

The meaning of materiality: reconsidering the materialism of Gramscian IR

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Abstract. Gramscian approaches in International Relations (IR) have sought to outline the relationship between ideas and material forces in the construction of world order. Scholars working within this broad school have sought to emphasise that ideas *are* material forces, and must be considered as concrete historical structures (Cox, 1987) central to the establishment of particular historical and hegemonic blocs. This literature has primarily focused on the discursive construction of hegemony by international elites and the impact this has on political practices. While these insights are important in understanding the construction of world order, it is necessary to extend them to include the creation of actual physical structures – that is, it is vital to link the ideational aspects of hegemony with actual material processes. I will argue that a consideration of the role of technology provides an ideal vehicle for this process, building on the preliminary work of Bieler and Morton in this regard (2008). Technological structures are the product of particular cultural values and embed these cultural values within their very structure. Physical material factors thereby express ideational values constructed by specific social forces. Social practices are thus not only a function of the dominance of certain ideological formations, but also the product of the material environment itself and the manner in which the human metabolism with nature must function through these physical constructions.

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The question of the ontological primacy of ideas or materiality has occupied a central role in theoretical debates in International Relations (IR) for the past 30 years. Whether in disputes over the status of ideas within research paradigms,¹ the nature of the structure-agency problem,² or any number of other controversies,

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¹ John Gerard Ruggie and Friedrich Kratochwil, 'International Organization: A State of the Art on the Art of the State', *International Organization*, 40 (1986), pp. 753–75; Robert Keohane, 'International Institutions: Two Approaches', *International Studies Quarterly*, 32 (1988), pp. 379–96.

² Roxanne Lynn Doty, 'Aporia: A Critical Exploration of the Agent-Structure Problematique in International Relations Theory', *European Journal of International Relations*, 3 (1997), pp. 365–92; Colin Wight, 'They Shoot Dead Horses, Don't They: Locating Agency in the Agent-Structure Problematique', *European Journal of International Relations*, 5 (1999), pp. 109–42.

claims for the primacy of one aspect over another often prove foundational for a theorists' identity within the discipline. In the process, however, IR theorists have in general skimmed over precisely what they mean by materiality, allowing for a general conception of 'materialist' theory to stand-in for more considered analysis of the material, physical world.³ As IR endures another of its 'turns' – this time to practice – and seeks to create a better integration of ideational and materialist theories, it is increasingly important to locate this turn to 'lived practices' in relation to the non-human world if we are to fully understand how men make history in conditions which they have not chosen.⁴ I offer a consideration of the place of physical materiality within IR theory which points to the need to consider how the physical world is constituted in and through social relations and how it constitutes them in turn.⁵ I aim to accomplish this task through a consideration of the place of technology within critical IR – specifically through engagement with neo-Gramscian approaches. I will argue that Gramscian IR needs to consider the manner in which the physical materiality of non-human objects expresses political and cultural norms that structure social relations and discourse in order to understand the specificity of historical change and world order.

Few approaches to social and political thought have engaged as extensively with the problem of technology as historical materialism. From Marx's foundational studies in political economy,⁶ through the metaphysical materialism of the Second and Third International, the development of Western Marxism and beyond, the central focus on the social relations of production has generated a variety of theorisations of the role of technology in social life. However, this engagement with the problem of technology has not extended to historical materialist approaches in IR. As a result, these theories remain unable to fully explain significant aspects of world order maintenance and change, the nature of power in the international system, and the relationship between ideas and

³ This can lead to significant confusion which allows for positivist epistemology, which is explicitly not philosophically realist, to be taken as a 'materialist' theory in which physical power resources determine the structure of the international system. See Hekki Patomaki and Colin Wight, 'After Postpositivism? The Promise of Critical Realism', *International Studies Quarterly*, 44 (2000), pp. 216–7.

⁴ Iver B. Neumann, 'Returning Practice to the Linguistic Turn: The Case of Diplomacy', *Millennium: Journal of International Studies*, 31 (2002), pp. 627–51. See also Emmanuel Adler, 'The Spread of Security Communities: Communities of Practice, Self-Restraint, and NATO's Post-Cold War Transformation', *European Journal of International Relations*, 14 (2008), pp. 195–230; Lene Hansen, *Security as Practice: Discourse and the Bosnian War* (London: Routledge, 2006); Vincent Pouliot, 'The Logic of Practicality: A Theory of Practice of Security Communities', *International Organization*, 62 (2008), pp. 257–88. Social theory has engaged with another turn, to the materiality of the non-human world, in the past 30 years via the field of science and technology studies. For a critical survey of a massive literature that cannot be summarised here, see Steve Fuller, *New Frontiers in Science and Technology Studies* (Cambridge: Polity, 2007). The turn of phrase is – of course – Marx's.

⁵ Please note that this is *not* an attempt to institute the physical materiality of non-human objects in a foundational position for IR theory.

⁶ For Marx's primary discussions of technology, see Karl Marx, 'Preface (to A Contribution to the Critique of Political Economy)' in Rodney Livingstone (ed.), *Karl Marx: Early Writings*, trans. Gregor Benton (London: Penguin Books, 1975 [1859]), pp. 424–28; and Karl Marx, *Capital: A Critique of Political Economy, Vol. One* (London: Penguin Books 1976 [1867]), pp. 455–636. Marx left no clear view of the place of technology within his work – for discussion see Nick Dyer-Whitherford, *Cyber-Marx: Cycles and Circuits of Struggle in High-Technology Capitalism* (Chicago: University of Illinois Press, 1999), pp. 38–61; and Donald Mackenzie, 'Marx and the Machine', *Technology and Culture*, 25 (1984), pp. 473–502.

materiality in world politics. A sympathetic discussion of Gramscian approaches in IR will serve as a preliminary sketch of these problems and demonstrate how an engagement with the political nature of non-human objects can benefit historical materialist scholarship specifically and IR theory in general. This body of work has formed a theoretically progressive and empirically productive strand of critical thought within the discipline. Drawing on the work of Antonio Gramsci this 'school' has produced studies that have detailed the production of liberal ideological and material hegemony by transnational classes.⁷ By tracing the relationship between social forces, states, and institutions, Gramscians have attempted to consider both ideational and material aspects of the global political economy in tandem, stressing both sides of the ontological coin.

These approaches maintain that ideas and materiality form an internal dialectic relationship, informing, constraining, and changing each other in a continuous process of historical development.⁸ Alienation and the fetishism of commodities that arise from the practice of the capitalist production process – humanity's very metabolism with nature – produce an appearance of how the social world functions and which obscures the essence of that social order.⁹ In turn, ideas are granted significant theoretical weight, to the extent that a central element of the Gramscian approach centres upon the *material structure of ideas* and the manner in which ideas function akin to materiality within the international political economy.¹⁰ If social being is seen to determine social consciousness, social consciousness is not sidelined in reproducing and changing the structures of world order.

Despite the strengths of the Gramscian approach, the nature of 'materiality' remains a theoretical problem for these studies. Defined almost exclusively in terms of the human social relations of production, this notion of 'materiality' suggests

⁷ For key works, see Robert Cox, 'Social Forces, states and world orders: Beyond International Relations theory', *Millennium Journal of International Studies*, 10 (1981), pp. 126–56; Robert Cox, *Production, Power and World Order: Social Forces in the Making of History* (New York: Columbia University Press, 1987); Stephen Gill, *American Hegemony and the Trilateral Commission* (Cambridge: Cambridge University Press, 1990); Stephen Gill, 'Epistemology, Ontology and the "Italian School"', in Stephen Gill (ed.), *Gramsci, historical materialism and international relations* (Cambridge: Cambridge University Press, 1993), pp. 21–48; Mark Rupert, *Producing Hegemony: The Politics of Mass Production and American Global Power* (Cambridge: Cambridge University Press, 1995); Kees van der Pijl, *Transnational Classes and International Relations* (London: Routledge, 1998); Andreas Bieler and Adam David Morton, 'The Gordian Knot of Agency-Structure in International Relations: A Neo-Gramscian Perspective', *European Journal of International Relations*, 7 (2001), pp. 5–31; Andreas Bieler and Adam David Morton 'The deficits of discourse in IPE: turning base metal into gold?', *International Studies Quarterly*, 52 (2008), pp. 103–28.

⁸ Cox, 'Social Forces'; Gill, 'Epistemology'; Mark Rupert, 'Alienation, capitalism and the inter-state-system: towards a Marxian/Gramscian critique', in Stephen Gill (ed.), *Gramsci, historical materialism and international relations* (Cambridge: Cambridge University Press, 1993), pp. 67–92; Bieler and Morton, 'The deficits of discourse'. For clear expositions of the philosophy of internal relations, see Bertell Ollman, *Alienation: Marx's conception of man in capitalist society, Second edition* (Cambridge: Cambridge University Press, 1976); and Bertell Ollman, *Dialectical Investigations* (London: Routledge, 1993).

⁹ Rupert, 'Alienation, capitalism and the states system', p. 70; Bieler and Morton, 'The deficits of discourse', pp. 114–7. These formulations would seem to satisfy Burnham's critique of Gramscian approaches in IR. See Peter Burnham, 'Neo-Gramscian hegemony and the international order', *Capital & Class*, 45 (1991), pp. 73–93.

¹⁰ The most sustained attempt to pursue this line of thought is in the work of Bieler and Morton. See, Andreas Bieler, 'Questioning Cognitivism and Constructivism in IR Theory: Reflections on the Material Structure of Ideas', *Politics*, 21 (2001), pp. 93–100; Adam David Morton, 'The age of absolutism: capitalism, the modern states-system and International Relations', *Review of International Studies*, 31 (2005), pp. 502–6; Bieler and Morton, 'The deficits of discourse'.

that our way of working with nature may be altered by altering these social relations alone, without considering how the very physicality of this process functions. In this sense, Gramscians are materialist in their focus on the (re)production of human society through particular formations of social relations – in essence, they focus on the practice of these relations and their enduring quality in constraining and enabling certain actions. Consistently ignored is the physical nature of ‘materiality’, the place of non-human objects within these social relations.¹¹ Gramscians define materiality as human interaction and fails to take account of the non-human in determining, and being determined by, these human interactions.¹² When physical materiality is considered within this body of work, it is primarily in terms of capabilities, a conception of materiality strikingly similar to orthodox IR scholarship. This underestimates the physically embedded nature of social orders. The international political economy is reproduced in a physical sense, as well as a social one, in the technologies that it produces and in the built environment. The social relations of production are not only reproduced through the material structure of ideas, but through the *ideational structure of material*. Non-human objects – considered here through technological systems and the built environment – have social, cultural, and political values embedded within their very physical nature.

This is an important insight in both political and theoretical terms. A change in social relations without a consideration of the physical bias of material structures may constrain a transition to different social orders. For example, some scholars suggest that the uncritical adoption by Bolshevik Russia of Fordist production technologies (biased towards capitalist control of labour rather than a democratic workplace) placed significant constraints on the attempted transition to democratic socialism.¹³ Politically, any prospective or proposed alternative world order needs to consider, as far as possible, the manner in which the physical materiality of current world order needs to be altered to realise emancipation. Theoretically, insight into the politics of technology allows for a stronger analysis of the changes or endurance of social structures. It may also furnish an understanding of the limits of discourse and the nature of practice in its encounter with physical reality.

This discussion will take place as follows. First, I will outline the initial development of Gramscian perspectives in IR in relation to their engagement with the structuralist theories of neo-Realism and World Systems theory. This section will note that a consideration of technology as a politically constituted physical institution deepens the Gramscian critique of Realist scholarship by outlining how ideas shape material capabilities in a specific physical expression. Second, I will discuss the recent Gramscian engagement with social constructivist and post-structuralist scholarship through the work of Andreas Bieler and Adam David Morton. I will argue that strengthening their attempt to outline the materiality of

¹¹ ‘Non-human objects’, along with other interchangeable terms, is used to refer – quite simply – to physical objects that are not human such as machines, railways, roads, skyscrapers or computers.

¹² Determination here is meant as constraint, not as causal determination. See Raymond Williams, *Culture and Materialism* (London: Verso, 2005 [1980]), p. 34.

¹³ Kendalle E. Bailes, ‘The American Connection: Ideology and the Transfer of American Technology to the Soviet Union, 1917–1941’, *Comparative Studies in Society and History*, 23 (1981), pp. 421–48; Dyer-Whitherford, *Cyber-Marx*, pp. 6–7; Mark Rupert, *Producing Hegemony*, p. 77.

ideas requires considering the limits of discursive constructions posed by technology and physical materiality. Finally, I will provide a brief sketch of the potential for a synthesis between Gramscian scholarship and Andrew Feenberg's critical theory of technology.

The development of Gramscian perspectives in IR

Changing ideas about theories of international politics

In order to understand the neglect of physical materiality within Gramscian IR it is necessary to place the development of this body of thought within the context of its intellectual evolution.¹⁴ The first generation of Gramscian scholarship in IR – developed initially by Robert Cox via a series of articles and one book length study and supplemented by the work of theorists such as Stephen Gill and Mark Rupert – arose against a background of structuralist theoretical dominance in IR, both within the mainstream Realist orthodoxy and in the critical alternative forwarded by World Systems Theory.¹⁵ Both strains of thought heavily stressed the primacy of systemic structures in determining the nature of world order. Within these theories, actors often appeared as little more than bearers of either anarchical or capitalist structures, obscuring the nature and sources of change in world order as a result. In response to the rigid and ahistorical frameworks produced by these structuralisms Gramscian IR sought to reintroduce the human agency and volition that these theories neglected.

One of the prime intellectual foils for this project was the Realism of Kenneth Waltz, and it is in reaction to Waltz's materialism where the limited engagement with materiality by Gramscian scholars may be located. Waltz has set out a vision for the study of world politics that was explicitly positivist and parsimonious.¹⁶ Its main theoretical innovation was the presentation of the anarchical nature of the international system as the determining factor in global politics. Within an anarchical international system, Waltz suggested, states could never be certain of their own security. This context forced a particular rationality on state actors to secure their survival by engaging in a competitive and ceaseless pursuit of power. In order to understand the nature of the international system at a given point in time one simply had to understand the distribution of power, with power defined as material capabilities possessed by states.¹⁷ The theory was thereby ostensibly

¹⁴ See Andreas Bieler and Adam David Morton, 'A critical theory route to hegemony, world order and historical change', *Capital & Class*, 82 (2004), pp. 85–114 for a fine exposition of Gramscian perspectives in IR. Their focus is primarily on locating this body of scholarship in historical context, while the present discussion focuses on its intellectual context.

¹⁵ Cox, 'Social Forces'; Robert Cox, 'Gramsci, hegemony, and International Relations: an essay in method', in Robert Cox and Timothy J. Sinclair (eds), *Approaches to World Order* (Cambridge: Cambridge University Press, 1996 [1983]), pp. 124–43; Cox, *Production, Power and World Order*; Gill, *American Hegemony*, pp. 11–55; Rupert, *Producing Hegemony*, pp. 1–15, 141.

¹⁶ Kenneth N. Waltz, *Theory of International Politics* (New York: McGraw-Hill, 1979).

¹⁷ Waltz, *Theory*, pp. 131, 191–4. For discussion of Waltz's view of power, see Brian Schmidt, 'Competing Realist Conceptions of Power', *Millennium Journal of International Studies*, 33 (2005), pp. 523–49.

‘materialist’ in that it proposed that the material capabilities of states, such as their military and economic resources, determined the nature of the international system, and that the pursuit of material capabilities defined states’ national interest. Waltz’s epistemology and his understanding of systemic determination sidelined the relevance of ideas to the study of world politics – actors who deviated from the pursuit of power would find themselves punished by the logic of anarchy. Such was the strength of the system that historical change was significantly missing in Waltz’s theorisation.

What is ‘material’ here, however, is human motivation for social action. Waltz’s model does implicitly propose a model of technological rationality derived from competition. The endless pursuit of power would motivate actors to develop military and economic technologies in order to increase their security, just as the competitive pressures of the market force continual innovation in the means of production upon individual capitalists. Despite this, the concrete nature of technologies is of no consequence to Waltz’s theory. While Waltz is able to suggest a general logic driving technological change, his theoretical edifice does not allow him to accommodate specific technological innovations, despite the fact that these innovations are granted significant weight in his conceptions of systemic change in the twentieth century, in particular the prospect of an atomic Leviathan ordering the international system.¹⁸ Regardless of the technological context, actors’ decision-making processes will remain the same. Furthermore, the innovation and development of technology forms a significant blindspot in Waltz’s work. While the logic of anarchy drives material innovation, in Waltz’s thought precise material innovations are not the product of anarchy but the product of unit level factors, and their impact on the balance of power cannot be attributed to the competitive nature of anarchy.¹⁹ It is not, then, the material distribution of power which explains world politics but the condition of anarchy, held as a common belief among states, which is the driving force behind these material changes and material interests.²⁰

Cox’s intellectual project located the central problem of structuralism in IR via his distinction between problem solving and critical theory.²¹ Problem solving theory was ahistorical. Taking the world as it was, it sought to examine the relationship between states without inquiring into the historical context or formation of world order. Critical theory, on the other hand, was historical and historicist. It was concerned with understanding the continuing process of historical change not only for intellectual purposes but also in order to denaturalise the existing order so that alternative political projects are forwarded in a non-utopian manner. Cox’s critique of Waltz, and the related critique posed by Gill to structuralist theorising, is largely premised upon addressing the relevance of ideas in world politics in order to provide space for explanations of historical change. For Cox, Waltz’s theory is the exemplification of problem solving theory, ‘tacitly assuming the permanency of existing structures, which is served by the positivist

¹⁸ Kenneth N. Waltz, ‘Nuclear Myths and Political Realities’, *The American Political Science Review*, 84 (1990), pp. 731–45.

¹⁹ *Ibid.*

²⁰ Alexander Wendt, ‘Anarchy is What States Make of It’, *International Organization*, 46 (1992), pp. 391–426.

²¹ Cox, ‘Social Forces’.

approach'.²² Drawing on Gramsci, he notes that hegemonic ideas asserting the validity of certain social structures are a material force, and work to structure that very system. Waltz is thereby unable to explain how the system itself has come into being. Cox notes the central weakness of Waltz's theory as

the inability of his theory to account for or explain structural transformation. *A general (read: universally applicable) science of society can allow for variations in technologies and in the relative capabilities of actors, but not in either the basic nature of the actors (power-seeking) or in their mode of interaction (power-balancing). The universality of these basic attributes of the social system comes to be perceived as standing outside of and prior to history [. . .] Despite his wide historical learning, Waltz's work is fundamentally ahistorical. The elegance he achieves in the clarity of his theoretical statement comes at the price of an unconvincing mode of historical understanding.*²³

Cox and his fellow Gramscians locate the nature of the actors and their mode of interaction in a specific historical context defined primarily by the social relations of production.²⁴ Central to their critique of Realism is thus the manner in which certain material circumstances, which they define as the social relations of production and the physical means of production, interact with ideas to produce intersubjective historical rationalities.²⁵ The cognitive understandings actors have of the world are not independent from material relations but arise from them. Capitalist social relations of production function by separating producers from their means of production, engendering forms of alienation and fetishism in which the relationships between human beings are understood as the relationship between things – commodities.²⁶ Human beings are thereby driven to misrecognise the nature of the social world and to attribute subjective understandings and human social relations as the product of – in this instance – a timeless relation of anarchy, but this is always the product of human interaction. A change in ideas may work to alter the relations of production in turn, but always through an internal relation in which an alteration in one aspect entails an alteration in the other. The interaction between ideas and materiality central to the Gramscian project effectively outlines how the international system has been constituted and how it has been misrepresented by the problem solving theory which accepts the international system as a naturalistic condition. Accordingly, Gramscian IR is sensitive to historical change, and is able to explain that process of change via reference to changes in the composition of social forces. However, the ability to explain change is limited by the inability to explain the place of non-human objects within this process, neglecting a central feature of both long term and short term historical transformations.

²² Robert Cox, 'Realism, positivism, historicism', in Robert Cox and Timothy J. Sinclair (eds), *Approaches to World Order* (Cambridge: Cambridge University Press, 1996 [1985]), p. 53; Cox, 'Social Forces', pp. 131–2. Gill's primary target for criticism is the Realist IR of Robert Gilpin but the substance of his argument is the same as Cox's critique of Waltz – see Gill, *American Hegemony*, pp. 38–41.

²³ Cox, 'Realism, positivism, historicism', pp. 52–3. Emphasis added.

²⁴ Cox, 'Gramsci, Hegemony and International Relations'; Cox, *Production, Power and World Order*, p. 1.

²⁵ *Ibid.*, p. 132.

²⁶ See also Rupert, 'Alienation, capitalism', p. 70; Rupert, *Producing Hegemony*, p. 17; Bieler and Morton, 'The deficits of discourse', p. 114.

Beyond material capabilities, towards material culture

While Gramscians have outlined ‘material circumstances’ as the social relations of production and the physical means of production, they neglect a consideration of these physical means in any depth. Cox seems to accept Waltz’s analysis of forms of physical materiality in world politics, and does not question the validity of Waltz’s conception of technological change or material capabilities. What is important to note from the quote above is that Cox does not consider Waltz’s theorisation of materiality and technological development as particularly problematic. Indeed, in many ways Cox’s understanding of materiality is little different from Waltz’s:

Material capabilities are productive and destructive potentials. In their dynamic form these exist as technological and organisational capabilities, and in their accumulated forms as natural resources which technology can transform, stocks of equipment (e.g. industries and armaments), and the wealth which can command these.²⁷

Material capabilities are here largely defined as resources that actors may use to meet particular objectives. In his study of the relationship between production and security in international politics Cox outlines a picture of technological development which very much mirrors that of Waltz.²⁸ Technological development is a function of a competitive world system that drives actors to pursue material capabilities in both economic and military terms: ‘Both factors can be assimilated to competition: competition for shares of consumer markets and competition between states [. . .].’²⁹ The social property relations of capitalism do impose a form of rationality upon capitalists that requires the continual improvement of productive technologies.³⁰ Cox’s ability to explain the reasons behind this dominant form of rationality is an improvement on Waltz’s ahistoricism – he is able to locate a historical reason for this competitiveness in capitalist social relations and forms of world order in the manner suggested above. Nevertheless, the end result remains stuck within a very general consideration of technological development.

The Gramscian study of Americanism and Fordism is the primary theorisation of the relationship between ideas and physical materiality centred upon technology in this body of scholarship.³¹ Both Cox and Rupert correctly take the place of physical technological artefacts and institutions to be central to Fordist modes of production. Importantly, they also note that specific technologies enabled capital to control the labour process more effectively, strengthening the power of capital over labour on the shop floor.³² Cox explicitly rejects technological determinism:

²⁷ Cox, ‘Social Forces’, p. 136.

²⁸ Robert Cox, ‘Production and Security’, in Robert Cox and Timothy J. Sinclair (eds), *Approaches to World Order* (Cambridge: Cambridge University Press, 1996 [1993]), pp. 276–95.

²⁹ Cox, ‘Production and Security’, p. 280; Cox, *Production, Power and World Order*, p. 313.

³⁰ Robert Brenner, ‘The Origins of Capitalist Development: A Critique of Neo-Smithian Marxism’, *New Left Review*, 1 (1977), pp. 25–92; Robert Brenner, ‘The social basis of economic development’, in John Roemer (ed.), *Analytical Marxism* (Cambridge: Cambridge University Press, 1986), pp. 23–53; Ellen Meiksins Wood, *Democracy Against Capitalism: Renewing Historical Materialism* (Cambridge: Cambridge University Press, 1995).

³¹ Cox, *Production, Power and World Order*, pp. 309–18; Rupert, *Producing Hegemony*. See, Antonio Gramsci, *Selections from the Prison Notebooks*, trans. Quintin Hoare and Geoffrey N. Smith (eds), (London: Lawrence and Wishart, 1971), pp. 277–318.

³² Cox, *Production, Power and World Order*, p. 316; see also David Noble, *America by Design: Science, Technology, and the Rise of Corporate Capitalism* (New York: Alfred A. Knopf, 1979); David Noble, *Forces of Production: A Social History of Industrial Automation* (Oxford: Oxford University Press, 1986).

Technology consists, after all, in the practical methods selected for the purpose of solving production problems. Thus defined, the questions that arise are: Problems for whom? Solutions toward what purpose? The answers are simple: For the accumulators and for the purpose of accumulation.³³

In doing so he notes that social power relations determine technological choices. Capitalist rationality, imposed by the social relations of production, is the central factor determining the choices made towards technology in the production process. Technological decisions are biased towards increasing accumulation strategies, and these strategies become embedded in the physical material structures of technology.

Despite the improvement over Waltz's ahistorical theory achieved via the introduction of ideas and ideology, the failure to consider in depth the construction of materiality suggests the same questions one must pose to Waltz – why do *specific* technological changes occur? For example, what were the ideas that supported this push towards the adoption of Fordist technologies, as opposed to other potential technological solutions? It was not the logic of capital alone that required the shift to Fordist production technologies – this begs the questions as to the origins of *Americanism* and *Fordism*, rather than simply Fordism. Instead, we must also consider the social and political values that supported the creation of these specific technologies and their values of efficiency, rationality, and progress. Rupert and Gill have gone farthest to take these considerations into account through their analysis of Americanism and Fordism and American informational capitalism, respectively.³⁴ Their work indicates the potentially valuable consideration of the relationship between technology and hegemony via the diffusion of technological artefacts, but remains primarily a study of hegemony expressed through the ideological and human institutions of Fordism or digital capitalism, rather than a consideration of its non-human aspects. The adoption of the production line as a form of technology was not, however, an obvious or necessary technical solution to the problem of accumulation outlined by capitalists in their struggle with labour. Instead, it relied on particular cultural and social beliefs – shared, to some extent, by both capital and labour – for the justification of these changes and for the specific changes themselves.

First, it is necessary to account for the manner in which particular social beliefs about technological development relate to the decisions to create certain technological artefacts and systems. Values of rationality and efficiency in relation to technology are always context specific. Fordist production methods developed in an American context of technological optimism, a belief in technological 'progress' in all forms as a solution to social problems. The US at the end of the 19th and early 20th century possessed a picture of itself as the most progressive society on earth.³⁵ The development of Fordist technologies relied on a cultural belief in the validity of this solution to the problem of development and worker unrest, as opposed to the pursuit of other potential solutions, and a belief that pursuing the

³³ Cox, *Production, Power and World Order*, pp. 21, 315.

³⁴ Rupert, *Producing Hegemony*, pp. 51–7, 76–78; Stephen Gill, *Power and Resistance in the New World Order* (Basingstoke: Palgrave MacMillan, 2003), pp. 181–210.

³⁵ Michael Adas, *Dominance by Design: Technological Imperatives in America's Civilizing Mission* (Cambridge, Massachusetts: The Belknap Press of Harvard University Press, 2006); Michael Foley, *American Credo: The Place of Ideas in US Politics* (Oxford: Oxford University Press, 2007), pp. 175–90.

most developed technological solutions to problems expressed the American character itself. It required a widespread belief that technological change and development was beneficial – a belief augmented and furthered by the ‘productivist’ compromise between labour and management, as Rupert suggests, but not limited to this alone. Michael Adas notes:

But the ideological imperatives that nature was to be mastered, resources exploited to the fullest, and technologies invented as these enterprises required had become defining sources of Americans’ sense of themselves as an exceptional people, and of the ways they conceived their relationship to the rest of the world [. . .] It fixed, for many, the conviction that American-style free market capitalism and representative democracy provided an institutional framework for societal improvement that transcended differences among even the most disparate human cultures. Sustained material increase engendered a commitment to progressive improvement, which came to be regarded as an essential attribute of civilized society in the modern age.³⁶

The decision to pursue and build Fordist technologies could not and did not rely only on capitalist rationality or distributive compromise. It was justified, as many other aspects of capitalist production relations are justified, through particular political and cultural values about technology which (re)produce this system of production. The shift to Fordist production methods was able to rely on and become linked with other values such as American nationalism, ideas about civilisation, race, and modernity, and a strong belief in the pursuit of Progress. In this manner the hegemony of Fordism relied also on the centrality of technology to American identity. In order to consider how ideas and materiality relate to each other, we need to consider not only how the logic of capital drives technological innovation but also how this is supported and reproduced by wider social values regarding how technology itself is conceptualised. This is fertile ground for extending the insights of Gramscian scholars, developing their ideological analyses yet further by integrating the ideological conception of technology within particular social and historical contexts.

Second, the particular technologies constructed will express the culture of their societal context. Fordism, and the development of automotive transport in the US was neither a pre-determined condition nor a clear-cut solution to problems of accumulation. Instead it represented a unique confluence of cultural values, both societal and individualistic (for Ford himself), which developed not only the production methods appropriate to these values but also the production of the automobile as a vehicle for the masses.³⁷ In turn, the development of the automobile changed the context of social organisation and altered the possibilities for how communities were structured, particularly in the post-war era. It allowed for the rapid development of suburbanisation and for the realisation of certain values of individualised property ownership that resonated deeply in American culture.³⁸ Cultural context heavily influenced the technical choice to develop an automobile for the masses – in France, by contrast, the car remained a luxury

³⁶ Adas, *Dominance*, pp. 74–5.

³⁷ W. Bernard Carlson, ‘Artifacts and Frames of Meaning: Thomas A. Edison, His Managers, and the Cultural Construction of Motion Pictures’, in Wiebe E. Bijker and John Law (eds), *Shaping Technology/Building Society* (Cambridge, Massachusetts: The MIT Press, 1992), p. 188.

³⁸ David Harvey, *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change* (Oxford: Basil Blackwell, 1989), pp. 69, 75–6; Foley, *American Credo*, p. 47; John Urry, ‘Inhabiting the Car’, *The Sociological Review*, 54 (2006), pp. 17–31.

vehicle, despite the capitalist imperatives shared with the US. It is possible to build automobiles in a variety of shapes and sizes and for a variety of purposes using its constitutive elements. An account of historical change needs to recognise the contingency of material objects in addition to the rationale that drives innovation in general. By considering both the ideological conception of ‘technology’ and the cultural values that shape particular technological goals an analysis of how ideas and materiality relate to is able to tie together ideas, materiality, and the non-human world in a more comprehensive manner.

This insight extends to the competitive logic of anarchy and geopolitical competition. While Cox acknowledges that the competitive drive of the international system accounts for a drive to improve military technologies, the specific technologies chosen within this overarching framework reflect the context in which they were developed, and have a significant subsequent impact on future technological choices. Paul Edwards notes, in his study on the development of missile defence technology by the US government in the post-1945 era, the importance of political culture on strategic weapons development: ‘Instead of universal conscription, the US chose the technological path of massive, ongoing automation and integration of humans with machines’.³⁹ Contra both Cox and Waltz, the logic of anarchy did not determine the particular choice of developing computerised missile defence systems. Instead, this relied on a number of interrelated discourses surrounding strategic options at the time not limited to competitive strategic rationales. In turn, the future development of weapons systems must be built upon this base – thus, we see the manner in which particular ideas about social organisation become embedded in particular non-human objects and influence future (in this case) strategic practice. This suggests that physical material exercises a structural power on the validity of ideas and social relationships through its expression of a particular material culture.

The consideration of ideas in relation to technological decision-making needs to be broadened in Gramscian thought beyond the economic rationality of capitalism to consider how particular notions of technology as determining, as instrumental, or as positive or negative, come to be discursively constructed. In addition to the importance accorded to ideas in changing world orders it could consider the material changes within world order with greater clarity, and outline in sharper relief how the character of the non-human world determines the scope of effort required to effect these changes. A historicist approach to IR should be historicist in relation to non-human objects in order to fully develop a critical theory approach to all aspects of global politics.

The social relations of discourse and the physical limits of social relations

While Cox and the first generation of Gramscians sought to contrast problem-solving theory with critical theory, recent Gramscian work in IR has sought to

³⁹ Paul Edwards, *The Closed World: Computers and the Politics of Discourse in Cold War America* (London: The MIT Press, 1996), p. 53; see also Donald Mackenzie, *Inventing Accuracy: A Historical Sociology of Nuclear Missile Guidance* (Boston: The MIT Press, 1990); Columba Peoples, *Justifying Ballistic Missile Defence: Technology, Security and Culture* (Cambridge: Cambridge University Press (2009)).

restrain idealist impulses in IR theory, which suggest the absolute contingency of ideas, by asserting the stable institutionalisation of ideas as a historical structure. They have sought to emphasise not only the importance of ideas, but to relate more comprehensively the internal relation between ideas and materiality, particularly through the notion of the material structure of ideas. I will focus primarily on the work of Bieler and Morton due to their sustained dialogue with these idealist approaches.⁴⁰

In their account of the ‘material structure of ideas’, Bieler and Morton outline their work as a response to social constructivist and post-structuralist positions in IR. The purpose of their sustained project is to ‘[...] show how ideas can be conceived as material social processes through which signs become part of the socially created world in a way that surpasses the deficits of social constructivist and post-structuralist approaches alike, without collapsing into the problem of economism’.⁴¹ They identify two separate faults with these approaches. For social constructivism, they note the manner in which ideas and materiality are considered always already separate. Material conditions are not tied to the ideas that actors have about the international system. Thus within any given configuration of material forces any particular understanding of the system could be posited within this framework.⁴² Rather than being internally related, ideas and materiality are externally related, with the potential that they develop separately prior to acting on one other. Moreover, social constructivism faces a problem in outlining why particular ideas are successful in changing structures and institutions and others are not. Failing to take into account the social relations of production, social constructivism is also limited by an inability to consider how power influences the validity of some ideas over others.⁴³

Post-structuralists, on the other hand, attempt to reject the distinction between the material and the ideational. Instead they suggest the need to uncover the conditions of possibility for certain economic practices as constructed via knowledge practices.⁴⁴ Bieler and Morton suggest that the problem that arises from these arguments is the inability to suggest why particular discourses become dominant and who promotes these discourses in relation to the distribution of material resources.⁴⁵ As a corrective to these faults, Bieler and Morton recount the understanding of the relationship between materiality and ideas largely in terms of the Gramscian IR perspective outlined above in relation to Rupert and Cox. They outline the relationship between the social relations of production and the ideas

⁴⁰ There has been a separate debate by some Gramscian or ‘quasi-Marxist’ scholars to engage with the perceived problems of idealist scholarship on the terrain of the philosophy of science which, while related to this discussion, remains separate. For examples, see Jonathan Joseph, *Hegemony: A Realist Analysis* (London: Routledge, 2006); Colin Wight, *Agents, Structures and International Relations* (Cambridge: Cambridge University Press, 2006); and Wight, ‘They Shoot Horses’.

⁴¹ Bieler and Morton, ‘The deficits of discourse’, p. 105; Bieler, ‘Questioning Cognitivism’; Morton, ‘The age of absolutism’, pp. 502–6; Adam David Morton, ‘The “grimly comic” riddle of Hegemony in IPE: where is class struggle?’, *Politics*, 26 (2006), pp. 62–72.

⁴² Bieler and Morton, ‘The deficits of discourse’, pp. 106–8.

⁴³ *Ibid.*, pp. 109–10.

⁴⁴ Marieke de Goede, ‘Beyond economism in international political economy’, *Review of International Studies*, 29 (2003), pp. 79–97.

⁴⁵ Bieler and Morton, ‘The deficits of discourse’, p. 113. Perry Anderson provides a strong critique of the post-structuralist authors on whom discourse centric IR draws – see, Perry Anderson, *In the Tracks of Historical Materialism* (London: Verso, 1983), pp. 32–55.

actors hold about the social world as follows: ‘On this basis, state and civil society, the political and the economic, are not understood as given or discursively constructed, separate entities, which are then externally related to each other, but as expressions of the same configuration of capitalist social relations of production’.⁴⁶ In these terms, Bieler and Morton provide a well-considered and comprehensively outlined Gramscian IR consideration of the relationship between ideas and materiality – one which is comprehensively centred on ‘lived practices’. The enunciation of particular ideas about the social world must also be related to the conditions of their production, which post-structuralist and constructivist theorists have largely been unable to accomplish.

Where their reading becomes more suggestive of a deepened and extended consideration of ideas and materiality is in the turn to the ‘material structure of ideology’. They note that Gramsci outlined a conception of ideology as instantiated in physical structures, ‘which included issues such as architecture alongside street layouts (as well as street names), and the social function performed by libraries, schools, publishing houses, newspapers, and journals, down to the local parish newsletter [...]’.⁴⁷ Importantly they extend this further to consider Eric Hobsbawm and David Harvey’s insights on the ideational relationship to the construction of actual physical structures. They outline the manner in which an understanding of the social world becomes part of the built environment, so that 19th century Paris came to express a particular historical relationship to, and attitude towards, the poor of urban Paris.⁴⁸ There is a hint, then, of the potential relevance of the ideational structure of physical materiality, its place in philosophically internal relations, and the limits this sets for social relations. However, their account of this is largely concerned with symbolic meaning – quoting Gramsci they write, ‘Overall awareness of these aspects of social power “would get people into the habit of a more cautious and precise calculation of the forces acting in society”’.⁴⁹ The physical nature of the city is thereby sidelined in favour of a symbolic reading, rather than a consideration of a practical encounter with the city and the political outcomes that result. While this engages with the politics of representation (contrary to post-structuralist claims) it also hints at a larger problem with Bieler and Morton’s perspective, and the perspective of Gramscians in IR overall – the failure to account for the constrictions that physical materiality places on the ideas that we may have about the social world, the clear theorisation that what compels the success of some ideas over others in relation to the human social relations of production is the materiality of the non-human world.

Returning to their example of the reconstruction of Paris is a helpful illustration. The power of the French state, and bourgeois capital, became embodied in its capital city. Future challenges to the state would thereby have to take account of, and necessarily be informed by, this material structure. An ideological response to the challenge posed by the Parisian proletariat and their

⁴⁶ Bieler and Morton, ‘The deficits of discourse’, p. 116.

⁴⁷ Antonio Gramsci, *Further Selections from the Prison Notebooks*, quoted in Bieler and Morton, ‘The deficits of discourse’, p. 118; Bieler, ‘Questioning Cognitivism’, p. 98.

⁴⁸ Adam David Morton, ‘The “grimly comic” riddle’’, p. 68; Bieler and Morton, ‘The deficits of discourse’, p. 118; James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University, 1994), pp. 59–63. David Harvey, *Paris, Capital of Modernity* (London: Routledge, 2006), passim.

⁴⁹ Gramsci, *Further Selections*, quoted in Bieler and Morton, ‘The deficits of discourse’, p. 118.

ability to occupy the city thereby became enmeshed in the physical materiality of the city itself. This became a significant power resource that shifted the nature of counter-hegemonic projects in the city, with Haussmann's changes comprehensively altering traditional revolutionary strategy both physically – the barricades, resorted to nine times prior to 1851, now faced massively widened boulevards to obstruct – and organisationally.⁵⁰ Indeed, Harvey's masterful work precisely notes the manner in which a changing physical context led to changed ideas and practices among the working class.⁵¹ Viewing physical materiality in these terms, it is evident that not all revolutionary strategies were plausible in relation to the embedded values expressed through the changed city, and that a discourse asserting the need to 'man the barricades' could only be rhetorically successful. At the same time, this non-human structure did not solely result from the process of alienation and fetishism in the production process. Aesthetics and vanity played a role in the redesign of the city, as did a desire to increase the public health of the city, beyond the need to expend excess capital or suppress labour uprisings.⁵² A particular idea of modernity was present in the mind of the architect in pursuing a rational and ordered, linear city. The power to create the city, derived from the relations of production and from the physical resources they produce, in turn serves to reproduce the cultural values of the dominant classes in society.

It is in this manner, in the physical making of the world, in the sensual *practice* central to Marxist theory,⁵³ that particular values are enshrined and to which ideational and discursive strategies must connect if they are to be successful. In this sense, alternative political strategies must incorporate not only attempts to change the human social relations of production, but also their physical manifestations in non-human objects. Without considering this it is unclear why certain ideas are unable to change the relations of production, or why all physical forms of productive relations could not be considered democratic. What is the social stuff that gives these relations their concreteness? If the suggestion is that this derives from alienation and fetishism, then the project of change does become largely ideational – we may continue to use the physical world as before as long as we change the social relations by which we reproduce in that world. However, this is not possible. The reason that not any given social strategy may be pursued lies in the bias of the non-human world towards certain values embedded within their structures. Precisely what makes social change so difficult are the physical, non-human expressions of particular political and economic relationships that must be actively altered at a substantial cost in time, effort and resources. Technology cannot be used in any particular manner – which is also the reason why it cannot be collapsed into discourse, as post-structuralist approaches would suggest. It is in the very practices we enact when using material objects or moving in the built

⁵⁰ Scott, *Seeing Like a State*, p. 61; Harvey, *Paris*, p. 12.

⁵¹ Harvey, *Paris*, pp. 175–6, 180, 200–2, 225, 296, 305–8.

⁵² *Ibid.*, p. 59–61.

⁵³ This is the foundation of Marx's claim to turn Hegel on his head, and is, perhaps, the centrepiece of Marxist thought. The *locus classicus* for Marx's transition from Young Hegelian to historical materialist is Karl Marx, 'Theses on Feuerbach', in *Early Writings*, pp. 421–3. Gramsci also asserted the centrality of practice to Marxism – see the discussion in Wolfgang Fritz Haug, 'From Marx to Gramsci, from Gramsci to Marx: Historical Materialism and the Philosophy of Praxis', *Rethinking Marxism*, 13 (2001), pp. 69–82.

environment that we express these values, beyond our particular understandings of their symbolism. It is on the terrain of non-human objects that the most pressing questions about contingency are asked of idealist scholarship. The project of countering overly idealist conceptualisations of global politics to which Bieler and Morton have devoted substantial time could thereby benefit from a sustained consideration of physical materiality and technology.

Thinking about things: looking to science and technology studies

Unfortunately, the Gramscian heritage is rather limited in developing an understanding of the place of non-human objects in the social world. Gramsci does develop a number of insights into the role of science and technology as powerful ideological and rhetorical resources that are central to any project of considering the role of the non-human in International Relations.⁵⁴ Within his work overall, however, there is a strong distaste for the philosophical materialism that characterised the crude reductionist Marxism of Plekhanov and Bukharin, and a subsequent neglect of the role of material culture in political economy. Gramsci, in outlining the need to critique ‘common sense’, writes that ‘In common sense it is the “realistic”, materialistic elements which are predominant, the immediate product of crude sensation.’⁵⁵ Gramsci ties this ‘immediate’ sensation to the faults of positivism in his lengthy indictment of dialectical materialism. In the process, he sidelines the place of the ‘forces of production’ within his thought.

Gramscian IR does contain some suggestive theorisations how to incorporate the built environment into its understanding of the dialectic internal relationship between ideas and material. These preliminary insights need to be extended and deepened through an engagement with the field of Science and Technology Studies (STS). Emerging out of debates within the philosophy of science prompted by Kuhn’s theory of scientific revolutions, STS has posed a radical challenge to the separation of science, technology and society within social theory.⁵⁶ STS has been engaged in a long consideration of the interrelationship between ideas, social practices, and technology in order to question the division of science and politics as separate and fundamentally different forms of human knowledge. Through a focus upon specific contexts of technological development, and the micro-politics of power, STS has comprehensively illustrated the underdetermined nature of technological artefacts and institutions.⁵⁷ As a consequence, the general technological rationality posed by much IR theory is called into question. Science and Technology Studies asks that we deconstruct naturalised understandings of technological process in order to reveal the politics of technological change, and in turn recognise that non-human objects exert an ideational force upon human social organisation.

⁵⁴ Antonio Gramsci, *Further Selections from the Prison Notebooks*, trans. Derek Boothman (ed.) (London: Lawrence and Wishart, 1995), pp. 293–306.

⁵⁵ Gramsci, *Selections*, p. 420.

⁵⁶ Fuller, *New Directions*, pp. 1–26.

⁵⁷ Wiebe E. Bijker, *Of bicycles, bakelites, and bulbs: toward a theory of sociotechnical change* (Cambridge: The MIT Press, 1995).

However, within the STS literature not all approaches are equal, and not all would be appropriate to draw upon or integrate with Gramscian IR theory. Both the Social Construction of Technology⁵⁸ (SCOT) literature and Actor-Network Theory⁵⁹ (ANT) utilise methodological processes that neglect a consideration of broader political and social structures. SCOT and ANT emphasise ‘following the actors’ in their accounts of sociotechnical networks to produce detailed, localised ethnographic studies. While successful on its own terms, this methodology raises a number of potential problems regarding these approaches of conception of society as a liberal pluralist society, the unequal ability of actors to tell their stories, and the unacknowledged role of abstraction within these accounts.⁶⁰ As a result these studies often fail to connect their specific analyses to wider political processes of social reproduction. At times this can lead to quite remarkable assertions, such as Latour’s commentary on the relationship between Hobbes and Boyle’s disputes over science and politics as the foundation of the modern differentiation of intellectual tasks into discrete areas.⁶¹ Undoubtedly these interactions, and their diffusion, were important in this process, but to make this claim without consideration of the epoch-making transition to capitalism underway during the modern development of this separation is unduly neglectful of political structures. Indeed, this lacuna is increasingly recognised as a significant problem within the STS literature.⁶² Given the explicit concern of Gramscian IR to connect micro-political processes to wider arenas of structural power an attempt to mesh these theories is a theoretical bridge too far.⁶³

Within the field of STS Andrew Feenberg’s critical theory of technology represents the clearest and most sustained attempt to trace the micropolitical construction of technological systems and artefacts while remaining cognisant of the need to place these practices within a wider structural framework. In response to the challenge Latour and SCOT have placed to ‘reified’ structuralist theory, Feenberg has argued for the retention of these structural considerations within any global theory, while remaining sensitive to local practices. Feenberg’s work considers these relations while also remaining non-reductive. Central to his argument is an acknowledgement that the ability of powerful actors to embed their values within technology reproduces not only the relations of production but also wider cultural manifestations of dominant cultural values – how we communicate,

⁵⁸ Bijker, *ibid.*; Wiebe E. Bijker (ed.), Thomas P. Hughes, and Trevor Pinch (eds), *The Social Construction of Technological Systems* (Cambridge: The MIT Press, 1987).

⁵⁹ Bruno Latour, *We have never been modern* (New York: Harvester Wheatsheaf, 1993); Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network-Theory* (Oxford: Oxford University Press, 2005).

⁶⁰ Hans K. Klien and Daniel Lee Klienmann, ‘The Social Construction of Technology: Structural Considerations’, *Science, Technology and Human Values*, 27 (2002), pp. 28–52; Andrew Feenberg, ‘Modernity Theory and Technology Studies: Bridging the Gap’, in Thomas J. Misa, Philip Brey and Andrew Feenberg (eds), *Modernity and Technology* (Cambridge: The MIT Press, 2004), pp. 73–104.

⁶¹ Latour, *We have never been modern*, pp. 15–48.

⁶² Sergio Sismondi, ‘Science and Technology Studies and an Engaged Program’, in Edward J. Hackett et al. (eds), *The handbook of science and technology studies, third edition* (London: The MIT Press, 2008), pp. 13–31; Charles Thorpe, ‘Political Theory in Science and Technology Studies’, in Edward J. Hackett et al. (eds), *The handbook of science and technology studies, third edition* (London: The MIT Press, 2008), pp. 63–82.

⁶³ Stephen Gill and David Law, ‘Global Hegemony and the Structural Power of Capital’, *International Studies Quarterly*, 33 (1989), pp. 475–99; Stephen Gill, *Power and Resistance in the New World Order* (Basingstoke: Palgrave Macmillan, 2003), pp. 116–32, 161.

how we are entertained, how we move.⁶⁴ Material capabilities are not therefore simply the ability to command money or guns given one's position in the social relations of production or destruction, but the ability to bias the physical means of human reproduction in accordance with one's values. Feenberg's work focuses on three arguments:

- (1) Technical design is not determined by a general criterion such as efficiency, but by a social process which differentiates between technical alternatives according to a variety of case-specific criteria
- (2) That social process is not about fulfilling 'natural' human needs, but concerns the cultural definition of needs and therefore of the problems to which technology is addressed
- (3) Competing definitions reflect conflicting visions of modern society realized in different technical choices.⁶⁵

In keeping with a rejection of structuralisms outlined by Gramscian IR, Feenberg rejects the notion of a pure technological determinism. Previous Marxist philosophers have outlined technology as either a neutral instrument that any actor can control to meet any end – a perspective that coloured Bolshevik thought – or a form of modernist domination that entails an inescapable technological rationality, as evident throughout the work of the Frankfurt School. Feenberg argues that this conceptualisation fails to recognise the specificity of technology, and the manner in which technological innovation is biased towards certain ends but remains ambivalent at the same time. He thereby suggests that while technology may be used towards domination, it may also be used for positive emancipatory ends – it has no natural character.

While Cox (and Waltz) note the centrality of competition in the development of technology, Feenberg asserts that technology does not develop according to an ahistorical conception of efficiency, but instead is historically specific. Feenberg's theorisation represents an advance over Cox's work in its acceptance that, within this form of rationality, specific technical choices are made on a case-by-case basis according to particular criteria. This process functions through the cultural definition of needs and is thereby subject not to a unidirectional development which capitalist rationality imposes or releases. Beyond simply reproducing commodities, then, Feenberg is able to suggest the reasons not only why certain social relations of production are reproduced, but also why particular technological artefacts are themselves produced – he marries the micropolitics of STS to wider social structures. Class relations are reproduced in this manner, but so are gender relations, values of paternalism, conceptions of social organisation intertwined with the social relations of production. It is precisely because non-human objects function in a 'common sense' manner that they are so important in reinforcing dominant social relations and ideological structures. Ideas about the world and social practices within the world, must always engage with the non-human in making, and making sense of, social systems. Feenberg's work indicates the value

⁶⁴ Andrew Feenberg, *Critical Theory of Technology* (Oxford: Oxford University Press, 1991), p. 131. See also Andrew Feenberg, *Questioning Technology* (London: Routledge, 1999); Andrew Feenberg and Alastair Hannay (eds), *Technology and the Politics of Knowledge* (Bloomington: Indiana University Press, 1995).

⁶⁵ Feenberg, *Questioning Technology*, p. 84.

in studying the cultural and ideological construction of norms and their relationship to how the technological means of production, and the wider non-human world. In turn, it also outlines how these technological norms inform the ideas and practices of the social world – the internal relation of ideas and materiality work in and through non-human objects. Cultural materialism needs to account for material culture in theorising the structures and practices of the global economy.

A turn to Feenberg's critical theory of technology provides Gramscian IR with the necessary tools to reconceptualise materiality and account for the place of the non-human within international politics more adequately. First, while Cox, Rupert and Gill consider technology at a general level their work failed to account for how and why specific technological institutions arise. Capital and labour relations are central to the construction of technology within the modern international system but they cannot fully account for the underdetermined nature of technological choices, even if those choices have as their end goal the pursuit of profit. Recognising this allows for a more nuanced account of historical change – key to Gramscian scholarship. Second, while Bieler and Morton stress the limits of discourse through a focus upon the material structure of ideas their criticism of post-structuralist approaches would benefit from recognising, as Feenberg does, that technologies express particular cultural values. Thus in our engagement with the non-human world through practice our ideas about what is and is not possible are significantly shaped. Furthermore, this technological expression limits the scope of sensible discursive constructions into an area defined by the technological code. The underdetermined nature of technological construction changes shape to become a determining force after its creation. Feenberg's conception of the bias and ambivalence of technology allows for Gramscian IR to meet the challenge of studying ideas and materiality within an adequate account of historical change, furthering the Gramscian project of rethinking the 'prevalent ontological assumptions of IR'.⁶⁶

Yet despite the merits of Feenberg's approach, he does not adequately situate technology internationally. The international aspects of technology present a complex interrelationship between the global political economy, geopolitics, and cultural difference that informs the construction, diffusion, and alteration of non-human objects within and between societies. A consideration of the international would require extending Feenberg's framework significantly. His account of power is often underdeveloped and he often fails to consider the international purposes for which technologies are developed. He suggests that, 'While social institutions adapt to technological development, the process of adaptation is reciprocal, and technology changes in response to the conditions in which it finds itself as much as it influences them'.⁶⁷ In certain contexts, the ability of actors to alter technology to fit their particular culturally defined needs is limited by the cost of such action. An attempt may be made at such modification but depending on the resources available this may be half-hearted or an excessive strain on a given country or social group. For instance, during the second Cold War, the US government promoted communications technologies from the West as a means of

⁶⁶ Adam David Morton, *Unravelling Gramsci: Hegemony and passive revolution in the global economy* (London: Pluto Press, 2007), p. 135.

⁶⁷ Feenberg, *Critical Theory*, p. 130.

placing pressure on the government of the Soviet Union by undermining its control of information – the Soviets simply did not have the necessary resources to block all communications of a transborder nature.⁶⁸ Thus, while an engagement with the critical theory of technology would aid the Gramscian project in IR, a similar benefit may be bestowed upon science and technology studies by investigating its international dimensions. A consideration of these in any depth is beyond the scope of this article, but some possibilities seem promising, such as a deeper engagement with the concept of hegemony as illustrated and complicated by the diffusion of technology internationally, or a consideration of technology within the current theoretical development of the problematic of uneven and combined development.⁶⁹ The range of objects open to consideration within such a framework would be vast – cars, information technology, transport technologies, military technology, energy infrastructures, are some of the potential areas where the interplay of the international, states, capital and non-human objects may be explored. We should avoid any attempt to delineate in advance the scope of potential study, risking needlessly closing down potentially exciting avenues for empirical study.

Conclusion

In discussing the place of technology and physical materiality in relation to the Gramscian theorisation of the internal relation of ideas and material three important points should be noted. First, social property and production relations remain as the starting point of analysis. This allows us to gauge who has, in a given historical configuration, the power to direct the development of the material world in particular direction through ownership rights and control over the productive process. As noted, Gramscians are largely able to account for the overarching nature of technological rationality within capitalism, if not its specifics.

Second, the physical materiality of the social world, produced through the interaction between ideas and the social relations of production, represents a fusion of these two moments into a single expression. It is this bias of the non-human world – always produced by human beings – that exercises a determining pressure upon social actors pursuit of different political discourses and projects, as much as the material force of dominant ideas. Recognising that social relations are alienated and fetishised cannot help to democratise the social relations of production until the physical production process itself changes, and this requires an alteration in the technical code. Materiality is a power resource not only in a direct instrumental sense, but in the manner it structures social interactions and limits – or facilitates – certain forms of action.

⁶⁸ Vannevar Bush, *Modern Arms and Free Men: a discussion of the role of science in preserving democracy* (London: William Heinemann Ltd., 1950), pp. 186–7, 225–6; Walter Lafeber, ‘Technology and US Foreign Relations’, *Diplomatic History*, 24 (2000), pp. 12–9; Odd Arne Westad, ‘The New International History of the Cold War: Three (Possible) Paradigms’, *Diplomatic History*, 24 (2000), pp. 558–61.

⁶⁹ On uneven and combined development see Morton, *Unravelling Gramsci*, pp. 137–70; Justin Rosenberg, ‘Anarchy in the Mirror of “Uneven and Combined Development”’: An Open Letter to Kenneth Waltz’, *International Politics*, 47 (forthcoming in 2010).

Finally, the bias of technology and its relevance to the study of IR is not limited to the constitution of production but also relates to important questions of culture, power and hegemony. This consideration undermines any attempts to paint historical materialism in a reductionist manner – it recognises the role of social, cultural and political values in the constitution of the technologies of production, and thereby extends the insights of Gramscian scholarship further. The critical theory of technology thus suggests that a consideration of ideas, production and physical materiality is necessarily not economistic – the ideas of the cultural sphere work to structure the instruments of production, just as the relations of production work to structure the cultural sphere. This goes a long way to meeting the criticism of historical materialism within IR and suggests the potential for a healthy debate on this ground.⁷⁰

Outlining the manner in which the problem of technology may contribute to the Gramscian dialectic of the internal relations between ideas and materiality suggests scope for a productive research program. Indeed, valuable work is already being conducted in this vein in relation to strategic studies.⁷¹ This work may be expanded in a number of directions, via theoretical discussions of the nature of power and technological institutions, by a consideration of how different cultures receive, alter, or sustain technological bias, by examining the manner in which discourses of development or progress legitimate certain forms of physical material structures, or how the particular form of media technology shape the ideological expression of its content. The turn to materiality thereby presents a useful building block for broadening and extending the work of Gramscian IR theory.

More generally, a consideration of technology may find a crucial role in investigating the experiences of lived practices that are increasingly influential within the discipline. Technology – with its roots in the Greek term *techne* and defined in the past as ‘a practical art’ or ‘the study of practical arts’⁷² – is directly implicated in how lived social relations occur. Action in IR is guided not only by the practice of discourse, or only by human-human interactions, but also by human encounters, interactions, changes and challenges with non-human objects. Understanding how these non-human objects permit certain actions, inhibit others, and require effort and toil to change is central to understand how practices are determined, and how they alter these determinations in turn. It also allows for theoretical dispute and interpretation – asserting the importance of non-human objects does not require any assumptions about human motivations. I have pointed towards the potential development of a historical materialist theory of technology in IR, but there is substantial room for dialogue with other theoretical approaches. The only requirement is an acknowledgement of the centrality of the non-human world to the practice of international politics.

⁷⁰ Randall Germain, ‘“Critical” Political Economy, Historical Materialism and Adam Morton’, *Politics*, 27 (2007), pp. 129–30.

⁷¹ Peoples, *Justifying Ballistic Missile Defense*; Richard Wyn Jones, *Security, Strategy and Critical Theory* (Boulder, Colorado: Lynne Rienner Publishers, 1999).

⁷² Langdon Winner, *Autonomous Technology: Technics-out-of-Control as a Theme in Political Thought* (Cambridge, Mass.: The MIT Press, 1977), p. 12.