



Emptying the future: On the environmental politics of anticipation



Christopher Groves

School of Social Sciences, 51a Park Place, Cardiff University, Cardiff CF10 3AT, United Kingdom

ARTICLE INFO

Article history:

Received 2 March 2016

Accepted 15 June 2016

Available online 16 June 2016

Keywords:

Anticipation

Future horizons

Energy infrastructure

Technological unconscious

Uncertainty

ABSTRACT

Anticipation may be seen as structured by images and representations, an approach that has informed recent work in science and technology studies on the sociology of expectations. But anticipation, as a capacity or characteristic, is not solely manifested in the form of representations, even where such representations of the 'not yet' are performative in nature. It also comprises material capacities, technological, biophysical and affective in nature. The politics of anticipation is shaped by how these symbolic and material capacities, and the forms of agency they make possible, are distributed. As anticipation is an environmentally distributed capacity, it is suggested that the politics of anticipation is also an environmental politics. A conceptual framework for analysing anticipation as comprised of environmental capabilities is introduced, and fleshed out using a case study of energy infrastructure planning from the UK. Key elements of this framework include the concepts of anticipatory assemblages and future horizons or 'styles' of anticipation. Working through the case study as an empirical example of a conflict concerning the politics of anticipation and of 'environments', it is demonstrated how the relationships between styles of anticipation are materially constitutive of such conflicts.

© 2016 The Author. Published by Elsevier Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

1. Introduction

The central role of anticipating the future in social life is attested to by recent research in science and technology studies (STS) (e.g. [Berkhout, 2006](#); [Jasanoff & Kim, 2009](#); [Ruivenkamp & Rip, 2011](#)). Much work in this field (e.g. [Borup, Brown, Konrad, & van Lente, 2006](#)) draws on earlier research within future studies on the role of images and representations in shaping perceptions and beliefs about the future (e.g. [Bell & Mau, 1971](#); [Polak, 1973](#)). However, anticipation includes more than acts of representation and their effects on how people perceive future possibilities. This is recognised in studies that have explored the performative function of promises and other forms of publicly enacted expectations ([Brown et al., 2000](#)). But the material aspects of anticipation – its capacity to draw virtual futures into the present and make them actually effective – extend beyond language. Anticipation is dependent on capacities of bodies and of socio-technical apparatuses, distributed throughout the environments of social action. This includes the living and geo-physical systems of the Earth ([Miller & Poli, 2010](#)), and the technological devices and infrastructures which are interwoven and imbricated with social practices ([Thrift, 2004](#)). Further, anticipation is also dependent on emotion and desire ([Brown, 2005](#)), which can coalesce in the form of positive and negative forms of attachment ([Berlant, 2011](#)) to people, objects and ideas.

E-mail address: grovesc1@cf.ac.uk (C. Groves).

The extent to which scholarship in STS and other fields interested in futures (such as environmental sociology, geography or sustainability studies) has been able to recognise this dual dimension of anticipation has been questioned by some (e.g. Anderson, 2010a; p. 17). A focus on language and representation continues to ‘humanise’ anticipation in a way that fails to acknowledge its ‘more than human’ dimensions. When anticipation conceptualised as conscious intention or orientation is placed in the foreground, the ways in which material assemblages are implicated in anticipation are pushed into the background. In this paper, I explore how understanding these ‘more than human’ dimensions of anticipation can give us a more comprehensive understanding of what is at stake in the politics of anticipation, and of the sense in which it is also an *environmental* politics.

That such dimensions can be politically significant is not difficult to demonstrate. Bodily and social routines, for example, create reliable expectations about the reproduction of social reality. The scripts written into infrastructures and technical devices organise spaces in ways that allow such routines to go on. This produces spaces of relative reliability, predictability and security that support the acquisition of important capabilities by individuals and by groups acting together, whether at work, at home, or in public life. In turn, these capabilities make possible effective agency, in the sense of enabling actors to shape their environments and the lives lived within them. But the socio-material organisation of anticipation is not a neutral process: it distributes unevenly and unequally the capabilities required by actors in order to influence the present and the future. While taming some uncertainties about what will happen, such processes can also intentionally or unintentionally move uncertainties around or create new ones, as in, for example, the organisation of assembly lines (Dudley, 1997).

This political aspect of anticipation also connects directly to how the social and material environment helps produce explicit anticipations. For example, ongoing activities of anticipation select certain aspects of these environments as ‘public things’ (Honig, 2012), objects of common concern, through which the future then becomes framed explicitly as an issue for the present. Conflicts over the intergenerational distribution of assets, over how a nation should produce energy, or about the significance of synthetic biology and nanotechnology for what it means to be human are all, at one level, debates about the social distribution of capacities for anticipation and over the injustices which may be produced by inequalities in this distribution. At the same time, what becomes a ‘problem’, and how, is a political question that reflects the outcome of how previous activities and processes of anticipation have been patterned, and which actors have been able to draw on particular anticipatory capabilities. If contemporary politics is, at one level, about ‘colonising the future’, then understanding how the means of anticipation are distributed can help us understand both the genealogy of particular ‘public things’, and also the injustices and injuries to which necessarily selective framings of the ‘not yet’ can lead.

In this paper, I have two goals. First, to contribute to the theoretical vocabulary through which the diversity of material as well as representational elements of anticipative capabilities can be understood. Second, to draw on this contribution to help understand the environmental politics of anticipation as arising from conflicts, not just between distinct *visions* of the future, but between different *styles of anticipation* or *future horizons*. Such conflicts, as intimated above, are significant because of how they reflect inequalities in the distribution of capabilities needed to influence individual and collective futures, and also because of how, through such conflicts, some aspects of social and material environments are foregrounded as things of public concern and others as not. I draw on an empirical case study and previous theoretical contributions (Groves, 2015) to help think through the relationships between material and representational anticipatory capacities and their political significance.

2. Materialising futures-in-the-making

We can take anticipation (in the broadest possible sense) to refer to the capacity of an organised system to incorporate projected future states into its present functioning, as a way of orienting or modulating its activity. This definition means that anticipation is a capability of living systems more broadly and not just a feature of intentional conscious states in humans (Miller, Poli, & Rossel, 2013). Deciduous trees, for example, anticipate falling temperatures in winter through their sensitivity to shorter day length (Rosen, 1985; p. 8). In the sense that they may ‘hesitate’ between potential bifurcated future states, this may also be said to be true of metastable non-living systems, insofar as they are capable of novelty (Groves, 2010). Where human activity differs from other forms of anticipation is commonly taken to be in the degree of active reflexivity through which humans may prepare for alternative future possibilities. But there is also a significant difference in how social futures are anticipated implicitly and materially as well as intentionally, through explicit representations of possible futures. For example, socially-inculcated bodily habits anticipate future states (Weber & Varela, 2002), and scripts written into technologies constrain future performances of practices, for example (Akrich, 1992).

Understanding human anticipation therefore requires that we analyse how socially-organised action and representation are patterned at several distinct levels. At the most concrete, empirical of these levels, anticipation has been the object of extensive study, particularly in the form of specific representations of future socio-technical developments. Consider nanotechnology, for example. For over 15 years, STS scholars have catalogued and analysed the use of images, metaphors and vignettes by enactors of nanotechnologies to create and reinforce future expectations (e.g. Bensaude-Vincent, 2004; Ruivenkamp & Rip, 2011), which constitute future imaginaries through which are built group and institutional identities, and to help create social coalitions (Mordini, 2007). This, in turn, shapes the ‘issue space’ which defines, here and now, the potential social significance of nascent technological developments. In this way, technologies and the social futures that they promise are speculatively constructed as public things, objects of concern, around which often equally speculative ethical debates are then constructed (Nordmann, 2007) (Fig. 1).

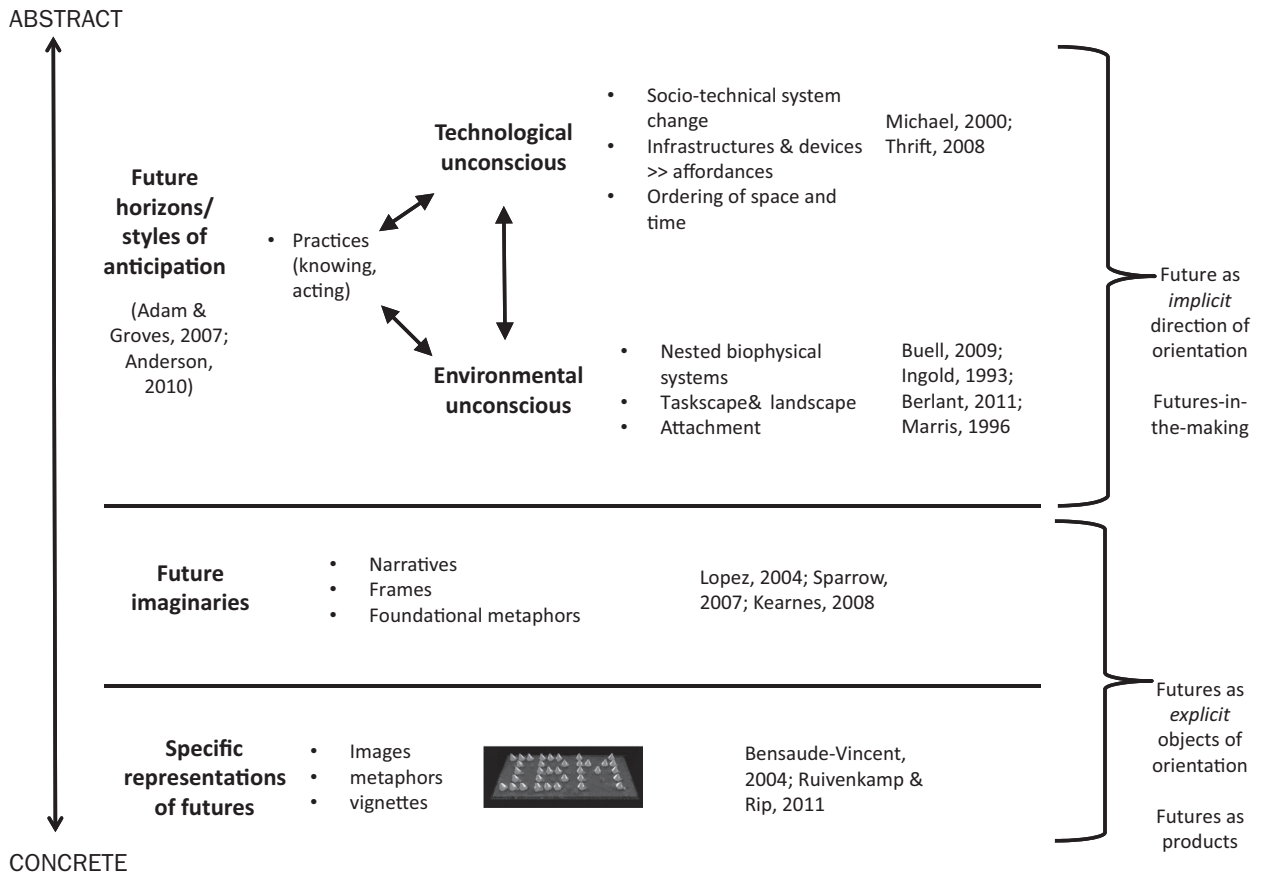


Fig. 1. Analytical levels of anticipation.

If STS has studied extensively the ways in which socio-technical futures are, in this way, *explicitly* constituted as public things by future imaginaries, the same is not so true of the more material and largely *implicit* dimensions of anticipation. To redress the balance, a theoretical move can be made here analogous to that made by geographers and STS scholars in recent years with respect to the ‘more than human’ elements through which a common socio-natural-technical world is constituted.

For example, Braun and Whatmore (2010) argue that social science is still wrestling with the humanist prejudice that social reality is solely an effect of human behaviour and intentions. Technology and nature, by contrast, appear as ‘others’ of humanity and thereby of the social. They call instead for a perspective in which technology is viewed as actively constitutive of the social and political realms, rather than just being an object of concern within politics. Influenced by this perspective, others have called for attention to how ‘socio-natural assemblages’ exert an influence alongside humans in co-producing their world (Ranganathan, 2015).

Just as ‘more than human’ perspectives on socio-natural assemblages focus on how these assemblages help to produce social reality, so a similar material perspective on futures can help us understand how certain futures become explicit objects of common concern, and how the capabilities to influence these processes, and with them, the present as well as the future, are differentially distributed. Futures-in-the-making (Adam & Groves, 2007), and the complex interplay of forces that shape them, must become the focus of scholarly interest, rather than futures already made (as images, promises, representations). How would politics look if we took this constitutive role of the material as well as the represented, performative future seriously? In line with Braun and Whatmore’s question ‘of what are collectivities and collective actions made?’, we might ask: of what is anticipation made? The answer to this question will shape any subsequent account given of what the politics of anticipation might look like. But as anticipation is reliant on capabilities ‘wired in’ to the environments in which subjectivity emerges, the politics of anticipation must also be an environmental politics. First, because of how anticipatory capabilities are distributed through this environment, which creates unequal relations between subjects (individual and collective). Second, because these relations influence the selection processes through which only some aspects of these environments become ‘public things’ with futures that emerge as objects of concern.

Some conceptual resources exist through which the material and representational aspects of anticipation can be brought together. Future horizons (Adam & Groves, 2007) and ‘styles of anticipation’ (Anderson, 2010b) make it possible to represent

the implicit combinations of knowledge practices, forms of social action, and normative frameworks which underlie and help organise future imaginaries. For example, religious hermeneutics, empirical methods or styles of theory-building in natural or social science, narrative reasoning about the lives of others, and mathematical techniques all allow the past and present to be connected and made sense of in distinct ways in the light of anticipated futures. Religious rituals, administrative routines, routinized care for family members or political activism, for their part, all contribute to the active shaping of futures. Such ways of knowing and of acting combine to help construct more fundamental tropes which underlie distinct concrete imaginaries and thus ultimately make specific representations of the future possible. These tropes organise the temporal direction and logic of relationships between past, present and future. Some examples might be the future as a divinely pre-ordained individual fate, as offering the possibility of universal material progress, or as the fully-determined product of past events. In this way, future horizons or styles of anticipation contribute horizons of meaning to social practices. They help define the present yet always point beyond it at the same time (Luhmann, 1976).

Foucauldian 'histories of the future' could therefore be envisaged, genealogies which describe how the future becomes a 'problem' for the present in different places and at different times, as a result of the emergence of distinct future horizons or styles of anticipation (Rabinow, 2003: 18). Such histories would be related to, yet distinct from, the histories that have hitherto been written of the ways in which the future has been represented and imagined with the aid of different forms of expertise (Andersson, 2012; Seefried, 2013). If such a Foucauldian history of future horizons were to be written, it would have to avoid limiting itself to comparing the forms through which potential futures are represented as public things.

Future horizons are not free-floating cultural structures, any more than are imaginaries and representations. They are always already stitched into material environments, both socio-technical and socio-natural. Often, these environments appear in social science as tools or resources, that is, as only having instrumental value. Yet they are also have a *constitutive* role, particularly as they are composed of systems which also anticipate futures. For example, scripts written into technological devices and infrastructures order space and train bodies (Thrift, 2004, 2008). Subsisting alongside imaginaries, future horizons or styles of anticipation have implicated within them a 'technological unconscious'. Through the technological devices and infrastructures on which social practices are interwoven, futures are not yet represented but are instead 'prehended' (Michael, 2000), as the condition of their being represented at all. Through the mediation of technologies and then also of knowledge practices, specific aspects of the social and natural worlds become salient for anticipation.

The material context of anticipation is not just socio-technical, however. It is also environmental in the sense that it includes biophysical systems, through which is produced the 'where' (the interwoven experienced and biophysical strata of place) of social practice that, ontologically speaking, precedes its 'what' (Buell, 2009; p. 44), i.e. its social and technical aspects. If biophysical systems can be counted as anticipatory to some degree – as shaping their present through embodied expectations of the future (Rosen, 1985) – these systems are also experienced by humans (producing the lived realities of place, for example) in ways that enable and constrain social practices and their technological components. Tim Ingold describes the routines and location-specific qualities of practices, or 'taskscape' (Ingold, 1993) through which socio-technical orders are sewn into landscapes (Ingold, 2011). Representations of the future thus arise within an environment that is socio-technical and biophysical, and are interwoven with a multi-layered ordering of space as well as time.

This dimension points to a fourth environmental aspect of future horizons. The subjects who are participants in practices, manipulators or users of technologies, and the inhabitants of places are produced alongside these implicit modes of anticipation, even as they help to produce them. They are invested subjects, whose identities are bound up with anticipations of the future as well as traces of the past, embodied subjects whose engagement with socio-technical-natural environments is affective and emotional (Groves et al., 2016). Affect and emotion – in the form of hope, fear, longing or anxiety – along with attachment to or disavowal of particular practices, technologies, places future imaginaries or representations should thus be an additional dimension of any 'history of the future' that goes beyond representations, underlining how imaginaries are 'products of reason lined with desire' (Romanyshyn, 1989a, 1989b).

Anticipatory representations and material elements may therefore be thought together as heterogeneous combinations or assemblages (Marcus & Saka, 2006) of components through which space as well as time are ordered. It is these combinations, I would suggest, that we should understand, alongside knowledge practices of various kinds, as the content of future horizons or styles of anticipation (we can use these concepts interchangeably). Such assemblages hang together in specific ways at different times and in different places. A history of how the future became a 'problem' told through such assemblages would need to differentiate, as Adam and Groves (2007) have suggested, between distinct ways in which anticipation 'hangs together'. Adam and Groves do this in terms of eschatological, closed, open, empty and abstract future horizons. These represent abstract patterns made up of diverse examples of practical, material and representational elements. Through such patterns, the future is brought into the present in a specific manner to order relationships between past, passing present and the not-yet. These patterns are abstract, yet not abstract in the way that a concept is when contrasted with the empirical instances it covers. Rather, they are abstract in the same sense as a diagram, as originally articulated by Foucault and then developed by Deleuze. The diagram is a 'disposition of centres and channels of power, of definition of the instruments and modes of intervention of power, which can be implemented in hospitals, workshops, schools, prisons' (Foucault, 1991; p. 205). Foucault saw this exemplified in the Panopticon, which was not just a representation of power, but an abstract plan for its realisation in the social field which would produce, over time, regular predictable effects. Deleuze, in his book on Foucault, foregrounds the future-taming orientation of the diagram, calling it a

'map of destiny' that is like the 'cause of the concrete assemblages that execute its relations, and these relations take place, not above, but within the very tissue of the assemblages they produce' (Deleuze, 2006; p. 37).

To clarify further what is meant by a diagram of anticipation, we can use an analogy with Romanyshyn's (1989a, 1989b) analysis of a diagram that primarily orders space but also provides a template for cultural interpretations of the relationship between past, present and future. He locates in the Renaissance the birth of linear perspective in art, which uses vanishing point and distance point together to locate objects within an image on the same plane. This way of organising space replaced the multiple perspectives evident in earlier medieval art, thus forming, Romanyshyn argues, the material basis of a characteristically modern imaginary of space but also of the future. He describes how this diagram organises the way the relationship between the subject and its world comes to be represented within European cultures, lifting the subject out of the lived immersion in sense impressions that was manifested materially in medieval multiple perspective paintings. The observer is positioned as a spectator outside the space thus represented (Romanyshyn, 1989a, 1989b), recalling the ancient Greek definition of the *theoros* (from which 'theory' comes) as a non-participating observer at a religious festival (Gadamer, 2009).

This diagram implicates within it specific 'environmental' conditions that are reproduced (with evolving historical variations) over time in European, colonial and then global cultures. These include technological capacities and knowledge practices (ways of reproducing representational forms, from the draughtsman's desk to the computer aided design package), but also the lived relationship with the socio-natural world of any participant in linear perspective (as 'outside' it), and finally an affective relationship to this world, that of the disconnected explorer, conqueror, or sovereign individual (Welsh, 2000).

Exploring what the analogues of such diagrams might be in the case of anticipation is the subject of the case study that follows. I examine how treating anticipation as constituted by assemblages that include both material and representational elements can help us understand better the nature of the politics of anticipation. I show, on the one hand, how this approach can help us appreciate the forces through which particular forms of anticipation help to create social coalitions on the basis of differing representations of the future and the material forms of anticipation that support them. On the other, I discuss how distinct styles of anticipation shape environmental conflicts—first, by helping to distribute power unequally between different social coalitions, and second (and as part of this process) by shaping how particular aspects of the environments of anticipation become 'public things', explicitly imagined futures (in my case study, energy security) that then become objects of concern. This strategy is foreshadowed to some extent in Romanyshyn's work, insofar as he suggests that, during the Renaissance and thereafter, linear perspective influences emergent imaginings of the future as a 'space of points and plotted trajectories' (Romanyshyn, 1989a, 1989b). This spatialized future is described by the historian Hölscher (1999) as the future as such, a totality of possibilities, to be contrasted with the religiously inspired concepts of individual fates through which Western antiquity and the medieval period tended to make sense of the future. Adam and Groves (2007) echo Romanyshyn's analysis in their description of 'present futures' as snapshots of future trends taken from a present which is itself abstracted from temporal becoming, in a similar way to the 'window' of subjectivity through which Romanyshyn's linear perspective assemblage constructs the 'outside world'

3. The politics of anticipation: energy infrastructure planning in the UK

My case study concerns energy demand forecasting in the UK, and the relationships between distinct anticipatory assemblages that developed in the course of a particular energy infrastructure siting conflict. Drawing on interviews with siting campaigners and document-based research (Groves, Munday, & Yakovleva, 2013; Groves, 2015) I show how the production of represented futures as public things, as matters of concern, is dependent on the dominance of particular anticipatory assemblages, and the ways in which their specific combination of material elements help constrain or exclude other anticipations of the future. In this way, capacities to influence the future are redistributed, and the environment of anticipation is translated selectively into a set of objects of interest which hide other possible objects of concern from view.

The necessity of planning for medium to long-term future energy needs has, in the last couple of decades, increasingly been framed around multiple issues, including the cost of energy, the need to reduce CO₂ emissions to mitigate anthropogenic global warming (AGW), and security of supply. Energy security has often been presented as the keystone of this 'trilemma', as an urgent matter of 'keeping the lights on' (DTI, 2006). In policy responses to this problem, the future is brought into the present chiefly through the socio-technical apparatus of demand forecasting, a combination of knowledge practices, techniques and particular socio-technical apparatuses (such as modelling software, demand measurement technologies, and so on). Like Romanyshyn's linear perspective, this assemblage produces a disembodied view, a 'present future' in which is represented a snapshot of the future as the necessary product of a set of known mechanisms. This then allows the future to be cast in a concrete, congealed form, such as a demand scenario.

In the UK, energy privatisation and deregulation in the 1980s created a private transmission network operator (TNO) called National Grid (NG) whose statutory public responsibility was to maintain and expand gas and electricity transmission infrastructure. Part of these duties was the production of annual 'ten-year statements' (National Grid, 2005), which informed government policy to help 'assess risks to the UK's future gas and electricity supplies' (Department for Business Innovation and Skills (BIS), 2009, unpaginated). Using past data and other (e.g. economic) forecasts, these reports set out conjectural scenarios about the near and medium term. The future thus constructed was one in which possibilities were translated, through the processing of available data, into probabilities. On the basis of the past data mobilised by demand forecasting, systemic risks (such as underinvestment in distribution infrastructure) are identified and then risk management decisions taken.

NG's demand forecasting connects with other anticipatory assemblages, such as that of planning governance, which enables demand forecasts to be translated, via intermediary processes, into siting decisions, buttressed via the 'presumption of development' (Cowell & Owens, 2011: 63). Forecasting enables the future to be represented as dependent on demand, treated as an independent variable subject to natural laws inferred from past data, and linked to other future scenarios. Cowell and Owens have argued that 'narratives of necessity' shape and are shaped by demand forecasting, linking the need for energy security to the need for economic growth (2011: 15). Mechanisms of demand growth are, for example, linked to the expectation that economic growth will continue.

In what follows, I show how these anticipatory assemblages can come into conflict with others in siting disputes. Linking two new liquefied natural gas (LNG) terminals in the port town of Milford Haven in west Wales to the UK gas network in England, the South Wales Gas Pipeline (SWGP) was built in the period 2003–08 by NG. Building new infrastructure to accommodate imports of liquefied natural gas (LNG) from sites in Qatar was seen as necessary to ensure that future risk of gas undersupply in relation to did not eventuate. The SWGP was proposed as a central part of this strategy.

The background to the SWGP was, as noted above, the privatisation of energy production and distribution carried out in the UK in the 1980s, which has been used as a blueprint by other nations around the world (Hope, 2008; pp. 9–10). Decentralisation was, however, accompanied by a form of recentralisation. New centres of calculation (Latour, 1987), such as NG's head offices in the British Midlands, were created that employed forecasting to render potential futures, in Scott's (1998) terms, standardisable and legible.

A specific mode of anticipating energy futures thus consolidated itself around a redistribution of expertise, in the form of particular knowledge practices and the socio-technical infrastructures of devices and networks on which they relied (Barry, 2001). These forms of knowledge united an understanding of the future as quantifiable risk with auditing practices and utilitarian welfare-economic frameworks (Power, 1997). Expertise and socio-technical apparatuses combined here to reinforce existing divisions of labour and process flow within planning governance, creating examples of what have been called 'planning cascades' (Owens, 2004). Within such a cascade, once strategic need has been identified on the basis of forecasts of future risk, then additional steps in choosing what to do are, essentially, about where the infrastructure necessary to serve this need will have to go (rather than about, say, finding opportunities to reflect further on the nature of strategic need). This marriage of forecasting expertise with planning governance creates a decision-making apparatus of a kind that reflects styles of governance that have gradually evolved since the emergence of the 'social state' in the late 19th century (Porter, 1995; Rose, 1999). The style of anticipation expressed through these arrangements then diagrams, maps or constructs the future as *abstracted* and as *emptied*.

Just as linear perspective, for Romanyshyn, locates all objects on a single plane, the goal of seeking an optimal means of providing for predicted demand flattens the future. By plotting the future as a space of a single predictable trajectory, an assemblage of technologies and practices constructs the future as resembling the past by continuing observed trends in the value of a given independent variable (such as aggregated energy demand). Creating the possibility of a narrative of necessity, this combination of anticipatory technologies and practices renders in the process certain public things imaginable and others not. Demand scenarios render the future tangible in the form of a limited set of interlinked problems, such as how to maintain services to consumers ('keeping the lights on'), how to sustain economic growth ('an impoverished Britain in 2020) and how to maintain energy security ('dependence on foreign imports). Other future possibilities, such as whether demand should be managed in order to reduce the externalities of economic growth (including AGW), or whether energy security could turn out to mean very different things to different social groups, either within countries and globally (Hildyard, Lohmann, & Sexton, 2012), become, as a consequences, less imaginable.

This style of anticipation does not just anticipate by abstracting, however; it also empties the future at the same time as it directs attention towards a restricted set of system variables. This is realised in two ways: first, the commensuration of outcomes, and second, the mapping of decision points. If anticipating through abstracting flattens the future, it does so by relating past, present and future events to each other in ways "where qualitative differences no longer matter when weighed against their calculated quantitative identities" (Romanyshyn, 2012). Quantitative measures of risk and benefit allow expected outcomes to be rendered commensurable with each other (Espeland & Stevens, 1998) in terms of a common measure (such as money, embodied in the expected cost of building infrastructure to ensure energy demand is met versus the risk, or expected probable cost, of not meeting it).

At the same time, this mapping creates a punctuated trajectory for decision-making (Guyer, 2007). Emptying the future means that the future is not simply constructed as a totality of possible events (Hölscher, 1999), around which imaginaries and narratives of necessity can then be constructed. If abstracting makes comparison between different future outcomes possible by constructing a space of possibilities, emptying makes possible a series of choices that might change this space of possibility, thus superimposing new maps of the future over old ones. Here, anticipation is no longer about mapping trajectories passively (and thus anticipating 'what's coming'), but about anticipating choices that will have to be made to optimise outcomes, while also anticipating the new trajectories that might result from these decisions. For example, the process of planning and constructing the SWGP was undertaken against the backdrop of a ten-year statement on demand, but key decisions (such as on where individual pieces of infrastructure had to be sited, on the acceptability of constructing a pipeline through a National Park, and so on) had to be taken within specific timeframes in order to keep open an optimal future (in which energy supply capacity could meet projected demand). At the same time, the future thus projected becomes charged with affect: it is not simply anticipated, but anticipated with anxiety—as suggested by the recurrence of the phrase 'keeping the lights on' as the core of a future imaginary in which scarcity, due to increased demand and insufficient supply, threatens 'our way of life'.

When campaigns were organised in communities along the length of the pipeline against its construction, these reflected different anticipations of the future and distinct imaginaries. One of the central differences between the style of anticipation that shaped NG's 'narrative of necessity' and that which can be traced in the arguments and narratives of campaigners concerns the respective roles of socio-natural environments in helping to anticipate futures. In contrast to styles of anticipation that abstract and empty the future, community-based campaigns coalesced around *lived* futures (Adam and Groves, 2007). Like the multiple perspectives of medieval painting as contrasted with the linear perspective developed in the Renaissance, lived futures set up future narratives around a multiplicity of lived experiences of place and community, interpreting potential futures through histories told at various levels. The disembedded and portable futures produced within centres of calculation reflect only the state of seclusion (Callon, Lascoumes, & Barth, 2009) in which knowledge workers and the variables they model are placed. The governance of aggregated energy demand is dependent on networked centres of calculation (Barry, 2001) through which results are passed and interpreted: NG, OfGEM, what was (in the early 2000s) the advisory Joint Energy Security of Supply Working Group (JESS) (Department for Business Innovation and Skills (BIS), 2009), and so on. Through a series of formalised interactions within secluded settings, a consensual scenario and set of responses to it are constructed.

For campaigners, however, the future is dependent on place. Affective and socio-natural components of anticipation therefore move into to foreground, both as providing anticipatory capabilities and, as time goes on, as public things of concern. Campaigners identified aspects of their immediate environments which made it possible to anticipate a secure *lived* future. One interviewee described the village she lived in as 'a country village', 'quiet, no traffic, it didn't even have streetlights', with rural landscapes that could be reached easily via back lanes and quiet roads: 'you know, there's a playpark that way, they [the children] can go mix, mingle with the children from the village' (Interviewee 11). Such elements, it was felt, were imperilled by the narrative of necessity surrounding the SWGP, as two campaigners stated in separate interviews [AUTHOR]:

We've never had anything, the only thing we've ever had is the fact that we're rural [. . .] But when you go up to March Hywel Mountain, which is practically a sacred mountain around here, up here you looking smack at it. So that area, we used to go up there, it's God's own country, you look out and you can see nothing, only mountains all way across to Brecon. That's been totally destroyed. (Interviewee 1)

And I would say it's a bit like somebody who had a beautiful house, and it became occupied by a huge serpent [. . .] and unfortunately it goes through every single room of my house. There isn't one piece left here. I had all these rooms in the countryside, all my most precious places, and that pipeline had gone through every single one of them. (Interviewee 5)

Abstracting and emptying futures performs a flattening and linearising of the future comparable to that performed upon space in Romanyshyn's account of linear perspective. Campaigns against the SWGP, on the other hand, emerged from assemblages of practices, attachments to place and community, and to specific socio-technical arrangements that were organised as *lived* futures. The diagram of lived futures is spiral and fractal, rather than linear. The narratives within SWGP campaigners' interviews bend back upon themselves in reflecting on potential futures in relation to particular pasts, and then in interpreting the past through possible future outcomes. Such narratives have, for their *dramatis personae*, not just the narrator but also a set of heterogeneous objects of concern (like other people, places, communities, and institutions). Each of these objects of concern also has its own narrative, its own singular future and thus its own needs and vulnerabilities. This interdependence of linked narratives spiralling onward through time makes some kind of juxtaposition of multiple perspectives necessary in trying to anticipate what will happen and to make decisions accordingly. Here, shared imaginaries are supported by an environmental and technological unconscious that locates and embeds them in space and in time (Fig. 2).

From within lived futures, connection and attachment make it possible to deal with uncertainty by structuring anticipation. Rhythms of living conducted in places and within communities form its material and affective basis. The future is known through the practices through which life goes on within interwoven landscapes and taskscapes (Ingold, 1993) in which the embeddedness of practice matters. Where siting conflicts occur, they can therefore begin with an attempt to make sense of the significance of how abstracted/emptied futures are translated into reorderings of spatial and social relationships in the present. The planning cascades Owens (2004) analyses prescribe how these disembedded futures become re-embedded, occupying and re-ordering space and with it, the relationships between the objects of concern through which lived futures are expressed.

As interviews with campaigners in the case of the SWGP demonstrate, conflicts may thus be generated around the uncertain potential for threats to health and/or environment embodied by new infrastructure. These uncertain and often contested risks may be the initial focus for campaigns, but these may then subsequently develop around actual or anticipated threat to the coherence of lived futures, as the interlinked narratives of places and people are disrupted (Groves, 2015). As the two interview extracts above show, the construction of infrastructure in place introduces a dynamic condition of uncertainty, disrupting patterns of anticipation.

The interview extracts also suggest that lived futures organise the space of public things differently. Abstracting and emptying the future takes as its orienting point a problem of predicting future system states and optimising responses in ways that create new, preferred system states. Energy security represents a public thing in this sense, an object of common concern, even if its exact meaning remains contested (Kruyt et al., 2009). For campaigners at various flashpoints along the

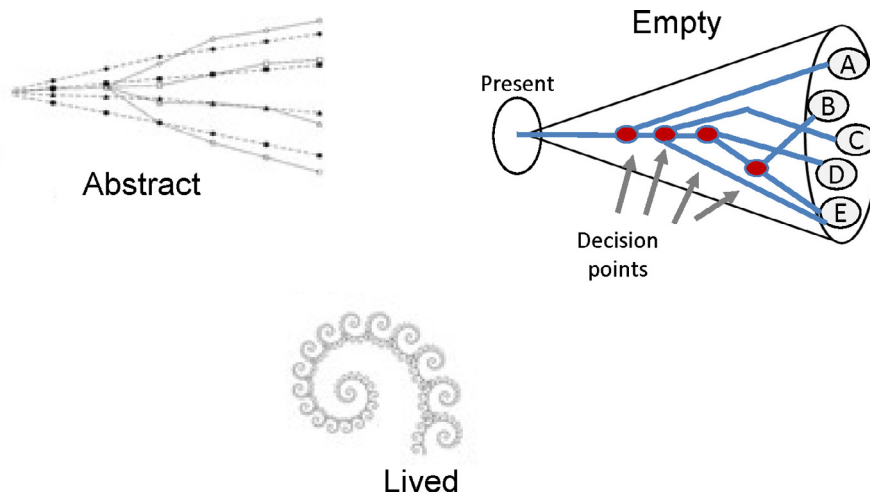


Fig. 2. Diagrams of anticipatory assemblages.

route of the pipeline, a variety of public things emerged as significant orienting points. These reflected narratives that made sense of social reality at a series of distinct, though often interconnected levels, and which anticipated through their constitutive imaginaries a variety of local, regional and even international futures. Among the themes of these narratives were climate change, the physical safety and economic security of often socio-economically deprived communities, and the preservation of community attachments, including landscapes and routes through them (Groves, 2015). As Vanesa Castan Broto argues, in her study of the motivations and activities of environmental activists in Tuzla, Bosnia-Herzegovina, what often emerges out of conflicts rooted in the disruption of place and community (and, I would argue, of anticipated futures) is a particular kind of public thing—a desired future in which a solidaristic relationship between the parties and their distinct orientations towards the future is forged, in which (for example) an industrial developer is ‘internalised’ into a community by aligning its goals with the preservation, enhancement and long-term sustainability of a community’s capabilities (Broto, 2013). Akin to a process of mourning, this move from disrupted attachment to some form of re-attachment reflects a desire to recompose a lived future.

The source of conflict here lies, in the first place, in the experience of being unable to maintain the coherence of styles of anticipation embedded in place and collectivities. Capacities and capabilities through which lived futures are expressed are often already unequally distributed. Capacities needed to influence one’s future and to contribute to caring for the futures of one’s objects of concern may not be available to the same degree to different actors (a difference which may track across various dimensions of social inequality). The translation of abstract and empty futures into new orderings of spatial and social relationships (through the planning and construction of infrastructure, for example) can modify this distribution of capacities by creating new uncertainties. By enabling some imaginaries of the future (e.g. demand scenarios) to be superimposed over others, abstracting and emptying the future enable in turn certain aspects of the social, technological and natural environment to become public issues and not others.

In the case of the SWGP, the material and symbolic consistency of a heterogeneous assemblage of knowledge practices, technologies, centres of governance and affects allows ‘energy security’ to be created as a public thing, a matter of universal concern and anxiety. The superimposition of abstracted and empty futures over lived ones is expressed symbolically and rhetorically in the public contest of imaginaries (the ruination of communities versus energy insecurity, for example), and materially in the translation of future imaginaries into physical infrastructure, facts on the ground. The conflicts to which these processes give rise are experienced (as the interview extracts above suggest) as an example of what Nixon (2011) has called ‘slow violence’, the triggering of long-term processes of harm which can only be felt through the erosion of environments and, I would add, the anticipatory capabilities embedded within them. It can therefore be problematic to represent the future as empty, as open to being written. Indeed, this is itself a political action, insofar as it overwrites the lived futures through which the future is already being shaped.

4. Conclusion

We have explored how the future is not simply anticipated through being represented and imagined, but is also anticipated through the material organisation of capacities that help to constitute the environment for knowledge and action in the present. These capacities are not only cognitive and imaginative possession of individual human subjects. They may be affective, but can also be ‘more than human’, being technological or embedded in place and non-human nature. How the exercise of these capacities is organised, I have argued, can be understood as exhibiting particular patterns that, following Romanyshyn, Foucault and Deleuze, I have likened to diagrams (Deleuze’s ‘maps of destiny’), abstract orderings which are

expressed through actual practices and socio-natural-technical arrangements and which help draw the future into the present, making it representable and imaginable in particular ways.

Examples of such diagrams have been elaborated via the example of a siting conflict which, I have argued, is a conflict between distinct styles of anticipation that plays out through processes of superimposition and translation. These processes are facilitated by social institutions (like those through which the land-use planning system is organised) which embody traditions of prizing and legitimating certain forms of future-oriented knowledge. While this conflict is experienced as a clash of contending interests or values articulated through contrasting visions of future outcomes, it primarily arises from tension between heterogeneous ways of knowing and taming an uncertain future.

Environmental politics, viewed through the analytical lens developed in this paper, can be understood as the process through which different styles of anticipation contend in defining public things. Understanding anticipation as a capacity dependent on a heterogeneous set of human and more-than human capabilities enables us to understand the deeper sense in which environmental politics is also a politics of the future – not just the future already made over into a product, an object of concern represented and imagined, but as futures-in-the-making into which flows a multiplicity of distinct activities of anticipation.

Through this kind of perspective, it become possible to think about power relations as modulated through the construction of the future. Anticipation does not just have rhetorical or performative effects. The representational and material capacities that are ordered through styles of anticipation are also expressed through forces that shape social, representational and physical spaces in which public things are constituted. They construct the future as a problem in different ways at different times and in different places. The politics of anticipation, as environmental politics, concerns the unequal forms of agency available to different actors for making the future a problem and an object of representation and imagination. Recomposing the relationships between distinct styles of anticipation or future horizons is thus, from this perspective, a central political problem. Re-integrating abstracting and emptying together with other future horizons is one way of understanding the task of a critical politics of anticipation. What has been called 'responsible innovation' (RI) (Stilgoe, Owen, & Macnaghten, 2013) represents an intervention in the politics of anticipation that recognises how conflicts can arise between distinct kinds of future-oriented knowledge. With its emphasis on constructing socio-political models for rendering innovation more responsive to a wider range of social priorities, RI places itself within a tradition of other attempts to place how the future is anticipated at the heart of politics, including what Moriarty (1999) calls 'focal engineering', which involves the re-embedding of engineering within places and communities. Focal engineering projects work through lived futures rather than against them, fostering projects like community-owned renewable energy infrastructure that are responsive to attachments and the social and extra-social relationships that sustain them. Examples of interventions such as these implicitly recognise that anticipatory capabilities are the connective tissue of political collectivities. They also implicitly acknowledge, however, that not only are these capabilities unevenly distributed, but that conflicts between different ways of organising them are at the root of the politics of anticipation.

Acknowledgements

My thanks are due to Dr Jeremy Walker, Prof. Juan Salazar and two anonymous referees for comments on an earlier version of this article.

References

- Adam, B., & Groves, C. (2007). *Future matters: action, knowledge, ethics*. Leiden: Brill.
- Akrich, M. (1992). The de-scription of technological objects. In W. E. Bijker (Ed.), *Shaping technology/building society* (pp. 205–224). Cambridge, MA: MIT Press.
- Anderson, B. (2010a). Preemption, precaution, preparedness: anticipatory action and future geographies. *Progress in Human Geography*. <http://dx.doi.org/10.1177/0309132510362600>.
- Anderson, B. (2010b). Security and the future: anticipating the event of terror. *Geoforum*, 41(2), 227–235.
- Andersson, J. (2012). The great future debate and the struggle for the world. *The American Historical Review*, 117(5), 1411–1430.
- Barry, A. (2001). *Political machines: governing a technological society*. London: Athlone.
- Bell, W., & Mau, J. A. (1971). Images of the future: theory and research strategies. In W. Bell, & J. A. Mau (Eds.), *The sociology of the future* (pp. 6–44). New York: Russell Sage Foundation.
- Bensaude-Vincent, B. (2004). Two cultures of nanotechnology? *Hyle*, 10(2), 65–82.
- Berkhout, F. (2006). Normative expectations in systems innovation. *Technology Analysis & Strategic Management*, 18(3–4), 299–311.
- Berlant, L. (2011). *Cruel optimism*. Durham, NC: Duke University Press.
- Borup, M., Brown, N., Konrad, K., & van Lente, H. (2006). The sociology of expectations in science and technology. *Technology Analysis & Strategic Management*, 18(3–4), 285–298.
- Braun, B., & Whatmore, S. (2010). The stuff of politics: an introduction. In B. Braun, & S. Whatmore (Eds.), *Political matter: technoscience, democracy, and public life*. Minneapolis, MN: University of Minnesota [i-xi].
- Broto, V. C. (2013). Employment, environmental pollution and working class life in Tuzla, Bosnia and Herzegovina. *Journal of Political Ecology*, 20(1), 1–13.
- Brown, N., Rappert, B., Webster, A., Brown, N., Rappert, B., & Webster, A. (2000). *Contested futures: a sociology of prospective techno-science*. Aldershot, UK: Ashgate.
- Brown, N. (2005). Shifting tenses: reconnecting regimes of truth and hope. *Configurations*, 13(3), 331–355.
- Buell, L. (2009). *The future of environmental criticism: environmental crisis and literary imagination*. London: Blackwell.
- Callon, M., Lascoumes, P., & Barth, Y. (2009). *Acting in an uncertain world*. Cambridge, MA: MIT Press.
- Cowell, R., & Owens, S. (2011). *Land and limits: interpreting sustainability in the planning process*, 2nd ed. London: Routledge.
- Department of Trade and Industry (DTI) (2006). *The energy challenge*. Norwich: HMSO.
- Deleuze, G. (2006). *Foucault*. London: Continuum.

- Department for Business Innovation and Skills (BIS). (2009). Joint Energy Security Of Supply Working Group (JESS). Retrieved 25 September, 2009, from <http://www.berr.gov.uk/energy/reliability/security-supply/jess/index.html>
- Dudley, K. M. (1997). *The end of the line: lost jobs, new lives in postindustrial america*. Chicago: University of Chicago Press.
- Espeland, W. N., & Stevens, M. L. (1998). Commensuration as a social process. *Annual Review of Sociology*, 24, 313–343.
- Foucault, M. (1991). *Discipline and Punish*. London: Penguin.
- Gadamer, H. G. (2009). *Truth and method*. London: Continuum.
- Groves, C. (2010). The futures of causality: Hans Jonas and Gilles Deleuze. In R. Poli (Ed.), *Causality and motivation* (pp. 151–170). Frankfurt: Ontos Verlag.
- Groves, C. (2015). The bomb in my backyard, the serpent in my house: environmental justice, risk and the colonisation of attachment. *Environmental Politics*, 24(6), 853–873.
- Groves, C., Munday, M., & Yakovleva, N. (2013). Fighting the pipe: neo-liberal governance and barriers to effective community participation in energy infrastructure planning. *Environment and Planning C: Government and Policy*, 31(2), 340–356.
- Groves, C., Henwood, K., Butler, C., Parkhill, K., Shirani, F., & Pidgeon, N. (2016). Invested in unsustainability? On the psychosocial patterning of engagement in practices. *Environmental Values*, 25(3), 309–328.
- Guyer, J. I. (2007). Prophecy and the near future: thoughts on macroeconomic, evangelical, and punctuated time. *American Ethnologist*, 34(3), 409–421.
- Hölscher, L. (1999). Die Entdeckung der Zukunft. In A. M. Frankfurt (Ed.), Fischer.
- Hildyard, N., Lohmann, L., & Sexton, S. (2012). *Energy security for what? for whom?*. Sturminster Newton: The Corner House.
- Honig, B. (2012). The politics of public things. *No Foundations*, 10, 59–76.
- Hope, E. (2008). The political economy of power sector reform: the experiences of FiveMajor developing countries. *Energy Journal*, 29(2), 186–188.
- Ingold, T. (1993). The temporality of the landscape. *World Archaeology*, 25(2), 152–174.
- Ingold, T. (2011). *Being alive: essays on movement, knowledge and description*. London: Taylor & Francis.
- Jasanoff, S., & Kim, S.-H. (2009). Containing the atom: sociotechnical imaginaries and nuclear power in the United States and South Korea. *Minerva*, 47(2), 119–146.
- Kruyt, B., van Vuuren, D. P., de Vries, H. J. M., & Groenening, H. (2009). Indicators for energy security. *Energy Policy*, 37(6), 2166–2181.
- Latour, B. (1987). *Science in action: how to follow scientists and engineers through society*. Cambridge, MA, Harvard: University Press.
- Luhmann, N. (1976). The future cannot begin: temporal structures in modern society. *Social Research*, 43(1), 130–152.
- Marcus, G. E., & Saka, E. (2006). Assemblage. *Theory, Culture & Society*, 23(2–3), 101–106.
- Michael, M. (2000). Futures of the present – from performativity to prehension. In N. Brown, B. Rappert, & A. Webster (Eds.), *Contested futures: a sociology of prospective techno-Science* (pp. 21–42). London: Ashgate.
- Miller, R., & Poli, R. (2010). Anticipatory systems and the philosophical foundations of futures studies. *Foresight*, 12(3) .
- Miller, R., Poli, R., & Rossel, P. (2013). *The discipline of anticipation: exploring key issues Global/Local anticipatory capacities*. Paris: UNESCO.
- Mordini, E. (2007). Nanotechnology, society and collective imaginary: setting the research agenda. In G. A. Hodge, D. M. Bowman, & K. Ludlow (Eds.), *New global frontiers in regulation: the age of nanotechnology* (pp. 29–48). Cheltenham, Northampton, Mass: Edward Elgar.
- Moriarty, G. (1999). A plea for the practice of focal engineering. *Technology in Society*, 21(4), 439–456.
- National Grid (2005). *Gas transportation ten year statement 2005*. National Grid: Warwick.
- Nixon, R. (2011). *Slow violence*. Cambridge, MA: Harvard: University Press.
- Nordmann, A. (2007). If and then: a critique of speculative NanoEthics. *Nanoethics*, 1(1), 31–46.
- Owens, S. (2004). Siting, sustainable development and social priorities. *Journal of Risk Research*, 7(2), 101–114.
- Polak, F. L. (1973). *The image of the future*. San Francisco: Jossey-Bass.
- Porter, T. M. (1995). *Trust in numbers: the pursuit of objectivity in science and public life*. Princeton: Princeton University Press.
- Power, M. (1997). *The audit society: rituals of verification*. Oxford: Oxford University Press.
- Rabinow, P. (2003). *Anthropos today: reflections on modern equipment*. Princeton, NJ: Princeton University Press.
- Ranganathan, M. (2015). Storm drains as assemblages: the political ecology of flood risk in post-Colonial Bangalore. *Antipode*, 47(5), 1300–1320.
- Romanyshyn, R. D. (1989a). *Technology as symptom and dream*. London: Routledge.
- Romanyshyn, R. D. (1989b). *Technology as symptom and dream*. London: Routledge.
- Romanyshyn, R. (2012). Technology: alienation and homecoming. *Existential Analysis*, 23(2), 200–212.
- Rose, N. (1999). *The powers of freedom: reframing political thought*. Cambridge: Cambridge University Press.
- Rosen, R. (1985). *Anticipatory systems: philosophical, mathematical, and methodological foundations*. Oxford: Pergamon Press.
- Ruivenkamp, M., & Rip, A. (2011). Entanglement of Imaging and Imagining of Nanotechnology. *Nanoethics*, 5(2), 185–193.
- Scott, J. C. (1998). *Seeing like a state: how certain schemes to improve the human condition have failed*. New Haven: Yale: University Press.
- Seefried, E. (2013). Steering the future. The emergence of Western futures research and its production of expertise, 1950 to early 1970. *European Journal of Futures Research*, 2(1), 1–12.
- Stilgoe, J., Owen, R., & Macnaghten, P. (2013). Developing a framework for responsible innovation. *Research Policy*, 42(9), 1568–1580.
- Thrift, N. (2004). Remembering the technological unconscious by foregrounding knowledges of position. *Environment and Planning D: Society and Space*, 22(1), 175–190.
- Thrift, N. J. (2008). *Non-representational theory: space, politics, affect*. Abingdon: Routledge.
- Weber, A., & Varela, F. J. (2002). Life After Kant: natural purposes and the autopoietic foundations of biological individuality. *Phenomenology and the Cognitive Sciences*, 1, 97–125.
- Welsh, I. (2000). *Mobilising modernity: the nuclear moment*. London: Routledge.