Introduction

This book has three interwoven theses: The first of these concerns the Anthropocene era and contends that a more accurate understanding of the history of natural law and its impact on the development of modern Europe, which, significantly, focuses and draws on previous transformations of the concept of nature, will facilitate the addressing of key current issues in respect of that era. The second concerns the metaphysics of human nature and nature more broadly and contends that the sceptical denial of the light of moral nature and of its epistemological freedom is related to the disappearance of nature as a sacred space. The third thesis concerns the modification of natural law in England during the seventeenth century and contends that the most important seventeenth-century scientists/natural lawyers buttressed their liberal politics by means of philosophical and ethical necessitarianism. The naturalism and scientificism of necessity and needs constituted the means by which they separated moral and theological issues from governmental matters, to advocate a threshold of necessities to which each human being and each citizen is entitled and to foster the inauguration of a monetary economy. Accordingly, the first three parts of this introduction deal with the new 'Empire over nature', the context of epistemological scepticism and the new political economy of necessity. This book therefore chiefly enquires into the relations between natural law and the evidence we find of competing metaphysics of the past.[1] It asks why, despite fundamental differences, the English liberal natural lawyers agreed on so much as to the new natural law. The first three parts of the introduction are roughly divided between utopian, materialist and realist metaphysics. The fourth and fifth parts deal respectively with methodological questions and provide an overview of the chapters.

[1] On the knowledge of the past through evidence, see Aviezer Tucker: 'Historiography makes no observations of historical events, but presents descriptions or representations or constructions of such events in the presence of evidence'. Aviezer Tucker, 'Historical Truth', in Vittorio Hosle (ed.), *Forms of Truth and the Unity of Knowledge* (Notre Dame: University of Notre Dame Press, 2014), p. 238.

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I Altering the Perception of Nature

Humankind's dominance of nature was articulated as a new geological epoch starting in the latter part of the eighteenth century and termed the 'Anthropocene' by chemist Paul J. Crutzen and biologist Eugene F. Stoermer more than twenty years ago. The measure they applied in assigning dates to this era was the evidence of measurable global effects of human activities, such as the concentration of 'greenhouse gases', that started during the nineteenth and twentieth centuries. Envisaging that humankind would continue to be 'a major geological force' for thousands and even millions of years to come, their proposal was to think strategically about ways in which to develop sustainable ecosystems.[2] Dominance of nature was a common trope of scholastic theology, and theologians ranging from Thomas Aquinas to Francisco de Vitoria, the leader of the Salamancan School, held that it was founded in Scripture.[3] Theologians accordingly took dominance over nature to be scriptural in origin and natural to human beings in respect of the use of nature. Further, they viewed the design of nature as being subject only to the power of God.[4] The political dream of being Lords (as Anthony Pagden described them) of all the world in the Spanish, French and British Empires had little to do with a scientific 'empire over nature', however appealing that Lordship was felt to be in relation to extracting natural resources from the new territories.[5] Instead, the ethical standpoint of reverence towards nature was dismissed among the ranks of natural scientists involved in the emerging Scientific Revolution. Consequently, the notion of nature had to be altered in such manner that its domination was permissible. Cruzen and Stoermer's chronology coincides with scholars' acknowledgment of a change in

[2] Paul J. Crutzen and Eugene F. Stoermer, 'The "Anthropocene"', 41 *Global Change Newsletter* (Stockholm: Royal Swedish Academy of Sciences) (2000), pp. 17–18.

[3] See Chapter 6.

[4] Thomas Aquinas, *Summa theologiae* q. 66 a.1. co; de Vitoria Francisco, *Comentarios a la Secunda secundae de Santo Tomás*, Vicente Beltrán de Heredia (ed.) Vol. III *De Justitia*, qq. 57/66, (Salamanca: Apartado 17, 1934), q. 66 art. 1, 73; Jaime Brufau Prats, 'La noción analógica del dominium en Santo Tomás, Francisco de Vitoria y Domingo de Soto' 4 *Salmanticensis* (1957), pp. 96–136; Annabel Brett, *Liberty, Right and Nature. Individual Rights in Early Scholastic Thought* (Cambridge: Cambridge University Press, 1997), ch. 4; Martti Koskenniemi, *To the Uttermost Parts of the Earth: Legal Imagination and International Power, 1300–1870* (Cambridge: Cambridge University Press, 2021) p. 150.

[5] Anthony Pagden, *Lords of All the World: Ideologies of Empire in Spain, Britain and France c. 1500-c. 1800* (New Haven: Yale University Press, 1998); Manuel Jimenez Fonseca, 'Civilizing nature. Revisiting the Imperial History of International Law 1511–1972' (PhD, Finland: University of Helsinki, 2017).

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attitude towards 'nature' and the argument that that transformation was one important factor in the eighteenth-century Enlightenment and the beginning of the Industrial Revolution.[6]

This book situates that change in the perception of nature in the previous century, when scientists set out to 'range, anatomize, and ransack nature'.[7] The novelty of this way of thinking lies in the way in which the faraway and exotic 'Other' was no longer the party candidly designated as a victim in the process of plundering and pillaging.[8] Now 'nature', simply and universally, ought to be ransacked. The new trend was to demystify nature, multiply it and transmute it. For the most part, leaving behind old occult practices and alchemy, how to do that lay in new knowledge. 'Man's power over the creatures depends chiefly upon his knowledge' wrote Robert Boyle (1627–1691).[9] Boyle was the foremost natural scientist and philosopher of nature of the era, brilliant in the extreme, though also extremely pragmatic as to his goals. It is unsurprising to find that two centuries later Friedrich Nietzsche defined science in exactly that manner in his *Will to Power*: 'the transformation of nature into concepts for the purpose of mastering nature.'[10] Apparently he wrote that approvingly.[11] There is a fine line between mastering and ransacking nature that perhaps now we are starting to sense. Hence, new theories about 'Earth Stewardship'

[6] Margaret C. Jacobs points to a text of mechanics of 1744 by Newton's assistant, John Teophilus Desaguliers (1683–1744) as the first with that 'critical insight'. See Margaret C. Jacob, 'The Cultural Origins of the First Industrial Revolution', in Marcus Hellyer (ed.), *The Scientific Revolution: The Essential Readings*, (Oxford: Blackwell Publishing, 2003), p. 212; Joel Mokyr, *A Culture of Growth: The Origins of the Modern Economy* (Princeton: Princeton University Press 2016).

[7] Robert Boyle, 'Of the Usefulness of Experimental Philosophy, The First Part, Principally as It Relates to the Mind of Man' in *The Works of Robert Boyle*, vol. 3 (London Pickering and Chatto, 1999), p. 237.

[8] On some of the 'Others', see for instance, Anne Orford (ed.), *International Law and Its Others* (Cambridge: Cambridge University Press, 2009), pp. 245–386; Anthony Anghie, *Imperialism, Sovereignty and the Making of International Law* (Cambridge: Cambridge University Press, 2005).

[9] Robert Boyle, 'Of the Usefulness of Experimental Philosophy'. The Second Part. Second Section, in *The Works of Robert Boyle*, vol. 6, p. 436.

[10] 'Science – the transformation of nature into concepts for the purpose of mastering nature – belongs under the rubric "means". But the purpose and will of man must grow in the same way, the intention in regard to the whole.' Friedrich Nietzsche, *The Will to Power*, Walter Kaufmann and R. J. Hollingdale (trans.), Walter Kaufmann (ed.) (New York: Vintage, 1967 (1901, 1906)), section 610.

[11] Eli I. Lichtenstein, 'Revaluing Laws of Nature in Secularized Science', in Y. Ben-Menahem (ed.), *Rethinking the Concept of Law of Nature: Natural Order in the Light of Contemporary Science* (Cham: Springer, 2022), pp. 347–377.

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turn to older traditions to revive aesthetic and moral appreciations of nature, and even to spiritual and sacred conceptions of ecological knowledge.[12] There is something about nature, scholars appear to argue, that we cannot know by simply dissecting and anatomizing it.

And yet, nature was necessary. Nature embodied the epistemic necessity of the new mechanical world. This time it was not a potential source of precious metals but of laws of motion and regularities. Laws followed principles, including the principle of causal necessity. Without nature as a container or perhaps the very articulation of all those necessary laws, what would be there to study? Moreover, knowledge about that nature was the driving force of much of the intellectual movement of the period. Transformations in the concept of 'law' in science towards 'law' either fully ruling the universe or being incapable of ruling it at all also followed from changes in the notion of 'nature'.[13]

II Nature and The Light of Nature

Utopian theology gave epistemological impetus to science. There was still so much to learn from a world created by an omnipotent God, but that was a theology without human beings. Its counterpart, the pragmatism of scientists, was the result of how they had decided to step in to replace the *designer of nature.* The idea of conceiving nature as something sacred had been in the Christian tradition that human and non-human nature alike had been created to give glory to God the Creator, each according to their specific nature. Therefore, there was a purpose to nature. By the mid-seventeenth century, on the grounds of its inviolability and the boundaries to human knowledge and dominion that it established, 'the unnecessariness of such a nature' deserving any kind of 'veneration' was declared.[14] Further, the rational human being no longer seemed to be part of nature. In the new natural law, every human being appeared a mystery.

[12] See Shan Gao, 'Aesthetic and Moral Appreciation of Nature in Philosophical Traditions of China'; Fausto O. Sarmiento, 'The Antlers of a Trilemma: Rediscovering Andean Sacred Rites'; Vicenta Mamani-Bernabé, 'Spirituality and the Pachamama in the Andean Aymara Worldview', all in Ricardo Rozzi et al. *Earth Stewardship. Linking Ecology and Ethics in Theory and Practice* (Cham, Heidelberg, Dordrecht, London, New York: Springer, 2015).

[13] See Lorraine Daston and Michael Stolleis (eds.) *Natural Law and Laws of Nature in Early Modern Europe. Jurisprudence, Theology, Moral and Natural Philosophy* (Surrey, Burlington: Ashgate 2008); John Dupré, *Metaphysical Foundations of the Disorder of Things* (Cambridge, Mass: Harvard University Press, 1995); Brett, *Liberty, Right and Nature.*

[14] Boyle, *A Free Enquiry into the Vulgarly Receiv'd Notion of Nature*, in *The Works of Robert Boyle*, v. 10, p. 485.

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If left to their own judgment, they were a threat to all humanity, and in spiritual terms they were called to respond to none but their God and conscience. What could be specifically natural about that? At the same time the human body became a central source of concern. An old Greek-Arabic tradition of household economics taking the physical needs of human nature as the foundation of politics resurged in Europe through new Latin translations. These ideas entered the philosophy of natural law quietly but firmly during the early modern period. Further, the moderation of living 'to or neere the necessity of nature', throwing off whatever threatened to interfere with a life of simplicity, was considered the model for the Reformed individual.[15] Nature, clearly articulating human necessities, represented thus the ideal of a virtuous Protestant. Around the middle of the seventeenth century the bottom line was that nature was considered to be a stream of constant needs experienced by human beings, which determined much of what followed in terms of virtue and sociability.

This physicalist idea about human nature was central to many Christian natural lawyers in seventeenth-century England working within the new science. The book explores the mixed vocation of Thomas Hobbes, Robert Boyle and John Locke, being at once natural scientists, economists, medical doctors, (al)chemists, theologians and philosophers. In the history of international law they are usually dealt with in terms of their 'philosophy of law' understood in a lego-juristic sense – except for Boyle who is usually omitted. But as a phenomenon extending now much further than 'treaties' or 'diplomatic endeavours', and encompassing all kinds of global matters and questions, both of social and of natural sciences, international law can benefit greatly from the rich approach to law that natural lawyers themselves adopted.

By emphasizing the physical aspects of the body within the pervasive dualist ideas of the period, such as Neoplatonism or Cartesianism, the great natural lawyers of the seventeenth century put aside the more intellectual view of human nature. In a period in which human beings were becoming masters and lords of empirical knowledge the light of nature was obscured. The classic notion of the light of nature illuminated the mystery of how individuals from all places and eras have searched for the good life, the virtuous life. Since Aristotle the light of nature had a

[15] In a letter from Sir Cheney Culpeper (1601–1663) to Samuel Hartlib (1600–1662), '7 November 1649', in M. J. Braddick and M. Greengrass (eds.), and Introduction, *The Letters of Sir Cheney Culpeper (1641–1657)*, (Royal Historical Society Camden Series, Vol VII, 1999), p. 360.

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divine connotation. In Christian theology it was either the image of God implanted in each human being, or a certain participation in the eternal law in the divine intellect.[16] Christian natural lawyers of previous centuries had even conceived human nature, soul and body, as 'reason'. That was true of the biologist-theologian Albert the Great.[17] For his disciple, Thomas Aquinas, moral natural law was, famously, participation in eternal reason, in a great part by means of the light of nature.[18] Despite the weakening consequences of the Fall, it was thought that a human being can think, decide and view things in the world as God had created them and wished them to be. This was a spiritual or indeed a divine conception of reason, of nature and of law, unconcerned with future burgeoning struggles among philosophers of history to explain the past in terms of necessity and contingency.[19]

As recovered by the first liberals in terms of necessities, human nature again became part of a cosmology, similarly to what had been before in the natural law period of theologians. It once more encompassed political thought, natural science, religion, natural law and the incipient science of political economy. However, natural law had undergone a complete transformation, as had nature. But, after all, nature was necessary. The needs of human beings imposed themselves in the articulations formulated by social sciences, leaving very little to the

[16] See Chapters 1 and 5.

[17] Alberti Magni, *De bono*, in *Alberti Magni opera omnia*, tomus XXVIII), Henricus Kühle, Carolus Feckes, Bernhardus Geyer (Proldgomena), Wilhemus Kübel, ediderunt, (Aschendorff: Monasterii westfalorum in aedibus, 1951), pp. 259–271; Albertus Magnus, *Ethica*, ed. Borgnet, vol. VII (Paris: Louis Vivès, 1891); Georg Wieland, *Zwischen Natur und Vernunft: Alberts des Grossen Begriff vom Menschen*, Lectio Albertina 2 (Münster 1999); Jörn Müller, *Natürliche Moral und Philosophische Ethik Bei Albertus Magnus* (Münster: Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters: Neue Folge 59, 2001); Stanley B., Cunningham, *Reclaiming Moral Agency: The Moral Philosophy of Albert the Great* (Washington, DC: Catholic University of America Press, 2008).

[18] Aquinas, *Summa theologiae*, I-IIae, q. 94; Riccardo Saccenti, *Debating Medieval Natural Law: A Survey* (Notre Dame: University of Notre Dame Press, 2017); Odon Lottin, *Le droit naturel chez Saint Thomas d'Aquin et ses prédécesseurs*, (Bruges: C. Beyaert, 1931); Martin Grabmann, 'Das Naturrecht der Scholastik von Gratian bis Thomas von Aquin. Nach den gedruckten und ungedruckten Quellen dargestellt', 16 *Archiv für Rechts-und Wirtschaftsphilosophie* (1922/1923), pp. 12–53; Brett, *Liberty, Right and Nature*, pp. 88–97; on Aquinas and *ius gentium* but also illuminating for natural law see, Koskenniemi, *To the Uttermost Parts of the Earth*, pp. 78–83; see also how the light of nature appeared in the legists in Rudolf Weigand, *Die Naturrechtslehre der Legisten und Dekretisten von Irnerius bis Accursius und von Gratian bis Johannes Teutonicus* (Munich: Hueber, 1967).

[19] Yemima Ben-Menahem, 'Historical Necessity and Contingency', in Aviezer Tucker (ed.), *A Companion to the Philosophy of History and Historiography* (Chichester: Wiley-Blackwell).

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imagination or poetic mind. Moreover, in this new cosmology, nature could be the problem, as Hobbes had stated, or the solution, as in Boyle's theory. All the goods of nature could be multiplied and offer food and occupation for human beings' needs and their multitude of desires. In a century when all authors proclaimed the obscurity and even the extinction of the divine light of nature, the death of sacred nature as described above was being planned.[20] It is impossible to take a scientific stand about a causal necessity between these two events. Instead, I suggest that since they were unable to understand themselves and the earth as part of a unified Creation, natural scientists opted to squander recklessly what was appraised as their inheritance.

III Needs, Politics and Money

The book contends that Hobbes and Locke developed their natural law and political theory revolving around a novel doctrine of necessity and of necessities. The utopian moment in the history of Europe described above is observed from the perspective of the doctrine of necessities and comprises the promise of unlimited knowledge and unlimited economic growth – significantly through nature – in circumstances of great freedom of thought. The standpoint of the philosophers of necessity is described in the book as a response to that utopian moment, tempering that enthusiasm for the sake of the safety and well-being of human beings.[21] In making this argument, several key transformations in the conception of nature and of money are uncovered that have not thus far received attention in the histories of natural law, international law and political economy.

A neutral, scientific idea of money has been instrumental in shaping the global legal order. But it is an open question whether there are other possible explanations of what money is. Also, the debate about whether scientific money would be the best instrument for devising the public good is as old as the scientific money itself. History and theories of natural

[20] See also Carolyn Merchant, *The Death of Nature: Women, Ecology, and the Scientific Revolution* (San Francisco: Harper San Francisco, 1990).

[21] 'For seeing every man, not only by Right, but also by necessity of Nature, is supposed to endeavour all he can, to obtain that which is necessary for his conservation; He that shall oppose himself against it for things superfluous, is guilty of the warre that thereupon is to follow; and therefore doth that, which is contrary to the fundamentall Law of Nature, which commandeth to *seek Peace*. The observers of this Law, may be called Sociable'. Hobbes, *Leviathan*, Noel Malcolm (ed.), ch. 15, p. 232.

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law, political economy, sociology and economics teach that money may be described in the following ways: as debt, credit, a medium of exchange, a lasting 'thing' that is not really a thing, but a measure of value, a social instrument, a political weapon, a storage facility for power, willpower, speculators' fantasy, an idol … Money is a complex reality that is particularly political and moral (a) in its relative independence from underlying reality, (b) in the way it may be distributed and (c) in the way that it is pursued within and outside the commonwealth and aligned with its principles or detached from them.

Ethical, political and economic concerns about economic inequality, the depoliticization of money and the ensuing undemocratic practices heightened after the 2008 financial crisis have prompted the resurgence of the debate about what money constitutes.[22] Despite important recent exceptions, for the most part public international law follows mainstream economics in keeping their distance from these debates.[23] Thus, international lawyers continue to reduce money to a formal medium and represent it as a 'black box' and as a function of other forces and institutions. This under-theorization veils the more theoretical and foundational thinking about what money is, undertaken within the old European tradition of theological and monetary thought, but also carried out by twentieth- and

[22] Aristotle, *Politics*, Ernest Barker trans., revised with an Introduction and Notes by R. F. Stalley (Oxford University Press, 1995); John Locke and Patrick Hyde Kelly (eds.), *Locke on Money. Vol. I and II* (Oxford: Clarendon Press, 1991); John Smithin, *Controversies in Monetary Economics* (London: Elgar Publishing, 2003); Geoffrey Ingham, *The Nature of Money* (Cambridge: Polity Press, 2004); Christine A. Desan, *Making Money: Coin, Currency and the Coming of Capitalism* (Oxford: Oxford University Press, 2014); Samuel Bowles, *The Moral Economy: Why Good Incentives Are No Substitute for Good Citizens* (London, New Haven: Yale University Press, 2016); Joseph Huber, *Sovereign Money: Beyond Reserve Banking* (London: Palgrave Macmillan, 2017); Diane Coyle, *Cogs and Monsters: What Economics Is and What It Should Be* (Princeton: Princeton University Press, 2021); Stefan Eich, *The Currency of Politics: The Political Theory of Money from Aristotle to Keynes* (Princeton: Princeton University Press, 2022).

[23] Rosa M. Lastra and others, 'Central Bank Money: Liability, Asset, or Equity of the Nation?' *Rebuilding Macroeconomics Working Paper Series, Working Paper No 20*, 25.11.2020; Rosa M. Lastra and Marcelo J. Sheppard, 'Ethical Foundations of Financial Law', in Costanza A. Russo, Rosa M. Lastra and William Blair (eds.), *Research Handbook on Law and Ethics in Banking and Finance* (London: Elgar Publishing, 2019); Isabel Feichtner, 'Law of Natural Resource Extraction and Money as Key to Understanding Global Political Economy and Potential for Its Transformation', in Poul F. Kjaer (ed.), *The Law of Political Economy: Transformation in the Function of Law* (Cambridge: Cambridge University Press, 2020); Isabel Feichtner, 'The German Constitutional Court's PSPP Judgment: Impediment and Impetus for the Democratization of Europe' 21 *German Law Journal* (2020); see also the group of researchers in justmoney.org.

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twenty-first-century economists and contemporary sociologists, political economists and anthropologists.[24]

Phenomena such as that of financialization fundamentally defy the scientific and neutral explanation of money in ordering global monetary operations. Economists and political economists describe financialization as the increasing power of financial actors over the political world, society and the rest of the economy.[25] The term has 'parasitical' and negative connotations as money gradually acquires a fictitious nature, sovereign countries become heavily indebted to foreign private lenders and entrepreneurs become 'liquidified' by seeking profit for shareholders first and foremost.[26]

Today Locke's monetary ideas stand out in the context of historical monetary theory as one of the key languages that scholars employ to decode money in the contemporary global economic system.[27] One of the general concerns expressed in this literature pertains to the way in which money resists being considered a political issue in many spheres. My argument is that in his monetary writings Locke took money to be a representation of need and necessities, not of the private individual, as Aristotle had it, but of the necessities of the state, and in this manner

[24] John Maynard Keynes, *A Treatise on Money*. Vol I *The Pure Theory of Money*. Vol. II *The Applied Theory of Money* (London: Macmillan and Co., 1935; 1950 [1930]); Joseph A. Schumpeter, *History of Economic Analysis*, Elizabeth Boody Schumpeter (ed.) with an Introduction by Mark Perlman (New York: Routledge, 1987); Paul A. Samuelson, 'Some Aspects of the Pure Theory of Capital' 51 *The Quarterly Journal of Economics* (1937); Ingham, *The Nature of Money*; Bill Maurer, *How Would You Like to Pay? How Technology Is Changing the Future of Money* (Durham: Duke University Press, 2015); Stefano Sgambati, 'The Significance of Money: Beyond Ingham's Sociology of Money', 56 *European Journal of Sociology* (2014).

[25] Engelbert Stockhammer, Stefano Sgambati and Anastasia Nesvetailova, 'Financialisation: Continuity and Change – Introduction to the Special Issue' 2 *Review of Evolutionary Political Economy* (2021).

[26] Cédric Durand, *Fictitious Capital: How Finance Is Appropriating Our Future*, trans. by David Broder (Brooklyn, London: Verso, 2017); Tristan Auvray, Thomas Dallery and Sandra Rigot, *L'entreprise liquidée. La finance contre l'investissement* (Paris: Michalon, 2016); Stockhammer, Sgambati and Nesvetailova, 'Financialisation: Continuity and Change'.

[27] Joyce Oldham Appleby, 'Locke, Liberalism and the Natural Law of Money', 71 *Past and Present* (1976); Patrick Hyde Kelly, 'General Introduction: Locke on Money', in Patrick Hyde Kelly (ed.), *Locke on Money* (Oxford: Clarendon Press, 1991); Daniel Carey and Christopher J. Finlay (eds.), *The Financial Revolution in the British Atlantic World, 1688–1815* (Dublin, Portland: Irish Academic Press, 2011); Daniel Carey, 'Locke's Species: Money and Philosophy in the 1690s' 70 *Annals of Science* (2013); Daniel Carey (ed.), *Money and the Political Economy of Enlightenment*, Oxford University Studies in the Enlightenment (Oxford: Oxford Voltaire Foundation 2014); Christine A. Desan, *Making Money*; Katarina Pistor, 'From Territorial to Monetary Sovereignty' 18 *Theoretical Inquiries in Law* 2017; Stefan Eich, 'John Locke and the Politics of Monetary Depoliticization' 17 *Modern Intellectual History* (2020); Eich, *The Currency of Politics*.

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began the scientification of money.[28] On the one hand, Locke was interested in promoting the monetary interests that he considered fundamental for the commonwealth to thrive. But he also foresaw the dangers posed by money, which he thought could be tempered by robust construction of the public good.[29] By integrating Locke's theory of money into the interpretative prism provided by the Scientific Revolution, the aim of *The Necessity of Nature* is also to contribute to current debate in Lockean interpretations, between Locke as the 'Evangelical political theorist'[30] and Locke as 'the inaugurator of radical capitalism'.[31] Furthermore, it analyses his ideas of the public good, which, it is argued, are also founded on the doctrine of necessities, alongside more traditional interpretations.

IV Necessity and Liberalism

Thomas Aquinas is for the most part a sort of silent discussing partner in the context of this book – providing arguments but remaining in the background. Thomas Hobbes's proposal for a political philosophy sustained by a new and robust metaphysics represented a decisive change in the seventeenth century. Aquinas's metaphysical question, 'what is good?'

[28] A contemporary account of 'the scientification of politics' in the knowledge society, in Peter Weingart, 'From "Finalization" to "Mode 2": Old Wine in New Bottles?' 36 *Social Science Information*, (1997), p. 605.

[29] John Locke, *Two Treatises of Government*, ed. with an Introduction by Peter Laslett (Cambridge University Press, 1988 [1967]). See on Aristotle, money and needs, chapter 9.2.2. below.

[30] John Dunn, *The Political Thought of John Locke: An Historical Account of the Argument of the 'Two Treatises of Government'* (Cambridge: Cambridge University Press, 1969); James Tully, *A Discourse on Property: John Locke and his Adversaries* (Cambridge: Cambridge University Press, 1980); Ian Harris, *The Mind of John Locke: A Study of Political Theory in Its Intellectual Setting* (Cambridge: Cambridge University Press, 1994); Timothy Stanton, 'John Locke and the Fable of Liberalism' 61 *Historical Journal* (2018); Paul Bou-Habib, 'Locke, Natural Law and Civil Peace: Reply to Tate' 16 *European Journal of Political Theory* (2017); Mark Goldie, in *2021, The Carlyle Lectures: John Locke and Empire*. www.history.ox.ac.uk/event/the-carlyle-lectures-2021-john-locke-and-empire

[31] C. B. MacPherson, *The Political Theory of Possessive Individualism* (Oxford: Oxford University Press, 1962); Leo Strauss, *Natural Right and History* (Chicago: University of Chicago Press, 1953); John William Tate, 'Locke, God and Civil Society: Response to Stanton' 40 *Political Theory* (2012); Neal Wood, *John Locke and Agrarian Capitalism* (Berkeley: University of California Press, 1984). See also Helga Varden commenting on Hannah Arendt's critique of the confusion between work and labour, Helga Varden, 'Locke on Property', in Jessica Gordon-Roth and Shelley Weinberg (eds.), *The Lockean Mind* (Abingdon, New York: Routledge, 2022), ch. 44.

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was displaced. As discussed in Chapter 2, in the construction of his metaphysics, Hobbes no longer asks what is good, but 'what is necessary?' This shift makes Aquinas and Hobbes look like opposites. However, in reality 'necessity' was their point of contact. Annabel Brett's study as to the interpenetration of notions of nature and the city in early modern natural law is in this sense key to ascertaining how 'naturalness' in Aquinas's eternal law and in English authors from John Case to Hobbes responds to the inclinations of the human spirit.[32]

The importance of Islamic sources and their ways in contributing to the development of Christian natural law is articulated for the first time in this book.[33] Avicenna barely wrote anything on moral philosophy, except for short tracts pointing to the centrality of human needs in ethics and politics. In his important commentary on Aristotle's *De Anima* he argued against the idea of the unity of human nature, contending that the soul was not the form of the human body in the metaphysical sense. In this manner the union of soul and body, also in terms of morality and epistemology, was shattered.[34] Moreover, the fact that he was a physician and that his extensive writings were taught for centuries in all European faculties is also of relevance in seeking to understand lawyers and medical doctors' differing philosophical concerns. I analyse Locke's early training in medicine and describe the philosophical baggage that this education entailed by discussing among others some of the ideas of another great philosopher-physician, Galen (129–216).[35]

Understanding how the assumptions behind the notions of 'nature' in the 'philosophies of nature' and 'natural sciences' impacted on natural law, natural rights and political theory shows the benefits of narrowing the gap between the methods of legal reasoning and of scientific thinking. Thomas Hobbes and John Locke, whether consciously or unconsciously, tried to bridge that gap between science and law. Their new and highly sophisticated ideas on necessity produced novel ways of thinking about human freedom, government, natural law, the economy and, finally,

[32] 'The will and nature do not conflict always and in all things, for we choose many things which are by nature, such as life and health', John Case, *Sphaera civitatis*, quoted in Annabel S. Brett, *Changes of State: Nature and the Limits of the City in Early Modern Natural Law* (Princeton: Princeton University Press, 2011), on Aquinas, p. 72; and on Hobbes, ch. 5, p. 121.

[33] I have, of course, found guidance in the work of theologians and philosophers, such as Étienne Gilson, 'Avicenne et le point de depart de Duns Scot' 2 *Archives d'histoire doctrinale et littéraire du moyen age* (1927).

[34] See on Avicenna's dualism of soul and body, chapter 9.1.1. below.

[35] Dag Nikolaus Hasse, *Success and Suppression: Arabic Science and Philosophy in the Renaissance* (Cambridge, Mass.: Harvard University Press, 2016).

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nature. Therefore, the book sheds new light onto the early stages in the development of what we have come to think of as liberalism. In his recent Carlyle Lectures (Spring 2022) Samuel Moyn analysed the attempts of some Cold War political thinkers to rescue the project of liberalism, with the stated purpose of ascertaining what can we salvage from these ideas of equality and universalism that were once so appealing.[36] In approaching the topic from the perspective of the Scientific Revolution and philosophical theology, *The Necessity of Nature* offers new insights into liberalism's internal contradictions: its savage inauguration of the Anthropocene as against the reordering of political institutions with a view to achieving equality; the disintegration of the sacred notion of nature and the novel quasi-naturalness of economy; the enslavement of human beings on a massive scale; and the new centrality of human needs emerging as a premise for the flourishing of any political society. Some of the themes discussed in the book bring to the fore a reminder about the theology, the economics and the politics of science. Doing that in the context of the Scientific Revolution, it is hoped, produces a much more forceful argument about the allegiances of science. Although it is very real nowadays, the presence of a methodological abyss between natural sciences reasoning and legal reasoning is unfruitful and arguably potentially dangerous both for the planet and for humanity. However, even if methodological differences are assumed and it is accepted that natural sciences and legal science are fundamentally different, it may be argued that they are similar in one respect: both have an important political aspect. I accordingly hope to underline the seriousness of the business the philosopher of law is enmeshed in and the responsibility it entails – a point scholars from other disciplines usually realize – and that it is vacuous to leave decisions on important matters of human society and human life to natural scientists alone. I hope that the book will also reveal a new Locke to a larger audience, one that is less like a liberal individualist and more like the figure presented in the theological interpretations of his work, albeit also more complex than that – a complexity that I reveal through analysis of his medical career and his medical and monetary studies. Though ambiguous in some respects, Locke was generous in devoting much effort to thinking about the public good and was tremendously committed in the way he embraced the societal responsibility of the philosophers of law.

[36] Samuel Moyn, *2022 The Carlyle Lectures: The Cold War and the Canon of Liberalism* www.history.ox.ac.uk/carlyle-lectures

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V Outline of Chapters

The scepticism of the period from roughly 1645 to 1680 prompted English philosophers' attempts to rethink theology and moral and civil philosophy in their search for ideas concerning the common and the public good. This is the argument of Chapter 1. Ralph Cudworth's effort to overcome the challenges posed by fragmentation in religion and politics and to develop a philosophy helpful in uniting society, but not at the expense of liberty, demonstrate that Neoplatonism was an important force during that period. In a sceptical era, John Selden's contribution to particularism in natural law stands in parallel to the turn to universalism that was partly made possible by means of medical ideas gleaned from widespread study of Arabic medical works. A discussion of Sir Robert Filmer's life and key political ideas together with the principles of political economy he espoused follows. Given the disintegration of moral theology in that period, the commercialization of societal ties seems to have been unstoppable. Against the Macphersonian critique of possessive individualism, the chapter puts forward the opening argument that both Hobbes and Locke sought to tame the harsh society characterized by the use of credit they saw before them and that they chose to do so by means of political philosophy and natural law.

Chapter 2 analyses Hobbes's 'doctrine of necessity', which was famously so termed by Hobbes himself in his debate with Bishop Bramhall. It argues that by means of this doctrine's basis in the natural sciences Hobbes transformed natural law from an idealist to a pragmatic enterprise, from one based on natural rights to one characterized by the pragmatic employment of principles of necessity. The chapter discusses Avicenna's metaphysics of existence, through which he described 'nature', which gives precedent to what exists in the material world and depends on the necessitarian principle that 'whatever exists is necessitated by another'. Similarities between Avicenna's metaphysics and Hobbes's are analysed, and in respect of the latter the capacity of the doctrine of necessity to sustain a metaphysical framework for philosophy and politics is identified.

The implications for morality and natural law of Hobbes's skilful employment of Neoplatonist metaphysics such as Avicenna's, entailing a sharp division between the human soul and the human body, are spelled out in Chapter 3. This shows that the concept of need, rather than right is central to Hobbes's natural law and political theory. Judgments concerning needs, including the needs of others, represent a constant source of legitimacy for acting in the state of nature and in the commonwealth. A

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thorough analysis of the doctrine of necessity in *Leviathan*, Hobbes's masterpiece, follows. The superior and absolute sovereignty that *Leviathan* evaluates and proposes is the true and scientific concept of sovereignty in a commonwealth, by reference to the needs of human nature and also in accordance with divine command. Hobbes exploits his doctrine of metaphysics of necessity to explain that that type of absolute sovereignty is compatible with freedom; after all, each free act of every human being is necessary in the sense of a metaphysics of necessity. He also models the question of faith on the principle of necessity and famously asserts that all that was necessary to salvation was 'Faith in Christ', and 'Obedience to the law'.

Chapter 4 discusses the circle that formed around the intelligencer Samuel Hartlib (1600–1662). Its overarching argument is that utilitarian science offered guidance in finding the simplicity of the *unum necessarium* (Luke 10:42), a common theme exalted by contemporary Millenarianism of the Protestant cause. In practical terms, knowledge about necessities became the means to achieving that goal of faith. The scepticism of the period and its obvious corrupting effects on morality and devotion led to inventiveness in pursuit of substitutes for the classical moral principle of the light of reason. The Reformers worked towards a political and theological project of a utilitarian science as a means by which to reach God and reproduce Paradise on earth. Scientific knowledge about trade became central and was expressed, significantly, in the momentous Navigation Acts of 1651.

Next, I consider the theology and moral philosophy of the respected theologian and moral casuist, Robert Sanderson. The divine Sanderson despaired of the unfortunate consequences for practical morality of denying the responsibility and freedom of individuals. In its historical context his doubt amounted to finally rejecting the Calvinist doctrine of predestination. Scholars consider Sanderson's *Several Cases of Conscience Discussed in Ten Lectures in the Divinity School at Oxford* a main reference for Locke in the writing of the unpublished *Two Tracts of Government* and his foundational *Essays on the Law of Nature*. Sanderson's work sets out a moral philosophy of free will reinforced by mechanical overtones of necessary causality in reasoning. The chapter briefly analyses this type of 'mechanical conscience' and shows how Sanderson was committed to a *de facto* theory of government.

The natural philosopher Robert Boyle, mentor of John Locke, took the view that the aim of science was 'the Empire over the Creatures'. The task of Chapter 6 is to show how Robert Boyle's new political system for an

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economics of natural science, primarily involving the utilitarian exploitation of nature and of trade, is connected with his contribution to the development of a form of natural law and natural philosophy shorn of moral natural law. That idea drew on classical theological teachings on dominion over creatures (as set out in Genesis 1:26) together with the economic goal of making natural sciences productive – also considering the significant expansion that the British Empire was undergoing at that point in time – and a heterodox programme with alchemical roots by which anything in nature could be transmuted into another thing. Theological principles about an omnipotent and bountiful God were crucial to Boyle's plans for the achievement of broader management of nature, but as a rule he avoided consideration of anthropological theology in his scientific writings. A close reading of *Of the Usefulness of Experimentall Natural Philosophy* and of the *Aretology* helps in articulating these ideas.

Chapter 7 examines Benjamin Worsley's manifesto of natural sciences that contained utopian ideas about human capacity to overcome death, if only the right scientific approach and the right moral attitude could be achieved. Boyle was inspired by his good friend and mentor when theology and experiment became the core of his work as a natural scientist. Revelation substituted what Boyle believed was the impossibility of grasping moral natural law rationally. Therefore, the study of moral natural laws is practically irrelevant in his work. Boyle moved constantly between a self-sufficient and mechanistic idea of the physical world and recourse to an infinitely wise God as a guide to human knowledge. He wrote several ambitious works on these issues, which are nowadays considered foundational to the Scientific Revolution but remain practically unknown beyond specialist circles. The chapter looks in particular at *The Origine of Formes and Qualities according to the Corpuscular Philosophy* and *A Free Enquiry into the Vulgarly Receiv'd Notion of Nature*. These works articulate Boyle's ambition to transmute everything in nature and his momentous critique of nature, a metaphysical concept that had been part of Western culture since at least the era of the great Greek philosophers.

The transformation of the politics of government towards material necessities has deep roots in Locke's work. This is the argument of Chapter 8, which first assesses the controversy over 'matters indifferent' into which the young Locke intervened in his unpublished *Two Tracts of Government*. Public order may guide human reason, he argued, while the classic understanding of conscience, with its troublesome perplexities, appears to be demoted to the private sphere. In his *Essays on the Law of*

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Nature innate principles are denied. Instead, Locke affirms the centrality of human necessities since they compel human beings to band together.

Locke's knowledge of medicine, and of the main Galenist principles, indicates the type of ideas he was familiar with at an early age. Scholars have analysed the reception in the European political tradition of the Pseudo-Aristotle's *Oeconomia* up to Robert Filmer's *Patriarcha*, where the household unites economy and politics as a kingdom. Chapter 9 evaluates in a novel manner, in the context of seventeenth century liberalism, the tradition of texts that deal with the materialist anthropology of needs, including the Pseudo-Galen's *Yconomia* and Avicenna's *Kitâb Al-siyâsa* (*Politics*) and *The Metaphysics of 'The Healing'*, in which household and humanity originate in the existence of needs. In these texts the state is the sum of individuals united through the materialist principle of human needs with an arbiter entrusted to resolve disputes about reciprocal transactions.

Chapter 10 introduces the wider context of Locke's corpuscularianism and explores what I have termed his 'doctrine of necessities. The chapter argues that his theory concerning the 'necessaries' and 'necessities', rather than 'rights', gives systematic coherence not only to his political and economic writings but to his entire philosophical theory. The chapter discusses in detail the literature dealing with moneylending that existed before Locke and demonstrates in this manner his originality.

In Locke's early writings on money discussed in Chapter 11, the key issue concerns economic phenomena that belong to an interdependent scientific system. Earlier and contemporary authors had observed the systematic aspects involved in the use of money for the nation's trade. Locke's novelty lies in the fact that he observed those systemic connections solely from the perspective of economic phenomena, and 'necessities' and the necessity of money constituted the main tool through which he described the phenomena associated with the emerging monetary economy. Instead of making the classic theological reference to usury, Locke built the theoretical foundation and normativity of money on the system of trade and its necessities, and hence on the survival of the nation. In this way he was able to gloss over the earlier theological discourse.

The goal of the final chapter is to examine the central role of necessities in the epistemological, moral and political theory of *An Essay of Human Understanding* and of the *Two Treatises of Government*. A study of the former shows Locke's preoccupation with classical moral questions such as happiness and the 'proper object of *Desire*' and how necessities helped him to strike a balance between tradition and the new science. As a rule of

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thumb of proper conduct, knowledge of necessities leads to the preservation of life, a human being's most important duty to God, while following desires threatens its loss if these desires are not examined with the goal of eternal life in mind. His doctrine of necessities is what made it possible for Locke to develop the theory of the public good with which, it is argued, he attempted to defeat the egoist theory of self-interest. Without a doubt, examination of his conception of property and money through the lens of human necessities shows a certain ambiguity in Locke's normative ideals. Nevertheless, my conclusion is that above other considerations underlying the capital-oriented ideals of the period, the last word of Locke's political theory is the public good represented by preservation and convenience for the commonwealth and, when possible, for the whole of humanity.

There is no study in existence that seeks to shed light on the distinctiveness of the phenomenon of modern natural law that emerged within the England of the Scientific Revolution. Rather the canonical argument is that English natural law closely followed the work done by continental authors.[37] In order to understand English originality, the book deals with fields as diverse as natural law, political theory, natural sciences, theology, moral law and monetary theory, both through the lens of primary literature and by making use of specialist works on the great natural lawyers and scientists. I have not sought to emulate, nor do I feel, that this book is in any way comparable to *The Machiavellian Moment* – Pocock's masterpiece – but that book has been an inspiration in the way in which it pinpoints core historical issues and political theory via philosophical theology. There are excellent works in existence that analyse certain notions that are key to this book from a contemporary perspective.[38] The

[37] Richard Tuck, *Natural Rights Theories. Their Origin and Development* (Cambridge: Cambridge University Press, 1978); Tully, *A Discourse on Property: John Locke and His Adversaries* (1980); Knud Haakonssen, *Natural Law and Moral Philosophy: From Grotius to the Scottish Enlightenment* (Cambridge: Cambridge University Press, 1996).

[38] These include the classic Leo Strauss, *Natural Right and History* (that I attempt to respond to), Thomas Piketty's *Capital* and, dealing with historically contextualized notions, Germano Maifreda, *From Oikonomia to Political Economy. Constructing Economic Knowledge from the Renaissance to the Scientific Revolution*, Loretta Valz Mannucci (trans.) (London and New York: Routledge, 2016); Keith Tribe, *The Economy of the Word, Language, History and Economics*, (Oxford: Oxford University Press, 2015); Carl Wennerlind, *Casualties of Credit. The English Financial Revolution, 1620–1720* (Cambridge: Harvard University Press, 2011) and Peter Remien, *The Concept of Nature in Early English Modern Literature* (Cambridge: Cambridge University Press, 2019). Superb studies of the ethics developed by English natural philosophers include Sorana Corneanu, *Regimens of the Mind. Boyle, Locke, and the Early Modern* Cultura Animi *Tradition* (Chicago: The University of Chicago Press, 2011) and, on the project of natural history, Daniel Carey, *Locke, Shaftesbury, and*

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range of analysis of some of these works extends to larger questions that combine theology and science, although none of them deals with natural law per se.[39] *The Necessity of Nature* offers the first study of the rich phenomenon of English natural law and its enduring contribution to the rise of the British Empire and the development of Europe at the dawn of the Scientific Revolution.

Hutcheson: Contesting Diversity in the Enlightenment and Beyond (Cambridge: Cambridge University Press, 2005). The rise of the public interest is usefully explored in Vera Keller, *Knowledge and the Public Interest, 1575–1725* (Cambridge: Cambridge University Press, 2015). All these studies establish the historical context and the theoretical underpinnings of specific notions.

[39] Other outstanding books that look at the history of science more thoroughly include Charles Webster, *The Great Instauration: Science, Medicine and Reform 1626–1660* (London: Duckworth, 1975) and John T. Young, *Faith, Medical Alchemy and Natural Philosophy: Johan Moriaen, Reformed Intelligencer and the Hartlib Circle* (Aldershot: Ashgate 1998) both including the aspect of science and theology; Alexander Wragge-Morley, *Aesthetic Science. Representing Nature in the Royal Society of London, 1650–1720* (Chicago: The University of Chicago Press, 2020), which combines the history of science and theology, is a rich study that opens vistas onto the Royal Society's larger project.

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