diverse and potentially far-reaching enterprise cannot be conducted without some meaningful order or, in other words, without an initial reflexion on what are the most salient

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the Anthropocene? Shifting perspectives in regulation of the oceans, environment and genetic resources’ (2015) 9 *Anthropocene* 1 (discussing the implications of the Anthropocene for two assumptions underpinning international law, namely the quest for stability in international relations and the assumption of stability in the natural substrate). Professor Vidas has been very active in integrating the Anthropocene concept into international legal scholarship, and he has participated in a variety of non-legal publications as well. Finally, two other articles use the term Anthropocene but, in fairness, it is more accurate to place them among the conventional literature on climate change law: K. N. Scott, ‘International law in the Anthropocene: Responding to the Geoengineering Challenge’ (2012) 34 *Michigan Journal of International Law* 309 (referring to the Anthropocene as the background of geoengineering but only identifying some well-known principles of international environmental law as applicable to the governance of geoengineering); S. H. Baker, ‘Adaptive Law in the Anthropocene’ (2015) 90 *Chicago-Kent Law Review* 563 (focusing on the inadequacy of current strategies to adaptation to climate change and arguing for adaptive legal principles).

17 Crutzen (2002), above n. 1.

18 See J. Grinevald, ‘L’effet de serre et la civilisation thermo-industrielle 1896-1996’ (1997) 108 *Revue européenne des sciences sociales* 141.

questions to be addressed and how they relate to each other and to the broader set of questions addressed in other disciplines of the humanities, social and natural sciences.

The purpose of the following sections is to identify three broad clusters of questions for which legal analysis is, in my view, particularly apposite. These clusters of questions are selected not only because of their importance to understand the role of law and legal analysis in the Anthropocene but also because they create bridges with the wider and integrative research agendas arising from both natural sciences and environmental humanities and social sciences. As in many other disciplines of human knowledge, the Anthropocene calls for a more general and comprehensive picture of the role of law rather than for ever-narrower specialisation. I would like to state this simple point as clearly as possible from the outset: if the role of law in prompting, sustaining and potentially managing the Anthropocene is to be elucidated and understood, it will not be through a specialised focus on or even an expansion of ‘environmental law’. We must instead revisit law in its entirety to understand its role in the Anthropocene. We must look at how our new condition is to be read into the very DNA of law. I hope that this article will show why.

### **3. INGRAINING NATURE IN LAW**

#### **3.1. Preliminary observations**

It is important, in designing the contours of this research agenda, to keep a clear focus on the role of law. This observation is intended to reassure impatient lawyers (or others interested in the role of law in the Anthropocene) as to the need for the detour that I am about to make. The detour is about the understanding of human agency in something as vast as geological time, where humans are latecomers and where there is a pervasive impression that the history and behaviour of humans is as irrelevant to the evolution of the Earth system as the latter is to the understanding of the former.

There are many ways of formulating the disconnection between these two strata and I will review some of them later on, but the thrust of the disconnection or ‘dualism’ argument, which justifies the detour, holds (i) that human behaviour is too marginal a variable when it comes to understanding something as vast as

geological evolution, (ii) that the connection between human history and environmental constraints may only be relevant in that environmental conditions affect humans, (iii) that the environmental conditions affecting humans are themselves cyclical and, with rare exceptions, such cycles remain unperturbed in a human timescale and (iv) in all events, modern technology – since the Industrial Revolution – has decoupled human history and behaviour from environmental constraints, which, given human newly acquired powers over nature, are at best a variable among many others explaining human historical events as well as individual and social behaviour (a proposition underpinning several, perhaps most, social sciences). In this regard, the Anthropocene concept has two main implications: firstly, contrary to proposition (i), human behaviour is not at all a marginal variable in geological evolution but may well be the driving one; secondly, contrary to propositions (iii) and (iv), the potentially considerable environmental effects of human action not only on the Earth system but also – thereby – on humans themselves call for a fundamental re-examination of our knowledge of the interactions between human action and natural processes.

I will now analyse the implications of these propositions for the underpinnings of humanities and social sciences, and hence for law. I should add that the detour is not only intended to clarify the implications of the dualism debate for law but also to integrate the potential answers of legal analysis within a broader research agenda on the Anthropocene.

### **3.2. Can the understanding of human action be dissociated from the evolution of the Earth system?**

Many works have charted the disconnection between natural history (and geological evolution) and human history as well as its implications.<sup>19</sup> In an oft-cited article, the historian Dipesh Chakrabarti has taken stock of some of this work and looked more closely at the implications of human agency on climate change for the writing of history.<sup>20</sup> His basic proposition is that ‘anthropogenic explanations of climate change spell the collapse of the age-old humanist

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19 See P. Rossi, *I segni del tempo: storia della Terra e storia delle nazioni da Hooke a Vico* (Milano: Feltrinelli, 1979) (providing a detailed history of the parallel evolution of natural and human historiography).

20 D. Chakrabarty, ‘The climate of history: four theses’ (2009) 35 *Critical Inquiry* 197.

distinction between natural history and human history'.<sup>21</sup> To flesh out the meaning of this point, he refers to several towering figures ranging from Giambattista Vico – or more specifically the interpretation of the latter's work by Benedetto Croce<sup>22</sup> – to Robin G. Collingwood<sup>23</sup> to E. H. Carr,<sup>24</sup> whose work contributed to play down the importance of geological time for the understanding of human history. Indeed, over the 19th century the realisation of the depth and scale of geological time led to the conclusion that this stratum moved so slowly that its pace was almost imperceptible to the human eye and was better treated as an external and constant stage within which human history unfolded.<sup>25</sup> Nature was thus seen as external and transcending human history.

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21 *Ibid.*, at 21.

22 B. Croce, *La filosofia di Giambattista Vico* (Bari: Laterza, 2nd edn 1922), translated into English by R.G. Collingwood.

23 E. H. Carr, *What is History?* (Cambridge University Press, 1961).

24 D. Smail identifies three main intellectual contributions as the pillars of this revolution in the understanding of time, namely C. Darwin's *On the Origin of Species* (1859), C. Lyell's *The Geological Evidences of the Antiquity of Man* (1863), and J. Lubbock's *Pre-Historic Times* (1865), D. L. Smail, *On Deep History and the Brain* (Berkeley: University of California Press, 2008), at 26.

25 Bonneuil et Fressoz illustrate this point with the converging views of two eminent 19th century academics, the French historian Jules Michelet and the British geologist Charles Lyell. For Michelet 'Since the beginning of the world a war started that will only end with the end of the world, not before; the war of man against nature, of spirit against matter, of freedom against fatality. History is nothing but the narrative of this everlasting fight [ ... ] What must encourage us in this fight without end, is the fact that, overall, one of the terms does not change, and the other does change and becomes stronger. Nature remains the same, whereas every day man takes some advantage over it', Jules Michelet, *Introduction à l'histoire universelle* (Paris: Hachette, 1831), at 5-7. A similar view is expressed by Lyell from the perspective of geology. He hypothesises that an 'intelligent being' observing the action of humans may at first have the impression that human agency can change nature 'but he would soon perceive that no one of the fixed and constant laws of the animate or inanimate world was subverted by human agency, and that the modifications produced were on the occurrence of new and extraordinary circumstances, and those not of a physical, but a moral nature. The deviation permitted, would also appear to be as slight as was consistent with the accomplishment of the new moral ends proposed, and to be in great degree temporary in its nature, so that whenever the power of the new agent was withheld, even for a brief period, a relapse would take place to the ancient state of things', C. Lyell, *Principles of Geology, being an Attempt to Explain the Former Changes of the Earth's Surface, by Reference to Causes Now in Operation* (London: John Murray, 1830), vol. 1, at 164. Both referred to in Bonneuil/Fressoz, above n. 1, 41-42 (our translation of Michelet's French text).



An analogous – albeit not entirely similar – disconnection lies at the foundations of social science since the 19th century. Here, the interaction targeted is that between human action and environmental constraints, and the disconnection between the two is seen as a condition for the emergence of a science of society and its dynamics.<sup>26</sup> In this context, the external character of nature and environmental constraints has a different root-cause than in historiography, namely the ability to escape environmental constraints based on the technological powers acquired by humans since the Industrial Revolution. But the end result, the disconnection of human and natural history and, more specifically, the independence of human action from natural constraints (reflected in the disciplines aimed at its understanding) is similar.

Such a disconnection can be illustrated by the way mainstream environmental economics treats human impact on the environment, which is mostly through the microeconomic prism of market failures and externalities.<sup>27</sup> At the macroeconomic level, the standard dynamic stochastic general equilibrium (DSGE) model<sup>28</sup> has rarely been used, if at all, to account for the impact of environmental degradation. This family of models could perhaps incorporate wider environmental constraints, but mostly as an external shock or exogenous disturbance of the normal economic processes. In other words, environmental constraints and environmental change (e.g. natural resource depletion or pollution) are not part of such ‘normal’ processes, not even the changes of geological scale unveiled by the Anthropocene concept. An important question in this regard concerns the extent to which the understanding of human behaviour that arises from a social science as influential as macroeconomics can continue to treat environmental change as merely external, even as a major stochastic shock, or should instead integrate it as part of its foundations or ‘normality’.

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26 See e.g. A. Comte, *Cours de philosophie positive* (Paris: Bachelier, 1839), vol. 4, at 251 (‘The local physical causes, very powerful at the origins of civilisation, have progressively lost their grip as the natural course of human development increasingly allows to neutralise their action’), Bonneil/Fressoz, above n. 1, at 45 (our translation of the French text).

27 The seminal study is that of R. Coase, ‘The Problem of Social Cost’ (1960) 3 *Journal of Law and Economics* 1.

28 The origins of DSGE modelling in neoclassical economics are often situated in the paper by F. E. Kydland, E. C. Prescott, ‘Time to Build and Aggregate Fluctuations’ (1982) 50/6 *Econometrica* 1345.

In both humanities – e.g. historiography<sup>29</sup> – and social sciences – e.g. economics<sup>30</sup> – there have been major efforts at addressing this disconnection through the creation of new disciplines or clusters of disciplines. As I shall discuss next, the disconnection has also characterised legal studies but, unlike other disciplines, law has until recently remained impervious to the Anthropocene’s core message.

### **3.3. The disconnection between law and nature**

#### **3.3.1. Overview**

The perceived disconnection between the natural and the human strata also underpins our understanding of law. Much like mainstream historiography and economics, law and legal studies have treated nature as an external object.

This can be observed from three main perspectives, namely (3.3.2) the deliberate detachment of law from nature (or the dualism of the natural and human strata in law) in positivistic accounts of law, (3.3.3) the expanded horizon of law in the Anthropocene as a normative construct regulating the actions of the human geological force, and (3.3.4) the need to go beyond the mere resort to ‘environmental law’ in order to genuinely ingrain nature in law. Each level raises important questions that call for specifically legal analysis.

#### **3.3.2. Law detached from nature**

##### **3.3.2.1. An (un)intended consequence of legal positivism**

The rise of a certain form of legal positivism can be compared, in many ways, to the process through which humanities and social sciences were detached from geological time and environmental constraints. As a philosophical matter, legal positivism, in its more condensed understanding, holds that whether a norm is law

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29 See e.g. Robin/Steffen, above n. 1; Chakrabarty, above n. 20; E. Russell, *Evolutionary History: Uniting History and Biology to Understand Life on Earth* (Cambridge University Press, 2011).

30 A pioneer study was published in 1971 by N. Georgescu-Roegen, *The Entropy Law and the Economic Process* (Cambridge MA: Harvard University Press, 1971). For an overview of the now well developed field of ecological economics see R. Costanza, ‘What is Ecological Economics?’ (1989) 1 *Ecological Economics* 1.

or not does not depend on its content but on how it has been created (posited).<sup>31</sup> There is of course much debate not only about the truth of this proposition but also about the extent to which it accurately depicts the core of legal positivism. It is, however, on a different plane that legal positivism deserves attention here, namely as an influential understanding of law and legal processes.

From the perspective of intellectual history, legal positivism can indeed be considered as a declaration of independence from religion, morals but also natural reason or other metaphysical accounts. It is an attempt at building a true ‘science of law’ (*Rechtswissenschaft*) which, in the first positivist accounts, was to be independent from certain metaphysical conceptions of nature<sup>32</sup> and, in time, it aimed at not being reliant on any such conception. Such a science of law was to focus on humans and not – in any way – on nature. The dissociation of the human and natural strata is particularly visible in some expressions of legal positivism. The immensely influential work of the Austrian jurist Hans Kelsen attempted to and in many ways succeeded in developing law as a detached technology. I do not mean by this that the conceptual construction of Kelsen (or other supporters of legal positivism) is flawless and that it actually managed, from a theoretical standpoint, to evacuate metaphysics. It is as an intellectual and social project, as an effort to mobilise academics and lawyers in thinking about law differently, that positivism has thrived, much like empirical – particularly quantitative – approaches to social science (from sociology, to economics, to political science) have thrived since the second half of the 20th century.

Detaching law and its science from what can be broadly referred to as conceptions of nature, whether religious or philosophical, was an enterprise comparable to that of building empirical (by contrast to normative) social

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31 This foundational meaning is usually traced back to the work of J. Austin, *The Province of Jurisprudence Determined* (London: John Murray, 1832). Legal positivism is traditionally understood as having emerged with the philosophical work of Jeremy Bentham (*Of Laws in General*, London: Athlone Press, 1970 [1782]), influenced by the works of David Hume and Thomas Hobbes, and influencing Austin and his conception of ‘command’. Two different conceptions of legal positivism which have exercised immense influence over the 20th century are those of Hans Kelsen (*Reine Rechtslehre: Einleitung in die rechtswissenschaftliche Problematik* (Leipzig ; Wien : F. Deuticke, 1934)) and Herbert Hart (*The Concept of Law* (Oxford : Clarendon Press, 1961)).

32 See D. Priel, ‘Toward Classical Legal Positivism’ (2015) 101 *Virginia Law Review* 987 (arguing that, in fact, Hobbes and Bentham understood their theory of law as derived from a broader – if idiosyncratic – metaphysical conception, distinct from that of natural lawyers).

sciences. As an enterprise it had, and still has, a lot of merit, and it enabled great advances in the way law was created, applied and analysed. Yet, much like for humanities and social sciences, legal positivism deliberately sought to dissociate any conception of nature from the foundations and remit of a science of law. As noted in Kelsen's preface to a synthesis volume in English (*General Theory of Law and the State*) bringing together and reorganising his work on the 'pure theory of law':

'When this doctrine is called the 'pure theory of law', it is meant that it is being kept free from all the elements foreign to the specific method of a science whose only purpose is the cognition of law, not its formation. A science has to describe its object as it actually is, not to prescribe how it should be or should not be from the point of view of some specific value judgments. The latter is a problem of politics and, as such, concerns the art of government, an activity directed at values, not an object of science, directed at reality. *The reality, however, at which a science of law is directed, is not the reality of nature which constitutes the object of natural science. If it is necessary to separate the science of law from politics, it is no less necessary to separate it from natural science. One of the most difficult tasks of a general theory of law is that of determining the specific reality of its subject and of showing the difference that exists between legal and natural reality*'<sup>33</sup>

The representative value of this opening statement, or of a major book, or even of a major author, such as Kelsen, is of course not enough to demonstrate that law underwent a disconnection analogous to that of other disciplines. It is offered here as a mere, but carefully selected, illustration of this forceful and influential attempt. Importantly, I am not taking position on the relative value of legal positivism and the (often simplified<sup>34</sup>) natural law conceptions against which positivism reacted. My point is simpler and of an empirical nature. Disconnecting law from its embeddedness in religious, moral and cultural values has implications not only for the development of law as a discipline and a social process but also for the definition of the ontology reflected in a given legal order.

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33 H. Kelsen, *General Theory of Law and the State* (Cambridge MA: Harvard University Press, 1945), at xiv (italics added).

34 The 'natural law' against which positivism reacted was a stylised conception hardly representative of the complexity and variety of a historical tradition dating back to at least Ancient Greece and perhaps earlier.

### 3.3.2.2. Illustration: conceptions of property

An example may help illustrate how different conceptions of nature translate into different legal ontologies and how deliberately displacing any relation to such conceptions (and implicitly endorsing some others) is not an innocuous step.

The idea of property can be translated into many different legal forms, each with different implications. The way in which property is organised in a given legal order reflects normative conceptions of the world or, more realistically, a sedimented layer of such conceptions. Thus, whereas there may be significant overlaps between the conceptions of property in civil law systems (as the ‘sum of its attributes’) and the Anglo-American doctrine of property as a ‘bundle of rights’,<sup>35</sup> the two ontologies differ at the very least in their representation of the powers and duties of the property holder. The Roman-influenced top-down characterisation found in civil law systems (property as a sum of three general attributes, i.e. *usus*, *fructus* and *abusus*<sup>36</sup>) is less case-specific and fine-grained than the variety of rights, prerogatives and duties – more than eleven according to some authors<sup>37</sup> – that together characterise property (or ownership) in bottom-up common law systems. In turn, none of these conceptions, however detailed, pay genuine attention to potential harm to future generations. For such a dimension to be brought into the picture, resort to other related concepts – e.g. the public trust doctrine<sup>38</sup> or the principle of inter-generational equity<sup>39</sup> – appear necessary.

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35 Y. Emerich, ‘Regard civiliste sur le droit des biens de la common law: pour une conception transsystémique de la propriété’ (2008) 38 *Revue générale de droit* 339, at 346-349.

36 *Ibid.*, at 346, referring to the foundational work of C. Aubry, C.-F. Rau, *Cours de droit civil français* (Paris: Librairies techniques, 7th edn by P. Esmein, 1961), vol. 2, pp. 236-238.

37 *Ibid.*, at 347, referring to A. M. Honoré, ‘Ownership’, in A. G. Guest (ed.), *Oxford Essays in Jurisprudence* (Oxford University Press, 1961), pp. 107-147, at 113.

38 See J. L. Sax, J. L., ‘The Public Trust Doctrine in Natural Resources Law: Effective Judicial Intervention’ (1970) 68 *Michigan Law Review* 471. For a practical application, see the decision of the Supreme Court of India in *Mehta v. Kamal Nath et al.* (1996), [1997] 1 SSC 388.

39 See E. Brown Weiss, ‘The Planetary Trust: Conservation and Intergenerational Equity’, (1984) 11 *Ecology Law Quarterly* 495. For a practical application see the decision of the Supreme Court of the Philippines in *Minors Oposa v Secretary of the Department of Environment and Natural Resources* (DENR) 33 ILM (1994) 173 (30 July 1993).

The need for such resort contrasts sharply with the conception of communal property of some indigenous peoples, where land is never fully held by an individual but belongs to the community – past, present and future – as a whole.<sup>40</sup> In such conceptions, respect for future generations is deeply ingrained in the very concept of property and does not require an additional layer of duties. The practical consequences of such a distinction for the legal organisation of human relations to nature must not be underestimated, and they have been recognised in practice in several cases concerning extractive industry projects in countries such as Nicaragua,<sup>41</sup> Paraguay,<sup>42</sup> or Ecuador<sup>43</sup> without the need for exceptional resort to supplementing concepts.<sup>44</sup>

The deliberate detachment of law from any conception of nature, and the efforts to conceptualise law as a pure technique, however useful, have also implications for the role of law in prompting, sustaining and potentially managing the massive human impacts on the Earth system unveiled by the Anthropocene narrative. From the perspective of the research agenda proposed here, this conclusion raises questions relating to the ways in which law may be embedded in different conceptions of nature, to the processes through which law has been detached from nature and the implications of such detachment, and to the desirability (or not) and potential avenues through which the two could be reconnected. As discussed next, the deliberate disconnection of law and nature seemed to assume – implicitly endorsing a modern ethics of science and progress – that human action could never become a nature-changing force of geological proportions. The assumption of the external and given character of nature is deeply ingrained in virtually all legal concepts, as in most ethical systems until

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40 See *Mayagna (Sumo) Awas Tingni Community v. Nicaragua*, ICtHR Series C No. 79, Judgment (31 August 2001) (in this leading case before the Inter-American Court of Human Rights, the Court concluded that: ‘the close ties of indigenous people with the land must be recognized and understood as the fundamental basis of their cultures, their spiritual life, their integrity, and their economic survival. For indigenous communities, relations to the land are *not merely a matter of possession and production but a material and spiritual element which they must fully enjoy, even to preserve their cultural legacy and transmit it to future generations*’, paragraph 149, italics added).

41 *Idem*.

42 See *Case of Sawhoyamaya Indigenous Community v Paraguay*, ICtHR Series C No 146 (29 March 2006), paragraph 118 (indigenous conception of property)

43 See *Indigenous People Kichwa of Sarayaku v. Ecuador*, ICtHR Series C No. 245, Judgment (merits and compensation)(27 June 2012), paragraphs 145-147 (indigenous conception of property)

44 See above n. 38 and 39.

the 20th century. Yet, the Anthropocene concept stresses that this assumption is incorrect and calls for a redefinition of the assumptions on which legal concepts are based.

### **3.3.3. *The horizon of law in the Anthropocene***

#### **3.3.3.1. Hans Jonas and the horizon of ethics**

The work of the German philosopher Hans Jonas<sup>45</sup> provides a useful starting-point to explore a general question relating to a major assumption underpinning legal concepts.

The new far-reaching powers that humans have conquered through the development of technology, and their implications for nuclear warfare, ecological degradation or genetic engineering, exceed the horizon of traditional ethics. Irrespective of the particular strand of ethics, the assumption has been that the normative guidance provided by ethical principles mainly concerned contemporary relations among humans living in a society. This is not to say that ethical principles cannot be adapted or extended beyond human relations (e.g. relations with different entities in nature) or beyond contemporaneity (e.g. relations to humans in the past or the future). But the immensity of the new powers acquired by humans and their potentially devastating effects on the Earth system as a whole called for much more; at the very least, it called for an ethics specifically (rather than tangentially) concerned with the implications of such powers and based on a reformulated understanding of responsibility.

Jonas' point is of great relevance also for other normative constructs such as law. Much like ethics, law does not merely seek to reflect reality through a variety of concepts but also to norm it. In other words, law – as ethics – is not a mere mirror of reality but a purposeful mirror. It seeks to both represent and orient behaviour. In point of fact, the main reason why it seeks to accurately represent

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45 H. Jonas, *In Search of an Ethics for the Technological Age* (Chicago IL: University of Chicago Press, 1984) (translation by H. Jonas and David Herr of Jonas' book originally published in German *Das Prinzip Verantwortung. Versuch einer Ethik für die technologische Zivilisation* (Frankfurt am Main: Suhrkamp, 1979)); H. Jonas, 'Philosophy at the End of the Century: Survey of its Past and Future' (1994) 61/4 *Social Research* 815 (see, particularly, Jonas' discussion of the ecological crisis starting at page 826).

reality is because it attempts to norm it. In this context, the newly acquired powers of humans have to be reflected to some extent in ethical and legal concepts, both for accuracy and normative (governance) purposes.

### 3.3.3.2. The task of law

Taking due account of human technological powers entailed, for Jonas, revisiting the foundations of ethics to ingrain an unprecedented level of responsibility on humans. Broadly speaking, the task of law in the Anthropocene is no different than that of ethics: it has to ingrain the unprecedented implications of human technological power in its foundational concepts. As for ethics, the question is not merely whether existing legal concepts can be extended and adjusted to reflect the new human condition but, more generally, whether new legal ontologies must be developed that are specifically (not just tangentially) concerned with the geological implications of human powers.

An additional difficulty faced by law arises from its social regulatory function. As noted by Jonas, it is not for philosophy to work out what he calls the ‘actual articles of a possible peace pact’ between mind (i.e. human technological power) and nature, but only to give the general argument and direction. The specificities would be the task of ‘practical experts’ and:

‘[a]ll the sciences concerning nature and human beings, concerning economics, politics and society, must cooperate in drafting a planetary statement of condition along with suggestions for arriving at a budget balanced between human beings and nature.’<sup>46</sup>

By its very function, law would be in the important and challenging position of translating such specific approaches and practical steps. But in order to do so, much like ethics for its own task (setting the overall direction), it must have the language, i.e. the legal concepts capable of spelling out the new (or the diversity of new) programme(s), as it is not clear whether the current grammar of law is appropriate let alone conducive to effect the necessary change.

Developing appropriate legal concepts may not merely consist in adding some new concepts (e.g. the precautionary approach or other ‘principles’<sup>47</sup>) or in adjusting some old ones (e.g. the extension of the concept of damage to cover also

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46 Jonas (1994), above n. 45, at 830.

47 This seems to be, however, the approach suggested in some of the environmental law literature. See e.g. Robinson (2012) and (2014), above n. 16.



the so-called ‘pure ecological damage’<sup>48</sup>), but it may require to entirely redefine some concepts (e.g. as discussed in the previous section in connection with the concept of property) or, more fundamentally, the redefine the entire legal cartography or language used to represent and norm the world, establishing new concepts and relations among them.

Ingraining in the law the unprecedented level of responsibility arising for humans raises several questions from the perspective of the present research agenda starting with the identification of certain legal concepts and their implications and ending with the potential redefinition of the entire legal language or ontology. Indeed, can existing legal concepts adequately translate the unprecedented level of responsibility of humans in the Anthropocene? And, depending on the answer to the previous question, what concepts could be added or reworked (expanded, redefined, suppressed) and what would be the interactions among such revisited concepts and the wider legal order? Can and should a new legal ontology be developed that is capable, as a more precise language, to integrate the new level of responsibility of humans? Brought back to our current understanding of the role of law with respect to the environment, what is called into question is the sufficiency of addressing our ecological crisis through the sole means of ‘environmental law’.

### **3.3.4. Revisiting foundational concepts**

#### **3.3.4.1. The external logic of environmental law**

The way in which the legal protection of the environment emerged and developed mainly from the 1950s onwards clearly conveys the assumption that the environment is an external object.<sup>49</sup>

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48 For an overview of approaches taken in international and comparative law, see M. Anderson, A. Boyle (eds.), *Environmental Damage in International and Comparative Law. Problems of Definition and Valuation* (Oxford University Press, 2002).

49 There is no major historical account looking at the development of domestic environmental law across countries. With some rare exceptions (e.g. R. Lazarus, *The Making of Environmental Law* (Chicago IL: University of Chicago Press, 2004, focusing on the United States), one must resort to the initial chapters of environmental law textbooks in the relevant jurisdictions.

Whether it is through personal-injury based techniques (e.g. through tort law doctrines of nuisance or civil law doctrines of *abus de droit*, and more recently environmental liability and human rights litigation) or through impact limitation techniques (e.g. environmental impact assessments, environmental permitting, zoning and protection of designated areas, pollution limitation standards, taxation, or market mechanisms), the assumption is that the legal system first organises social processes, such as defining subjects, rights, duties, devolution of powers, general taxation, corporate structures, economic freedoms, labour relations, horizontal relations (e.g. tort and contract law), etc., and only then it adds a layer of regulation aimed at protecting the environment. It sets bounds to – it ‘regulates’ – a pre-established system.

In order to preserve the foundational legal categories and their goals, such an additional layer may even be organized on the basis of the very same concepts used to pursue the implicit value system ingrained in law (e.g. the quest for growth and efficiency).<sup>50</sup> By way illustration, law may grant property rights (‘sovereign rights’) over the resources located in the exclusive economic zones of States,<sup>51</sup> or create rights to pollute within tolerable levels, as for a variety of allowances relating to the emissions of sulphur dioxide<sup>52</sup> or carbon dioxide<sup>53</sup> to reduce pollution while achieving efficiency. This approach contrasts with the possibility of reformulating the very concept of property, as discussed in section 3.3.2.2, to integrate respect for nature and future generations.

Such a choice may be entirely legitimate if its implications for the overall operation of a legal order are fully understood. But even in more traditional forms of environmental regulation, such as the requirement of a prior environmental impact assessment, the approach remains supplemental in that it simply adds a

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50 See e.g. D. Grinlinton, P. Taylor (eds), *Property Rights and Sustainability: The Evolution of Property Rights to meet Ecological Challenges* (Leiden: Martinus Nijhoff, 2011) (the contributors to this edited volume offer a critical perspective on property rights as tool for environmental protection and discuss different adjustments and reformulations).

51 Under the international law of sea, as codified by the United Nations Convention on the Law of the Sea, 10 December 1982, 1833 UNTS 397, Part V, coastal States have ‘sovereign rights’, i.e. exclusive jurisdiction, over the exploitation of natural resources in the water column extending up to 200 nautical miles from their baselines.

52 See G. Chan, R. Stavins, R. Stowe, R. Sweeney, ‘The SO<sub>2</sub> allowance-trading system and the Clean Air Act Amendments of 1990: Reflections on 20 years of policy innovation’ (2012) 65 *National Tax Journal* 419.

53 See D. Freestone, C. Streck (eds.), *Legal Aspects of Carbon Trading* (Oxford University Press, 2009).

requirement for the conduct of an activity that is otherwise fully organised through the laws relating to corporate structures, economic freedoms, property rights, contractual arrangements, labour relations, and others.

### 3.3.4.2. Illustrations: conceptions of sovereignty and causality

We have lost sight of how idiosyncratic and culturally-situated the growth and efficiency-based legal organisation of society and its relations with nature are. Comparative law but also non-legal disciplines such as historiography and anthropology could help to broaden the perspective that we have on our legal concepts and conceptions through the study of entirely different legal ontologies and of how the relations between humans and nature are organised in them.

An example of a basic concept will help clarify the difference between treating the environment as an external object and integrating it into a core legal concept. States have powers over the organisation of their economic activities and the exploitation of their natural resources within their territory or jurisdiction. Such a distribution of powers, which is a major cause of the collective action problem leading to increasing emissions of greenhouse gases,<sup>54</sup> is based on a distribution of political power legally expressed through the concept of sovereignty. States are 'sovereign' in that they are independent from all other States and have the full and exclusive exercise of public prerogatives within their territory.<sup>55</sup> Unrestricted use of such powers may have deleterious effects on the environment of other States or beyond national jurisdiction. As a result, the exercise of such powers has been subject to an additional layer of regulation at the international level, including norms such as the prevention principle, the principle of cooperation or the requirement to conduct a prior environmental impact

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54 See the study by S. Barrett, *Environment and Statecraft* (Oxford University Press, 2003) (discussing how the political organization expressed by the concept of sovereignty limits cooperation).

55 See *Island of Palmas Case (or Miangas) (United States v Netherlands)*, Award (4th April 1928), II RIAA 829 (where the sole arbitrator, the Swiss Max Huber, stated the most influential understanding of the concept of territorial sovereignty, still valid today: 'Sovereignty in the relations between States signifies independence. Independence in regard to a portion of the globe is the right to exercise therein, to the exclusion of any other State, the functions of a State. The development of the national organisation of States during the last few centuries and, as a corollary, the development of international law, have established this principle of the exclusive competence of the State in regard to its own territory in such a way as to make it the point of departure in settling most questions that concern international relations', at 838).

assessment in a transboundary context.<sup>56</sup> In this approach, the environment is an external object for the protection of which the exercise of sovereignty is restricted to some extent.<sup>57</sup> To move beyond the current binary approach whereby sovereignty is first asserted and then we add some limits to its exercise, the very concept of sovereignty would need to be shaken to its roots. Some scholars have argued in favour of reconceptualization of sovereignty as a form of stewardship or trusteeship, not merely to the benefit of a State's population, as in mainstream democratic theory, but also to the benefit of those beyond it.<sup>58</sup> The very need to respect the environment would no longer be an *ad hoc* limitation of sovereignty but it would be an integral part of it, much like in the example of communal property discussed in section 3.3.2.2.

Another example of a basic legal concept that is challenged by the Anthropocene narrative is that of 'causality'. There are different theories of causality in both domestic (e.g. tort law) and international law (e.g. State responsibility) and they all convey, whether explicitly or implicitly, a value judgement or normative choice of what consequences are to be legally attributed to a given agent. Such value judgements are culturally-situated but they also respond to practical considerations. In a traditional causation of fact principle or 'causalité adequate' test, some consequences of actions would escape attribution if the link between a specific tortious act and the injury suffered by the victim could not be established at the relevant standard of proof (e.g. preponderance of the evidence). This understanding of causality could be expanded to give more room to scientific and fairness considerations. Ronald Dworkin has highlighted the normative dimensions of such an extension by reference to the imaginary case of Mrs Sorenson<sup>59</sup> (conceptually reflecting the well-known case *Sindell v. Abbott*

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56 See Rio Declaration on Environment and Development, 13 June 1992, UN Doc. A/CONF.151/26, principles 2 (prevention), 17 (environmental impact assessment), 18-19 (cooperation). For a detailed commentary of this foundational instrument see J. E. Viñuales (ed.), *The Rio Declaration on Environment and Development. A Commentary* (Oxford University Press, 2015).

57 This is the thesis expounded by N. Shrijver, *Sovereignty over Natural Resources. Balancing Rights and Duties* (Cambridge University Press, 1997).

58 For two prominent examples see F. Francioni, 'Realism, Utopia and the Future of International Environmental Law', in A. Cassese (ed.), *Realizing Utopia. The Future of International Law* (Oxford University Press, 2012), pp. 442-460; E. Benvenisti, 'Sovereigns as Trustees of Humanity: On the Accountability of States to Foreign Stateholders (2013) 107/2 *American Journal of International Law* 295;

*Laboratories*,<sup>60</sup> which recognised so-called ‘market-share liability’) where the traditional rule of liability requiring causation is overcome by a theory of market-share liability, under which each proved contributor to the problem is liable to the extent of its contribution, measured by its market share, even if a causality link with the specific damage suffered by the victim is not established. Market-share liability is a legal approach to fill a gap left by the conventional requirements of causation. Its legal nature has been debated,<sup>61</sup> but its operation would allow for a legal extension (based on a normative choice) of a factual relationship that cannot be fully established scientifically. However, applying such an expanded conception of causality (where, in fact, the tortious act is considered to be that of a group of defendants taken together, which is then causally related to the injury) in the context of Earth system change remains particularly challenging because the group deemed to commit a tortious act is not easily identifiable (it would include, at the very least, portions of past and present generations, with different sectors involved) and the injury itself cannot easily be attributed to a major environmental disruption (e.g. whereas climate change increases the frequency of several extreme weather events, attributing a specific event to it – e.g. the hurricane that took place on a given day of May – remains scientifically difficult). In many ways, the main legal shield protecting those groups and countries responsible for climate change-inducing emissions is the prevailing understanding of causality. As with the concept of sovereignty, a reconceptualization of the legal

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59 See R. Dworkin, *Justice in Robes* (Cambridge MA: Harvard University Press, 2006), at 143 (‘Mrs. Sorenson suffered from rheumatoid arthritis and for many years took a generic drug—*inventum*—to relieve her suffering. During that period *inventum* was manufactured and marketed under different trade names by eleven different pharmaceutical companies. In fact the drug had serious and undisclosed side-effects, of which the manufacturers should have known, and Mrs. Sorenson suffered permanent cardiac damage from taking it. She was unable to prove which manufacturer’s pills [ ... ] had actually injured her. She sued all the drug companies who had manufactured *inventum*, together, and her lawyers argued that each of them was liable to her in proportion to its share of the market in the drug over the years of her treatment. The drug companies replied that the plaintiff’s request was entirely novel and contradicted the long established premise of tort law that no one is liable for injury he has not been shown to have caused. They said that since Mrs. Sorenson could not show that any particular defendant had injured her or even manufactured any of the *inventum* she took, she could recover against none of them.’)

60 *Sindell v. Abbott Labs.*, 607 P.2d 924 (Cal. 1980).

61 M. A. Geistfeld, ‘The Doctrinal Unity of Alternative Liability and Market-Share Liability’ (2006) 155 *University of Pennsylvania Law Review* 447, at 449-452 (discussion conceptions of market-share liability as risk-based liability or as a more complex expression of damage/causation based liability)

principle of causality would have to ingrain the complexity of natural processes within law. But as suggested by the market share liability theory, such a reconceptualization is possible on normative grounds.

Importantly, the challenges that the Anthropocene poses to the principle of causality also show another wider problem that any reconceptualization attempt will have to face, namely the imbrication of legal concepts. Indeed, legal concepts, and particularly the most foundational ones, can only be defined in relation to each other. Taken together, they all amount to a legal ontology, a specific representation of reality, as discussed in section 3.3.3. Reconceptualising causality is likely to change many other areas of a legal order such as the understanding of responsibility/liability which, in turn, is likely to change the understanding of duties or obligations (e.g. a new tort based on risk has been considered as a corollary of the extension of causality in market-share liability) as well as of rights (rights of recovery but also of action) which, in turn, may also redefine the concept of subject (recognising an obligation towards future generations or parts of the environment or granting to these entities the right to bring an action would amount to creating at least partial subjects of law). Whether the reconceptualization process starts at one or the other end (e.g. whether it starts with the concept of obligation or that of subject), the interconnectedness of legal concepts cannot be overlooked.

From the perspective of this article, the foregoing examples illustrate the differences between an external logic, which currently prevails the making of environmental law, and the possibility of redefining certain foundational legal concepts to ingrain nature within them. At the same time, they raise a number of important questions relating to the areas of environmental law where the external logic appears insufficient to address the challenges of the Anthropocene as well as to the most suitable approaches to rise to such challenges. Specifically, one question is whether conventional environmental law can be enhanced (I will discuss later in this article the attempts to develop ‘adaptive environmental law’) or whether, at least in some areas, a reformulation of foundational legal concepts is necessary. To the extent that the latter approach may be explored, particular attention should be paid to the imbrications or ‘side-effects’ of different reformulations of a foundational concept.

More clearly reflecting the complexities of nature and the unprecedented responsibility of humans are not the only tasks of law in the Anthropocene. Neither the responsibility for prompting and sustaining the Anthropocene nor the impact (positive or negative) of the new era is spread equally across the entire

human race. There are differences and inequalities within the apparently homogeneous category of ‘humans’, and they raise a question of distributive justice for which law also needs to account.

## 4. ACCOUNTING FOR INEQUALITY

### 4.1. Preliminary observations

The need to address questions of inequality and redistribution within the Anthropocene narrative highlights the fundamental role of social sciences and humanities, including law, in understanding our new condition. Indeed, natural science accounts of the Anthropocene have been oblivious or insufficiently sensitive to what lies beneath an analytical category such as ‘humankind’ or ‘human systems’ or, still, ‘human agency’. In the attempts at developing models that take into account the interactions between natural processes and humans, the latter are taken as a single homogeneous variable, even by those modelling efforts that seek to provide higher resolution.<sup>62</sup> This difficulty has been highlighted in a number of contributions from social scientists, such as those of Andreas Malm and Alf Hornborg,<sup>63</sup> Christophe Bonneuil and Jean-Baptiste Fressoz,<sup>64</sup> and Frank Biermann and colleagues.<sup>65</sup>

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62 See e.g. the ‘Bretherton Diagram’ where ‘human activities’ are integrated as an additional component or cycle of a socio-ecological system (*Earth System Science Overview. A Program for Global Change*, NASA Science Advisory Committee, 1986, at 19) or newer models with a higher resolution of the human variable (F. Berkes, J. Folke, C. Colding (eds.), *Navigating Social-Ecological Systems. Building Resilience for Complexity and Change* (Cambridge University Press, 2003), or E. Bennett, G.D. Peterson, L.J. Gordon, ‘Understanding relationships among multiple ecosystem services’ (2009) 12/12 *Ecology Letters*1394), all referred to in Bonneuil/Fressoz, above n. 1, at 48-49.

63 A. Malm, A. Hornborg, ‘The geology of mankind? A critique of the Anthropocene narrative’ (2014) 1/1 *The Anthropocene Review* 62

64 See Bonneuil/Fressoz, above n. 1.

65 See F. Biermann et al, ‘Down to Earth: Contextualizing the Anthropocene’ (2016) 39 *Global Environmental Change* 341 (and the other contributions to this special issue devoted to the Anthropocene)

The main tenets of this critique highlight: (i) the dominance of natural science approaches in the Anthropocene narrative; (ii) the inability of such approaches to capture important and even decisive intra-species inequalities among humans; (iii) the higher responsibility of early industrialised countries, particularly the United Kingdom and the United States, and their elites in the advent of the Anthropocene; (iv) the wide diversities in those who have benefited from the results of technology and those who have suffered the adverse effects of them; and (v) the implications of not recognising such disparities for the attempts at actually taking action to address the root causes of the Anthropocene.

As with the previous analysis of the disconnection between law and nature, it is important to introduce a detour through some social science accounts of the Anthropocene, both to identify the implications for law and legal analysis and to relate the ensuing legal questions to a wider research agenda including other disciplines.

## **4.2. A finer-grained analysis of the human variable**

The use of ‘humankind’ as an analytical category fails to capture the importance of historical contingency in human processes and thereby on the impact of humans even at the aggregate level of a geological force. Reconnecting conceptually human and natural history calls for different levels of analysis, some of which are widely overlooked by the natural science approaches to the Anthropocene. At this level, the disconnection between nature and humans discussed earlier in this article is useful to highlight that human agency is not fully determined by natural causes. However, introducing elements of historicity and contingency in the Anthropocene account does not amount to preserve the disconnection, as natural processes remain important variables in shaping human agency and, perhaps more importantly in this specific context, contingent historical elements may be found at the origin of the human processes – the Industrial Revolution – that have prompted the Anthropocene. In discussing some examples of historical contingencies that have been instrumental in triggering the Industrial Revolution, my purpose is to highlight the need for a finer-grained approach to the connection between humans and nature in the advent of the Anthropocene. As I will show in a moment, some major contributions to historiography and social science suggest that historical contingency has played a major role in shaping the type of ‘world-



systems<sup>66</sup> capable of explaining (i) why the Industrial Revolution took off in the United Kingdom and Western Europe, and greatly accelerated after the Second World War, and (ii) the profound differences among countries in terms of both historical responsibility for and exposure to the risks of the Anthropocene.

One significant contribution to the understanding of the origins of the Industrial Revolution in the UK and some parts of Western Europe is the 2000 book of the American historian Kenneth Pomeranz entitled *The Great Divergence*.<sup>67</sup> Pomeranz seeks to overcome the divide in historical accounts of the origins of the Industrial Revolution between two polarised theses, where ‘either a Europe-centered world system carrying out essential primitive accumulation [of capital] overseas or endogenous European growth [are] called upon to explain almost everything’.<sup>68</sup> He adopts a comparative method assessing the similar overall conditions prevailing in certain areas as late as 1750, particularly England and the Yangzi Delta region, as potentially conducive for what became the Industrial Revolution. He then asks ‘Why wasn’t England the Yangzi Delta?’ and, conversely ‘Why wasn’t the Yangzi Delta England?’<sup>69</sup> His detailed and elaborate answer, which occupies the remaining of the book, points to two main differences between the subsequent paths followed by the two regions, namely the fortuitous availability of great reserves of coal in the UK (that could substitute for forests) and the ‘natural bounty’ made available through trade flows of raw materials against manufactures between the UK and its colonies or former colonies (that could largely substitute for land and relied on slavery). These two factors made possible a capital and manufacture intensive path, with a growing population fed through slavery-based natural resources brought from overseas. By contrast, the

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66 For a concise overview of Wallerstein’s analytical approach see I. Wallerstein, *World System Analysis: An Introduction* (Durham NC: Duke University Press, 2004). The full extent of Wallerstein’s theory was developed in three main volumes: *The Modern World-System, vol. I: Capitalist Agriculture and the Origins of the European World-Economy in the Sixteenth Century* (New York/London: Academic Press, 1974); *The Modern World-System, vol. II: Mercantilism and the Consolidation of the European World-Economy, 1600-1750* (New York/London: Academic Press, 1980); *The Modern World-System, vol. III: The Second Great Expansion of the Capitalist World-Economy, 1730-1840’s* (San Diego: Academic Press, 1989).

67 K. Pomeranz, *The Great Divergence: China, Europe and the Making of the Modern World Economy* (Princeton NJ: Princeton University Press, 2000).

68 *Ibid.*, at 5.

69 *Ibid.*, at 13.

development of the East Asian hinterland retained the resources of these peripheral areas, which were therefore not available to fuel a similar trajectory in the Yangzi Delta. As noted by Pomeranz:

‘China’s Lower Yangzi [ ... ] had increasing trouble selling enough cloth and importing enough food and timber to sustain either proto-industrial growth or the relatively high living standards of its workers. This was not because of any internal “flaw” in the region but because the areas it had traded with were undergoing their own population and proto-industrial booms and so were becoming less complementary to it’<sup>70</sup>

For present purposes, the main question is not whether Pomeranz’s analysis provides a more accurate picture of the origins of the Industrial Revolution than the other polarised theses that he seeks to overcome. Rather, it is the need to resort to historical analysis and look at certain contingencies, such as the availability of coal and the asymmetric imperial trade, to explain the emergence of the thermo-industrial revolution that prompted the Anthropocene.

In addition, the asymmetry presented by one these contingencies is of critical importance to highlight that it is not the entire humankind that led and benefitted from the industrial processes underpinning the Anthropocene but only a highly privileged portion of it, whose location has varied over the last two centuries from England and some countries of Western Europe, to the United States and Japan as well as some areas of the former Soviet Bloc after the Second World War, to China and some other ‘emerging’ economies in the last decades. By contrast, large portions of the world population suffered from the colonial and post-colonial political asymmetry that enabled the Industrial Revolution and the post-1945 Great Acceleration and hardly partook in the resulting benefits. To capture such disparities, an analytical approach with much higher resolution than the one proposed by the natural science narrative of the Anthropocene is required. And such disparities are important to understand the Anthropocene not only from the perspective of the latter’s impact on different peoples around the world but also because, without such disparities, the Industrial Revolution may not have been possible. In an important critique of Crutzen’s standard narrative of the Anthropocene, Swedish human ecologists Andreas Malm and Alf Hornborg argue that:

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70 *Ibid.*, at 22.

‘uneven distribution [of resources and wealth] is a condition for the very existence of modern, fossil-fuel technology [ ... ] These technologies are an index of capital accumulation, privileged resource consumption, and the displacement of both work and environmental loads. After more than 20 years, we still tend to imagine “technological progress” as nothing but the magic wand of ingenuity which, with no necessary political or moral implications elsewhere, will solve our local problems of sustainability’<sup>71</sup>

Critical accounts of the dynamics of the Industrial Revolution, particularly of the inequalities on which it was based, raise the wider question of the origins and workings of capitalism. However polemic, such accounts provide powerful analytical tools to understand human agency leading to the Anthropocene and, more specifically, the role of law within it.

The work of American sociologist Immanuel Wallerstein on ‘world-system analysis’<sup>72</sup> is particularly illuminating in this regard because it is capable of linking a given organisation of a world-system, such as the UK-dominated one that prevailed from the late 18th to the beginning of the 20th century, with an ensuing social and ecological footprint. Bonneuil and Fressoz review several contributions that, relying on the concept of world-systems, have tried to clarify the ecological implications of different production systems, particularly during the British-led Industrial Revolution and the US-led Great Acceleration.<sup>73</sup> This ecological

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71 Malm/Hornborg, above n. 63, at 64.

72 See above n. 66.

73 Bonneuil/Fressoz, above n. 1, chapter 10, referring a number of interdisciplinary studies, often influenced by Marxism: H. Schandl, N. Schulz, ‘Changes in the United Kingdom’s natural relations in terms of society’s metabolism and land-use from 1850 to the present day’ (2002) 41 *Ecological Economics* 203; A. Hornborg, C. L. Crumley (ed.), *The World System and the Earth System* (Walnut Creek CA: Left Coast Press, 2006); M. Fischer-Kowalski, H. Haberl (eds.), *Socioecological Transitions and Global Change: Trajectories of Social Metabolism and Land Use* (Cheltenham: Edward Elgar, 2007); J. B. Foster, B. Clark, ‘Ecological imperialism and the global metabolic rift: Unequal exchange and the guano/nitrates trade’ (2009) 50 *International Journal of Comparative Sociology* 311; J. B. Foster, B. Clark, R. York, *The Ecological Rift. Capitalism War on the Earth* (Monthly Review Press, 2010); A. Hornborg, *Global Ecology and Unequal Exchange. Fetishism in a Zero-Sum World* (London: Routledge, 2013); A. Hornborg, ‘Ecological economics, Marxism, and technological progress: Some explorations of the conceptual foundations of theories of ecological unequal exchange’ (2014) 105 *Ecological Economics* 11; J. B. Foster, H. Holleman, ‘The theory of unequal ecological exchange: A Marx-Odum dialectic’ (2014) 41 *Journal of Peasant Studies* 199; J. W. Moore, *Capitalism in the Web of Life* (London: Verso, 2015); A. Malm, *Fossil Capital. The Rise of Steam-Power and the Roots of Global Warming* (London: Verso, 2016).

footprint can be calculated by reference to concepts such as ‘ghost or incorporated hectares’ (i.e. the number of hectares necessary to produce a given good or raw material) or ‘ecological unequal exchange’ (i.e. exchanges of goods that require far less land or have a far lower ecological footprint against goods with far higher land requirements or ecological footprints). By way of illustration, Hornborg has estimated that, in 1850, an exchange of £1000 of textile manufactured in Manchester against £1000 of cotton produced in the US was highly unequal in ecological terms because the US cotton required 6000 times more land than the English goods.<sup>74</sup> A similar estimation concerns the increasing UK net imports of biomass, which were multiplied by a factor of six over the period from 1855 to 1930.<sup>75</sup> The ecological footprint of the Great Acceleration is also immense and highly uneven. In a study published in 2014,<sup>76</sup> a group of Austrian scientists showed that since the 1950s, global material consumption (an aggregate variable of all materials processed in an economy, except for water and air, including biomass, fossil energy resources, metals, industrial minerals, construction minerals, and other traded products) has increased faster (by a factor of 3.7) than population (by a factor of 2.7). The distribution of this increase, both in the aggregate and in per capita measures, clearly shows striking levels of inequality in the consumption/use of such materials. Up to 1990, the West and the Soviet block amount together to over 50% of globally extracted materials. Over the period 1950-2010, annual per capita consumption in the West was three times (14.8 tonnes) that in Sub-Saharan Africa (4.8 tonnes). Starting in 2000, Asia (particularly China) overtook the West in its global share of resource use, although not in per capita terms.

These are but some measures of inequality relevant for the assessment of the relative ecological footprint of countries, groups of countries, and populations. But they clearly convey the message that inequality is deeply present in human agency, and that using ‘humankind’ as an aggregate variable is not only inaccurate but also unfair.

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74 Hornborg 2013, above n. 73, at 85-91.

75 Schandl/Schulz, above n. 73, at 215.

76 A. Schaffartzik et al, ‘The global metabolic transition: Regional patterns and trends of global material flows, 1950-2010’ (2014) 26 *Global Environmental Change* 87.

### 4.3. Law and inequality in the Anthropocene

#### 4.3.1. Overview

A number of legal developments enabled or facilitated the industrial trajectory of the different hegemony and beneficiaries of world-systems.

In addition to the oft-cited consolidation of unified management, limited liability and share tradability as a major advantages of new business organisations,<sup>77</sup> the legal questions relevant for the understanding of these trajectories would include the protection of the assets of companies against the creditors of shareholders,<sup>78</sup> the legal organisation of labour relations,<sup>79</sup> the accommodation through compensation of the impacts of industrial processes,<sup>80</sup> and

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77 On the origins of industrial corporations see: S. Williston, 'History of the Law of Business Corporations before 1800' (1888) 2/3-4 *Harvard Law Review* 105 (part 1), 149 (part 2); A. Berle, G. Means, *The Modern Corporation and Private Property* (New York: Macmillan, 1932) (classic account of the foundations of corporate law stressing the separation between ownership and control of corporate affairs); R. E. Seavoy, *The origins of the American business corporation 1784-1855* (Westport, Conn.: Greenwood Press, 1982) (paying particular attention to corporate law in New York); W. G. Roy, *Socialising Capital: The Rise of the Large Industrial Corporation in America* (Princeton NJ: Princeton University Press, 1997) (analysing the quasi-public origins of major corporations); T. W. Guinnane et al, 'Pouvoir et propriété dans l'entreprise: Pour une histoire internationale des sociétés à responsabilité limitée' (2008) 63/1 *Annales. Histoire. Sciences Sociales* 73 (arguing that the diffusion of the corporation as a form of business organization has been overestimated, and focusing on other forms of limited liability organisations in France, Germany, the UK and the US).

78 See e.g. H. Hansmann, R. Kraakman, R. Squire, 'Law and the Rise of the Firm' (2005/2006) 119 *Harvard Law Review* 1335.

79 See e.g. §, 'Legal Framework', in A. Flanders, H. A. Clegg (eds.), *The System of Industrial Relations in Great Britain: its History, Law and Institutions* (Oxford: Blackwell, 1954), pp. 42-127; O. Kahn-Freund, *Labour Relations: Heritage and Adjustment* (Oxford University Press, 1979); M. Linder, *The Employment Relationship in Anglo-American Law: A Historical Perspective* (New York: Greenwood, 1989); J. Le Goff, *Du silence à la parole. Une histoire du droit du travail des années 1830 à nos jours* (Rennes: Presses universitaires de Rennes, 2004); A. Supiot, *Critique du droit du travail* (Paris: Presses universitaires de France, 2007).

80 See e.g. J. F. Brenner, 'Nuisance Law and the Industrial Revolution' (1974) 3/2 *Journal of Legal Studies* 403; A. E. Dingle, 'The Monster Nuisance of All. Landowners, Alkali Manufacturers, and Air Pollution, 1828-1864' (1982) 35/4 *Economic History Review* 529; B. Pontin, 'Tort Law and Victorian Government Growth: the historiographical significance of tort law in the shadow of chemical pollution' (1998) 18/4 *Oxford Journal of Legal Studies* 661; G. Massard-Guilbaud, *Histoire de la pollution industrielle en France*,

more generally an international legal order allowing for the use of force,<sup>81</sup> downplaying the validity of the territorial title of non-European political entities<sup>82</sup> (with some exceptions, particularly in the Americas), enabling colonial exploitation of natural resources and, later on, enabling access to natural resources located abroad as well as to markets for manufactured products.<sup>83</sup>

Given space and the author's own limitations, it would be impossible to cover, even superficially, all these areas of law and their role in prompting and sustaining the industrial processes leading to the Anthropocene. Instead, my purpose in the following sections is to identify three sets of questions that I see as potentially useful directions for legal research into the arrangements underpinning the trajectories and disparities discussed in the previous section. These three sets include questions relating to the legal organisation of production processes (business organisation, labour, impacts on third parties) (3.3.2) and of asymmetric international exchange systems (colonial and post-colonial) (3.3.3), as well as the legal expressions given to disparities in historical responsibilities within humankind (as regards reparation for past damages, the representation of future generations, and the contemporary distribution of the benefits/burden of taking action) (3.3.4).

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1789-1914 (Paris: EHESS, 2010); J.-B. Fressoz, 'Payer pour polluer: l'industrie chimique et la compensation des dommages environnementaux, 1800-1850' (2013) 28/1 *Histoire & mesure* 145.

81 See e.g. I. Brownlie, *International Law and the Use of Force by States* (Oxford: Clarendon Press, 1963), chapter 2 (focusing on the period between 1815 and 1914).

82 In his discussion of the Berlin Conference on the partition of Africa, John Westlake, the then Whewell Professor of International Law at Cambridge, noted that 'it would be going much further, and to a length to which declined to go, if we were to say that, except in the case of unprovoked aggression justifying conquest, an uncivilized population has rights which makes its free consent necessary to the establishment over it of a government possessing international validity [ ... ] Those arrangements [the Berlin act] are not to be construed as denying, because they do not affirm them, the rights of any who are not stipulating parties to the conventions by which they are made. The moral rights of all outside the international society against the several members of that society remain intact though they have not and scarcely could have been converted into legal rights', *Chapters on the Principles of International Law* (Cambridge University Press, 1894), at 139-140.

83 See A. Anghie, *Imperialism, Sovereignty and the Making of International Law* (Cambridge University Press, 2004), pp. 141-162 (discussing the level of priority accorded by colonial powers to the resources of the colonies and, after the First World War, in the context of the mandate system established by the League of Nations, the discursive emphasis on developing such resources both for the local populations but, in practice, mostly for the benefit of 'the Commerce of the World').

## 4.3.2. *Legal organisation of production*

### 4.3.2.1. **Organising production for the Industrial Revolution**

The legal organisation of production processes relies heavily (albeit not entirely) on three bodies of norms, namely those structuring the form of business ventures, those addressing the situation of the workers, and those dealing with the impacts of industrial processes on third parties. In reviewing the development of these bodies of law, a common feature is the limited attention paid to the adverse impacts of the processes thus organised. Even the regulation of industrial emissions, which seems specifically targeted to such impacts, focused largely on the reparation of injury suffered by third parties and, more recently, the reduction of the harm through preventive techniques.

But the desirability of the industrial processes (e.g. chemical industries or electricity production) remained the driving assumption and the limitations on their operation, however hard fought, took the form of either an additional layer of norms dealing with the protection of social rights, affected populations or the environment (see sections 4.3.2.3 and 4.3.2.4) or, increasingly, they were shaped as ‘regulation’, understood as technical standards aimed at fine-tuning and optimising the operation of a (productive) system.<sup>84</sup>

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84 For the distinction between ‘regulation’, in the meaning of self-adjustment or optimization, and ‘*règlementation*’, understood as the attempt at governing reality in such a way that it pursues certain values, see Supiot, above n. 79, pp. X-XIII.

### 4.3.2.2. The law of business organisation

The law of business organisation experienced significant change starting in the 19th century in both the UK<sup>85</sup> and the US,<sup>86</sup> but also in other countries benefiting from the ‘world-systems’ established by the hegemon (e.g. Germany<sup>87</sup> or France<sup>88</sup>). Depending on the level of analysis, the trajectories defined by the law of business organisation and their impact vary from one account to the other. Overall, however, it seems clear that the processes unleashed by the Industrial Revolution were enabled by laws providing certain basic features, such as limited liability (whether provided by a corporate form or by another form of business organisation<sup>89</sup>), unified and separate management, tradability of shares and some protections against liquidation of the business entity, whether against the very owners of the entity (or their successors<sup>90</sup>) or against their creditors.<sup>91</sup>

Importantly, a major factor driving the emergence and development of these legal entities was the need to commit the significant amounts of capital required by industrial and infrastructure projects and the idea of setting up ‘chartered’ entities was modelled on earlier State-sponsored entities used to pursue colonial interests (e.g. England’s East India Company) and/or to manage public monopolies.<sup>92</sup> The economic importance of these new business organisations is well

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85 See Companies Act 1862 (25 & 26 Vict. c. 89). On the process that led to this statute see P. L. Cottrell, *Industrial Finance 1830-1914. The finance and organization of the English manufacturing industry* (London: Routledge, 1980), chapter 3.

86 See Seavoy, above n. 77 (referring to the law of business organisation in New York)

87 *Aktiennovelle von 1870* (or New Company Act 1870), which was an amendment of the 1861 *Allgemeines Deutsches Handelsgesetzbuch*, which was further reformed in 1884. See N. Horn, ‘Aktienrechtliche Unternehmensorganisation in der Hochindustrialisierung (1860-1920)’, in N. Horn, J. Kocka (eds.), *Recht und Entwicklung der Grossunternehmen in 19. und frühen 20. Jahrhundert: wirtschafts-, sozial- und rechtshistorische Untersuchungen zur Industrialisierung in Deutschland, Frankreich, England und den USA* (Göttingen: Vandenhoeck & Ruprecht, 1979), pp. 123-189.

88 *Loi du 24 juillet 1867 sur les sociétés commerciales*. On the process leading to this statute see C. E. Freedman, *Joint-stock enterprise in France, 1807-1867: From privileged company to modern corporation* (Chapel Hill: University of North Carolina Press, 1970).

89 See Guinnane et al, above n. 77.

90 See M. M. Blair, ‘Locking in Capital: What Corporate Law Achieved for Business Organizers in the Nineteenth Century’ (2003) 51 *UCLA Law Review* 387.

91 See Hansmann et al, above n. 78.

92 See Hansmann et al, above n. 78, at 1377 (referring to Holdsworth and Williston); Roy, above n. 78.



known and does not call for much additional comment. I should add, however, that until quite recently – at least when one considers the history of the Industrial Revolution – the ‘social responsibility’ of corporations was still understood as the mere maximisation of their profits.<sup>93</sup>

The emergence of corporate social responsibility standards<sup>94</sup> has not changed this picture fundamentally as such standards, to the extent they are indeed implemented, are rarely a driver of the business organisation of a venture.<sup>95</sup> Rather, they operate as (normally non-binding) limitations setting some broad outer limits (regarding human rights, social rights, environmental protection, corruption, etc.) for business action, much in the same way as the two other areas of law to which I now turn, namely labour relations and the regulation of externalities.

#### 4.3.2.3. Structuring labour relations

Labour relations in Britain remained largely unaddressed by statute law until the second half of the 20th century. Until the 1960s and 1970s, labour relations were governed essentially by employers and trade unions in what O. Kahn-Freund’s called ‘collective laissez-faire’.<sup>96</sup>

The emergence of this governance approach was hard fought,<sup>97</sup> as for most of the 19th century, trade unions had to face hostile common law courts that considered their aims and action as contrary to economic freedoms (the doctrine of restraint of trade) and exposed strike organisers to potential liability on the

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93 In the early 1960s, Milton Friedman famously wrote that the corporate responsibility of business was merely to increase its profits. See M. Friedman, *Capitalism and Freedom* (Chicago IL: University of Chicago Press, 1962), at 155.

94 See A. B. Carroll, ‘A History of Corporate Social Responsibility: Concepts and Practices’, in A. Crane et al (eds.), *The Oxford Handbook of Corporate Social Responsibility* (Oxford University Press, 2008), pp. 19-45.

95 The external dimension of corporate social responsibility, as an additional layer overimposed on ‘normal’ business operations, can be contrasted with the focus on social development as an integral dimension of so-called ‘social entrepreneurship’. See e.g. A. Nicholls (ed.), *Social Entrepreneurship. New Models of Sustainable Social Change* (Oxford University Press, 2006) and, for an exposition of the principles underlying a prominent example, see M. Yunus, K. Weber, *Building Social Business* (New York: Public Affairs, 2010) (relying on the experience gained by Yunus’ founded Grameen bank).

96 Kahn-Freund (1954), above n. 79.

97 For a vivid account of the history of trade unions in Britain see A. Reid, *United We Stand. A History of Britain’s Trade Unions* (London: Penguin, 2005).

basis of several economic torts (conspiracy, inducing breach of contract, interfering with trade or business).<sup>98</sup> As late as 1901, in the *Taff Vale* case, the House of Lords expressed the view that trade unions could be directly sued in tort and held liable for the acts of their officials.<sup>99</sup> In this tense context, the framework for self-regulation was introduced through subsequent statutory interventions in 1871 and 1906 under which trade unions and strike organisers were shielded from the doctrine of restraint of trade and common law economic torts.

In the United States, over the late 19th and early 20th century, worker movements faced similar resistance from the judiciary, on the basis of criminal conspiracy charges or through the use of labour injunctions.<sup>100</sup> After the Great Depression, however, the loss of confidence in business leaders and courts as well as the massive protests staged by farmers and workers led to a series of statutory interventions, above all the National Labor Relations Act of 1935 (NLRA), which legitimized the use of collective bargaining.<sup>101</sup>

In both countries, economic freedoms were initially and for more than a century used to sustain the asymmetric relation of power, subjecting workers to employers. Economic torts were interpreted in such a way as if worker mobilisation could only hurt employers and national prosperity, overlooking the very reasons why workers mobilised in the first place. In the United States, at the turn from the 19th to the 20th century, this tension had crystallised into competing interpretations of the Thirteenth Amendment. Workers saw themselves as in a condition of ‘involuntary servitude’ whereas courts asserted that the amendment only protected the individual right to resign free from physical coercion.<sup>102</sup> This tension recalls the darker origins of the asymmetry sustained by law, namely slavery, and it connects the stories of the US and the UK in that, as argued by Pomeranz, the latter was able to overcome the land constraint and

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98 A. C. L. Davies, *Perspectives on Labour Law* (Cambridge University Press, 2nd edn. 2009), at 4.

99 *Taff Vale Railway Co v Amalgamated Society of Railway Servants* [1901] AC 426 (HL), referred to in *idem*.

100 For a concise account see W. E. Forbath, *Law and the Shaping of the American Labor Movement* (Cambridge, Mass.: Harvard University Press, 1991).

101 See J. Pope, ‘Worker Lawmaking, Sit-Down Strikes, and the Shaping of American Industrial Relations, 1935-1958’ (2006) 24/1 *Law & History Review* 45.

102 See J. Pope, ‘Contract, Race and Freedom of Labor in the Constitutional Law of ‘Involuntary Servitude’ (2010) 119 *Yale Law Journal* 1474.

move into the Industrial Revolution as a result of slave-grown farm export from plantations in the Caribbean, the southern parts of the US and northeastern Brazil.<sup>103</sup>

#### 4.3.2.4. Pollution and third parties

The law-enabled asymmetry is also noticeable in the relations between producers and third parties affected by what we call today negative externalities, such as pollution. A number of historical studies<sup>104</sup> have shown that the legal framework introduced some oversight of industrial operations but that the thrust of the system was to provide a right of compensation to (immediately) affected third parties, with no regard for the environment as such or future generations. The latter point seems natural, as concern for the environment and future generations did not arise until the second half of the 20th century. However, it shows that the relevant laws took as their starting-point that industrial production could not have effects beyond contemporary humans (as noted by H. Jonas with respect to ethics) and, even among them, the prevailing approach was not to prevent, let alone block polluting activities, but to allow them assorted with certain duties of compensation.

In an early contribution to the understanding of the (limited) role of nuisance law in the Industrial Revolution, J. Brenner argues that:

‘the main explanation of the irrelevance of nuisance to industrialization lies not in the doctrine itself but rather in the fact that it was not applied precisely to those classes of parties who were most responsible for economic growth and pollution’.<sup>105</sup>

More specifically, relying on the case law of mid 19th century England, Brenner shows that nuisance law was applied differently to individuals and factories, and hardly applied at all to quasi-public (chartered) enterprises, and that, in all events, there was no systematic prosecution of public nuisances. Even after the Alkali Act was adopted in 1863, placing the property of manufacturers

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103 Pomeranz, above n. 67, at 264. For a history of the Atlantic slave trade covering the relevant period see H. Thomas, *The Slave Trade: The Story of the Atlantic Slave Trade, 1440-1870* (New York: Simon & Schuster, 1997).

104 See above n. 80 the studies by Brenner (1974); Dingle (1982); Pontin (1998); Massard-Guilbaud (2010); Fressoz (2013).

105 Brenner, above n. 80, at 408; Dingle, above n. 80, at 537-538.

under State oversight in order to protect the property of (large and wealthy) landowners,<sup>106</sup> the system of the Act soon became (and came to be seen) as a case of what today would be called regulatory capture, with very few prosecutions of alkali manufacturers.<sup>107</sup> In point of fact, manufacturers were generally favourable to the introduction of the Alkali Acts, partly because they believed that cooperation would allow them to prevent more intrusive regulatory approaches such as the one followed in France, which dictated the location of a manufacture on the basis of its level of impact. Yet, even in France, the 1810 *décret sur les établissements classés* was applied in a way that was highly accommodating for industrial activities<sup>108</sup> and the analysis of the private law case law of the time shows that the main approach was to compensate financially the damages suffered by third parties, and not to suspend industrial operations.<sup>109</sup>

Since the early days of the Industrial Revolution, legal controls over pollution have undergone fundamental changes, both from the perspective of regulatory oversight and private litigation. By and large, however, the conceptual underpinnings of the control systems are still shaped by the idea that production is to be organised first and then limitations added to it. In other words, as noted earlier in this article, environmental protection has still to become part of the DNA of law, including in those areas that organise production processes both domestically and internationally.

### **4.3.3. Asymmetric international exchange systems**

#### **4.3.3.1. The British Atlantic system**

An important aspect in Pomeranz's explanation of the origins of the Industrial Revolution in England is, as already noted, reliance on raw materials from the Americas, Brazil and the Caribbean. Pomeranz shows that the purchase of English manufactures consumed most of the income received by these dependencies from the exports of sugar, corn or cotton, and that the labour for the production of such raw materials relied very heavily on slave trade.<sup>110</sup>

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106 Dingle, above n. 80, at 529-530.

107 *Ibid*, at 545.

108 See generally Massard-Guilbaud (2010), above n. 80.

109 Fressoz, above n. 80, at 146.

110 See Pomeranz, above n. 67, chapter 6.

Trade had already become a concern of empire ideologists in the late 17th and early 18th century.<sup>111</sup> The British historian David Armitage notes that, by the mid 18th century, the Anglophone inhabitants of the British-shaped Atlantic world had started to describe their community (encompassing the UK, its Caribbean and North-American possessions, and to some extent African and the East Indies) as the ‘British Empire’.<sup>112</sup> He quotes a contemporary writing by Malachy Postlethwayt on *The African Trade, the Great Pillar and Support of the British Plantation Trade in America* (London, 1745), according to which: ‘the General Navigation of Great Britain owes all its Encrease and Splendor to the Commerce of its American and African Colonies’.<sup>113</sup>

The domestic and international law of the time was instrumental in enabling the flows of slaves from Africa and the unequal exchange of manufactured goods from England and raw materials from the colonies and later the new world. Several aspects would have to be covered, including the lawfulness, until the early 19th century (and in some areas much later) of slavery, the laws regulating the freedom of the seas, and those organising market access and trade. In what follows, I briefly discuss the latter as it concerns the British Empire and then the post-1945 world trade system.

### 4.3.3.2. The legal organisation of trade

Initially, the approach pursued was a mercantilist one<sup>114</sup> shaped by the Navigation Acts of 1660, 1663, 1670 and 1673 whereby the trade relations of the British colonies were tightly regulated to prevent them from trading with other European powers – particularly the Dutch – and their colonies.<sup>115</sup> But as the industrial processes that characterised the Industrial Revolution unravelled, and the manufacturing sector’s political influence grew stronger, a movement towards tariff

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111 See D. Armitage, *The Ideological Origins of the British Empire* (Cambridge University Press, 2000), pp. 147-148.

112 *Ibid.*, at 171.

113 *Idem.*

114 *Ibid.*, pp. 166-167 (discussing the views of three influential analysts of trade, namely Josiah Child, Charles Davenant, and William Wood).

115 See G. M. Walton, ‘The New Economic History and the Burdens of the Navigation Acts’ (1971) 24/4 *Economic History Review* 533 (comparing three attempts at assessing the impact of the British trade system on the American colonies).

reduction and free trade, first on a reciprocal basis and then unilaterally, gained ground in the UK. The analysis of the transition must necessarily be nuanced and integrate different levels,<sup>116</sup> including a diversity of political interests for and against trade liberalisation, the perceptions (whether justified or not empirically) of the advantages of free trade, and the international context. This movement culminated with the repeal of the Corn Laws in 1846 and later with a network of over fifty bilateral trade treaties that followed the conclusion of the Cobden-Chevalier treaty of 1860 between the UK and France.<sup>117</sup>

By the end of the 19th century, however, the market dominance on which the UK free trade approach relied for its expected success was challenged by a series of international developments, including highly protectionist policies in the United States and Europe (e.g. France, Germany, Italy) shielding the agricultural and the industrial sector,<sup>118</sup> often to protect ‘infant industries’ that would later become major competitors of the UK manufacturing sector. There has been significant debate as to whether the rise of protectionism in the late 19th century enabled growth in Europe and the Americas. The debate focuses mostly on explaining the observed positive correlation between trade protectionism and growth,<sup>119</sup> and it is relevant to situate the evolution of international trade policy in the context of the two features of the Anthropocene highlighted in this article, namely growth and inequality, and how law matters for them. The First World War and the inter-war period were characterised by extremely protectionist and opportunistic trade practices (so-called ‘beggar-thy-neighbour’ policies) centred on imperial blocks. Some explanations for the enactment of these policies in countries such as the UK, Germany and Japan (but not the US) point to the strong

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116 The repeal of the Corn Laws paving the way for British free trade policies has been described as a ‘puzzle’, which has not yet been adequately explained. See C. Schonhardt-Bailey, *From the Corn Laws to Free Trade: Interests, Ideas and Institutions in Historical Perspective* (Cambridge MA: MIT Press, 2006), at 1. The same author published a comprehensive four volume documentary history covering the 19th century: C. Schonhardt-Bailey (ed.), *The Rise of Free Trade* (London: Routledge, 1997).

117 See M. Lampe, ‘Explaining nineteenth-century bilateralism: economic and political determinants of the Cobden–Chevalier network’ (2011) 64/2 *Economic History Review* 644 (explaining different drivers of the emergence of this treaty network).

118 See generally P. Bairoch (1989). ‘European trade policy, 1815-1914.’, in P. Mathias and S. Pollard (eds), *The Cambridge Economic History of Europe* (Cambridge University Press, 1989), vol. 8, pp. 1-160 (highlighting the link between protectionism and growth)

119 For an overview see K. H. O’Rourke, ‘Tariffs and Growth in the Late 19th Century’ (2000) 110 *The Economic Journal* 456.

pressure from domestic manufacturers who faced increasing international competition and, unlike manufacturers in the United States, had only small domestic markets to invest in major capacity enhancement.<sup>120</sup> Imperial protection offered a way of expanding the market while excluding competition.

The multilateral trade system established in the aftermath of the Second World War around the 1947 General Agreement on Tariffs and Trade (GATT)<sup>121</sup> and the failed International Trade Organisation (ITO)<sup>122</sup> sought to avoid precisely this type of inward policies, which were considered to have contributed to the break off of the war. But in establishing basic standards of trade liberalisation across the board, such as the most-favoured-nation and national treatment clauses and the progressive reduction of trade tariffs through negotiation rounds, it also introduced a significant element of *de facto* inequality, as many countries could not compete in international trade markets. Interestingly, the very *de facto* discrimination (i.e. discrimination that results not from the face of the measure but from its actual application or the empirical conditions to which it applies) that the non-discrimination standards of the GATT seek to avoid among products is, to some extent, inherent to the general application of such standards to all countries, where very different initial conditions prevailed. Very soon, the *de facto* advantages provided by the world trade system to certain countries were challenged and several development countries together with a wave of newly independent countries emerging from the decolonization process called for differential application of trade rules. These claims led to the creation of the United Nations Conference for International Trade and Development (UNCTAD) in 1964<sup>123</sup> to promote development matters in international trade negotiations.

However, the UNCTAD has faced great competition from other organisations focusing on growth and trade, such as the Organisation for Economic Co-operation and Development (OECD), which emerged from the post-war Marshall Plan, and above all the World Trade Organisation (WTO) established in 1994.<sup>124</sup> Matters of inequality remain prominent in the more recent

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120 See K. A. Chase, 'Imperial protection and strategic trade policy in the interwar period' (2004) 11/1 *Review of International Political Economy* 177.

121 General Agreement on Tariffs and Trade, 30 October 1947, 55 U.N.T.S. 194.

122 Havana Charter for an International Trade Organisation, 24 March 1948, UN Doc. E/Conf. 2178.

123 See United Nations Conference for Trade and Development, *UNCTAD at 50: A Short History* (Geneva: United Nations, 2014).

124 Agreement establishing the World Trade Organisation, 15 April 1994, 1867 U.N.T.S. 154.

green industrial policies required to effect the transition to a low carbon economy.<sup>125</sup> Protectionist policies, even when they seek the protection of an environmental infant industry (e.g. renewable energy) have been challenged as breaches of non-discrimination standards (see section 5.3.3 below). It is no exaggeration to say that, under current trade rules, environmental protection measures can only be adopted with they are consistent with trade liberalisation.<sup>126</sup>

Viewed from the perspective of the Anthropocene narrative, this conclusion amounts to confirm what I have said earlier in this article, namely that legal institutions are built in such a way that socio-economic growth/development are structured first and only then environmental protection concerns are added, as external and additional. More fundamentally, the growth/development system entrenched in legal institutions favours those countries that were already competitive when the new standards came into play, and they may become means to thwart or delay transition to a new socio-technical regime (see below section 5.2). In brief, the inequalities in the production processes and prosperity that have led to the Anthropocene can also be read in past and existing legal institutions.

#### **4.3.4. Operationalising historical responsibility**

##### **4.3.4.1. Level and time-horizon**

An important question is whether law can reflect the different historical inequalities and responsibilities of different human groups for the advent of the Anthropocene and, if so, through which means and approaches. As with previous questions, the range of legal concepts potentially relevant is vast. They include the bodies of law specifically developed to allocate responsibility for environmental action (e.g. allocation of regulatory responsibility)<sup>127</sup> and damage (responsibility/

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125 See e.g. United Nations Environment Programme/International Institute for Sustainable Development, *Trade and the Green Economy. A Handbook* (third edn. 2014), at 1.

126 See P.-M. Dupuy, J. E. Viñuales, *International Environmental Law* (Cambridge University Press, 2015), at 400.

127 For an example of this broad question in a specific regulatory context see J. van Zeben, *The Allocation of Regulatory Competence in the EU Emissions Trading Scheme* (Cambridge University Press, 2014).



liability/ compensation)<sup>128</sup> but also those governing access to justice<sup>129</sup> and the organisation of redress processes,<sup>130</sup> and even foundational concepts such as those of legal personality, representation, obligation, debt, causality or damage.

In order to provide a meaningful structure to the inquiry, two analytical clarifications appear useful. Firstly, although the reference to historical responsibility would not necessarily exclude individual liability or individual damage, I will situate my inquiry at a broader level capable of reflecting the magnitude entailed in the term 'historical'. I do not mean that an individual's action or his/her suffering may never reach historical proportions, as Hitler's monstrous decision to trigger a genocide or, conversely, Mandela's heroic decision to peacefully tolerate long years of prison certainly did. But the concepts capable of reflecting the historical responsibility for the Anthropocene would have to refer to the action or suffering of more aggregate groups, such as future generations, or slaves, or oppressed peoples, or small island nations, or certain non-human species. Secondly, the time direction implicit in legal approaches is also important. Some of them (e.g. historical debt or mass redress mechanisms) look mainly at the past, whereas some others (e.g. representation of future generations) are more forward-looking. Between the two, the allocation of responsibility for action among contemporaneous actors provides a basis to organise present action (whether such action is mainly backward- or forward-looking).

With these two clarifications in mind, the purpose of this section is to survey three ways of fleshing out legally the historical responsibilities arising from the advent of the Anthropocene, namely historical redress processes, the legal recognition of future generations and the allocation of responsibility for present action.

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128 For a comparative study see M. Hinteregger (ed.), *Environmental Liability and Ecological Damage in European Law* (Cambridge University Press, 2008).

129 See the seminal study by C. Stone, 'Should Trees have Standing? Towards Legal Rights for Natural Objects' (1972) 45 *California Law Review* 450.

130 For two studies focusing on different areas of redress see P. de Greif (ed.), *The Handbook of Reparations* (Oxford University Press, 2008); H. Holtzmann, E. Kristjánsdóttir (eds.), *International Mass Claims Processes* (Oxford University Press, 2007).

#### 4.3.4.2. Industrialisation and the historical debt towards Africans

I have already mentioned the important advantage offered by the slave trade in the advent of the Industrial Revolution in England at the beginning of the 19th century. The same considerations could be extended to native peoples in the Americas as well as to other oppressed groups, whose labour and resources were instrumental in the economic equation that, according to Pomeranz, enabled the Industrial Revolution. From a normative perspective, two main approaches have been followed to address such past injustices. One concerns the normative concepts grounding the need for redress, such as the concepts of ‘debt’, ‘responsibility’ or ‘obligation’. The other focuses on the actual redress mechanisms, whether in the context of mass property claims or transitional justice. Unsurprisingly, the operational nature of the second approach makes it relatively more effective (albeit often controversial and highly criticised) than the first approach. Yet, redress mechanisms would normally suppose a prior allocation of responsibility. Depending on the cases, and political circumstances, such allocation is softened by a variety of ‘restorative justice’ tools that seek to make up for the victims suffering without incriminating – at least fully – their victimisers.

The close connection between the concepts used to translate injustice into responsibility and the redress mechanisms that may be used at an operational level can be illustrated by reference to a debate concerning the historical responsibility of the West for the African slave trade. In a special issue of *African Studies Quarterly*, a number of contributions addressed redress options ranging from the creation of a tribunal<sup>131</sup> (based on the idea of criminal responsibility) to compensation for the African contribution to the development of Europe<sup>132</sup> (based on considerations akin to unjust enrichment) to the development of an African Marshall Plan<sup>133</sup> (relying on a restorative – rather than punitive – justice approach). Of particular interest is Professor Mazrui’s contribution, which is based on an earlier and more developed study published in 1994 in the *African Studies*

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131 Ricardo Laremont, ‘Political versus Legal Strategies for the African Slavery Reparations Movement’ (1999) 2/4 *African Studies Quarterly* 13.

132 Ali Mazrui, ‘From Slave Ship to Space Ship: Africa between Marginalization and Globalization’ (1999) 2/4 *African Studies Quarterly* 5.

133 D. Thomson, ‘The Debt Has Not Been Paid, the Accounts Have Not Been Settled’ (1999) 2/4 *African Studies Quarterly* 19 (Thomson derives the idea of a Marshall plan for Africa from previous proposals, including from Mazrui)

*Review* and based on his inaugural Bashroun M.K.O. Abiola Distinguished Lecture.<sup>134</sup> Writing in the context of what he saw as the emerging ‘Reparationist’ movement, fostered by a resolution adopted by the Organisation of African Unity (O.A.U.) in 1993 and calling for the compensation of a ‘unique and unprecedented moral debt owed to the African peoples which has yet to be paid’,<sup>135</sup> Mazrui asks whether ‘the restitution [should] be calculated on the basis of the pain of the slave or the profit of the slaver’.<sup>136</sup> He reasons that both have to be taken into account and refers, specifically, to the ‘era of the labor imperative [ ... ] when the West was interested primarily in African labor- and was prepared to promote slave raids, the Middle Passage and slave plantations to ensure that kind of exploitation of African labor.’<sup>137</sup> Referring to this era, Mazrui’s 1999 article expounds the same relation between slave trade and the Industrial Revolution made by Pomeranz, whereby:

‘labor of Africa's sons and daughters was what the West needed for its industrial take-off. The slave ship helped to export millions to the Americas to help in the agrarian revolution in the Americas and the industrial revolution in Europe simultaneously’<sup>138</sup>

This not the only basis Mazrui sees for reparation, as the imperialist powers also benefited from African lands and natural resources, but the key consideration here is that the historical debt rests both on historical and ongoing damage to Africa and on a form of unjust enrichment, the extreme form of which was the economic compensation received by slavers for the emancipation of slaves. The redress mechanisms would have to reflect these different bases and involve not only monetary transfers but also empowerment strategies of Africans with respect to their own State machines as well as with respect to the World.

One specific attempt at claiming such reparation was made in the conclusions of the African World Reparation and Repatriation Truth Commission that met in Accra, Ghana, in August 1999 and asked ‘the West’ to pay 777 trillion

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134 A. Mazrui, ‘Global Africa: From Abolitionists to Reparationists’ (1994) 37/3 *African Studies Review* 1.

135 ‘The Abuja Proclamation’, Declaration of the first Abuja Pan-African Conference on Reparations for African Enslavement, Colonization and Neo-Colonization, sponsored by The Organization of African Unity and its Reparations Commission April 27-29, 1993, Abuja, Nigeria.

136 Mazrui, above n. 134, at 8.

137 *Ibid.*, at 9 (referring to J. H. Clarke’s *African People in World History*, Baltimore: Black Classic Press, 1993, pp. 51-71)

138 Mazrui, above n. 134, at 5.

to Africa within a period of five years as reparation for the slave trade.<sup>139</sup> This initiative, influenced by the transitional process undertaken in South Africa at the end of the apartheid regime as well as by other redress processes (e.g. reparations paid to Jewish victims of Nazism, native Americans, and others), reflected only the loss of life and the value of resources looted during the period of British rule.<sup>140</sup> Significantly, the scope of the debt relevant from the perspective of the Anthropocene narrative is not merely the resource debt or even the ecological degradation of the land,<sup>141</sup> but more generally the enslavement of large portions of a continent to sustain a production system that has led to the Anthropocene. The narrow confines of environmental law and degradation would be utterly insufficient to capture this broader debt.

#### **4.3.4.3. The legal representation of future generations**

The time-horizon of the debt and associated redress mechanisms is particularly important in the Anthropocene narrative both retrospectively (as discussed in the previous section) and prospectively, to the extent that our generation and the preceding ones will be leaving a more challenging Earth system to future generations. From a normative standpoint, the need to provide protection to future generations has received ample attention in the last decades. Of particular note is the work of Edith Brown Weiss on the legal dimensions of the principle of intergenerational equity.<sup>142</sup> This principle, which has been formulated in a number

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139 J. Fast, *Beyond Bullying: Breaking the Cycle of Shame, Bullying and Violence* (Oxford University Press, 2016), at 199.

140 *Idem.*

141 See Mazrui, above n. 134, at 9 (referring to the role of ecological degradation in preventing the socio-economic development of Africa).

142 E. Brown Weiss, *In Fairness to Future Generations: International Law, Common Patrimony and Intergenerational Equity* (United Nations University, 1989).

of constitutional<sup>143</sup> and international instruments,<sup>144</sup> aims at balancing the interests of present generations with those of future generations as regards development and environmental protection, but it can also have a procedural dimension.<sup>145</sup>

A significant problem in fleshing out the protection of future generations is whether they are to be deemed a subject<sup>146</sup> with its own interests and capacity to act (through representation) or a mere object to be directly (as such) or indirectly (through the protection of the environment as such) protected. The choice between these different approaches has important institutional implications. In a 2013 Report prepared by the UN Secretary-General<sup>147</sup> following a recommendation from the outcome document of the 2012 Rio Summit on Sustainable Development<sup>148</sup> a number of institutional options to give a voice to future generations were considered. The report stands out, as a document arising from the United Nations bureaucracy, for the attention paid to theoretical questions. It devotes several pages to the theoretical foundations of intergenerational equity, reviewing several statements and instruments that acknowledge the need for some degree of solidarity with and representation of future generations. It then moves to a review of institutional developments at the international and domestic levels.

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143 See J. C. Tremmel, 'Establishing intergenerational justice in national constitutions', in J. C. Tremmel (ed.), *Handbook of Intergenerational Justice* (Cheltenham: Edward Elgar, 2006), pp. 187-216.

144 See C. Molinari, 'Principle 3: From a Right to Development to Intergenerational Equity', in J. E. Viñuales (ed.), *The Rio Declaration on Environment and Development. A Commentary* (Oxford University Press, 2015), pp. 139-156.

145 See e.g. *Minors Oposa v. Secretary of the Department of Environment and Natural Resources* (DENR)(1994) 33 ILM 173 (30 July 1993), 185 (where the Philippines Supreme Court granted jus standi to future generations on the basis of the principle of intergenerational equity in the Constitution of the Philippines); *State of Himachal Pradesh and others v. Ganesh Wood Products and others*, 1995 (6) SCC 363 (where an Indian court took the principle of intergenerational equity into account in assessing the legality of the granting of a permit), cited in Ramlogan, R., *Sustainable Development: Towards a Judicial Interpretation* (Leiden: Martinus Nijhoff, 2011) 226.

146 See e.g. *E.H.P. v. Canada*, HRC Complaint no. 67/1980 (27 October 1982), para 8(a) (where the Human Rights Committee considered a reference made by the applicants to future generations as a mere way of expressing additional concern).

147 UN Secretary-General, *Intergenerational Solidarity and the Needs of Future Generations. Report of the Secretary-General*, 15 August 2013, UN Doc A/68/322

148 *Ibid.*, para 86.

The report reviews developments in Canada, Finland, Hungary, Israel, New Zealand and Wales, where specific committees, commissions or commissioners were established starting in the 1980s to protect the environment, including – sometimes explicitly – the rights of future generations. The first specific Commission for future generations was established in Israel in 2001 and the charge of Commissioner fell upon a judge, Shlomo Shoham.<sup>149</sup> Although the Commission was disbanded in 2007, it is interesting to note the type of tasks that had been devolved to this institution. The Commission had both investigative and advisory functions. It could seek information from different agencies regarding the implications of different acts and pieces of legislation for future generations and make recommendations to the Parliament. A more advanced institutional approach was later created in Hungary, where the Parliamentary Commissioner for Future Generations, **Sándor Fülöp**, was tasked with the protection of the constitutional right to a healthy environment and, to this effect, it could also hear individual complaints from affected citizens.<sup>150</sup> The role of the Hungarian Commissioner was that of an ombudsman, although it also had investigative and advisory powers, including that of advocating legislation promoting the rights of future generations. The function was later subsumed under a single overall role of Commissioner for Fundamental Rights, but one of the Commissioner’s deputies, Marcel Szabó, kept the specific task of advancing the interests of future generations. A third illustration is provided by the Commissioner for Sustainable Futures, a position created by the Welsh government in 2011 and later transformed, on a specific statutory basis (the Well-being of Future Generations Act of 2015), into a Future Generations Commissioner. Unlike the previous examples, the Commissioners who have subsequently held these positions, Peter Davies and Sophie Howe, have essentially an advisory role although they can take a wide range of initiatives to promote sustainable development.

At present, there have been calls for extending the representation of future generations through the creation of a similar ‘guardian’ position at the level of the European Union.<sup>151</sup> Some of the deficiencies that such an institution would address

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149 For an assessment see S. Shoham, N. Lamay, ‘Commission for future generations in the Knesset: Lessons learnt’, in J. C. Tremmel (ed.), *Handbook of Intergenerational Justice* (Cheltenham: Edward Elgar, 2006), pp. 244-281.

150 For an assessment see E. T. Ambrusné, ‘The Parliamentary Commissioner for Future Generations of Hungary and his impact’ (2010) 10/1 *Intergenerational Justice Review* 18.

include the insufficient reflection of the interests of future generations in the choice of discount factors within cost-benefit analysis assessments<sup>152</sup> or in the policies relating to areas such as climate change or nuclear energy.<sup>153</sup>

#### 4.3.4.4. Present allocations: common but differentiated responsibilities

The allocation of the benefits and burden of protecting the environment among present generations has been fleshed out through the concept of differentiation<sup>154</sup> and a number of more specific expressions, such as the principle of common but differentiated responsibilities (CBDR).<sup>155</sup> The latter has played a prominent role in the negotiations concerning global environmental problems, such as climate change and biodiversity, but also the protection of the ozone layer or the control of persistent organic pollutants. Although broadly accepted as a principle, the specific implications of CBDR are controversial in many ways as, depending on its interpretation, it can result in very different allocations of responsibility. A comparison of how the principle has been fleshed out in three treaty contexts will help illustrate this point.

The first clear (albeit implicit) expression of the principle of CBDR is the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer.<sup>156</sup> The ‘common’ and ‘differentiated’ aspects of the responsibility for the protection of the ozone layer are articulated through a distinction between core production/consumption obligations, which are common to developed and developing countries (the latter are called parties ‘operating under Article 5’) alike, and the modalities of implementation, which are more generous for developing countries (which are given more time to phase out the relevant substances and can benefit from financial and technological assistance). A different approach was followed by the Kyoto Protocol to the UNFCCC,<sup>157</sup> under which

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151 See M. Nesbit, A. Illés, *Establishing an EU ‘Guardian for Future Generations’, Report and recommendations for the World Future Council* (London: Institute for European Environmental Policy, 2015).

152 *Ibid.*, pp. 15-17.

153 *Ibid.*, pp. 17-18.

154 See M. Hébié, ‘Principle 6: Special Situation of Developing Countries’, in J. E. Viñuales (ed.), *The Rio Declaration on Environment and Development. A Commentary* (Oxford University Press, 2015), pp. 207-228.

155 See P. Cullet, ‘Principle 7: Common but Differentiated Responsibilities’, in J. E. Viñuales (ed.), *The Rio Declaration on Environment and Development. A Commentary* (Oxford University Press, 2015), pp. 229-244.

156 Montreal Protocol on Substances that Deplete the Ozone Layer, 16 September 1987, 1522 UNTS 29, art. 5.

157 Kyoto Protocol to the UN Framework Convention on Climate Change, 11 December 1997, 2303 UNTS 148.

only developed countries and countries in transition to a market economy (Annex B) have quantified emission reduction obligations (Article 3 and Annex B) whereas developing countries, including many of the main emitters of greenhouse gases, such as China, were not subject to any new obligations under the protocol (Article 10). This so-called ‘Chinese wall’ between developed and developing countries reflected the historical emissions argument according to which developed countries, by virtue of their early industrialisation, have mostly caused the carbon budget of the troposphere to be overused.<sup>158</sup> In such a legal architecture, the differentiated aspects of the CBDR principle clearly prevailed over the common ones.

However, the trends in emissions and emitters since the early 1990s have significantly changed, with many developing countries now appearing as the main present and future emitters. In order to bring these countries under some form of mitigation discipline, the process leading to the adoption of the Paris Agreement on climate change in December 2015<sup>159</sup> had to resort to a different way of fleshing out the CBDR principle. The key difference lies in the fact that, instead of focusing on a plethora of criteria or formulae for differentiation among States, as the mainstream literature suggested, differentiation was effected at the level of the very objects to be distributed (e.g. burden of emission reductions, financial contributions, access to different forms of assistance, etc.) each with its own distribution key.<sup>160</sup> For mitigation, the overall system established by the Agreement is similar to all States and is based on unilateral declarations by each State of its own targets (called ‘nationally determined contribution’ or NDC) and long-term low carbon strategies, to be revised up at regular intervals of time (Article 4). The unilateral character of such declarations allows countries to

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158 The Subsidiary Body for Scientific and Technological Advice (SBSTA) under the UNFCCC undertook a programme to flesh out methodologically the CBDR principle (called ‘MATCH’), except for questions of land use change. See N. Höhne et al, *Summary report of the ad-hoc group for the modelling and assessment of contributions to climate change (MATCH) (2008)*, available at: [www.unfccc.int](http://www.unfccc.int)

159 ‘Adoption of the Paris Agreement’, Decision 1/CP.21, 12 December 2015, FCCC/CP/2015/L.9, Annex (Paris Agreement).

160 For an early exposition of this approach see J. E. Viñuales, ‘Balancing Effectiveness and Fairness in the Re-design of the Climate Change Regime’ (2011) 24/1 *Leiden Journal of International Law* 223. On the use of this approach in the Paris Agreement, see L. Rajamani, ‘Ambition and Differentiation in the 2015 Paris Agreement: Interpretative Possibilities and Underlying Politics’ (2016) 65/2 *International and Comparative Law Quarterly* 493.



specifically tailor the contents of such declaration to their circumstances and plans. In addition, developing countries are to receive financial (Article 9), technological (Article 10) and capacity-building support (Article 11), from developed countries and potentially from other countries as well (e.g. emerging economies) to realise their targets under the Agreement. The overall system is one in which more leeway is granted to those countries that did not participate in the early stages of the Industrial Revolution and whose current developmental priorities are seen to justifying a higher environmental footprint.

The inequalities expressly consented by differentiation systems are important to reflect inequalities in responsibilities and impact (as well as capabilities) in the past. However, redressing inequalities may have unintended effects which are particularly clear in the climate change context to the extent that there are limits in the amount of greenhouse gases that may be emitted if the problem is to be tackled. Integrating both effectiveness and equity in our response to the Anthropocene challenge is a daunting enterprise from both a political and operational perspective. As discussed next, law has an important role to play in this regard, as it can organise not only the response but also the processes through which such a response is to be considered legitimate.

## 5. LEGAL ORGANISATION OF THE TRANSITION

### 5.1. Preliminary observations

For as far as there are reliable written records, law has been widely used to organise and contain the consequences of the major shifts in power and wealth entailed by transitional processes.<sup>161</sup> A transition of the magnitude required to

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161 After the restoration of democracy in Athens in 403 B.C., a complex legal system was used to manage the transition, particularly as regards amnesty for crimes committed during the dictatorship and oligarchic periods and the restitution of property. On these two points see, respectively: D. Cohen, 'The rhetoric of justice: strategies of reconciliation and revenge in the restoration of Athenian democracy in 403 BC' (2001) 42/2 *Archives européennes de sociologie* 335, at 338; J. Elster, *Closing the Books: Transition Justice in Historical Perspective* (Cambridge University Press, 2004), at 13. For a specific study of this transition see T. C. Loening, *The Reconciliation Agreement of 403/402 B.C. in Athens* (Stuttgart : Franz Steiner Verlag,

manage our newly acquired powers with their deleterious effects on the Earth system will certainly entail major shifts. In point of fact, what we face as a species, with unequal responsibilities, is a series of transition processes closely but often unclearly interrelated. Whether one thinks of the climate-driven transition from a fossil to a low carbon energy matrix or of the climate/ population/ pollution-driven transformation of agricultural and food production systems or, still, of the move from a waste disposal to a circular reuse system, the institutional changes that will need to be phased-in and those that will be phased-out are of gargantuan dimensions.

To situate the role of law in managing this transition, it is first necessary to clarify our very understanding of these processes as ‘transitions’. The use of the term transition in this context is not innocuous<sup>162</sup> as it deliberately seeks to play down the existence of a ‘crisis’ and suggests a certain incrementality or progressiveness of the process rather than an abrupt change. In addition, the term transition conveys the idea of a ‘managed’ process, which in turn calls for an elucidation of both the techniques used to manage it and the source of legitimacy of the ‘manager’ driving and accompanying the process. In introducing the implications of the term transition as well as its deliberate and reflexive character, I will seek to lay the wider humanities/social science foundations of the specific questions that law is capable of answering. As before, the main reason for the detour is to integrate the legal inquiry conducted in this article to the much wider research agenda relating to the Anthropocene.

## 5.2. The transitional narrative in energy studies

The prevailing understanding of the evolution of energy systems holds that there have been phases dominated respectively by animal/human strength, wind and water mills, wood, coal and oil as the main energy resource, punctuated by phase transitions from one era to the other.<sup>163</sup> In addition, starting in the 1950s and 1960s, there was some expectation that nuclear energy would be the next leader, although this forecast never fully materialised. Instead, the energy matrix

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1987).

162 Bonneuil/Fressoz, above n. 1, pp. 121-122.

163 For a concise long-term account see V. Smil, ‘World History and Energy’ (2004) *Encyclopedia of Energy* vol. 1, pp. 549-561.

remained dominated by the use of fossil fuels, with important additions from nuclear and hydroelectric energy and, much more recently, other renewable sources such as solar, wind and biomass (including, ironically, wood). In order to understand the implications of this narrative, one must first look at the discourse that gradually introduced it. Although there is no comprehensive literature review that could serve as a basis for this task, some partial attempts at looking at the relevant data and theoretical sources have been published over time. Here, I will focus on one recent review, which is both comprehensive and fair and balanced.<sup>164</sup> It must also be noted that the transitional narrative appears in some of the main historiographical accounts of energy's role in the Industrial Revolution<sup>165</sup> as well as energy history *tout court*.<sup>166</sup> After briefly reviewing this body of literature and, indeed, of conceptualisation of our understanding of energy as a social process, I will turn to the relevance of this debate for our more specific legal inquiry.

The transitional narrative has been widely endorsed to make sense of trajectories that initially appeared as data, mostly of energy supply but, increasingly, also of energy demand (end use). In other words, and perhaps unsurprisingly, statistical energy data came first and interpretation and theory, in the form of transitional theories, came later.<sup>167</sup> In curves depicting the relative share of each energy source over time (i.e. the percentage of each source in the overall energy matrix<sup>168</sup>), changes from one source to the other appear as transitions. Moreover, for early adopters, the rise of new energy sources was a long and slow process spanning, for the modern transitions, approximately 130 years

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164 A. Grubler, 'Energy transitions research: Insights and cautionary tales' (2012) 50 *Energy Policy* 8.

165 D.S. Landes, *The Unbound Prometheus. Technological Change and Industrial Development in Western Europe from 1750 to the Present* (Cambridge University Press, 2nd edn 2003 [1969]) (Landes characterises the Industrial Revolution as a succession of technological changes, particularly the rise of the steam engine, but also new forms of industrial organisation, particularly the 'factory system').

166 V. Smil, *Energy in World History* (Boulder CO: Westview Press, 1994) (Smil's study is a major effort to defeat deterministic accounts of energy's role in world history. He considers critically the tendency of such grand accounts of energy and human history to identify energy eras and energy transitions. His analysis highlights, however, the dominant role of such accounts in understanding the history of energy use).

167 Grubler, above n. 164, at 9 (referring to some pioneering efforts to gather and refine data on energy at the international level – from P. C. Putnam, *Energy in the Future* (New York: Van Nostrand, 1953) to A. Kander et al, *Power to the People. Energy in Europe over the Last Five Centuries* (Princeton NJ: Princeton University Press, 2012) - or at the domestic level – e.g. S.H. Schurr, B.C. Netschert, *Energy in the American Economy 1850-1975* (Baltimore: John Hopkins Press, 1960) or R. Fouquet, P.J.G. Pearson, 'A thousand years of energy use in the United Kingdom' (1998) 19/4 *The Energy Journal* 1).

(for the phasing in of coal and steam power in the Industrial Revolution) and 80 years (for the phasing in of oil, gas and electricity).<sup>169</sup> There is a body of literature suggesting that for late adopters (countries, political units, companies, etc.) the pace of the transition can be much faster as it relies on the experience gained by early adopters.<sup>170</sup> A. Grubler summarises this point, by reference to the phasing in and out of coal and steam, with the simple expression ‘first in, last out; last in, first out’.<sup>171</sup> Thus, the UK and Germany were early adopters of coal and steam (as compared to late adopters such as Italy and Sweden) and they phased out this energy matrix later than late adopters.<sup>172</sup> Another important way in which this literature relies on the concept of transitions is by identifying sequential stages in the development and diffusion of energy technologies, starting with a long but critical period of experimenting and learning at the technology units level (e.g. engine, turbine, nuclear reactor, solar panel), which are then scaled up to benefit from economies of scale (e.g. larger units), which subsequently turn into a major industry servicing core markets and, eventually, move from core markets to other (rim and peripheral) markets through trade and investment.<sup>173</sup> Significantly, this body of research suggests that the stages in the up-scaling process are sequential and not simultaneous, which further anchors the idea of transitional processes.

Moreover, a combination of empirical studies and more specific theoretical models<sup>174</sup> suggests that the role of policy in the emergence and, even more, the refinement and diffusion of technologies is of particular importance. For present

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168 Bonneuil and Fressoz rightly caution against conflating this relative measure of the role of a given energy source (e.g. coal accounting for more than 60% of the energy sources used at time 1) with absolute measures (e.g. if the energy consumption at time 2 is three times as large as that at time 1, even if coal accounts for 30% of the new energy matrix, much more coal is being consumed in absolute terms at time 2 than at time 1). They hold this confusion as a major problem presented by accounts of energy transitions, which, in their view, obscure the levels of overall consumption. See Bonneuil/Fressoz, above n. 1.

169 Grubler, above n. 164, pp. 11-12.

170 See M. Frankel, ‘Obsolescence and technological change in a maturing economy’ (1955) 45(3) *American Economic Review* 296; A. Grubler, ‘Time for a change: On the patterns of diffusion of innovation’ (1996) 125/3 *Daedalus* 19; B. Gales et al, ‘North versus south: energy transitions and energy intensity in Europe over 200 years’ (2006) 11/2 *European Review of Economic History* 219; C. Wilson, *Meta-analysis of Unit and Industry Level Scaling Dynamics in Energy Technologies and Climate Change Mitigation Scenarios*, IR-09-029 (Laxenburg: International Institute for Applied Systems Analysis, 2009).

171 Grubler, above n. 164, at 12.

172 *Ibid.*, at 13 (figure 2).

173 *Ibid.*, at 14 (discussing the work of C. Wilson, above n. 170).

purposes, three insights must be highlighted. Firstly, as already mentioned, empirical studies show that the initial phase of emergence, experimentation and refinement is critical for the up-scaling of new technologies.<sup>175</sup> Secondly, also from an empirical perspective, it has been widely shown that new technologies have to face ‘socio-technical regimes’ that are deeply grounded (both in terms of sunk investments but also rules – laws – and power relations) on existing technologies.<sup>176</sup> Thirdly, the up-scaling and diffusion process is a competitive and often confrontational one where the established participants in the regime incur higher costs (scrapping infrastructure and investment) and potentially decline in moving into a new socio-technical regime (as suggested by the ‘first in, last out’ insight), and they are likely to use the means at their disposal to prevent the change or at least to make it less costly and gain time. Such trade-offs between industries also involve trade-offs between individuals (e.g. workers in the old model may lose their jobs) and countries (e.g. countries deeply invested in the old technology may lose ground to new entrants) and, above all, values (e.g. reducing unemployment and offering cheap electricity versus protecting health from air pollution or mitigating climate change). For example, fighting climate change may entail for some emerging economies to move massively into renewable energy generation. From the perspective of energy transition theory, such a move by latecomers makes much sense as it entails lower levels of investment scrapping and can accelerate the adoption of the new technology, with the ensuing mitigation effects benefitting all countries. However, it also challenges an established regime (entrenched, among others, in international trade, investment and intellectual property rules) with its own beneficiaries. As discussed next, these three aspects of transitions are of particular relevance from a legal perspective.

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174 F. Geels, ‘The multi-level perspective in sustainability transitions: Response to seven criticisms’ (2011) 1 *Environmental Innovation and Societal Transitions* 24 (discussing and addressing recurrent criticisms of the multi-level perspective (MLP) of socio-technical transitions and offering a useful literature review).

175 See Wilson, above n. 170.

176 Geels, above n. 174, at 27-28 (characterizing the concept and referring to a the literature on applications of the MLP to transitions of electricity systems, transportation systems or biogas, among others).

## 5.3. Law and sustainability transitions

### 5.3.1. Overview

As discussed in the preceding section, technological transitions and, more generally, sustainability transitions call for policy (and hence legal) change. When such policy changes are attempted or introduced, different legal means may be used to either promote (new patents, environmental regulation, health regulation, investment law, trade law) or to hinder (patent infringement litigation, investment law, trade law) such developments. In addition, beyond the pragmatic aspects of promoting/hindering, law plays a critical role in offering avenues to legitimise change.

These three aspects of the legal organisation of transitions, namely the legal form of policy changes, the legal means to promote or hinder such changes, and the wider legal frameworks capable of legitimising them, all call for further elucidation. As in previous sections, the field is too vast to be covered even superficially within the confines of this article. My purpose is only to frame the broad legal questions that would have to be addressed and, when possible, to discuss the most relevant legal literature. To better understand the nature of these three inquiries, it may be useful to recall a distinction made by A. Supiot in the context of his critique of labour law,<sup>177</sup> namely that between a conception of norms and regulation as technical fine-tuning or optimisation, and another conception according to which norms express moral choices.

The first inquiry discussed next (5.3.2) is clearly based on the optimisation conception, where law is seen as a technology conveying pre-determined scientific truths (rather than fundamental normative choices) and, as a result, the objective of legal research is to make the instrument (law and regulation) fit for purpose. At the other end, the third inquiry (5.3.4) is based on the assumption that social choices cannot be fully pre-determined by scientific truths and, therefore, an explicit normative or value choice is an indispensable and unavoidable step in policy- and decision-making. The fact that law may be mostly, but never entirely, the expression of one of these two conceptions is well illustrated by the second aforementioned inquiry, namely that on how law may promote or hinder policy change (5.3.3).

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<sup>177</sup> Supiot, above n. 79, pp. X-XIII.

### 5.3.2. Adaptive legal systems

Law, when considered as a regulative instrument, becomes a technology that can be fine-tuned and optimised to reach a stated purpose. Some of the work that has been done to explore the role of law in the Anthropocene follows this perspective and argues in favour of a regulatory paradigm where law would become an ‘adaptive system’.<sup>178</sup>

In a collection of works edited by A. S. Garmestani and C. R. Allen, several case-studies relating to wildlife and biodiversity protection, natural preserves, marine protected areas, water governance and climate change are discussed from the perspective of socio-ecological resilience, characterised as a change within the system rather than of the system (regime change).<sup>179</sup> The goal of the book is to contribute to the design of legal systems that are capable of remaining relevant (regulative) even in cases of regime change. As discussed previously in this article, the wide assumption on which law making processes are based is that nature does not fundamentally change or, as the contributors to this book note, that ‘the environment, ecosystems, and natural resources are presumed to exist in a particular condition or state’.<sup>180</sup> Once that state is defined, the conventional approach to environmental regulation is to introduce a rigid framework to keep the system in that state, for example, by limiting extraneous inputs or interference (e.g. pollutants) within limits that allow the system to return to its equilibrium. However, socio-ecological systems cannot be conceptualised as having a single equilibrium. Rather, there is substantial evidence suggesting that ecosystems can exist in a variety of stable states. In order to adapt to the constant change in socio-ecological systems, laws and regulations must be managed as adaptive systems that try different types of interventions on the basis of different understandings of a problem and adjust accordingly as the results of such interventions are known. The authors acknowledge the need for law to provide a

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178 See Garmestani/Allen, above n. 14 ; Baker, above n. 16.

179 Garmestani/Allen, above n. 14, at 6 (defining socio-ecological resilience as ‘the amount of disturbance a linked socio-ecological system can absorb before reorganizing into a state characterized by a different set of processes and structures’)

180 *Ibid.*, at 2.

certain degree of certainty, hence of rigidity, and the ability of law to adapt to changing human values, but they argue that such an approach to regulation remains inadequate for ecological processes and features:

‘The maladaptive nature of law can allow, facilitate, or even mandate pathological choices and behaviors with respect to ecosystems. It can contribute to incidents of ecological collapse, which in turn lead to incidents of social collapse’<sup>181</sup>

Different legal techniques or tools could be used to fine-tune legal systems, and the contributors to the volume discuss some of them with emphasis on the administrative and environmental law of the United States.

The detail of these techniques is less important for present purposes than the overall approach expounded by the editors and contributors of the book, which is genuinely regulative in that it seeks to optimise the ability of legal systems with respect to socio-ecological processes. Degradation of ecological processes can indeed lead to collapse of social processes, but excessive protection of the environment may also have adverse social effects. The great uncertainties entailed by these complex interactions hence call for a constant adjustment and fine-tuning of the regulatory system. Interestingly, the process of fine-tuning seeks some form of scientific optimality but it displays limited sensitivity to other features of real life, such as the dynamics of socio-technical transitions, politics, vested interests, and the like, with which law must also cope. Law can to some extent be analysed as a technology, but it certainly cannot be analysed only as a technology.

### **5.3.3. Promoting or hindering the transition**

Law plays a major role in signalling and prompting or, conversely, preventing social change. The analysis of sustainability transitions cannot overlook this dimension. Yet, technology-focused models rarely pay any attention to the legal

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181 *Ibid.*, at 5.



form of recommended policy interventions,<sup>182</sup> even when they explicitly aim to cover rules and institutions.<sup>183</sup> This is problematic because legal form does matter, as can be illustrated from a current example.

The recent conclusion of the Paris Agreement on Climate Change<sup>184</sup> was largely facilitated by an initial understanding between the two main emitters of greenhouse gases, China and the United States. A key part of this understanding was the effort of the US administration to regulate emissions from power plants through the so-called ‘Clean Power Plan’ (CPP), a regulation from the US Environmental Protection Agency, published in late 2015.<sup>185</sup> Taking action on its main source of emissions made the United States’ commitment to a climate deal credible to the eyes of both China and the rest of the world. However, such action rests on potentially fragile legal grounds. Although the Obama administration initially sought to have a specific Act (the ‘Clean Energy and Security Act’ or ‘Waxman-Markey Bill’) passed through the US Congress, that option was not politically possible due to opposition at the Senate. The administration then turned to another avenue, a legal enabler, namely using the authority already delegated by Congress to it in a piece of legislation several decades old, the Clean Air Act (CAA), which authorises regulation to fight air pollution.<sup>186</sup> Through an earlier reinterpretation of the CAA to include carbon dioxide among air pollutants,<sup>187</sup> this delegation made legally possible the adoption of the CPP. What to a non-lawyer may look like a hardly noticeable difference in legal form is, in practice, very important for the prospects of the CPP and, accordingly, for those of the bottom up mitigation approach envisioned in the Paris Agreement. This became manifest when in early February 2015 the US Supreme Court suspended

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182 New and more realistic modeling approaches may be capable of addressing this deficiency, see J.-F. Mercure et al, ‘Modelling complex systems of heterogeneous agents to better design sustainability transitions policy’, (2016) 37 *Global Environmental Change* 102.

183 As in the case of the multi-level perspective of socio-technical transitions discussed in Geel, above n. 174.

184 See above n. 159.

185 Environmental Protection Agency, Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 80 Fed. Reg. 64,662 (October 23, 2015). From the perspective of China, a change of development model greatly contributed to setting new priorities in international climate negotiations. See I. Hilton, O. Kerr, ‘The Paris Agreement: China’s ‘New Normal’ Role in International Climate Negotiations’ (2016) 16 *Climate Policy*, forthcoming.

186 Clean Air Act, 42 U.S.C. §7401 et seq. (1970).

187 *Massachusetts v. EPA* 549 U.S. 497 (2007).

the implementation of the CPP following legal action from a group of affected federated States and companies.<sup>188</sup> The challenge of the CPP provides a textbook illustration of how the stakeholders that are more involved in the current socio-technical regime and that, as a result, would lose more from a regime change can use legal means to hinder a sustainability transition or, at least, to gain time.

A similar analysis can be conducted in connection with the resilience of the energy transition policies (e.g. Feed-in-tariff schemes) adopted by countries around the world, from Canada, to Spain, the Czech Republic or India, when assessed from the standpoint of international trade and investment law. Depending on the specific legal form of an energy policy intervention (e.g. whether the instrument has been adopted following due process standards, or is more or less proportional, or whether it subjects foreign and domestic producers and investors to different treatment), its legal resilience will not be the same, because it may be challenged before an international trade or investment tribunal.<sup>189</sup> Very often, however, as for the CPP, the features challenged are legal enablers necessary to make the adoption of the instrument politically possible.

A good illustration is provided by the subsidies scheme introduced by India to support local producers of renewable energy (solar) equipment. To understand the deeper implications of this case, it is useful to recall some conclusions of the literature on socio-technical transitions discussed earlier. One important aspect was the ‘first in, last out; last in, first out’ insight. Applied to China, South Korea, India and other emerging economies, this means that the cost of moving away from a given socio-technical regime and into a new one is lower for such a country, because it is less tied to the previous regime. In fact, embracing the new technology may provide a competitive advantage if and when the new socio-technical regime (based on a low-carbon energy matrix) becomes dominant. From a political perspective, it is then reasonable to expect that India will move in the direction of the new socio-technical regime not only because there are global benefits relating to climate change mitigation but also because, by doing so, it may give its industry an opportunity to position itself in the emerging socio-technical regime. This is precisely what the Indian renewable energy support scheme (India Solar Mission) tried to achieve by including local content (‘buy

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188 Order in pending case, *West Virginia et al v. EPA et al* (February 9, 2016), 577 U.S.

189 See Jorge E. Viñuales, *Foreign Investment and the Environment in International Law* (Cambridge University Press, 2012, reprint 2015).

local') requirements. In order to participate in government electricity purchase programme introduced by India, a producer of electricity from renewable sources had to source its equipment from Indian producers. Such a measure is normally illegal under both international trade and investment disciplines and, following legal action from the United States and others, a trade panel constituted under the aegis of the WTO found India in breach of its international trade obligations.<sup>190</sup>

Underlying this ruling – and the trade rules on which it is based – is the idea that trade must be liberalised to promote efficiency based on comparative advantage reasoning. If a foreign producer of solar energy equipment abroad is more efficient (it produces and sells at a lower price) than an Indian one, then its advantage must not be neutralised by governmental interference (protectionism). However, the operation of the rules can also be assessed in a different light. The overall operation of trade rules could be seen as an obstacle to an energy transition in one of the two most populated countries of the world. To the extent that for a country such as India it is not realistic to move massively into renewable energy if that amounts to subsidise foreign producers of renewable energy equipment, rather than local ones, then the question is whether we are serious in our constant efforts (including complex and costly climate change negotiations) to push emerging economies into a low carbon energy matrix. It may be theoretically possible to ask such countries to both move into renewables and buy foreign products, as trade law seems to require, but it is hardly realistic and, even if they could be pushed into that direction, it is not necessarily fair. It may be useful to recall here the discussion earlier in this article regarding global exchange systems, and the protectionist position taken by developed countries at the stage when they were developing new industries and technologies. Irrespective of the policy (and political) stance one may take on this question, the relevance of law and legal form in promoting or hindering sustainability transitions can hardly be questioned. As for the deeper normative question of the values that should be advanced by legal frameworks, this is also an area where law can play a major role.

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190 *India — Certain Measures Relating to Solar Cells and Solar Modules, Report of the Panel*, 24 April 2016, WT/DS456/R.

### 5.3.4. Legitimising the transition

A different conception of law underpins discussions of its role in providing legitimacy. Although a form of legitimacy may be granted to a regulatory system as a result of its effectiveness in reaching certain goals (results-based legitimacy), these very goals arise from a prior value or normative choice. Thus, even the conception of law as a technology or a regulative mechanism pursuing goals set by science is not value free. It is simply an approach to fine-tuning the instrument – laws and regulation – to make it fit for purpose. But, a more fundamental role played by law is to translate into an institutional form (even when such institutions consist of an understanding of what customary or ‘common’ law is) some foundational values, particularly the organisation of a community (often enshrined in the ‘organic’ part of constitutions, including devolution of powers and institutional checks and balances) and certain rights and guarantees (whether called ‘amendments’ or ‘constitutional rights’).

Much like the standard ethical systems discussed by Hans Jonas,<sup>191</sup> modern constitutional systems are broadly based on an understanding of human agency that is challenged by the Anthropocene narrative. The modern conceptions of liberty and equality and the articulation between these two fundamental values are based on a culture of ‘progress’, understood as the human ability to increasingly push back natural constraints, as well as of emancipation through freedom from nature and abundance with no impact on nature. Several significant contributions have been made to highlight the anthropocentric underpinnings of modern constitutions as well as to reformulate constitutionalism from an environmental perspective.<sup>192</sup> In a recent book, Louis Kotzé has investigated the

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191 See above n. 45.

192 See particularly, in the German constitutional scholarship, the works of R. Steinberg, *Der ökologische Verfassungsstaat* (Frankfurt am Main: Suhrkamp, 1988) (relying on the earlier work of M. Kloepfer, who saw the environment as an intrinsic element for the existence of the State, now reinterpreted as ‘Umweltstaat’, Steinberg argues for a ‘ecological constitutional State’ in which protection of the environment is both instrumental (anthropocentric) and an end in itself); K. Bosselmann, *Im Namen der Natur: Der Weg zum ökologischen Rechtsstaat* (Bern: Scherz, 1992) (introducing the conception of an ecological rule of law, which seeks to depart from the overwhelmingly human-centred conception of modern constitutions, with its focus on human development as pushing the limits of – indeed, destroying – nature). In North-American constitutional scholarship the contributions follow a more empirical and comparative approach (see e.g. D. R. Boyd, *The Environmental Rights Revolution: A Global Study of Constitutions, Human Rights, and the*

implications of the Anthropocene narrative for the understanding of constitutional law in a comparative and international perspective.<sup>193</sup> Relying on previous work on environmental constitutionalism, he explains that constitutional intervention for environmental protection is seen as the most effective – because the most fundamental – form of legal intervention. At the constitutional level, the relations between humans and nature can be genuinely redefined from a normative perspective, much in the same way as – in his experience as a South African – constitutional law has been able to structure South Africa’s transition out the apartheid regime. He then reviews different ways in which the main dimensions of constitutionalism, including the rule of law, separation of powers, judicial review, constitutional supremacy, democratic rule and constitutional rights, could be revisited from an environmental protection perspective. Despite the significant effort displayed in this account, its fundamental premise seems to remain that an environmental reformulation of constitutional law, and its possible generalisation at the international level, are the best legal means to rise to the unprecedented challenge posed by the Anthropocene. As noted by Kotzé:

‘The central hypothesis of this book is that ‘ordinary’ non-constitutional law, while crucial to mediating the human-environment interface, will not be sufficient to do so on its own in the Anthropocene. A form of constitutional law, most clearly explicated by environmental constitutionalism, is required to confront Anthropocene exigencies because of the social, political juridical and regulatory advantages that constitutionalism holds out over ‘ordinary’ non-constitutional law.’<sup>194</sup>

Perhaps this is to say that ‘environmental law’ alone or, more specifically, ‘ordinary’ environmental law will not be sufficient to rise to the challenge. In that case, I can only agree. But I am less persuaded that an environmental re-interpretation or even re-design of constitutional law is the most that can be done from a legal perspective. As I have endeavoured to show throughout this article,

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*Environment* (Vancouver: UBC Press, 2012) and J. R. May, E. Daly, *Global Environmental Constitutionalism* (Cambridge University Press, 2014)) although there have been major contributions to the reformulation of foundational legal categories (a classic example is C. Stone, ‘Should Trees have Standing? Towards Legal Rights for Natural Objects’ (1972) 45 *California Law Review* 450. Louis Kotzé provides a lucid account of these and other contributions in Kotzé, above n. 14, pp. 136-151.

193 Kotzé, above n. 14.

194 *Ibid.*, at 177.

there are myriad ways in which law has over the last centuries prompted and sustained the advent of the Anthropocene, and they may all be engaged in attempting to manage our new geological era.

Changing the top of the pyramid would certainly be a major step. But what exactly is to be considered the top of the normative pyramid? Is it the constitution, understood from a top-down hierarchical perspective of law? Is it the bottom-up law of an inverted pyramid that governs commercial transactions, payments, property, labour, business organisation, and many other areas of human activity? Is it the international legal frameworks organising broad international flows of goods, services, capitals, people, waste, resources, knowledge or culture? Is it the very legal concepts pervading European-rooted legal discourse, whether constitutional or other, which carry a dominating and unsustainable ontology of human relations to the world? Is it all of these and other ways in which law influences human behaviour at once? My view is that, at least from a methodological perspective, we must take the time to revisit all these different dimensions. But the more we include, the higher the need for a meaningfully structured inquiry identifying a limited set of questions that relates to the inquiries conducted in other disciplines, whether in the humanities, social or natural sciences. We (environmental) lawyers need to stop speaking mostly to each other and start engaging more widely with others, lawyers and non-lawyers alike, about the role of law in the Anthropocene narrative. We need to do it in a way that is intelligible to others, that can be integrated into the broader collective enterprise or at least that can shed light on other lines of research.

## 6. LAW AND THE ANTHROPOCENE: A RESEARCH AGENDA

The purpose of this last section is to pull all the threads unwound in the previous pages in order to provide a concise and hopefully meaningful agenda to guide legal research on the different dimensions of the Anthropocene. Importantly, the proposed agenda must be capable of integrating legal inquiry into the broader interdisciplinary efforts aimed at understanding the Anthropocene. For this reason, each the three previous sections started with a detour or, in other words, a reference to the wider debate in the humanities, social and natural sciences, which

provide both the foundations and the connection with the legal research agenda developed here. Within these broader questions, the proposed agenda must identify questions that are apposite for legal inquiry, i.e. questions for which legal inquiry is capable of providing relevant answers that cannot be provided from other disciplines. Finally, the agenda must both select an appropriate set of legal questions of sufficient generality and organise them into an overall coherent framework.

Based on these considerations, I would like to offer the following research agenda aimed at understanding the role of law in prompting, sustaining and potentially managing the Anthropocene:

### **1 Dualism**

#### *1.1 Broader inquiry:*

*The Anthropocene narrative challenges the widely held assumption that human progress consisted of pushing natural frontiers and constraints, within a natural theatre deemed to be immutable in a human timeframe. Such frontiers were seen as less and less relevant to understand human behaviour and dynamics as science and technology – hence human powers over nature – progressed. Instead, the Anthropocene narrative suggests that human and natural histories are intertwined, even within a short – human – timeframe, because what was believed to be progress with no adverse impact on the ability of the Earth system to regenerate is in fact modifying major geological cycles to such an extent that humans are a geological force whose impact on the Earth will be felt both in natural cycles and by humans themselves.*

#### *1.2 Within this broader inquiry a cluster of legal questions can be identified regarding:*

- i) The extent to which and the processes through which law and legal concepts have been detached from nature, and the implications for the advent, sustaining and potential management of the Anthropocene;*
- ii) The extent to which law and legal concepts can express the unprecedented level of responsibility of humans as a geological force driving the Anthropocene;*
- iii) The extent to which legal orders can be adjusted through additional layers of norms – such as environmental law – or, instead, require a deeper reformulation of foundational concepts, with the ensuing imbrications of such reformulations, to address the challenges of the Anthropocene.*

## **2 Inequalities**

### *2.1 Broader inquiry:*

*Stating that 'humans' are the geological force behind the Anthropocene conceals profound intra-species inequalities between regions and groups of people in prompting, sustaining or suffering from the unsettling of natural cycles unveiled by the Anthropocene narrative. Understanding such inequalities is important both for allocating responsibilities and for addressing the social dynamics that prompted and sustained the Anthropocene and will in all likelihood affect some groups more than others.*

### *2.2 Within this broader inquiry a cluster of legal questions can be identified regarding:*

- i) How the legal organisation of production – including the law governing business organisation, labour relations, and effects on third parties – is related to the inequalities underpinning the Anthropocene;*
- ii) How the law governing exchange systems at the internal (including imperial) or international (bilateral, regional, global) levels is related to the processes prompting and sustaining the Anthropocene;*
- iii) How law can be used to allocate responsibilities for the past, present and future adverse impacts unveiled by the Anthropocene narrative among past, present and future groups of people and generations.*

## **3 Transitions**

### *3.1 Broader inquiry:*

*Given the role of energy, transportation, agriculture and other foundational activities in prompting and sustaining the Anthropocene, it is necessary to understand the dynamics of transitions to other socio-technical regimes, including the emergence of pioneering technologies, the necessary period for their refinement and diffusion, the many resistances from prior entrenched interests and, more generally, the many trade-offs entailed by the transition.*

### *3.2 Within this broader inquiry a cluster of legal questions can be identified regarding:*

- i) Ways to improve law and regulation as a technology to address the challenges of the Anthropocene;*
- ii) Ways in which law can promote or, conversely, hinder attempts to transition from one unsustainable socio-technical regime to a sustainable one;*
- iii) Legal ways of organising processes to legitimise the choices entailed by such a transition.*