Material Participation

Technology, the Environment and Everyday Publics

Noortje Marres

'A rich and stimulating book.' – *Journal of Cultural Economy*

'Marres' attention to the material conditions of political participation is not a return to materialism but a deep redefinition of each of those terms: why does politics matter and what does it mean to be involved in politics? Before her a pragmatist view of politics and publics remained abstract, without a clear method to follow the objects, pragmata, that give relevance to the creation of the public. Marres' work deeply renews what it is for the study of politics and participation to take material conditions seriously.' – *Bruno Latour, Professor, Sciences Po, Paris, France*

'*Material Participation* is a book about the role of objects in political participation. It is part of what has been called the object turn – what Noortje Marres, more delightfully, calls the coming out of things. It is an account of how moral and political phenomena may unfold on the plane of things. It deploys a vocabulary of modality, multi-valence, implication, accomplishment, setting and relevance to make visible the middling work of objects. And in doing so offers us the possibility of taking part in a politics of co-articulation, of producing new, more variable kinds of connections between publics, ontology, and the empirical.' – *Celia Lury, Professor, Centre for Interdisciplinary Methodologies, University of Warwick, UK*

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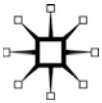

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that is covered in my chapter on Experiments in Living (to appear in C. Lury and N. Wakeford (2012) *Inventive Methods: The Happening of the Social* (London: Routledge)). Chapter 5 includes some material that has also been presented in the article 'Why Political Ontology Must Be Experimentalized' in *Social Studies of Science* (Marres, 2013).

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I once found a phrase, written on a bench in a train station, which said something along the lines of 'you are at home there where you are understood'. At the time, I found myself agreeing, and felt very fortunate that I could. But more recently I have also come to appreciate the daily reminders that mutual understanding is not automatic.

Introduction to the Paperback Edition

What is the role of things in political participation? This question is being asked by researchers, theorists, designers and practitioners concerned with public involvement in a wide range of areas. Those engaging with environmental issues such as nuclear waste or air quality are interested in the capacity of natural entities and other 'non-humans' – like trees and power plants – to inspire awareness of these issues and mobilize publics. In the worlds of design, science, art and engineering, materials are treated with renewed respect, as the handling and crafting of fabrics, metals and other distinctively material entities are widely believed to enable innovation and to be capable of informing new techniques and new forms of behaviour. Finally, in the area of digital technology and media, platforms, devices and all manner of applications are configured with the explicit aim of facilitating participation, in ways that put the engaging capacities of objects in the forefront. Many digital devices deploy 'data objects' – such as 'tags' or 'memes' – to enable and organize engagement. This approach has also been extended to actual objects, which are then digitally wired to enable 'smart' forms of engagement – as in the case of the experimental toaster that not only 'knows' when you would like your toast, but when others might be having theirs.[1] There is, then, a broadly shared commitment to accord to objects the capacity to inspire, disturb, provoke and surprise in socially, politically and morally significant ways. However, the suggestion that there is something exceptional or especially noteworthy about the roles attributed to things in participation may also strike one as odd or artificial. Don't *all* forms and practices of participation have a material dimension, and hasn't this always been the case?

Of course, participation in public affairs has always happened in some material setting, and since times immemorial it has been associated with distinctive locations, from the forest clearing to the urban square and impressive Greek and Roman architectures of theatrical assembly that remain with us today. However, it is also the case that participation in public life has long been associated first and foremost with words and not with things, with the 'distinctively human' capacity for language as opposed to the more widely shared ability to manipulate things and

environments. As the British classicist Mary Beard (2013) recently noted in a lecture on the 'public voice' of women, special privileges have been accorded since ancient times to the speaking subject – the one gifted with speech – as the figure uniquely capable of participation in political and public matters. However, Beard also tells us that material practices have been appreciated as an 'alternative register' of participation for an equally long time: such practices may enable public expression when language fails us, as in the Greek myth of Philomela, who lost her tongue, but 'still managed to denounce her rapist by weaving the story into a tapestry.'[2] In several respects, then, it is absurd to state that participation has gained a material dimension only recently. However, the story of Philomela also helps to make it clear that some practices of participation are more explicitly 'material' than others, and more decisively so.

Valuing material participation

All practices of participation have a material dimension, but 'material participation' denotes something above and beyond this basic circumstance: everyday material practices are today explicitly put forward as relevant sites of public involvement. In this book I propose that material participation can be taken to refer to a distinctive mode of engagement, one in which everyday material actions, like washing or foresting, are put forward as useful and valuable operations upon matters of public concern. As I will describe it here, material participation is suggestive of a different register of engagement than the one the mythical Philomela engaged in: while the Greek princess was concerned to express and communicate a message to an audience and deployed material means to this end, the forms of participation that I examine in this book are focused on 'changing the world' by material means, and seek to enable practical or even physical interventions in current states of affairs.

One of the examples I will discuss in what follows is the everyday practice of 'making tea', which has been put forward in the United Kingdom and elsewhere as exactly the type of material action that offers a useful focus for public engagement with environmental issues. Thus, gadgets and gimmicks like the 'eco-friendly kettle' or the 'green teapot' have in recent years acquired special salience as devices for raising awareness and involving people in issues of climate change and fossil fuels (see Figure 3.1, see also Marres, 2013). They are presented as playful means to get people to consider the environmental consequences of their everyday activities in terms of energy use and the dirty emissions

associated with this. Such deployments of material entities, it seems to me, open up a distinctive avenue of inquiry for social studies of participation. We must now ask: how are everyday things, technologies and settings invested with the capacity to engage? And, can everyday material activities really be said to enable distinctively 'material' forms of involvement, ones that differ from other forms of engagement, such as the symbolic actions of protest movements or discursive participation in public debate? While a teapot may not satisfy several criteria for successful engagement with public issues, the rise to prominence of a participatory device such as this may bring into focus alternative requirements for partipation, ones that we have perhaps not sufficiently appreciated until now.

This book, then, is concerned *not* with the role of things in political participation in general, but with the more specific question of how everyday material practices are framed, defined and equipped in order to render them available as sites and means of public involvement. I am interested in the *valuation* of material practice as a distinctive setting and register of public action, and the practical, political and creative work involved in this. I do not think that this focus necessarily implies a de-valuation of other, less explicitly 'material' forms of participation, such as public consultations and the meetings of civic associations. However, to declare that material participation constitutes a distinctive form of public involvement, one that warrants closer examination, does imply a normative assessment. It seems to me that we are already pretty well equipped – intellectually, empirically, morally – to value speech and voice as registers of public involvement, but that we still have much to learn about the possibilities that everyday material practices offer for engagement with public affairs. These practices may well facilitate *idiosyncratic* forms of participation, with their own conditions of success and failure. Insofar as this is so, there is work to be done if we are to adequately appreciate material modes of participation. We must investigate empirically how things, technologies and settings are deployed in actual practice to enable material participation, and we must also enquire conceptually into what enables the qualification of material practices as enactments of public participation.

Conceptualizing material participation

The proposal to pay special attention to the role of objects in participation is certainly not new. Work in the social studies of science and technology (STS) and related fields has for many decades studied the

roles of things, technology, and environments in politics and democracy. Drawing on a variety of traditions in social research and theory, including the writings of Michel Foucault and the ethnomethodology of Harold Garfinkel, work in this field has investigated how material entities are deployed to normative ends and have distinctive political effects. A square with a slanted surface that is just too steep for a wheelchair (Moser and Law, 2007), a pink shaver designed to assuage women's 'fear of technology' (Oost, 2003): these settings and devices have been demonstrated to exert 'political' force in particular ways. An environment like the slanted square excludes particular types of people by material means; a material device like the pink shaver operates on people's perceptions of gender-specific roles and capacities.

In this book, however, I suggest that these examples present us with one particular mode of material politics: here settings and things operate upon people's room for manoeuvre and their (self-)understanding in a latent, implicit manner. As such, these settings and devices do not announce their political powers publically, but rather exert them surreptitiously, without people necessarily noticing or understanding them in political terms. The practices and forms of material participation that I will examine in this book present a different way of doing politics with objects, settings and technologies. Building on the above accounts of the politics of technology developed in STS, I argue that material things are today deployed to enact *a distinctive public form* of engagement. In these cases, material objects, devices and settings are explicitly ascribed the capacity to enable political participation: they are deliberately invested with the ability to render complex public problems such as climate change available for practical intervention by everyday people. In the case of the square and the shaver above, material politics operates in the background of public life. By contrast, the things, devices and settings that I will focus on in this book 'wear their politics on their sleeve': they broadcast their special capacities to engage.

In investigating material participation as a distinctive form of engagement, this book brings social studies of technology into conversation with political theory. As I will discuss, social studies of technology have previously tended to assume that material politics operates on a different level than that of 'abstract' theories of participation: these politics were said to occur primarily on the level of practice, and therefore to be best understood through empirical study. An explicit engagement with the concepts of political and democratic theory was considered not strictly necessary. However, when we approach material participation as a distinctive *form* of public engagement, this reasoning no longer holds.

The location of participation in everyday material practice may now involve the deployment of distinctive theoretical ideals and assumptions regarding public participation. Thus, in the aforementioned case of the eco-kettle, the investment of everyday material practice with capacities for engagement is accompanied by distinctive arguments and ideals from political theory, most notably the liberal ideal of 'involvement-made-easy', which proposes that participation must be made doable for people (Pateman, 1989b). In other cases, the promotion of an everyday practice like 'making tea' as an occasion for environmental awareness-raising appeals to the pragmatist ideal of 'the more invested, the more engaged': the idea that people care more about things when they handle them on a daily basis (Dewey, 1955 [1908]). Here, the ascription of political capacities to material devices does not operate on a different level than that of political ideals, but rather invokes such ideals. In what follows, I will then examine how devices of material participation enable particular relations between practices and ideals.

In recent years, a range of authors have argued that the investigation of materiality opens up opportunities for mutual engagement between social studies of science and technology (STS) and political theory (Braun and Whatmore, 2010; Coole and Frost, 2012; Kelty, 2014). While I am in broad agreement with this general project, I make a particular case for such engagement and favour a specific approach. In my view, investigating political phenomena in their material dimension does *not* require us to posit a fully fledged 'materialist' theory of politics or democracy. Indeed, the point is precisely *not* to posit 'matter' as a new foundation or foundational dynamic for politics or democracy, on general grounds. Instead, the aim should be to call attention to the specific roles played by things, technologies and environments as notable *participants* in the doing of politics and democracy, and this does *not* exclude the participation of other, human, social, technical or abstract entities on a more or less equal footing (Suchman, 2014). In what follows, I will therefore argue for a *non-exceptionalist* understanding of the role of things in political participation: neither of humans nor of non-humans can it be assumed that they are well-equipped for politics and participation. For both these types of entities, we must ask how they come to be invested with capacities for political participation in particular practices.

The politics of material participation

To conclude this introduction, I would like to flag some of the political issues at stake in material participation and its study. Above I suggested

that we do not yet know how to adequately appreciate material forms of participation, but it *cannot* be deduced from this that there are no vocabularies available to describe the practices involved. The problem is rather the opposite. An evolving apparatus of ideas, norms, concepts and rules is today deployed to establish the social, political and economic importance of the practices that I designate as instances of material participation. Not least important is the language of 'behaviour change,' which proposes that changing people's everyday routines offers a reliable and effective way to enlist them in wider campaigns addressing public problems (Lemov, 2005; Shove, 2003). A related example is the aforementioned ideal of 'involvement-made-easy', and the associated formula of 'small changes', which suggests that minor adaptations in everyday behaviour offer a far more effective approach to societal and environmental change than more comprehensive efforts to change society. In this book, I will take issue with these dominant framings of material practices of participation, and offer alternative ways of describing and understanding them.

Arguments for small changes and easy involvement often imply a rather belittling view of the capacities of everyday people to address environmental issues. As we shall see, they often propose that we must lower our expectations of everyday people, if campaigns for public engagement are to be successful and effective. Some even suggest that by focusing on the minor modification of material practices, everyday people can be enrolled in environmental programmes without any significant appeal to their consciousness being necessary. They might even insinuate that people's commitment is immaterial to societal and environmental change, and present the perceived need for political commitment on the part of everyday actors as an 'obstacle' to social change. In such arguments for 'small changes', the promotion of what I call material participation risks to become a way of removing initiative from everyday people and practices. In developing an account of material participation in this book, my aim is to counter these anti-democratic implications, and to develop an appreciation for the complexities of material participation. Like the advocates of small changes, I propose that we must take seriously the constraints that people encounter in everyday life in their efforts to engage with public affairs. But unlike these defenders of what I will call 'the change of no change', I argue that appreciating these constraints does not in any way require that we diminish our expectations of everyday practices of participation. To the contrary, the value of material participation derives precisely from the normative capacities of everyday material practices that it brings into view: they are able to generate insight and make possible new forms of intervention.

My gamble, then, is that in developing an STS-informed account of material participation, we are not only offering a different vocabulary for speaking about public engagement, it also enables us to make a different case for the salience of material practices for political participation. To fully grasp the relevance of these practices, it can now be made clear, we must open up for questioning certain established assumptions about what constitutes 'effective' participation. Furthermore, it requires us to let go of some particular habits of critical thinking, to begin with what we might call the habit of demarcation: the often unthinking assumption that in order to think normatively about participation we must start by making a firm theoretical distinction between true and false participation, between strong and weak forms of participation. In this book, I offer a different approach. In a radically empiricist spirit, I propose that we should begin by following the circulation of particular objects, technologies and formats of participation among different settings and practices, moving freely along with them to where they may lead us (Latour, 1988) in order to examine what capacities for involvement they have and may enable.

In the following chapter I will situate this project in relation to various approaches in social and political research and theory to understanding the role of objects in participation. After a discussion of the concept of 'material publics' in Chapter 2, I will turn in Chapter 3 to the example of environmentally aware household devices, including a 'smart' teapot that tells its user when the grid has spare capacity to boil some water. In Chapter 4 I turn to sustainable living blogs, a popular genre in which people report on their everyday efforts to lead a less environmentally damaging life on the Web and in news media. In Chapter 5, I consider environmental show homes as experimental sites of material politics, a site where the political capacities of objects and environments are being actively configured. In discussing these various cases, I certainly do differentiate between more and less enabling practices and forms of material participation, but I do so on the basis of empirical description, and not a priori, on purely theoretical grounds. In relation to material participation, too, we must learn to appreciate that its distinctive strengths and weakness are accomplishments of specific practices, and that these practices no less than others have the capacity to surprise.

Notes

1. As in the project 'Addicted Toasters' (2012) by the designer and researcher Osman Haque, see http://www.haque.co.uk/addictedtoasters.php

2. See Mary Beard (2014), The Public Voice of Women, London Review of Books Vol. 36, no. 6
   http://www.lrb.co.uk/v36/n06/mary-beard/the-public-voice-of-women
   Beard adds gloomily: this is 'why Shakespeare's Lavinia has her hands, as well as her tongue, removed'. Beard's essay is rich with such cunning commentary, but does not consider the possibility with which this book is concerned: to address the question of participation in public life, we could examine not just the issue of 'voice' – of what women and other subjects say in public – but equally that of practice – of what they do. Material action may also constitute a form of participation. Indeed, it seems not entirely coincidental that the increased participation of women in public life at the current juncture coincides with a revaluation of material practices as sites and forms of public action.

1
Participation as if Things Mattered

Introduction

Political participation always takes place in a material location, but it could be said that some sites of engagement are more material than others. Certain settings of public involvement seem designed to make things recede into the background, as in the case of the auditorium, of which the shape and acoustics conspire to let the sound of voices take centre stage, allowing the audience to temporarily leave behind the material mess of everyday living. But of other settings of participation the opposite seems true. Of this there is no lack of examples today: a broad range of recent initiatives of citizen engagement have proposed that material practices like washing, cycling and gardening may usefully facilitate participation in social and public life. These projects and campaigns suggest that everyday material environments – like kitchens and allotment gardens – have distinctive capacities to engage people, and some even propose that such settings may render wider social problems – such as public health and environmental issues – available for intervention by everyday people.[1] This proposition of 'material participation', as I will call it, raises all sorts of questions about the legitimacy, efficacy and comparative worth of explicitly material forms of engagement: is it really possible to contribute to, become involved or intervene in public affairs by means of everyday material activities? We can also wonder about the distinctiveness of material modes of participation. Is there something special or specific about efforts to practice engagement with objects, devices and environments: do they enable forms of involvement that are distinct from other forms?

This book grew out of the intuition that this question can be answered in the affirmative. One feature of the aforementioned initiatives of

material participation deserves special attention in this respect: such initiatives tend to involve specific *operations* upon everyday settings, as I will discuss in more detail in what follows. More often than not, they undertake modifications of everyday environments and objects, equipping them so that they may facilitate participation. In practices of material participation, everyday things, devices and environments may then *acquire* the capacity to engage and to mediate involvement with public affairs, and I will argue that this sets them apart from other forms of engagement. To introduce this claim, this first chapter will present an empirical example of material participation taken from an environmental awareness campaign called 'DYI Planet Repairs.' I will discuss this example against the background of existing approaches in social and political research and theory to understanding the role of objects, technologies and environments in engagement. In so doing I would like to show that current forms of material participation trouble and challenge certain prevalent assumptions of social and political thought about participation, and that they do so in potentially productive ways.

The performance of material participation

In recent years, there has been a range of institutional, organizational and individual attempts to locate public engagement with environmental issues in everyday material practice. The more visible of these attempts take the form of publicity campaigns promoting material actions, like heating, cooking and washing, as a way of engaging with an assortment of issues, from climate change to resource depletion and biodiversity (Hinchliffe, 1996; Walker and Cass, 2007; Shove et al., 2009). These campaigns assign to everyday material objects – like lightbulbs, thermostats and compost – the capacity to mediate public action upon the environment (Hawkins, 2006; Marres, 2010; Hobson, 2006). This entails a particular framing of what participation is about, one that deviates from more customary framings of it in terms of 'literacy'. Rather than seeking to increase people's *knowledge* about environmental issues, these initiatives focus on *action and impact* – on what people can do about the issues in question. And the focus on everyday material action, in turn, enables a set of distinctive ideals of participation to be deployed. A report from a recent environmental awareness campaign provides a case in point.

Figure 1.1 is taken from a marketing report accompanying 'DIY Planet Repairs', a 2007 publicity campaign convened by the Mayor of London.

It presents the results of a survey measuring different levels of environmental engagement among citizens of London, listing a number of changes in everyday habits and habitats that people may or may not be prepared to make. By ordering activities according to the amount of effort involved in them – from 'tried not to use my hose pipe' to 'installed an alternative energy source' – people's commitment to environmental issues is measured in terms of the more or less laborious modifications of everyday routines and environments that they are willing to undertake. In this respect, the figure codifies participation in material terms: it literally overlays a range of material activities with levels of environmental engagement, turning everyday material action into an index of public participation. And in so doing, the diagram also develops a particular analysis – or perhaps even a theory – of public participation.

The 'DIY Planet Repairs' figure defines engagement in terms of the degree of effort that it requires from subjects (in the words of the report, 'the level of engaged effort required'). As such, it stipulates a precondition for public participation to be successful: only when it is made easy for people to take 'environmental action' will they engage in it. Or to phrase this more formally, the figure proposes that the scope of public engagement is inversely proportionate to the level of practical investment this activity requires from citizens. By overlaying everyday material actions with modes of public engagement, the figure then makes the 'doability' of engagement a requirement for its success – a proposition that echoes classic arguments in liberal political theory about the minimization of effort as a condition for public participation. I will explore these resonances further, but the figure provides an indication that the framing of participation in material terms involves the deployment of distinctive techniques, methods and concepts.

To highlight the role of techniques, methods and concepts in the definition of material participation is to adopt a performative perspective on it. This broad approach is widely used in sociology, anthropology and the social studies of science and technology (STS) to investigate how phenomena are 'accomplished' in practice. The perspective was initially developed for the critical study of seemingly 'natural' phenomena, like human behaviour and scientific facts, and to expose their *artificiality* by describing how these phenomena were 'done', 'produced' or 'enacted' in practice (Goffmann, 1959; Garfinkel (1984 (1967)). Performative studies of social life use fieldwork methods or archival research to demonstrate how a seemingly 'objective' phenomenon like a fact about how the brain works (Latour and Woolgar, 1979) or 'child abuse' (Hacking,

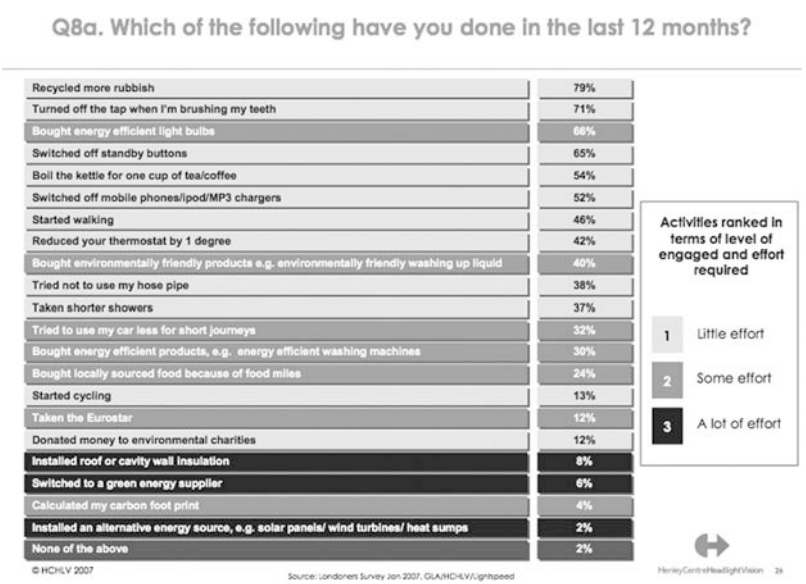

Figure 1.1 Market segmentation report for 'DIY Planet Repairs', an environmental awareness campaign by the Mayor of London, HenleyCentre HeadlightVision, now The Futures Company, February 2007

1999) is brought into existence with the aid of specific instruments and props deployed in particular settings, such as a scientific laboratory or a therapist's consultation room. In this way, such accounts undo 'naturalistic' understandings of these phenomena as somehow 'given' and gifted with a self-evident, independent existence. In this book I want to show that such a performative approach is also useful for investigating a political phenomenon like everyday forms of public participation.

The concept of performance has been widely used to make sense of political participation also, as several important studies of public life have described it as a special form of 'theatre' (see for a discussion Sennett, 1977; White, 2002). However, contemporary efforts to locate public participation in everyday material practice pose special challenges: these efforts often involve the deployment of technology to locate participation in seemingly simple or 'authentic' settings like the home, investing these settings with seemingly 'natural' powers of engagement. To analyse these particular projects and forms of what I call material participation, the approaches developed in STS and sociology for the critical study of the performativity of 'objective' phenomena seems especially useful. To focus on the 'artificiality' of material participation,

and to examine how it is accomplished with the aid of devices and settings, is to go against a more 'objective' and in some ways more spectacular, interpretation. Thus, it may be tempting to approach the material specification of participation as an indication that a new type of citizenship is emerging. One would then argue that the materialization of participation involves the supplanting of the familiar character of the 'informational citizen' – the one in need of information in order to adequately perform his role of opinionated, decision-making subject – with another figure, which we could call the material public. There are good grounds for such a claim (I will examine the concept of the material public in Chapter 2). Material participation has in recent years been explicitly promoted as a way of addressing the 'failure' of literacy as the foundation of an effective participatory regime (Macnaghten and Urry, 1998; Macnaghten, 2003; Nordhaus and Schellenberger, 2007; also Eden et al., 2008). Locating participation in everyday material practices, it has been argued, solves a number of problems associated with informational citizenship – a form of public participation often criticized for making impossible demands on everyday subjects, insisting that they take an interest in complex issues with little or no relevance to their everyday lives. Following this argument, one would say that material participation is being configured today as the successor to informational citizenship.

However, rather than developing this kind of general claim, which would establish material participation as a robust phenomenon that exists out there in the world, in this book I want to approach it as a rather more precarious proposition, and direct attention to the distinctive methods, technologies and concepts that are deployed in order to make material participation happen. I want to explore how the specification of participation in material terms is accomplished in practice, and accordingly I will consider material participation as an empirical phenomenon: as an *effect* that is achieved – or aspired to – in a wide range of institutional and practical initiatives, projects and campaigns aimed at fostering public engagement.[2] For this reason, I will explore the role of objects in the enactment of public participation in this book by focusing on a particular empirical area, that of sustainable living. There are several reasons for adopting such an empirical and performatist approach, but one of these is that it helps to dispel the idea that material participation must be understood in strict opposition to informational forms of citizenship.

When we consider an empirical device like the DIY Repairs survey visualization above, it becomes clear that material participation does *not* involve stripping participation of its informational, linguistic

or discursive components. It rather makes a particular addition to, or modification of, the more usual codification of engagement as a state of informedness. Second, to consider material participation as a performative accomplishment opens up the question of how we are to understand it as a normative project. The pervasiveness of material participation as a distinct form of public action poses a challenge to prevailing normative analyses of the role of things in social, political and cultural studies of participation. In these fields, this role has often been characterized as a shadowy one, as something that goes largely undocumented in most official, academic and public accounts of participation (Foucault, 1975; Anderson, 1983; Akrich, 1992; Latour, 1992; Warner, 1990). This characterization does not really work for the campaigns for material participation described here, as they precisely foreground the role of things as notable components of participatory projects. To see why this difference matters, it is necessary to locate a performative approach to material participation in the context of the long-standing interest in the role of material entities in the organization of citizenship and public action in social, political and cultural studies. This work is very wide in scope, and I will therefore limit my account here to situating material perspectives on participation in relation to the 'object turn' in recent social, cultural and political research and theory.

The object turn in social theory and the 'coming out' of things[3]

A variety of fields have inquired into the role of things in participation, from sociology to political theory, cultural studies, anthropology, archaeology and geography.[4] Much of this work is empirical in focus, interrogating the role of specific objects, technologies and settings in the enactment of citizenship and public action: from waste to bicycles, from freebies to packaging, opinion polls, focus groups and civic meetings, to in situ protests in road construction sites and test fields trialling genetically modified crops (Barry, 2001; Cochoy, 2007; Hawkins, 2011; Harvey, 2010; Osborne and Rose, 1999; Lezaun, 2007; Lash and Lury, 2007; Bennett, 2007; Stöckelová, 2009a; Girard and Stark, 2007). This empirical interest in the materials, technologies and settings of public engagement is closely linked to a wider 'object turn' in recent social, cultural and political theory (Knorr-Cetina, 1997; Latour, 2005b; Lash and Lury, 2007). This field of work finds its starting point in the rejection of the critique of objects that

has been dominant in twentieth-century social science: the idea that things, technology and materiality render engagement impossible. This work suggests that this negative critique has lost its plausibility, and proposes what could be called an 'object turn' in social, political and cultural research: we must recognize that material entities equally make an important positive contribution to the organization of social, political and moral life in industrialized societies (Callon and Latour, 1992; Barry, 2001; Miller, 2005; Bennett, 2004; Thevenot, 2006; Thrift, 2008).[5]

In recent years, material studies of participation have started to explore the implications of this broader object turn for the understanding of democracy and public action, as they focus attention on the capacities of things to facilitate, inform and organize citizenship and engagement. In so doing, this work has raised questions about the status and intent of accounting for participation in material terms. Can all forms of engagement be described equally well in such terms? Or should material participation be understood as a distinctive type of public action to be counterposed to other types, such as that of 'public debate'? Material accounts of participation have been remarkably cautious on this point. Indeed, many of the authors associated with the object turn in social and political research and theory have been reticent about challenging the privilege accorded in our societies to linguistic, dialogic and deliberative concepts and procedures of participation (Latour, 2004b; Callon et al., 2009; Rose and Novas, 2004).[6] This has created the impression that to recognize the role of things in participation does not necessarily have consequences for our valuation of different forms of civic and public action.

One way to explain this reticence in studies of the materiality of citizenship and participation is to consider the deeper intellectual roots of these studies, those that lie beyond the object turn in social and political theory. Interest in the role of material entities in the organization of citizenship and public action, in social, cultural and political studies, can be traced to the philosophical traditions of phenomenology and post-structuralism. It has been informed by a normative project associated with these currents (see on this point also Bennett, 2004). *This work seeks to return to citizenship, the body politic and the public what these categories had been denied in rationalist and positivist theories of democracy, which defined them primarily in abstract and linguistic terms*: a sense of public engagement as an embodied activity that takes place in particular locations and involves the use of specific objects, technologies and materials. As a consequence, accounts of

participation in material terms have tended to approach materiality as an under-appreciated dimension of participation, and the 'force of things' as one that is exerted surreptitiously, below the radar of official discourses about public participation (Bennett, 2004). From this vantage point, it is the task of social and political studies to recover the material dimension of participation, and to testify to its normative significance.[7]

There are specific circumstances under which the project of 'recovering' the materiality of participation makes sense, for instance where its disavowal clearly distorts our understanding of participation. The neuromuscular disease patients studied by Callon and Rabeharisoa (2004), for instance, seem apathetic and disengaged, only so long as we ignore the myriad ways in which they are involved in the issues at hand by socio-material means: the drugs they (do not) use, the clinics they visit and so on.[8] And projects of recovery may also be useful in order to challenge asymmetries in how different forms of participation are valued. Explicitly material practices such as in situ protests and domestic activities are frequently criticized or disqualified as improper or ineffective forms of engagement, in part because of the ways they entangle subjects in contingent, everyday, and often dirty stuff (Mol, 2008; Bennett, 2010). The understanding that all forms of participation have an irreducible material dimension is a useful first step to challenging this kind of prejudice. However, the proposal that the material dimension needs to be brought back into view, and that we need social, political and cultural studies to do this, does not really work when material participation figures as a distinctive public form.

Material entities are not forgotten at all in these cases, as in the DIY Repairs campaign above. To the contrary, the investment of material settings, objects and devices with participatory capacities here features as *a more or less deliberate effect* that is accomplished – or at least sought after – in the practices under study. When objects like light bulbs, plastic bags or compost are used as 'poster objects' for public campaigns they are *explicitly* attributed the ability to mediate engagement in public affairs. This 'coming out' of things has consequences for how we account for the material dimensions of public participation. Adopting a material perspective on participation meant engaging in a form of underground inquiry as long as the 'forgetting of materiality' (Stengers, 2010)[9] could be assumed. It was the role of social studies to uncover the latent roles played by material settings, devices and stuff in the organization of participation, roles which were *not*

fully acknowledged in the mainstream view of participation, which tended to assume informational or deliberative conceptions of it.[10] And as long as the politics of things is presumed to play itself out surreptitiously, it does not really seem capable of disturbing established forms of democratic action.[11]

However, when material participation figures as a public form in its own right, materiality clearly does not refer to an under-articulated phenomenon. Here, the enactment of participation in a material dimension implies a distinctive formatting of participation: it is framed as a particular kind of practice to be pursued in a particular setting, such as recycling, changing bulbs and so on. It then becomes important to document the particular methods, technologies and genres of publicity deployed to frame participation in material terms. The question now is: How do things *acquire* the capacities to organize publics by particular means? We must study the making of participatory objects. How could tomatoes emerge as a focal point of public campaigns against genetic modification (Kräftner and Kröll, 2003)? How were plastic bags – and particular versions of it like 'the bag for life' – turned into carriers of environmental awareness (Hawkins, 2006)? And how did electricity meters acquire the ability to mediate public involvement with climate change (Marres, 2009; Michael and Gaver, 2009)?

Adopting a performative perspective on material participation also has consequences for how we understand the normative project of the materialization of participation. The notion of the forgetting of materiality put social and political studies in the position of an agency of redress. Their role was to challenge the disavowal of matter and to offer an *empiricist affirmation* of the role of things in the enactment of participation. Here, the task of social studies is to dismantle the critical understanding of objects. They must counter the deep-seated suspicion that a political or social grouping organized through things cannot possibly be a true public, but is sure to present a consumerist, domesticated parody of it. However, if we consider object-centred participation as a distinct public form, it cannot be approached uniquely in the affirmative mode. We must develop a more nuanced and ambivalent appreciation of the role of things in the enactment of public participation. Indeed, when materiality cannot be taken to refer to an under-acknowledged dimension of participatory practices, it becomes important to consider why things have been thought to cause problems for participation in the past.

Before and after the object turn: problems of participation

Material entities are widely believed to cause trouble for public engagement. Political and social theorists have long deemed a preoccupation with material things to be antithetical to participation, in at least two important respects. First, classical political theory explicitly associated material entanglement with domestic life, labour and leisure, and as such located it in the private sphere. According to theorists from Aristotle to Arendt, participation in the public precisely requires actors to *extract* themselves from the absorbing material entanglements that mark these domains: only then will citizens become capable of grasping common rather than particular interests and of making autonomous judgements (Arendt, 1958; Pateman, 1989a; Pocock, 1992 (1998); Marres and Lezaun, 2011). Modern social theory offered a second reason why material entities render public engagement impossible: here the rise of industrial type objects, that is technology and commodities, has been held responsible for the demise of community in industrial societies, an argument that has been central to the foundation of social and political science in the early twentieth century (Latour, 2005b; Wolin, 2004a). (What I referred to above as the 'coming out' of things into public life brings these two distinct conceptual tropes into contact with one another (see Chapter 4).)

The wider object turn in social and political theory is mainly concerned with this second critique of objectivity. Its principal project is to move beyond it, and to undo the modern understanding of objects as antithetical to social and political engagement. In providing positive affirmation of the role of things in contemporary forms of social and political engagement, the object turn challenges an idea that has been formative of modern social and political science, and is associated with theorists from Emile Durkheim to Theodor Adorno and Carl Schmitt (Lash and Lury, 2007; Knorr-Cetina, 1997; Latour, 2004a): the idea that the rise of industrial objects – from technology to commodities and scientific objects – should be held responsible for the demise of sociability and politics in industrial, bureaucratized, technological societies. This idea also lies behind a general diagnosis of the pathology of modern society: that is suffers from a shortage of sociability, community or engagement (Putnam, 2001). Indeed, this diagnosis has to an extent created the *need* for social and political research and theory, and thus provided an important legitimation for it.

In proposing to investigate how modern objects mediate sociability – how they enable rather than disable involvement – contemporary social

theory specifically sought to undo the depiction of scientific, technological and commodity objects as anti-social and anti-political forces, as drivers of rationalization, bureaucratization, individualization, privatization and so on (Miller, 1998; Latour, 2005b; Knorr-Cetina, 1997). However, in providing a positive affirmation of the social and political capacities of objects, this work did not only undo the critical definition of modern objects. It also dismantled modern analyses of problems of engagement in technological societies: those that posit the demise of face-to-face interaction, the falling apart of communities, the forgetting of social skills and so on, and blame this on the rise of modern objectivity (Latour, 1991; Bennett, 2010). Object-centred social and political theory thus raises the question: if we have been partly wrong to blame problems of participation on objects, *how else* should we make sense of these problems in technological societies? The affirmation of objects and their capacities for engagement, then, at least partly suspends the classic modern sociological understanding of problems of engagement. However, the question of what could replace this possibly 'outdated' problem definition follows immediately from this: surely object-centred social and political theories do not want to suggest that problems of participation in technological societies are simply figments of the sociological (and political) imagination, an artefact of outmoded habits of modern social and political thought?

The object turn in social and political theory certainly does not result in the dissolution of problems of participation. Rather, this work has undertaken an important *qualitative displacement* of this problem. From an object-centred perspective on social and political life, the idea that society suffers from a deficit of engagement does not really make sense.[12] If we approach social and political actors as materially entangled beings, what stands out are the myriad ways in which they are *already* implicated in public affairs by material means. However, this circumstance does not necessarily mean that actors figure as participants in these affairs. As mentioned advocates of a material perspective on engagement have noted how socio-material entanglement in issues tends to remain on the level of an underground mode of engagement, one that remains unacknowledged in, is frequently at odds with or actively undermined by institutional framings of public engagement (Wynne, 1996; Irwin and Michael, 2003; Bennett, 2005).

Thus, on the one hand, work associated with the object turn proposes that insofar as socio-material entanglements mediate participation, social actors are always already actively implicated in issues. Knorr-Cetina's amateur cyclists (1997), Bennett's slow fooders (2007),

Wynne's sheepfarmers (1996) and Callon and Rabeharisoa's neuromuscular disease patients (2004; 2008) are all involved in issues of public health, environment, trade and foreign policy and so on, as a consequence of their socio-material embodiment and entanglement. These authors challenge the assumption of a *lack* or deficit of engagement on the part of social actors – which is then to be made up for by campaigns and programmes that seek to foster 'participation' where allegedly there was none.[13] On the other hand, however, this certainly does not mean problems of participation are a figment of the imagination. But these problems are now understood as at least in part perpetuated by institutional regimes: the problem of public participation here comes to refer to a *mismatch* between an institutional mode of operation which assumes that public engagement is to be created 'ex nihilo', and actors' ontological entanglements with issues which it actively disasavows (Wynne, 2008; see also Marres, 2007).[14]

While the object turn thus certainly did not result in the dissolution of problems of engagement in technological societies, material participation itself is not really problematized in these strands of work. However, as soon as we consider material participation as a distinctive public form, it turns out that it brings with it problematics of participation of its own. Where material participation figures as a specific modality of engagement, it can no longer be understood as an under-articulated phenomenon, and in this context, attempts to organize publics by material means themselves evince a distinctive set of problems, both empirical and conceptual. And here the 'classic' critique of materiality as antithetical to public participation becomes relevant again to contemporary framings of it.

The problems of material publics

The empirical formulation of material participation may involve the attribution of particular problems to publics, as we have seen in the first section of this chapter. To mention another example, a recent report for the UK Sustainable Development Commission (Lockwood et al., 2007) proposed to measure public engagement with environmental issues in terms of the material actions people are willing to take to address them, and on this basis noted a discrepancy between what people say and what they do:

> Statements of the willingness to take action to reduce emissions contrast strongly with the trends in what people actually do. Data

> on actual behaviour show increases in flying, holidaying abroad, driving, and consumption of household appliances (see, for example, Retallack et al. 2007). At the same time, opinion polls generally show a majority (60 per cent or more) opposed to higher taxes on driving and flying (for example, YouGov 2007). The Energy Saving Trust's Green Barometer survey shows a similar contrast between a widespread desire to be seen to be green and majority opposition to carbon rationing (EST 2007). There is thus a significant group of people in the UK who are opposed to new policies on the environment, especially on taxation.

A subsequent report by the same authors concluded that the public remains unwilling to 'make any personal sacrifice [...] thus poisoning efforts to champion the environment at the ballot box' (Lockwood and Bird, 2009).[15]

Concepts and methods of material participation, then, like others, can be used to problematize the public.[16] They enable a *distinctive* formulation of the public's problem, one that could be called 'the disinvested public'. Rather than by a lack of understanding of the issues, or 'literacy,' as is most common, publics are here marked by inaction or a lack of will or desire to make even small changes in their everyday lives. In a familiar turn of the plot, actually existing publics are here chastised for failing to live up to expectations generated by theories of the public: in this case, for not performing in accordance with even the most minimal expectations implied in the ideal of 'involvement made easy'. There are a number of problems with the resulting model of the public as a passive mass,[17] such as the highly asymmetric way in which it distributes the cause for wider societal inaction on the environment, presenting 'the public' as a (the?) major factor in this, as I will discuss in what follows. However, it is equally important to recognize that material participation is not only a problem because predominant discourses say it is: there is a long intellectual history that suggest that material engagement presents an inherently problematic mode of involvement.

Material publics have long been considered a problematic proposition – if not a contradiction in terms – in political theory, and when we consider object-centred participation as a distinct public form, some of these problems turn out to be all too relevant to our analysis of it.[18] There are then not only empirical but also good conceptual reasons to pay special attention to the problems of material publics. The classic Aristotelian idea that participation in public affairs requires social actors to disentangle themselves from their everyday material concerns

continues to be evoked today to criticize attempts to locate public participation in everyday material practice.[19] Modern political theory has added further problematizations of material publics. As I will discuss in the next chapter, the American pragmatists John Dewey and Walter Lippmann have identified a whole range of problems with the organization of publics by material means. These publics suffer, for instance, from problems of instability: paradoxically, collectives that are organized by means of objects turn out to be especially ephemeral or fluid ones. This makes it hard to see how these publics could ever act as effective agents of change. And then there is the problem of demarcation, the fact that material publics do not map onto an exclusive domain of public action, something which led the political theorist J.G.A. Pocock to argue that if we allow the concept of the public to pertain to material practice, this is likely to entail the dissolution of boundaries between public and private, and this 'might well mean that the category of the public loses its distinctiveness' (Pocock, 1992/1998; see also Dobson, 2003).

To consider material publics, then, is to engage with a different set of problems of social and political theory than those associated with what we could call the sociable public, thematized in early twentieth-century social and political research and theory, and connected with the notion of a participatory deficit 'caused by' wider developments like industrialization and bureaucratization. I will argue that the problems of material publics require a somewhat different approach and normative strategy than those of the sociable public. Instead of affirming the materiality of the public, and dismantling critiques of this type of public, I propose that we should extend an affirmative approach to the *problems* of material publics. Not just material participation, but the trouble with this form of participation requires our attention. This is not because critics are right to disqualify material action as an unviable form of public participation, but because 'problematicness' may well turn out to be an important constitutive feature of material publics. The question then is what normative register is appropriate to the analysis of material participation. Neither positive affirmation nor negative critique, taken on their own, seems quite adequate to it, and I want to suggest that a positive valuation of the problems of material publics is an important step towards getting this right. To arrive at a better appreciation of these problems, social studies of participation stand much to gain from a deeper engagement with political theory (Braun and Whatmore, 2010; Wynne, 2008; Latour, 2007).

In choosing this focus, I will quite unembarrassedly concentrate on one strand of political theory, namely that of classic American

pragmatism and work informed by it. While, as mentioned, there are many political theories relevant to the analysis of material participation, I will mostly engage with the pragmatist political theory of John Dewey. This is because his work has arguably done most to bring about the type of object turn in political theory that I favour – one that is experimental and empiricist in orientation – but has not widely been recognized as such. As I will discuss in more detail in Chapter 2, Dewey had the audacity to propose that we must learn to think political and moral phenomena as unfolding 'on the plane of objects'. As he forcefully claimed in an essay titled 'Does Reality Possess Practical Character?' (1908), things like values, desires and interests are best regarded as 'aspects of objective situations:' 'Such things as lack and need, conflict and clash, desire and effort, loss and satisfaction [must be] referred to reality.' It is also to say, Dewey suggested, that there is nothing *resolved* about the politics of objects. Indeed, this is what makes Dewey's object-centred political theory so significant in my view; in proposing that we approach political phenomena such as interest, conflict and strife as 'aspects of objective situations', Dewey transformed political ontology itself: the 'plane of objects' now emerges as a plane perturbed and animated by 'such things as lack and need, conflict and clash, desire and effort, loss and satisfaction'.

In this respect, Dewey's audacious proposal also opens up a set of questions in relation to contemporary political theory. I am thinking here in particular of the argument developed by Chantall Mouffe (2000) and others that conflict and strife must be placed at the heart of democracy. Distinctive about Mouffe's 'agonistic' theory of democracy has been a double commitment, a commitment to two things that have often been conceived as mutually exclusive: it aims to recognize 'clash and conflict' as a formative dynamic of politics, but, in doing so, it takes as its central question that of how 'clash and conflict' can be made productive for *democracy* (rather than assuming that democracy requires some form of consensus, as other political theorists have been prone to do). This question, I think, is equally relevant for object-centred political theory, and Dewey's political theory provides a language for posing the question in object-centred terms. (Indeed, Mouffe (1996) herself has engaged with pragmatism, though mostly with its theory of knowledge.) The question then is: if we are committed to recognizing that political conflict and strive unfold on the plane of objects, in what sense can this be understood as productive for democracy? One of the questions I then try to address in this book is whether and how agonism can be thought and studied as an 'aspect of objective situations'. But

before further exploring this question, I first want to say a bit more about the broader political and intellectual context in which object-centred studies of participation intervene, as this matters, too, to how we understand their normative import.

Beyond technocracy: traffic between democracy and technology (and much else besides)

The turn to objects as foci of public participation is today occurring in a particular context, one in which calls for a 'participatory turn' in scientific research, innovation and environmental management are proliferating (Irwin, 2006; Sismondo, 2007; Waterton and Ellis, 2004; Jasanoff, 2003a).[20] The call to 'democratize' science, innovation and the governance of nature used to be the signature position of radical and progressive intellectuals, including those associated with 'Science and Society' movements of the 1970s and 1980s. But today the opening up of processes of research, technology development and environmental governance to publics may be considered the rule rather than the exception (Sismondo, 2007). This project is now actively endorsed and pursued in a variety of governmental, industrial and non-governmental settings: from the organization of public consultations on controversial techno-science (Hagendijk and Irwin, 2006; Callon et al., 2009) to the implementation of platforms for user-centred design (Wilkie, 2010; Ehn and Badham, 2002; Thrift, 2008) and the proliferation of initiatives for community-centred management of the environment (Whatmore, 1999; Agrawal, 2005; Waterton et al., 2006).[21]

The idea of an object turn on participation both overlaps with and differs from that of the participatory turn. In some ways, the object turn is simply *the mirror image* of the participatory turn undertaken in the 'objective' fields of science, technology and nature. The two turns may be understood as different formulations of a similar phenomenon: the attempts to approximate the categories of objectivity and community. From this vantage point, the difference between the two turns is principally one of perspective (as with the famous rabbit of the Gestaltswitch literature): it depends on how you look at it, whether you recognize in participatory initiatives attempts to render objects more central to participation or efforts to render participation more central to object-centred practices. However, there are also some differences of emphasis between the two turns, and these differences matter insofar as they suggest a different intervention in wider debates about the democratization of science, technology and nature.

One could say that the two turns imply a different analysis of the approximation of the categories of objectivity and engagement. To speak of a participatory turn is to support, however broadly, the thesis of the 'democratization' of science, technology and the environment. It invokes the narrative according to which the previously 'closed' worlds of objectivity –science, engineering and technocratic modes of government – are today being opened up to the public (Brown, 2009; Nowotny, 2003; Irwin, 2001).[22] By contrast, the idea of an object turn on participation is *not* necessarily aligned with this narrative, and indeed complicates it in a number of ways. Most importantly, it challenges the notion that the attempt to bring science, technology and democracy closer together constitutes a *historical exception* of some kind. Attempts to make democracy revolve around objects can be identified in different historical literatures and epochs, and contemporary efforts to do so must, as a consequence, be understood as simply 'one more object turn' after a broad range of previous ones: it presents a rather small variation in a much longer history of very similar attempts, which have gone under several names, but one of which is *scientific liberalism*.[23]

Historians and philosophers of science have argued that science and technology, far from presenting institutions that are external to democracy, have long played a central role in the performance of the public in liberal democracies (Ezrahi, 1990; Turner, 2003; Barry, 2001). Indeed, this political form can in part be *defined* in terms of the attempt to make politics revolve around objects and to approximate the categories of objectivity and democracy, and in this respect science has served as a crucial source of its metaphors, procedures and tropes. This becomes especially clear if we consider the *formats* of public action that are associated with liberal democratic traditions. As Yaron Ezrahi (1990; 1995) has shown, a whole range of genres of public action – from procedures of accountability to dialogic conceptions of participation and objective measures of performance – bear the traces of discursive forms associated with science. The public testing of hypotheses; the critical debate among peers; the dissociation of deeds from their doers, so as to bracket subjective factors; the projection of the public in the role of a reliable witness of public experiments: these forms can all potentially be traced back to attempts to introduce a 'scientific epistemology' into modern democracy (see also Shapin and Schaffer, 1989). Liberal democracy, then, invokes an *empirical* imagination of the public and as such, it is often said to involve the attempt to make democracy more like science (Wolin, 2004b; Stengers, 2005).

Such historically informed analyses of democratic forms place contemporary calls to 'democratize' science, technology and the environment in a particular perspective. It suggests that we may be dealing with a strange loop in this case: what is presented as an attempt to pry open scientific and technological institutions, *as if from the outside*, actually draws on genres of publicity that *derive* from science and technology to an extent. The historical analysis of liberal democracy, then, suggests that the call to 'open up' science, innovation and environment governance to more public scrutiny does not exactly introduce an 'alien' or 'new' element into these fields, but rather mobilizes public forms that *already* bear a scientific and technological imprint: accountability, critical debate, informational citizenship. The merit of the notion of an 'object turn' on participation, in this respect, is that it reminds us of this ongoing 'traffic' between democracy, science and technology (the term is Rosengarten's, 2009). It tells us that calls for public engagement with science, innovation and the environment are in some respects a continuation of all-too-familiar histories: attempts to 'objectify' democracy, as I will discuss in more detail in Chapter 2.

However, to note this is certainly *not* to accept that object turns regarding democracy necessarily involve the attempt to make it more like science. To the contrary, to speak of an object turn in relation to participation is an attempt to loosen the grip on our imagination of the public of a particular story: the narrative that equates objectivity with science and presents 'technocracy' as the principal threat to democracy in post-industrial times. As I mentioned, the wider object turn in social and political theory precisely seeks to move *beyond* the idea that scientific objects, technology, commodities are necessarily corruptive of social and political life. And this also has consequences for how we conceive of the relation between technology and democracy. If we recognize that projects of democratization draw on scientific and technological forms, it is no longer so plausible to understand democracy and technocracy in strict opposition to one another (see also on this point Braun and Whatmore, 2010; Kelty, 2008; Lezaun and Soneryd, 2007; Marres, 2005a, Laurent et al., 2010).[24] Indeed, it may now seem problematic to let the 'threat of technocracy' guide our thinking about democracy; among others, it distracts from all the ways in which projects of public engagement with science and technology involve the mobilization of expert knowledge, methods and technologies of public participation (Lezaun and Soneryd, 2007).

This distraction is problematic for a negative reason: it prevents us from noting how easily the democratization of science and technology

may collapse into its opposite, the technicalization of publics. But the spectre of technocracy may also count as a distraction for a positive reason: it may prevent us from imagining the public as a technologically equipped entity, whose organization requires the material and technical modification of settings and practices. Indeed, this is another way of understanding why an object-centred perspective on participation is useful: it sensitizes us to the instruments deployed in the enactment of participation and directs attention to the artifice involved in processes of democratization, reminding us that science and technology are not necessarily external to democracy.[25] In what follows, I will argue that object-centred approaches to participation require that we extend the range of 'objectual' forms of publicity – the term is Knorr-Cetina's (2001) – to be considered relevant to the enactment of participation: we should not only consider empirical forms like for instance the focus group, but also public forms associated with art and morality, such as experiments in living.

I then adopt an 'anti-exceptionalist' perspective here, proposing that object turns in relation to participation and democracy are and have been on-going, for a century at least (Ezrahi, 1995). This also implies that this turn does not necessarily represent a singular or unified phenomenon. Rather, the object turn must be understood as historically, conceptually and empirically multiple. There are, and have been, many object turns in relation to participation, involving the deployment of different theories, methods and techniques, and with very different normative implications. Instead of dramatically opposing an object-centred vision of participation to an 'object-less' one, we must address the question how to deal with the many different faces of the object turn – with the fact that there are many, partly continuous but also divergent versions of it. I take this to be one of the main challenges for an object-centred approach to participation, which in this book I try to address by combining theoretical and empirical ways of exploring material participation. I want to conclude this first chapter by introducing this way of thinking and working.

Dis-aggregating the object turn: theory, concepts and methods

To note the multiplicity of a phenomenon has become somewhat of an obligatory gesture (Dean, 2002), but in the case of object-centred participation it makes an important difference in at least one respect: it makes it possible to understand the object turn as a *variable* phenomenon.

Variability, I will argue in this book, should be regarded as a constitutive feature of participatory objects, conceptually, empirically and normatively speaking. The same or a similar object may facilitate very different modes of engagement, and it may take on varying normative charges: participatory things must be understood as multivalent. In order to appreciate this feature, it seems important to avoid a monolithic account of the difference that things make to participation, to resist fixing or overdetermining the object turn by theoretical means (to 'know' all too well what it is). Thus, instead of suggesting that the rediscovery of things, matter and stuff is inherently enriching for democracy, I will concentrate on the question of how to distinguish between different versions of object-centred participation, and also, when it is appropriate to acknowledge the slippages between them.

Thus, in the next chapter I will differentiate a number of concepts of the material public developed in recent political theory and related fields: in particular, concepts of the community of the affected developed in liberal political theory and notions of matters of public concern that have recently been proposed in science and technology studies and are loosely modelled on republican notions of the common good. Not only do these notions involve a different understanding of the role of material entities in democracy, but they also suggest different analyses of the 'problem' with publics that are organized by material means. While in some accounts concepts of the material public are to provide politics with a new set of principles for deciding who or what is wrongfully excluded, others take it to highlight a distinctive modality of the public, a distinct mode of becoming. It seems especially important to think through the differences between these versions of the material public if we are to move beyond a simple opposition between technocracy and democracy: the significant distinctions must now be made among various forms of technological or material or ecological democracy.

If there exist many different but partly continuous versions of material publics *in theory*, this applies even more so to object-centred participation in practice, and this I will consider in chapters 3 to 5. To begin with, there is the basic fact that, when approached as an empirical phenomenon, material participation varies across settings. A public campaign against the storage of nuclear waste near the Suffolk town of Leiston is likely to draw on very different genres, concepts and methods for performing object-centred participation than the cultural movement that emerged around 'Soviet' Sausages in post-communist Lithuania (Klumbytė, 2010). This relatively basic circumstance of empirical variability may nevertheless have far-reaching consequences

for our analysis of material participation. As authors in social studies of technology have emphasized, an empirical or empiricist approach should prevent us from treating our object of inquiry – material participation – as a singular object, and help us to recognize that it is differently constituted in different settings.[26]

The inherent variability of phenomena can be understood in many different ways, and it raises the question of how variability is distributed between theory and empirical reality. We must ask a question that so many philosophers and scholars have already asked: is it the ideas that remain stable and the empirical incarnations that vary, or may stability and change also be distributed differently between practices and ideas? This question is especially pertinent in relation to participatory things, insofar as they are frequently characterized as *dynamic* objects. Social and political theorists of various stripes have argued that, to account for the role of material entities in the organization of social and political life, we must consider them in their 'active' element: we must focus on how things come to matter (Law, 2004b; Latour, 2005b) or their inherent liveliness (Fraser et al., 2006; Bennett, 2010; Hawkins, 2011). In what follows I will also suggest that one of the important features of participatory objects is their normative instability. Insofar as engaging objects are happening or 'lively' objects, their participatory capacities fluctuate – objects may become politicized (or 'issuefied') easily, but their normative charge may be lost or transformed into something less lively just as quickly. Indeed, this seems partly what makes objects work as engagement devices.

This feature becomes all the more important, I will argue, in a context in which calls for a 'participatory turn' proliferate, and in which participation cannot be primarily identified with a singular normative agenda. In this situation, we are likely to have to consider a whole range of attempts to transform material things into vectors of participation of different kinds. I will explore this normative variability of participatory objects – their multivalency – by adopting an empiricist strategy. I will turn to a particular empirical site to explore the role of material objects, methods, techniques and concepts in the enactment of material participation: the environmental home, and its various attendant devices, such as technologies of everyday carbon accounting, the publicity genre of the experiment in sustainable living and the 'green' electricity grid.

The environmental home and related devices are especially rich sites for exploring the variability of material participation because they are being deployed today as participatory devices by a whole range of different agencies, from energy companies to environmental activists

and, not least, social scientists. As such, it is also particularly well suited for the study of material participation as a performative phenomenon. Here the enactment of participation by material means can clearly be seen to involve the deployment of knowledges, methods and techniques and the equipment of the setting for this purpose. In the context of environmental living, then, the instability or 'liveliness' of participatory objects may turn out to have as much to do with this variation in the empirical equipment of the setting as with any ontological variability of political objects 'themselves'. In the last section I want to introduce this 'empirical' site in some more detail.

The 'empirical site' of the environmental home

To turn to the environmental home to study material participation is to locate it in a particular site. There are certainly less located ways of defining the phenomenon: projects to situate participation in everyday material practice go under various labels, from 'post-environmentalism' (Nordhaus and Schellenberger, 2007) to ethical consumption and the formula of 'behavioural change'.[27] Each of these approaches offers a *generalizable* formula for the deployment of things, technologies and settings for purposes of engagement with environmental problems, a formula that is scaleable and expected to be applicable *in the same form*, more or less, across a variety of settings. My examination of material participation deviates from this generalist approach in that I focus on the *circulation* of devices, genres and formats among settings. I concentrate on the devices themselves and their lateral movements among locations, following good practice in anthropology and STS (Law, 2004; see also Lash and Lury, 2007). I am especially interested in the adaptation, modification and modulation of devices that happens between settings, and seek to specify the political capacities that derive from this. In Chapter 3, I examine everyday technologies of 'carbon accounting', experimental devices that have been developed in recent years to calculate the environmental costs of everyday practices as part of these practices, such as smart electricity meters and the 'carbon rationing' card, which attempts to set a limit to everyday energy consumption. In chapter 4, I discuss the popular genre of the sustainable living experiment, a formula in which everyday people report on their efforts to lead a less environmentally damaging life on blogs and in other publicity media. In Chapter 5, finally, I turn to environmental show homes, demonstrational settings that are designed and/or equipped to show how 'the environment' can be taken into account materially speaking,

as part of everyday living. For each of these devices, I show how they inflect the proposition of material participation in different ways, in each case giving it a different normative orientation.

Examining participation in situ enables us to understand how material participation is performatively accomplished, through the deployment of specific technologies, settings and things. In this respect, environmental homes have the merits of offering both a robust example of material participation as well as a site where it is noticeably accomplished by practical means. On the one hand, strong claims have been made about the home as a site of material participation. Domestic life in and of itself is widely understood to implicate us in wider environmental, social and ethical problems by virtue of the consumption and production of energy, waste, water and other materials that goes on here (Dobson, 2003; Hobson, 2006). On the other hand, however, the enactment of material participation in domestic settings in practice turns out to be dependent on the deployment of particular devices, from composting bins to light bulbs and smart electricity meters. The combination of these two facts makes the environmental home a good place to study material participation as a performative phenomenon.[28]

What also stands out about the environmental home in this respect is its empirical equipment. As Michelle Murphy (2006) has shown in telling detail, environmental homes tend to be kitted out with a whole range of different empirical technologies, from sensors in walls that measure humidity levels to webcams to show the world how to make tea in an environmentally friendly fashion. These devices play an important role in attempts to invest everyday objects with capacities to facilitate participation with environmental issues: they help to constitute everyday material action as a mode of action upon public affairs. I will consider a range of empirical instruments of material participation, from everyday technologies of carbon accounting (Chapter 3) to the publicity format of the 'sustainable living experiment' (Chapter 4). A focus on these devices enables us to study empirically the investment of everyday objects with participatory capacities, and to consider material participation as in part an accomplishment of the material setting and attendant devices (Garfinkel, 1984 (1967)).[29]

The environmental home, then, offers a useful site to develop a 'device-centred' perspective on material participation: one that pays special attention to the role of technologies, settings and objects in the performance of public engagement. There are various justifications for adopting such a 'device-centred' approach which I will discuss in Chapter 3.[30] But one argument is that it offers an empirical way of

engaging with issues in social and political theory. More specifically, to attend to the role of technologies in the performance of material participation is to question a particular assumption that has informed many approaches to public participation in social and political studies, that of the primacy of procedure or the abstractability of method (Duhem, 1906 (1982); Lynch, 1991).[31]

The notion that public participation can be defined in terms of an abstract procedure or general method has deep roots in the philosophy of politics and knowledge. It is related to the precondition that classic theories of democracy posit for participation: the requirement that actors and action must be dis-embedded from the material entanglements of everyday life in order to qualify as publics and public participation. In this context, to focus on technologies of participation is to suggest that settings and material devices have a more important role to play in the performance of participation than these procedural understandings of participation have recognized. This is *not* to propose that conditions of dis-embedding are irrelevant and settings can take the place of method as an organizing principle of public participation. But it is to offer a sited answer to the question of how things may acquire participatory capacities, or 'powers of engagement' (Marres, 2009).[32] As I will discuss in Chapter 4, these powers may partly derive from the confusion of properties among theories, methods, settings and objects deployed in participatory settings. When things acquire the capacity to mediate public engagement, this has something to do with the fact that from *the standpoint of their effects* methods, settings and objects are relatively indistinguishable (Cussins, 1996; Latour, 1999).

A device-centred perspective, then, allows for a particular empiricist take on the theoretical question of how things mediate publics. Such an approach also has implications for how we understand the affordances of everyday settings for engagement. Work in the social studies of science and technology (STS) has insisted on the importance of situating engagements with science, technology and nature in everyday settings (Michael, 2006; Wynne, 1996; Murphy, 2006). These sites make it obvious that people's lives are already entangled with technological, scientific and natural entities, from velcro to thermostats. A focus on everyday life provides an effective deterrent against the notion that a wide gulf separates the public from the objective world of nature, science and technology. Furthermore, in some ways, such a focus already entails a material conception of people's engagement with science and technology, insofar as it is here understood to be mediated by everyday objects. However, something to which these studies have

paid less attention so far, and which will be a central concern of this book, is that by reframing everyday sites as settings of engagement, it becomes possible to broaden the genres that may be deployed to enact public engagement to include designerly and activist formats, among others. I will therefore consider a broad range of formats of publicity that help to locate public engagement in everyday practices, like carbon accounting, sustainable living experiments and eco-show homes. A focus on these formats also inflects my approach to 'the everyday': where these formats are deployed everydayness becomes an object of performance too.

Finally, I want to note that turning to the 'empirical' site of the environmental home has implications for how we understand the contribution of social research to public participation. In such a site, it is impossible to forget that sociologists are *not alone* in researching, and writing 'up', the capacities of mundane settings and things to facilitate participation. A host of other agencies, from building researchers to housing developers and environmental activists and independent filmmakers, is invested in adapting this site for research purposes, and thus, to enact it as an engaging location. The definition and equipment of the environmental home as a research setting is something in which social studies *participate*, and of which we cannot assume ownership. As such, it may be useful to define the setting of the environmental home as a *critical* site of research. As a whole battery of agencies are currently invested in equipping this site as a space of engagement, it provides an appropriate setting for social studies to attempt to intervene in prevailing definitions of material participation.

The appropriateness of this setting is sometimes questioned, implicitly or explicitly, as when it is argued that non-domestic settings offer better and more effective opportunities for material political action – such as power plants and oil rigs (Mitchell, 2009).[33] To understand the environmental home as a critical site of research is to beg to differ from this suggestion. The project of making domestic sites matter by means of research is not only an aspiration of social studies but is also something in which a whole range of political, economic, social and aesthetical agencies are currently invested. The question therefore becomes whether, by *adding* social research to the list of research agencies populating the setting, we can make a difference to the kind of site the environmental home turns out to be and what it might be capable of. As I hope to make clear in the chapters that follow, social research has a particular contribution to make to the understanding of environmental participation, namely to insist on the 'un-boundedness of

the setting'. It is not just infrastructural hubs like power plants, but everyday settings too, that have the capacity to implicate us in a host of other sites. In exploring the environmental home through this prism, my gamble is that social analysis may give us a different kind of material participation, one in which 'living' practices do not signal withdrawal, but an opening out onto wider environments.

Conclusion

The account of material participation that I develop in this book does not only grant special importance to devices but also entails a commitment to a particular setting. The following chapters each interrogate an aspect of material participation by examining devices that locate participation in domestic environments. In adopting such an approach, I follow a style of research and writing that has been championed by STS, one that is sometimes referred to as 'empirical philosophy' (Mol, 2002). Thus, famous studies in this field have addressed thorny issues of the philosophy of science – truth, legitimacy, reality – through empirical studies of specific settings, like the laboratory, or what scientist refer to as 'the field'. This book extends this method to a specific topic of social and political theory: material participation. The aim, in doing so, is to accomplish, to use a term that Steve Woolgar (pers. com.) helpfully suggested, a *re-specification* of this phenomenon. In analysing technologies of environmental living, the aim is to decompose material participation into constituent parts, and then to put it back together, so that we may offer an alternative account of what it is, how it is accomplished and why it matters.[34] I will end this introductory chapter by briefly summarizing how each of the different chapters contributes to this project.

The next chapter is the only one that engages exclusively with political theory. It returns to classic American pragmatism to investigate the concept of the material public developed in this tradition, suggesting that this concept offers an enrichment of contemporary conceptions. The theories of the public developed by John Dewey and Walter Lippmann, I propose, allow us to understand what is distinctive about the concepts of material democracy that have been put forward in actor-network theory and related post-instrumentalist approaches in political theory. The key contribution of the pragmatists to the analysis of material participation, I argue, was to offer a distinctive formulation of the problem of these publics, as a problem of relevance. Furthermore, both Dewey and Lippmann defined material publics as inherently

problematic, proposing to understand their formation as indicative of a particular kind of 'ontological trouble'. I propose to analyse this type of trouble further by examining the role of devices in the mediation of material participation.

Chapter 3 outlines a device-centred perspective on material participation through a case study of everyday technologies of carbon accounting. These instruments can be said to materialize participation, insofar as they locate environmental engagement in everyday practices such as cooking and heating. The chapter argues that material participation in this case involves a particular *codification* of it, in terms of the investment of effort. Material participation, then, does not just refer to its mediation by things: it involves the deployment of specific legitimatory tropes associated with liberal theories of citizenship and the domestication of technology, in particular the notion that the engagement of everyday subjects requires things to be 'made easy'. The chapter goes on to investigate the political affordances of this type of enactment of material participation. It argues that everyday technologies of carbon accounting enable a politics of 'co-articulation' (Callon, 2009): carbon accounting devices produce connections between the registers of participation, technology and economy, and different versions of this device do this in different ways, with significant normative implications in terms of the distribution of responsibility and opportunities for societal change.

Chapter 4 interrogates the role of experiments in the enactment of material participation. The chapter begins with an overview of different perspectives on the role of experiments as genres of public and democratic life. It then turns to a specific genre, the experiment in sustainable living, and argues that it enables a distinctively material form of publicity. As such, living experiments pose a challenge to classic understandings of the politics of technology and the politics of objects, which suggest that things and machine exert their normative powers surreptitiously and operate below the radars of public discourse. By contrast, experiments in sustainable living invest objects, technologies and settings with explicit powers of engagement, and as such they can be understood as exercises in the explication of the politics of things. The chapter concludes with a discussion of different conceptions of political ontology and proposes that material participation offers opportunities to further experimentalize our understanding of it.

Chapter 5 further explores the relations between experiments, ontology and democracy through an analysis of the device of the environmental show home. The chapter starts with a paradox that has troubled attempts to include non-humans in democracy. This paradox says that this project

of inclusion both extends the realm of public participation and at the same time limits it severely. I propose that a device-centred perspective on participation provides a way of making this paradox tractable, by offering an alternative understanding of the role of things in the enactment of participation. Sustainable show homes allow us to expand the performative analysis of material participation. They direct attention to empirical devices of measurement, monitoring and public display in the equipment of settings for participation and the investment of things with capacities of engagement. The chapter goes on to distinguish a performative approach to material politics from the discursive understanding of the politics of objects and environments put forward in the social studies of architecture. This also allows us to clarify the contribution of empirical devices to the enactment of material democracy.

In the last chapter, I return to the problems of material participation introduced in the first part of the book. Drawing on arguments in STS, I propose that a device-centred perspective allows for the redistribution of these problems. Such a perspective, I propose, offers a much more symmetrical approach to problems of material participation than is customary. Rather than attributing problems of participation to features of publics themselves (their illiteracy, indifference, short-sightedness), it allows us to investigate the distribution of these problems among the whole range of actors and agencies with a stake in participatory arrangements: institutions, infrastructures, settings, technologies, and so on. Such an approach 'empiricises' problems of material participation, as it suggests that their distribution among actors and agencies is a practical accomplishment that may vary from case to case. The chapter goes on to specify further the problem of the material public in terms of relevance. It distinguishes three versions: a positional, topographic and a topological definition of the public's problem of relevance. This excursion enables us to understand the implications of adopting an empirical approach to problems of material participation for our conception of the spaces of participation. It allows us to 'devise' these spaces. Rather than conjuring up a space of democracy by projecting the metaphor of debate onto practice, we must examine how specific devices enable (or disable) the unfolding of spaces of participation.

2
The Invention of Material Publics: Returns to American Pragmatism

Introduction

To ask about the role of things in political participation is not only to ask an empirical question, one that requires us to go out into the world and examine how participation is done in practice. It equally opens up issues in political theory, as it disrupts a well-established assumption of theories of public engagement: the idea that materials settings ideally present no more than a 'precondition' for public participation. Many political theories have sought to limit and contain the role of objects and material environments in participation, proposing that certain things like a well-structured setting should be in place for public engagement to become possible, but that these material arrangements should not attract attention to themselves, and ideally should not feature in our account of what participation is really about. One could say that the material dimension of democracy has often been bracketed in political theory. This is becoming more obvious today, not least because a variety of authors in political theory and related fields have begun to undo this bracketing and develop much more affirmative accounts of the role of things in democracy (Latour, 2005; Marres, 2005; Coole and Frost, 2010; Bennett, 2011). However, as soon as we undo the bracketing of the material dimension of democracy, a whole string of further questions is opened up.

Once we probe further as to why and how political theories of participation sought to reduce materiality to a mere precondition for public participation, we encounter a whole string of further assumptions and concerns. Material elements were not supposed to feature as active

components in participatory processes for specific reasons, for instance, in order to ensure participation remained 'unbiased': following this reasoning, participation should not bear the marks of 'the influence of the setting' because democratic subjects need to be protected from manipulation.[1] In this critical sense, then, political theorists have long been concerned with the role of material entities in participation: this interest is *not* a recent one. However, we should equally consider the limited nature of this critical understanding of the role of things in participation: the above concerns derive from a specific normative tradition in political theory, one that has variously been characterized as rationalist, Cartesian or prescriptive, and there are many other traditions (Mol, 2002; Coole and Frost, 2010). In this chapter, I would therefore like to argue for a more nuanced theoretical engagement with the role of things in participation. In my view we do not get very far if we assume that a 'material' perspective on participation is strictly opposed to other perspectives, such as the linguistic one. As I have discussed in the previous chapter, the relation between the material and linguistic (or informational) dimensions of participation are far more complex than that. I want to advocate a 'non-exceptionalist' approach to the turn to things in public participation and its analysis: such an approach seeks to move away from the strict opposition between pro-material and anti-material theories of participation, as this keeps us from recognizing there are many different ways of configuring the role of things in participation. It is these latter, more subtle, differences that I will concentrate on in this chapter.

As I suggested in the previous chapter, one can also argue that calls to return things to the centre of democracy have been voiced many times over in political philosophy. Some authors have argued that there is *little* that is exceptional about this proposition, such as Gerard de Vries (2007) who compared the theories about 'object-centred' politics that are currently being developed in science and technology studies and related fields to Aristotle's republican concept of politics. This archetypical idea of politics, he notes, could equally be called 'object-centred', as it considers life in the polity as principally orientated towards the 'common good'. But, as Bruno Latour (2007) suggested in his reply to De Vries, once we start making such comparisons, there turn out to be many other good candidates for the analogy. For instance, should not the classic–modern preoccupation of liberal thought with *l'administration des choses*, or the governance of things, that was described so convincingly by Michel Foucault (2008), not similarly be understood as an attempt to make politics and government revolve around things?

Calls to attend to the public in its material dimension also bear some similarities with liberal theories of democracy that centre on the critique of metaphysics. Thinkers like Karl Popper and Richard Rorty proposed that in liberal democracies politics becomes a form of 'problem-solving', and this can be said to imply an 'object-centred' understanding of democracy. In political theory, these authors have been approached as representatives of a widely shared liberal idea of scientific democracy, which models democracy on objective knowledge practices as a way of defending democracy against the corrupting influences of power and ideology, or as the critical analysis has it, in a misguided attempt to expel the political from politics (Ezrahi, 1990; Ankersmit, 1997; Mouffe, 2000; Wolin, 2004b). In this chapter, I want to examine in more detail the similarities and differences between concepts of material participation and the ideal of a politics of problem-solving associated with scientific liberalism, as it seems to me that this analogy puts contemporary proposals for object-centred democracy especially at risk.[2] The analogy, namely, not only casts doubt on the distinctiveness of material perspectives on participation vis-à-vis other theories that outline some form of object-centred politics. It also threatens to efface the idea that material participation offers an alternative to, and addresses the limits and shortcomings of, currently predominant models of democratic governance, which have precisely been criticized for reducing politics to an expert-based form of problem-solving (Guilhot, 2005).

Certainly, in some respects it is *not* difficult to pinpoint how contemporary concepts of material participation differ from the ideal of object-centred democracy advocated by Popper and Rorty. By placing objects at the centre of democracy, these liberal thinkers sought to *expand* the role of science and technology in democratic politics: their visions of a politics of problem-solving grant a significant role to experts in political process, and to an extent models it on science, with deliberating politicians acting like scientists engaged in critical debate (Rorty, 1998; Popper, 2002 (1945); see on this point also, Turner, 2003). By contrast, the 'turn to things' in social and political studies of participation draws on an intellectual tradition that precisely aims to place more stringent limits on the role of science and technology in democracy: much of this work draws on science and technology studies, a field that is concerned with the democratization of science and technology, the opening up of expert-driven processes to greater involvement by other social actors (Wynne, 1992; 2008; Callon et al., 2009(2001)). Furthermore, as mentioned the politics of problem-solving is broadly associated with an anti-metaphysical approach to democracy, one in which a practical,

rational commitment to 'piecemeal engineering' is to replace a 'theoretical' politics driven by comprehensive doctrines. Contemporary inquiries into 'the politics of matter', by contrast, are broadly 'post-instrumentalist' in orientation: they seek to move beyond a narrow framing of the political role of material things as 'mere means'. These studies take an interest in the normative capacities of non-humans, their ability to engage, provoke, challenge, organize and so on (Latour, 2005a). Which is also to say, far from anti-metaphysical in orientation, these studies are marked by an interest in the *political ontology* of mattering (Bennett, 2010; Law, 2004b).

However, apart from these differences, there are also some striking similarities between the liberal and the 'post-instrumentalist' concepts of object-centred politics. As I will discuss, each of these approaches defines the polity as mediated by material relations: as consisting of actors that are implicated in common affairs by way of things, technologies, substances and environments. And insofar as this mode of implication is an elusive one, it is not always straightforward to distinguish a 'post-instrumentalist' version from a liberal conception of object-centred political communities (as well as from a materialist version of this idea, as I will come to below). How different, we can therefore ask, are the issue-based communities celebrated in liberal democratic theory from the 'concerned groupings' foregrounded by theories of 'Dingpolitik' (Latour, 2005a)? This question of the differences between visions of object-centred publics becomes especially relevant in the context that I described in Chapter 1 as the proliferation of object turns on participation. Material approaches to participation are being put forward in a range of practices, from environmental politics to technology design. To better grasp this empirical multiplicity, we need to develop a sensitivity to the small but significant differences between various object-centred *conceptions* of public engagement.

This chapter will investigate these differences by considering a philosophical ancestor that these different concepts of object-centred democracy have in common: American pragmatism. Both adherents of 'a liberal politics of problem-solving' (Rorty, 1982; 1998) and post-instrumental theories of the 'politics of matter' have cited pragmatism as their inspiration (Bennett, 2010; Latour, 2001; Grosz, 2005). Here I will return to the classic work of John Dewey and Walter Lippmann on democracy in technological societies in which they put forward 'object-centred' conceptions of the public (see Marres, 2005b; 2007). Their classic pragmatic concepts of the public can not only be of help

in distinguishing between different contemporary versions of the material public, but also have something to *add* to contemporary versions: they propose that material publics are marked by a distinctive problem, which I call the problem of relevance. According to their definition, the problem of the public is that it is at once intimately affected by issues, but also finds itself at a remove from the platforms that are in place to address their issues. In this regard, I will argue, the material public can be taken to refer to a distinct type of 'ontological trouble'. If we appreciate this pragmatist-inspired insight, we will understand better what exactly is inventive about post-instrumentalist attempts to (re-)insert objects into democracy.

Versions of the material public: communities of the affected

A broad range of intellectual traditions has inquired into the ways in which material entities structure political participation, from Marxist perspectives on political economy to structuralist approaches in cultural anthropology. But one concept is central to several different attempts to address this issue: the notion of the 'community of the affected'. This concept is taken up by contemporary theorists ranging from the liberal to the post-republican and the new left, with each of them giving it a somewhat different twist. Some theorists have given the concept a materialist interpretation, proposing that political communities are bound together by relations of material harm. Liberal theorists advocate a more minimalist *procedural* version of the idea: they have adopted the 'all-affected principle' as a way of deciding which actors have a right to participate in political processes. Those actors that are significantly affected by a given issue, this principle says, must be included in decision-making about it. Finally, the concept of the community of the affected has been taken up to develop a post-instrumentalist understanding of political community: here the aim is to bring into view the capacities of objects to provoke, suggest, challenge and thus to inform our political and moral capacities to be affected. These three approaches draw on different theoretical traditions, and, for this reason, the concept of the 'community of the affected' provides a useful site to consider both the differences and continuities between various contemporary theories of material publics.

The version that is arguably the most influential, in both political theory and practice, is the *procedural* notion of the community of the affected. It has been the subject of debate in cosmopolitan social and

political theory, which proposes that processes of globalization make it increasingly necessary to define political community in other than territorial terms (Habermas, 2001; Archibugi, 2003; Beck, 2005, Fraser, 2005; Uribinati, 2003; Sassen, 2006). The concept of the community of the affected provides an elegant way of doing so, as it offers a single alternative criterion for membership in political community. The idea is often presented as a formal definition, which states that 'the polity consists of all those who are significantly affected by the indirect harmful consequences of human action' (Held, 2000; see also Karlsson, 2006). This definition of political community can be placed in a well-established tradition in political and moral theory. It can be traced back to the utilitarian distinction between the private and public, where the latter is defined in terms of relations of indirect harm: when actions do harm to strangers, these actions become a public concern (Mill, 2002 (1863); see for a discussion, Marres, 2010). 'Harmful consequences of human action' have long figured as a regulatory principle in the liberal tradition as a way of demarcating spheres of permissible action and defining normative obligations. However, in proposing their versions of the 'affectedness principle', several liberal theorists have insisted on it being a *procedural* idea (Habermas, 2001; Held, 2004; Eckersley, 2004).

The point of the concept, then, is not to provide a true or valid 'blue print' of the political community, but merely to provide guidance as to *how* to delimit the polity in a post-territorial mode, stipulating that those 'who are affected by a given issue, should have the right to participate in decision-making about the matter' (Held, 2004). However, such a concept of the issue-based community can also be called 'crypto-materialist', insofar as it presumes or may translate into the notion that physically robust 'relations of affectedness' between issues and actors are discernable by empirical means, and can be relied on to demarcate participation in sufficiently unambiguous ways.

By contrast, in a second version of the 'community of the affected' the materialist implications of conceiving of the polity in terms of affectedness are clearly explicated. Such materialist understandings of political community have been prominently put forward in environmental political theory. Here, a concern with the role of non-humans in public life has translated into theories of political community that foreground the 'inter-dependency' of people, things and nature. Some of these theories focus on the need to extend formal recognition to non-humans as relevant members of political community (for a discussion see Jasanoff, 2010). Others are more concerned with the ways in

which material events, relations and entities may mediate normative relations among human actors. In the materialist political theory of Andrew Dobson (2003), for instance, the obligations and rights of 'environmental citizenship' come about through factual relations of affectedness. In his account, political communities are formed when actions in one location cause material harm in another, as this generates civic obligations. Here, the political community consists of causal material connections stretching across time and space, for instance between consumptive practices in the north and ecological issues arising in the south (Dobson, 2003; see also Cheah and Robbins, 1998).

Such materialist conceptions of political community have also been put forward under the rubric of 'new materialisms': contemporary political theorists have drawn on the work of classic thinkers like Spinoza and Hobbes to conceptualize political subjectivity (Bennett, 2004; Coole and Frost, 2010).[3] They have proposed that it is actors' capacities to be affected by material entities that constitute them as political subjects. Arguably, this insistence on capacities gives the concept of a community of the affected a performative twist: affectedness is here not a factual relation that is established among things and actors 'impinging' on one another. The formation of such a community also involves the development of the ability to enter into affective relations with things. A third approach to material publics builds on this latter idea, but proposes to attend to the normative capacities of *things* to activate and mobilize publics (Braun and Whatmore, 2010; Bennett, 2010; see also Marres, 2005b). This perspective draws on the cosmopolitical project outlined by Isabelle Stengers (2005) and Bruno Latour (1999; 2005a) and can be termed *post-instrumentalist*, in that one of its principal objectives is to dismantle the modernist assumption that the political life of things can be limited to that of passive means or compliant instruments of human action.

The concept of cosmopolitics directs attention to the abilities of specific objects to disturb, provoke and suggest, and the critical role this plays in the making of political events and the interpellation of actors as political participants. Proposing the concept of the 'hairy object', this approach has emphasized the relative *unknowability* or *opacity* of political things and the ways in which they implicate actors (Stengers, 2005; see also Latour and Gagliardi, 2006; Latour, 2004b). To understand the role of stuff in politics we must here begin by recognizing that political objects do *not* take the form of neatly bounded, atomic particles, but rather consist of tangles of which it is not clear where they begin and where they end, and what exactly they are made up of (Latour, 2004b).

Neither is there any way of knowing where human subjects begin and non-human objects end.

The post-instrumentalist perspective on communities of the affected, then, does not just question the reduction of things to extensions of human will, but also challenges the expectation that political objects would comply with *any* neat and determinate ontology, as outlined for instance in political philosophy. This perspective emphasizes that political objects tend to be resistant to delineation and classification: when things acquire political saliency – like DDT or CO2 – it tends to become impossible to determine their boundaries, that is, to settle the question of which attributes, phenomena and so on must be considered part of it. The 'cosmopolitical collective' comes about when political things turn out to have entangled or implicated a range of actors in ways that are in part still to be determined.

The distinctiveness of material publics

There are a number of ways in which the above three versions of the 'community of the affected' can be distinguished. The procedural definition offered by liberal political theorists can be contrasted with the substantive concept put forward by materialists. Thus, the latter outline a particular political ontology, one in which relations of affectedness organize the polity. But the former are wary of any attempt to provide a substantive definition of what political communities are made up of. The determinate political ontology proposed by materialists, in turn, can be distinguished from the *in*determinate ontology evoked by post-instrumentalists. Whereas the former seek to provide a definitive statement of what constitutes the material polity, the latter emphasize the relative *under*determinacy of political communities organized by material means. And while proceduralists tend to reject ontological accounts of the political community altogether, post-instrumentalists take an *empirical* approach to questions of ontology: for the latter, the ontological determination of political community is an empirical accomplishment, as different modes of implication in issues (affectedness) emerge in social and political processes of issue articulation. Finally, where both proceduralists and materialists assume that it is possible to render relations of issue affectedness legible and transparent, post-instrumentalists emphasize their inherent and irreducible opacity.

These distinctions between different versions of the community of the affected can help to make clear how exactly the post-instrumentalist understanding of the material public deviates from the liberal

notion of object-centred democracy. Post-instrumentalism, we can say, offers a different solution to the problem of political ontology than the one associated with liberal proceduralism. Like liberal proceduralists, post-instrumentalists are resistant to the attempt to stipulate a fixed political ontology once and for all: they too suggest that we miss something important about political process if we try to reduce it to some kind of theoretical blueprint. But post-instrumentalists equally reject the liberal tendency to try to dissolve questions of political ontology, that is the liberal attempt to subsume these questions – what does the material polity consist of? – by a purely analytical account of the procedures and criteria that are to guide political process. From a post-instrumentalist standpoint, the fixation on procedures is in some respects *not so different* from a fixation on a given ontology: *both end up assuming too much*. As proceduralists propose that an adequate procedure is the main thing required for a community of the affected to become organised, they assume that a political architecture already exists. That is, they presume that an institutional platform and a common language are already in place to support the participation of implicated social actors in political process. This is where the post-instrumentalist point of the relative opacity and unknowability of communities of the affected bites: it means that the determination of the sites, modes and devices of issue involvement is a *task* still to be accomplished.

A post-instrumentalist perspective on the material public, in this regard, echoes an existing critique of liberal political theory, as formulated by political theorists like Chantal Mouffe (2000): the critique, namely, that liberal political theory's 'can-do' approach to the organization of political community is a consequence of its tendency to assume as given what in fact is still to be accomplished, that is democratic institutions, accessible political platforms and a common vocabulary. From the post-instrumentalist perspective, the question of which institutions, devices and vocabularies may prove capable of mediating public involvement can only be understood as a challenge of political process. This, then, is a crucial difference between the post-instrumentalist and the liberal 'community of the affected': while the latter assumes there is a common framework for the demarcation of political community, the former suggests that the commensurability of different modes of being implicated in public affairs is to be proven rather than assumed (see on this point also Stengers in Latour and Gagliardi, 2006; Marres, 2005a). However, besides this important difference, there are also some striking morphological similarities between the three versions, which are all the more remarkable because of the aforementioned differences.

Each of the three versions of the 'community of the affected' organizes the polity around public matters, objects or issues, and in each case actors come to participate in the polity by virtue of their implication in these things. In this respect, materialists, proceduralists and post-instrumentalists can *all* be said to share a common assumption: they all presuppose the existence of a framework or space in which things acquire the capacity to engage participants in political process. All three approaches to an extent assume that arrangements are in place to facilitate object-centred politics. In this respect, I want to argue here, post-instrumentalist approaches – and arguably materialist ones too – *are* vulnerable to another criticism that is often made of liberal political theory and its attempt to make democracy revolve around objects. The liberal belief that the focus of political process should be on the substantive tasks of issue articulation and problem-solving has been criticized for making an implausible assumption: that it is possible to rid political process of the influence of conflict, power and ideology (Wolin, 2004b; Crick, 1962/2000; see also Mouffe, 2000). A different version of this critique may be extended to post-instrumentalist – and to a degree, materialist – understandings of object-centred politics.

Materialist and post-instrumentalist approaches to political community certainly recognize the role of conflict, power and ideology: a central argument of materialist political theory is that relations of material harm are also power relations. And the cosmopolitical proposal (Stengers, 2005) insists that materially organized collectives are full of tensions and antagonisms. However, these approaches seem to assume that a political space is already in place in which the articulation of material relations and objects can take centre stage, and which is shielded from forces that could derail this process. In this respect, I would like to argue that the concept of the 'community of the affected' brings with it a particular risk: in placing material objects and relations at the centre of political community, we are in danger of re-inventing the very liberal ideal of 'object-centred democracy' that we set out to problematize (see on this point also Wynne, 2008).[4] Concepts of the material public then raise troubling questions as to its distinctiveness: the question can*not* quite be put to rest whether critiques that have been levelled against liberal ideals of object-centred democracy should not be extended to these other concepts of the community of the affected.

It is here that a re-examination of classic American pragmatist theories of the public can help to clarify matters: these theories define the material public as a community of the affected, but in a way that

differs from each of the versions above. Before discussing this further, however, I want to return to a point I raised in the first chapter: material publics have been *problematized* in various ways in political theory, and this includes some of the theoretical traditions from which concepts of the community of the affected are derived. It is worth explicating this further, as one of the principal contributions of the pragmatists is their proposal that the material public is an inherently *problematic* formation. Moreover, a lack of distinctiveness features prominently among these problems of the material public.

Material publics and their problems

It does not seem an exaggeration to say that the material public has constituted a favourite object of problematization in twentieth-century political theory. Authors working in various theoretical traditions have stipulated that groupings organized by material means lack certain necessary features of a politically and practically viable public. Both Arendt and Habermas deemed such formations too ephemeral, complex or unstable to enable a political collective to form itself and for it to acquire the capacity to act. Such problems are also foregrounded in recent criticisms of concepts of the 'community of the affected' in political theory. Thus, Will Kymlicka (1999) has argued that this notion of political community is too 'thin': in his account, the community of the affected lacks the shared linguistic or cultural frameworks that a public requires to sustain and organize itself (see also Eckersley, 2000). As these political collectives come about through joint implication in public issues, their members have too few things in common for them *to cohere* as a public. Relatedly, and by the same token, these collectives are said to lack the shared institutional, linguistic or cultural resources that would enable them to *act* upon the issues they are implicated in. Communities of the affected, then, are found lacking in terms of organizational coherence, cultural-epistemic equipment and/or institutional instruments that are required in order for them to effectively perform the roles of the public.

Furthermore, while these criticisms of the community of the affected problematize the material public on specific grounds, the concept has also been the subject of more fundamental challenges. Thus, it has been suggested that there is something *inherently* problematic about the notion of a political collective organized through material means. As Samantha Frost (2008) has argued, this kind of political formation violates certain basic assumptions of post-Cartesian thought about the

requirements of political subjectivity. In this tradition, moral and political subjectivity is conceived of as predicated on the autonomy of the subject, and its independence from material constraint. Imperviousness to material influence is then understood as a necessary condition for adequate moral and political judgement and, hence, agency. This requirement of autonomy also returns, albeit more implicitly, in the criticism of material publics that draws on classic republican thought, like the warning by J.G.A. Pocock (1998 (1992)) discussed in the first chapter.

According to Pocock, the idea of a material public violates certain assumptions of the classic republican theory of citizenship. In his account, it effectively implies a blurring of the public/private distinction: extending the concept of citizenship to entanglements in material relationships, he proposes, undermines the Aristotelian distinction between a public sphere of engagement with common affairs and a private sphere dedicated to the reproduction of everyday life. And to allow the public/private distinction to become blurred, in his view, is to risk robbing the political category of citizenship from everything that is distinctive about it. Those who advocate such a move, Pocock argues:

> will have to decide whether the concept of the 'public' has survived at all, or whether it has merely become contingent and accidental, or has actually been denied any distinctive meaning. And if that is what has happened, the concept of citizenship may have disappeared as well. (Pocock, 1998 (1992); also see Dobson, 2003)

For Pocock, then, to conceive of publics as coming about in and through material practices is to threaten the separation between a non-political domain, which is concerned with the reproduction of daily life, and the political sphere, where citizens who have extracted themselves from everyday entanglements assemble around matters of general concern. It seems to entail an un-bounding of the category of the public, its spilling out beyond the dedicated forums of democratic politics that would ensure their efficacy.[5] Which is also to say that Pocock's argument suggests that a lack of distinctiveness may be a feature of material publics themselves.

As the material public is considered problematic for different reasons in different traditions in political theory, the question arises as to the status of these problematizations themselves. If the problematization of material publics can seem ubiquitous in political theory, there are nevertheless some significant differences among the styles of

problematization that different political theories adopt. Political theorists like Pocock, as well as Kymlicka above, approach the material public from the standpoint of prescriptive political theory, and here the identification of problems with this formation entails an argument or warning *against* this type of the public, and its endorsement. However, these problems can also be approached in a more constructive fashion: the problems of material publics can be taken to refer to challenges that these particular collectives themselves must face. In this case, concepts of the material public must not so much be read as offering theoretical 'solutions' to problems of the organization of the political community, which may or may not be adequate. Rather, they present a particular understanding of the political or normative challenges that political collectives themselves are up against. The 'problems' of the material public then refer not so much to shortcomings or flaws of this conception or type of political collectives, but to the difficulties such collectives themselves must negotiate.

This difference between prescriptive and constructive understandings of the problems of the material public can also be recognized in relation to the concept of the 'community of the affected'. Thus, proceduralist definitions of this community stipulate a complication that is not so different from the problems that prescriptive political theorists have with the concept itself. They propose that this political formation is marked by a particular *disjunction*: the political community here consists of actors who are materially *implicated* in the issues at stake, yet they are excluded from the political processes that are (or are not yet) in place to address these issues. The problem with which communities of the affected are faced is then that of a gap between the circumstances of their material involvement in issues and the absence or lack of skills, resources, vocabularies and connections, which effective action on these issues requires. This is also to say, the material public *itself* is marked by the problems that prescriptive political theorists identified in relation to the concept: they lack access to discursive, cultural and institutional arrangements that would enable effective collective action upon the issues that actors are implicated in.

The problems of the material public may then alternatively be interpreted in negative terms, as indicating what is *wrong* with this particular type of public. Or, in a more constructive fashion, they may be taken to refer to the problematics that this political collective is faced with: it is lacking the capacities and/or means required for effective awareness of or action upon the issues in which it is implicated.[6] In this respect, I want to argue, one of the important questions to ask about material

publics is what *style of problematization* is appropriate to them. And this is where a return to classic American pragmatist concepts of the public may prove helpful. The writings of John Dewey and Walter Lippmann develop a particular conception of the public as organized by material means, one which suggests that the material public is best understood as an *inherently* problematic formation. This suggests a particular, constructivist approach to the problems of the material public. It opens up for questioning our expectation that concepts of the public should already contain the theoretical solution to the public's problems. The question should rather be whether concepts allow for productive forms of problematization (Deleuze and Guattari, 1994 (1991)).[7] The pragmatist concept of the material public does precisely this, I will argue, insofar as it invites us to attend to the 'ontological trouble' that marks this political form.

Returning to classic American pragmatist theories of the public

Much recent work in social and political theory on publics and participation returns to classic American pragmatism (see, e.g., Bernstein, 2010; Dryzek, 2004; Thévenot, 2006; Unger, 2007; Keulartz et al., 2002). This is especially true of studies that reflect on the role of publics in relation to objective phenomena or practices, from science to technology and architecture and the environment. John Dewey's famous book *The Public and its Problems* is today widely cited as an inspiration for theories of environmental democracy (Beck, 2005; Dryzek, 1999; see also Marres, 2005a).[8] In science and technology studies and cognate fields, John Dewey is credited as the philosopher who offered a new way of appreciating the role of non-humans in the organization of the particular political collective called public (Latour, 2001; Yaneva, 2009a; Girard and Stark, 2007; see also Marres, 2010). Here I will further develop this latter strand of argumentation. However, in approaching classic American pragmatism as a 'site of return' for thinking about publics, I also draw on a more general point made by the feminist political theorist Veronique Mottier (2004), namely her characterization of American pragmatism as a site of a 'failed rendezvous' between different approaches in contemporary political theory.[9]

A similar point can be made about contemporary writings that draw on pragmatism to think about the place of objects, technology and the environment in democracy. In much of this work, classic pragmatism figures prominently, but it appears in widely diverging, and sometimes

contradictory, roles. Thus, John Dewey is sometimes presented as an inventor of a thoroughly *practical* approach to environmental democracy, as the precursor of a new, participatory kind of 'green' culture that breaks with the romanticization of nature, and which embraces instead 'a problem-solving, tool-using, environment-transforming' approach to our ecological predicaments (Kirk, 2007; Nordhaus and Schellenberger, 2007). But Dewey's work is equally said to offer us a new kind of *political ontology*, one that allows us to stop thinking that nature, technology and democracy are opposed to one another, and that provides ways of reconnecting these ontological domains or registers (Bennett, 2007; see also Marres, 2005a). These two pragmatism differ in some respects: while the former promotes technically doable forms of environmental change, the latter seeks to move beyond a narrow instrumental conception of the world of objects. That is, these two approaches locate pragmatisms on opposite sides of the 'politics of problem-solving', among both the supporters as well as the critics of this form of politics.

To an extent, this divergence reflects a wider disagreement in social and political theory over the status of problems and problem-solving in pragmatism. Thus, some critical theorists have held the pragmatist tradition partly responsible for the rise to prominence, in the twentieth century, of the politics of problem-solving: they associate pragmatism with a particular style of technocratic politics, in which the deployment of expertise to detect, analyse and address neatly defined problems takes precedence, at the expense of other modalities of engagement and, according to some, of politics itself (Wolin, 2004b; Osborne, 2006; see also Muniesa, 2007). However, others have turned to pragmatism for intellectual inspiration to *challenge* such a narrow instrumentalist conception of politics. Here, pragmatism presents us with an inherently complex and dynamic world, in which problems *cannot* be neatly demarcated, and must be expected to *resist* attempts to control them by known means (see among others Stears, 2010; Latour, 2001; Marres, 2005a). In these readings, pragmatism teaches that politics is about accommodating recalcitrant issues rather than about solving problems by technical means: it offers an ontology of resistance rather than the baseline assumption that nature can be mastered (Stengers, 2005; Grosz, 2005).

These divergences and contradictions between different interpretations and appropriations of pragmatism are rarely discussed. In this sense, we may call pragmatism a site of a 'failed rendezvous' in this case too. But a return to pragmatist political theory is useful, I want to propose, precisely insofar as it allows us to consider the differences

between various conceptions of the role of objects in democracy. More specifically, it invites us to move beyond the opposition between two forms of object-centred politics: between a narrow, 'instrumentalist' focus on the politics of problem-solving, on the one hand, and a comprehensive politics of ontological change, on the other. Pragmatism suggests that the suspicions against instrumentalist politics may well be justified. Instrumentalism recognizes problematic objects as organizing forces of democracy, but only insofar as science, technology and human ingenuity can be relied upon to provide effective means for their (re-)solution. However, pragmatism equally casts doubt on the customary alternative to instrumentalism: it warns against the displacement of politics onto the more fundamental level of political ontology, as somehow operating on the level of underlying frameworks that structure political institutions and actions. The merit of the pragmatist political theory of John Dewey is that it offers a perspective on the role of things in democracy that deviates *both* from narrow, empirical instrumentalism, as well as from a purely theoretical politics of 'ontology'.[10]

The pragmatist conception of the material public is crucial in this respect. One of the distinctive but under-appreciated contributions of John Dewey, and of his interlocutor Walter Lippmann, is their suggestion that this public should be understood as an *inherently* problematic formation. From this follow two things. First, it entails a radical constructivist approach to the public's problems: material dynamics of problematization must be understood as constitutive of the very process of the public's formation. Second, the Pragmatists' definition of the material public suggests an 'environmentalization' of the public. In their account, participation in the public comes about through material practices, which render actors complicit in harmful effects that are distributed in time and in space, and for that reason may be qualified as 'environmental'. Furthermore, their material publics present uniquely influenceable formations, as living environments leave their mark on the modes of their involvement. This raises the question of whether we may conceive of environmental influences on the public in positive terms, of whether socio-material entanglement may constitute an *enabling* condition of public involvement. I will now present John Dewey's and Walter Lippmann's concepts of the public, and discuss how they allow us to differentiate instrumental and post-instrumental versions of object-centred publics along these lines.

A distinctively pragmatist public: John Dewey's community of the affected

The definition of the public that John Dewey put forward in *The Public and its Problems* (1986 (1927)) has become famous for shifting the terms of its theoretization, and for giving us an account of the public that seriously engages with the technological society, which entails some far-reaching changes in the conditions for its organization (Peters, 1999; Stears, 2010). With respect to the latter point, it is important to note from the outset that Dewey's theory of the public engages with *a whole range* of challenges to democracy that marked the onset of the twentieth century, including the increased complexity, inherent dynamism and fragmentation of society. Perhaps precisely insofar as this is the case, Dewey's definition of the public prefigures contemporary concepts of the public, and more specifically those that have been developed in response to environmentalism and globalization, that is, concepts of the 'community of the affected'. This is the formal definition of the public Dewey provides in *The Public and Its Problems* (PP):

> The public consists of all those who are affected by the indirect consequences of human action, to such an extent that it is deemed necessary to have those consequences systematically cared for. (PP, p. 15)

The first thing to note about this definition is that it specifies the public neither in terms of procedure nor of substance. Thus, Dewey does *not* define the public exclusively in terms of the procedures, vocabularies or technologies that are – or are not – available for its organization. His public presents something more substantive than that: it comes about when actors are implicated in a particular distribution of problematic effects. However, neither can this be taken to mean that Dewey advocates a classic ontological understanding of the public: he does not stipulate a given set of entities and relations by which all publics can be said to be composed. His public is too volatile for that. The Deweyan public refers rather to a particular *modality* of being implicated in inherently dynamic formations, which stand out first and foremost for the requirement of some kind of collective action upon them.[11] In this respect, Dewey's public is perhaps best characterized in terms of a problematic mode of material entanglement.[12]

Generally speaking, problematization is a crucial dynamic in Dewey's pragmatist philosophy, of which one of the most famous concepts is

that of the 'problematic situation'.[13] The concept returns in his writing on science, democracy and ethics, and Dewey formulates a particularly evocative version of it in his theory of valuation (1955 (1908)):

> valuation takes place only when there is something the matter; when there is some trouble to be done away with, some need, lack or privation to be made good, some conflict of tendencies to be resolved by means of changing existing conditions.

The notion of the problematic situation, then, is *not* an epistemological concept, according to which the problematicness of a situation would have to be understood as an artefact of it being 'perceived' or 'defined' in these terms. Rather, it foregrounds a kind of 'ontological trouble' (Woolgar, 2005). In Dewey's view, it is the type of trouble that plays itself out on the plane of 'something the matter', that we must examine if we are to make sense of morality, politics and ethics (see also Dewey, 1998 (1908); Marres, 2010).

As I mentioned in the first chapter, one of Dewey's important but not always appreciated contributions to political theory is his audacious claim that political and moral phenomena are best regarded as 'aspects of objective situations'.

In his account, phenomena like conflict and clash, lack and need, loss and satisfaction are most productively approached as dynamics that unfold 'on the plane of objects'. We can now say that his theory of the public provides a further specification of this claim, as it specifies the type of 'ontological trouble' that is distinctive of and concerns publics. In *The Public and Its Problems*, Dewey defines the public in terms of a particular *type* of ontological trouble. It is a type of trouble which is resistant to familiar strategies of problem-solving.

Dewey's publics come about when actors become implicated in problematics that they cannot control as individuals. This is why they require some form of collective action. But neither can these problems be solved by instrumental action on the institutional level. In Dewey's account, the public's problems are those that resist established routines of problem-solving: they require that 'we break with existing institutional forms' (Dewey, 1991 (1927), pp. 30–1). More specifically, public-generating relations of affectedness, in Dewey's account, are resistant to the calculation of ends and means. His publics come about when things or actions designated as 'means' to certain ends turn out to have consequences that were not included among its 'ends' (Dewey, 2007 (1922), pp. 222–7). For this reason it would be misguided to assume that

these consequences themselves could be approached in an instrumental fashion. The public's question is rather: how to act upon consequences which fit neither the definition of 'means' nor 'ends', and disrupt prevailing assumptions in this respect.[14] The public's problems, then, are precisely not the kind of detectable, analysable, controllable effects that are associated with an instrumental notion of problem-solving.

This understanding of the public's problems as resistant to instrumental action also comes through in his account of the technological society, as a context in which publics proliferate. Here, Dewey suggests that societies marked by technological innovation tend to continuously generate new types of indirect consequences, and thereby potentially, new kinds of publics. Thus, in specifying the conditions for publicity in technological societies, Dewey directs attention to the tendency of technological 'means', not only to produce 'undesired' consequences, but also to produce new types of consequences:

> *Industry and invention in technology, for example, create means which alter the modes of associated behavior and which radically change the quantity, character, and place of impact of their indirect consequences* [italics mine]. These changes are extrinsic to political forms, which, once established, persist of their own momentum. The new public which is generated remains inchoate, unorganized, because it cannot use inherited political agencies. The latter, if elaborate and well institutionalized, obstruct the organization of the new public. (PP, pp. 30–1)

In passages like this, it also becomes clear that Dewey grants a central role to technologies, substances and objects in the formation of publics: they actively contribute to the production of the consequences that call publics into existence. Indeed, one of Dewey's stated aims in *The Public and Its Problems* is to direct attention to changes in 'the material conditions of life' as an occasion for the formation of publics (PP, p. 44), and for the development of democratic societies more broadly. In his account the proliferation of technologies and other innovations in twentieth-century societies does *not* mean that there are less opportunities for actors to come together as a public, *but more*. Here the joint implication of actors in problematic arrangements, technological, material, natural and otherwise, secures the proliferation of the entanglements called public. In Dewey's view, then, the technological society is not marked by a deficit of publics, but rather by their radical *multiplication* and excess (PP, p. 126). Which is also to say, it is their uncontainability, not containment, that here emerges as a constitutive feature of publics.

This account of the proliferation of publics in technological societies also clarifies further the sense in which Dewey understands the organization of publics as a process of problematization. The formation of a Deweyan public involves the ostensible disruption of working routines, and the opening up of a space of articulation as a consequence. When actors experience harmful indirect effects, they are transformed from ordinary actors, caught up in habitual ways of doing, into participants – or at the very least, 'implicants' – in problematic assemblages. Furthermore, as the public in Dewey's account refers to a distinctive mode of problematization, it should not be expected to contain already within itself the solution to its problems. Indeed, Dewey's material publics may well be understood as *inherently* problematic configurations: he emphasizes that the possibility that communities of the affected are transformed into politically effective forces is severely constrained. Publics, as Dewey noted above, frequently remain condemned to an inchoate, obscure, and unstable existence, as the kinds of troubling effects that call them into being are likely to remain under-documented in public discourse. This is partly because the indirect consequences of action are constantly changing in technological societies. But equally important is that the kinds of publics that are brought into being by indirect consequences are not likely to map onto existing social groupings. That is, material publics should be expected to consist of strangers who do not have at their disposal shared locations, vocabularies and habits for the resolution of common problems.[15]

Walter Lippmann's entangled citizens

As Dewey himself pointed out, he first got his ideas about the material public by reading the work of the journalist Walter Lippmann and in subsequent exchanges with him, in what has become famous as the 'Lippmann–Dewey debate', about the fate of democracy in technological societies. Here I want to go back to Lippmann's work – in the reverse order that is characteristic of turning back – for two reasons: because it adds significantly to Dewey's concept of the public as a problematic mode of entanglement, and also because it subtracts from it. Because of the latter, Lippmann's concept can help to make clear why the material public has come to be understood, in much twentieth-century thinking about publics, as a 'merely' instrumental formation.

Lippmann's contribution to the debate about democracy in technological societies consisted of two books, *Public Opinion* (1922), and *The Phantom Public* (1927), which appeared a few years before Dewey's *Public*

and Its Problems. The concept of the public that Lippmann puts forward in these writings can be seen to prefigure Dewey's in some important respects (Marres, 2005a, 2007; see also Westbrook, 1991; Latour, 2008b).[16] Like Dewey, Lippmann defined the public as consisting of actors that are jointly implicated in problematic entanglements, which prove resistant to established strategies of problem-solving. This is how he defined it in *The Phantom Public*:

> The public with respect to a railroad strike may be the farmers who the railroad serves; the public with respect to an agricultural tariff may include the very railroad men who were on strike. The public is not, as I see it, a fixed body of individuals. It is merely those persons who are interested in an affair and can affect it only by supporting or opposing the actors. (Lippmann 1927, p. 67)

Just as Dewey, Lippmann defines the public in terms of a particular modality of issue involvement. However, in Lippmann's account this public mode is much less determinate than in Dewey's. The problematics in which Lippmann's publics are entangled are relatively unknowable and opaque, both in terms of their composition and their boundaries. This is how he characterizes the public's problems further on in the same book:

> Yet it is in controversies of this kind, the hardest controversies to disentangle, that the public is called in to judge. Where the facts are most obscure, where precedents are lacking, where novelty and confusion pervade everything, the public in all its unfitness is compelled to make its most important decisions. The hardest problems are problems which institutions cannot handle. They are the public's problems. (Lippmann, 1927, p. 121)

One could say that Lippmann's public is marked by ontological uncertainty (Stöckelová, 2009b): actors are socio-materially implicated in problems that are unclear and impenetrable to them.[17] Furthermore, the Lippmannian mode of issue involvement can be called *inherently* problematic, insofar as it combines two partly contradictory ways of being implicated in problems: on the one hand, Lippmann's publics are *intimately* caught up in the problematics at hand – their particular livelihoods are put at stake in them (as in the examples of the strike and tariff above). But, on the other hand, his publics relate to the affair at hand as relative outsiders, to the extent that they lack both familiarity

with and knowledge of the issues at hand.[18] In Lippmann's account, it is this quite impossible mode of issue involvement that comes to hold the place of 'the problem of the public'.

Before further discussing this problem, however, I want to note that Lippmann's understanding of the public in terms of issue entanglement also has the effect of *environmentalizing* the public. Insofar as Lippmann's public is defined by the ways in which it is socio-materially implicated in affairs, the settings and wider arrangements of everyday and professional life take on special significance as mediators of public participation. Lippmann worked as a journalist while writing the two books, and in them, he pays detailed attention to the particular locations in which the work of public opinion formation is done, like the metro carriages in which people read the newspaper on the way to work, and factory halls where unions meet. Lippmann emphasizes the implications these settings have for the kinds of engagement people are capable of: the morning bustle surrounding 'commuters readings headlines on the train' (*The Phantom Public* (PO), p. 63) limits their attention, while in the case of industrial men, 'thought goes on in a bath of noise' (PO, p. 40), and 'a young girl', sitting at a kitchen table 'in a Pennsylvania mining town' (PO, p. 27), is very much aware of the delays with which news reaches her from the world beyond. That is also to say, Lippmann's publics consist of actors who are influenceable by their surroundings.

Lippmann's environmental specification of the public has been interpreted negatively, as an attempt to demonstrate why ordinary people cannot live up to the demands of classic democratic theory, which requires them to take the time to learn the facts, and to calmly form their opinions (Ryan, 1995; Peters, 1999).[19] However, if we consider that Lippmann also provided a positive definition of the public as a materially entangled entity, as in the quote above, his insistence that publics are exposed to environmental influences may also be understood more constructively: it implies an extension of the theoretical perspective on the public beyond the narrowly confined settings with which public participation is classically associated – the spaces of bourgeois debate – to include the spaces of everyday living (Robbins, 1993; Marres and Lezaun, 2011).[20] More generally, it entails an 'ontological' broadening of the range of entities considered relevant to the public's constitution. To attend to the ways in which settings leave their mark on processes of public opinion formation is then a way of taking seriously the manner in which material constraints inform democratic action.

Indeed, it should be noted that in his first book, *Public Opinion*, Lippmann explicitly challenged the engrained habit in modern democratic theory to bracket material entanglement. Here he observed a 'horror of things' in modern democratic theory, noting that Thomas Jefferson refused to consider the implications of the proliferation of 'foreign entanglements' for democracy: Jefferson preferred to leave out of account the complex material tangles emerging in the wake of international trade and colonial engagements, turning his attention instead to the villages of New England, and presenting the small-scale farmer's community as the ideal seat of democracy (Lippmann, 1922; see also Dewey, 1990). This is also to say that Lippmann was well aware that in defining the public in terms of extensive material entanglements, he was going against some of the central assumptions of modern (as well as classic) democratic theory, such as the idea that for democracy to work well, it requires the containment of a small-scale community, one in which the actors know each other well, and shared vocabularies, customs and locations can be assumed. In this respect, it should not come as a surprise at all that, in making room for material entanglement in their account of the public, Lippmann and Dewey ended up turning it into a problem. Material entanglement had been a problem for democracy at least since the days of Thomas Jefferson.

In Lippmann's account as well as Dewey's, the public comes to refer to an inherently problematic mode of material entanglement: it consists of actors who are intimately affected by an issue, but who are not part of a community that is equipped to address them.[21] To fuse Lippmann and Dewey's terminology: the public emerges when actors find themselves intimately affected by harmful consequences of human action, but fail to qualify as participants in these affairs, in the sense of having the connections, skills and vocabularies required to address these issues. In the pragmatists' account, then, 'the public' refers to a particular kind of complication that plays itself out ontologically, one that is marked by a particular combination of external and internal relations to the issues at hand: the public's problem is that social actors are too involved in an issue to qualify as mere outsiders, who could leave the care for issues to other professionals. But at the same time they are too much of a stranger to the public affair in question to have access to the resources required to deal with them. We can say that Lippmann and Dewey's material public is marked by a *problem of relevance*. And this problem differs in a small but significant way from other problems that are more

customarily associated with the material public, or more specifically, the community of the affected.

The public's problem of relevance

Pragmatist conceptions of the material public prefigure contemporary concepts of the community of the affected in various ways: they contain elements that recur in liberal, materialist and post-instrumental accounts of this type of polity. Lippmann's idea of actor groupings that are differentially implicated in issues can be taken as a precursor of the liberal conception of the public as a community of stakeholders. And Dewey's definition of the public in terms of the harmful consequences that call it into being returns in the materialist focus on relations of material harm. Lippmann's insistence that the public's problems are relatively unknowable and opaque recurs in the post-instrumentalist idea of the cosmopolitical collective, and so on. Crucially, however, the pragmatists' publics deviate from all of these conceptions in other respects. They offer a distinctive understanding of the problems of the material public: whereas most contemporary accounts focus on problems of affectedness, the pragmatists formulated a somewhat different problem, which I call the problem of relevance.[22] (And this problem definition, in turn, can help to clarify why object-centred publics are not necessarily in alignment with 'the politics of problem-solving'.)

The pragmatists, as we have seen, define the problem of the public in terms of particular modes of being implicated in issues. Their public consists of concerned outsiders: actors who are sufficiently entangled in issues for their indifference to be problematic, yet who find themselves at a remove from the sites and networks where processes of issue formation take place. To participate in the public is then to stand in both internal *and* external relations to the issues at stake. In the accounts of the pragmatists, this mode of involvement entails a problem of relevance: it is by no means clear how, in these conditions, issues can acquire the public pertinence that is required for effective public action to be taken upon these issues. This is different from the problem of affectedness, which does not take into consideration the articulation of relevance relations, as I will discuss further below. However, it is equally important to note that Dewey and Lippmann each gave a different formulation to this problem of relevance, with different implications for democracy.

It was Lippmann who first outlined the idea of a public problem of relevance. As he characterized the public as both implicated in, and alien

to, the issues at hand, he located the public in a subtly defined middle region along an 'isoline' of relevance:[23] this line starts, at one end, with actors who are so directly involved in a controversy that the relevance of the affair is not in question for them. At the other end, we find actors for whom the affair is so utterly irrelevant that not even the worst escalation of the crisis could arouse their interest in it. The public's problem of relevance follows from its particular position on this line: the more inclusively we define the set of actors that may take an interest in the matter at hand, *the less relevant* the issues are likely to be to them. In Lippmann's account, then, if we search for the public along isolines of relevance, we are likely to move down a path of *decreasing* relevance of issues: larger publics are *less* likely to take an articulate interest in affairs than those who are directly involved, professionally or as recognized interests, or affected parties.[24]

Crucially, however, in engaging with Lippmann's concept of issue-specific publics, Dewey's approach eschewed this understanding of the public in terms of decreasing relevance. He rejected the notion that the more public an issue is, the less 'relevant' it becomes. In Dewey's account, *special* conditions of relevance obtain for the public in relation to its problems. He stuck with an observation that Lippmann started out from: the idea that publics consists of actors who are not directly involved in the issue at hand, but are therefore no less intimately implicated in it. From his perspective, Lippmann's idea of decreasing relevance entailed a disarticulation of the problem of the public: rather than further examining its intrinsically *ambivalent* mode of issue involvement, Lippmann ultimately dissolved the public into a large stakeholder grouping, which is less interested in the issues at hand than stakeholders are. In stark contrast to this, Dewey understood the differences between publics and stakeholder groupings in positive terms, suggesting that because of its status as a grouping of intimately affected outsiders, publics have *special* capacities for political action. Which is to say, precisely because they have to negotiate problems of relevance publics are able to make a distinctive contribution to politics. And these problems of relevance differ from problems of affectedness in a number of subtle but important ways.

From problems of affectedness to problems of relevance

As we have seen, accounts of the community of the affected also formulate problems of the public. The liberal, procedural perspective on issue-based political communities directs attention to a particular

problematic disjuncture: it notes a discontinuity between the broad set of actors who are significantly affected by issues, and the much less inclusive actor grouping that actively participates in discursive and institutional processes of issue formation. These liberal perspectives on the community of the affected then propose procedural arrangements that are designed to alleviate this disjuncture. And we could say that this problem is given a more substantive formulation in materialist theories of the community of the affected. Here, the polity is marked by a gap between the *de facto* implication of actors in relations of material harm, and the *de jure* arrangements that are in place – or rather, not in place – to address the resulting injuries. For the materialist, the problem of the public then too is that of a lack of overlap between, on the one hand, the material relations that bind actors into a polity and, on the other hand, the discursive and institutional frameworks that would enable effective public action upon the issues at stake. As for post-instrumentalists, they have been less inclined to formulate a problem of the material public, and tend to focus instead on the positive challenges that materially implicated actors face, such as that of 'learning to become affected' by issues. It is here that the problem of relevance formulated by the pragmatists has an important contribution to make.

There are some important differences between the problem of affectedness and the problem of relevance, and these have implications for our normative appreciation of material publics. First, the problem of affectedness takes the form of a correspondence problem, as it posits a disjuncture between two states: *de facto* assemblages of actors who are implicated in issues fail to map onto a *de jure* polity of actors who are endowed with the rights and responsibilities that participation in political community entails. Furthermore, once this definition of the public's problem is endorsed, it is frequently translated into a problem of representation: the problem of the public here becomes that of how to secure the adequate representation of the constituents of issues – both actors and sub-issues – which are currently left out of account in public forums (see Held, 2000, and also Fraser, 2005). The focus is on the establishment of mechanisms for the inclusion of actors in processes of issue formation, and the communication of issues to actors. Problems of relevance, by contrast, refer not to problems of correspondence and representation, but to problems of articulation (on this distinction see Latour, 2005; Lash and Lury, 2007; Callon et al., 2009 (2001)).

To consider problems of relevance is to resist the assumption that issues and issue communities are somehow objectively given, and the

only thing lacking is adequate political *representation*. In attending to these problems, we shift our focus to the *process by which entanglements of issues and actors come to specified*. As we have seen, the pragmatists defined the problem of the public as a problem of political ontology. For them, the problem of the public is not limited to the representation of a given political ontology of issue involvement. The public's problem, rather, refers to a particular kind of ontological trouble, that of being at once internally and externally implicated in issues. The problem here is how relations of relevance between issues and actors may be established – or come to be specified – under these circumstances. To adopt a pragmatist sensitivity to problems of relevance is, then, to adopt a political ontology that does not assume the separation between *de facto* and *de jure* forms of issue involvement, but instead conceives of issue specification as a wider material, technical, political and social process. From the standpoint of the problem of affectedness, 'problem ontologies' are given and *subsequently* the question arises: How to ensure that those implicated in issues are adequately represented in institutional processes of knowledge and decision-making? Problems of relevance, by contrast, suggest a dynamic political ontology in which the process of the specification of issues and the organization of actors into issue assemblages go hand in hand. Here, the composition of the public – which entities and relations it is made up of – must be understood as partly the outcome of, and as something that is at stake in, the process of issue articulation.[25]

These conceptual differences between the two problem definitions have implications for our normative valuation of the problems of the material public. The problem of affectedness is formulated from an 'externalist' perspective, while the problem of relevance assumes the perspective of the public, to an extent. The former problem of affectedness opens up a *demarcationist* approach to the normative evaluation of the public, as in the procedural version put forward by liberal theorists like David Held (2004). Here, the question is how to draw a line between those actors who qualify as legitimate participants in the political community and those who do not, between those actors who are sufficiently implicated in issues to warrant political participation and those that are not. This approach assumes the standpoint of an external authority which aims to regulate (and contain) political process: it proposes who should be included in political process *given* a particular distribution of objective harm. By contrast, to consider problems of relevance is to assume a more internalist perspective on the problem of the public. Here the focus shifts to the challenges posed by

the particular mode of issue entanglement that is distinctive of publics. As Dewey especially made clear, the problem of this public is that of *what can serve as the means for its own organization*.

The pragmatists, we could say, were concerned with the difficulty of how a productive 'circularity' of engagement may come about in the case of publics. Both Lippmann and Dewey proposed that concern should be understood as an effect of people's previous, practical investments in a particular matter. Lippmann emphasized time and again that only stakeholders could be expected to give up time and energy to resolve a given affair. As for Dewey, he argued that our concern with an issue is best expressed in terms of the time and effort we are willing to invest in its alleviation. (I will explore this definition of public involvement in terms of the investment of effort further in the next chapter.) However, it seems difficult for this dynamic to obtain in the case of publics, given their lack of prior investment in the matter at hand. How do members of a public arrive at a pertinent formulation of their concern in the absence of prior investment? This presents an organizational and not so much a demarcation problem: how to secure sustained engagement by actors in issues to which they are strangers by most counts or standards? By what means may such publics come to 'hold themselves' (Dewey, 1927), how may they translate into an enduring political formation? To attend to the problem of relevance, then, is to confront the *tenuousness* of issue relations, and the challenge of finding the means to establish their relevance.[26]

From this follows what I think is a decisive difference between the two problem formulations. The problem of affectedness is defined in a way that makes possible the *resolution* of the problem of the public. It provides a way of dissolving the complexity of being at once an insider and an outsider to issues. Given a particular issue definition, it says, it must be possible to determine unequivocally which actors legitimately qualify as insiders to this issue and its politics, and which actors are simply outsiders. In contrast to this, I take the pragmatists to be insisting on the formative role of the insider/outsider dynamic in the process of the public's formation. It suggests that to 'solve' the problem of the public by allocating to actors a single position of relevance, where the issue either is or is not relevant to them, is to misunderstand the problem of the public, which involves precisely a double positioning. The impossibility of a straightforward resolution of the insider/outsider conundrum has consequences for how we judge the material public. It means that it would be misguided to criticize publics for failing to perceive the relevance of issues that so intimately affect them, as this

is to fail to take seriously their status as outsiders to platforms of issue formation. But the opposite suggestion, that publics should simply accept their status as outsiders – and, for instance, just let the stakeholders and other professionals get on with it – is equally inappropriate, as it fails to consider the intimate modes of issue entanglement that mark material publics.

If we want to take seriously the pragmatist problem of relevance, I want to propose here, we do well to direct our critical attention to the *devices* that are deployed to organize public relevance relations. The importance of mediating devices follows from the double position that is characteristic of the public: if publics are located at a remove from sites of issue formation, but are also intimately affected by these issues, the question of what instruments can be used to establish relevance relations among issues and publics emerges as crucial. Also, this question is precisely the one that is at risk of being bracketed in definitions of the material public as a community of the affected. In materialist approaches, the question of the *means* by which issues come to matter to actors does not really arise, because they assume that 'issue communities' are somehow ontologically given, and only need to be rendered *legible* to acquire political salience, these approaches do not really consider how relevance relations *can be produced* among the entities, settings and actors that make up the public. Proceduralist approaches to this question of the means of issue articulation are limited to discursive and institutional instruments. While they prefer to remain silent on issues of ontology, they equally tend to end up assuming that material implication in issues is somehow given. Finally, the question of differentials of relevance *among material locations* is not really taken up in materialist and proceduralist approaches: they do not really acknowledge that issues matter differently in different material settings, and that these differences are likely to be irreducible.

Conclusion

We are now in a position to answer the question of what is distinctive about material publics. Pragmatist theories about democracy in technological societies bring into view a material public that clearly differs from the object-centred publics that are associated with scientific liberalism. They demonstrate that to make objects central to our understanding of the public, it is *not* necessary to accept that 'democratic' process is limited to problem-solving by technical or expertly means. To the contrary, pragmatist political theory shows how object-centred publics

emerge out of political dynamics that have long been understood as the opposite of a technocratic politics of problem-solving, namely a politics of conflict and clash, and the articulation of lack and need. It proposes that there is no reason why these dynamics cannot be understood – indeed, that 'they are best regarded' – as playing themselves out on the plane of objects.

Lippmann and Dewey insist that publics come into play when institutional habits of problem-solving falter: when the issues are most obscure, when no one knows what to do, when unprecedented kinds of consequences make themselves felt, this is when publics may or must intervene. According to the pragmatists, publics that are called into being by issues are morphologically different from communities of stakeholders, those that consist of issue experts and actors with a *direct* stake in the issue at hand. In their description, the public is not just another, larger, stakeholder community whose concerns must be taken into account. It is marked by a distinctive problem of relevance: the public consists of actors who are intimately affected by issues, yet are not participants in the networks, platforms and vocabularies of issue articulation. To put this differently, the material public does not just face an epistemic problem of representation, in which the question is how, *given* a political ontology of 'issue affectedness', actors and issues can be adequately represented in the public institutions and language of issue formation. In the pragmatists' account, material publics are faced with an ontological problem: they are problematically entangled in issues.

In making this argument, the pragmatists made it clear why material publics are *not necessarily* susceptible to the critiques that have been made of liberal concepts of object-centred democracy. Pragmatist thinking about the role of objects in democracy was not guided by the choice that has marked the post-war debate between the defenders and critics of scientific liberalism: either democracy revolves around objects and politics must be consensual, or politics is conflictual and we must let go of objects and define politics principally in subjective terms (Popper, 2002 (1945); Wolin, 2004b). For the pragmatists, to grant a central role to objects in the organization of publics it is *not* necessary to disavow conflict as a constitutive dimension of public politics. They challenged the idea that conflict could be excluded from democracy, so that only the virtuous stuff remains (knowledge, morality). But the type of conflicts that implicate publics was for them as much an ontological as a political phenomenon: publics come about where 'something [is] the matter; when there is some trouble to be done away with, some need, lack or privation to be made good, some conflict of tendencies to

be resolved' (Dewey, 1955 (1908)). Or as I put it, the pragmatists defined the public in terms of a particular type of 'ontological trouble'.[27] In offering this definition, pragmatist political theory shows how it is possible for object-centred political theory to make a 'double commitment', one that is not dissimilar to the one formulated by Chantal Mouffe: it shows that it is both possible to approach publics as taking form on the 'plane of objects' and to grant a formative role to dynamics of 'strife and conflict' in democracy. And it is this point that is missed when the political philosophy of American pragmatism is equated with liberal instrumentalism. This particular *interpretation* of pragmatism as a precursor of the instrumentalist rationality that marked scientific democracies of the twentieth century, we could even say, has contributed to the 'dis-invention' (MacKenzie, 1990) of a distinctively pragmatist conception of the material public.[28]

In defining the public in terms of an ontological problem, the pragmatists provide a *conceptual specification* of material publics, without however getting trapped in an overly static description of the type of entities or events that constitute publics. From this standpoint, we can say that post-instrumental ontologies of politics are often not specific enough: they posit a general event, that of 'mattering', which they then leave under-determined, as it must be considered an 'empirical matter.' While this empiricist intuition seems right, it here has the unfortunate consequence that the public remains conceptually under-specified. (As I will discuss in Chapters 4 and 5, to arrive at a conceptual specification of ontological effects that are empirically accomplished, we need a particular way of approaching political ontology, which I will call experimental ontology.) Here I want to emphasize that this implies a positive appreciation of the problems of the material public. From a pragmatist standpoint, these problems cannot simply be taken to refer to a set of shortcomings or flaws of this type of political formation. Rather, they suggest that if we consider material publics to be problematic – if we are inclined to think of them as weak publics, susceptible to capture by negative forces like technocracy, or as too ephemeral because resistant to institutionalization – this may have a lot to do with the difficulty of finding a place for objects in democracy. As Lippmann insisted, modern democratic theory has had difficulties in making room for material entanglement at least since the days of Thomas Jefferson. So why would we expect that a material public could suddenly become a 'working proposition'? Such a constructive appreciation of the problem of the material public also invites us to turn a critical eye to what we expect from theories of the public: it directs attention to our inability to

conceive of the public as a problem, our expectation that any adequate conception of the public must already contain an adequate solution to its problems. What if the public is indeed a problem, what if this problem must be appreciated *as a problem* before it can be sorted out?

On a more general level, the pragmatists' concepts of the public challenge the theoretical investment in the object-centred political community as a way of *containing* publics. They go against the assumption of both liberal political thought as well as post-Aristotelian theories of the public that the public can only exist on the condition of its containment in either a procedure or a clearly delineated domain. In the pragmatist account, the ontological dynamics of the formation of publics can only be understood as a dynamics of uncontainable problems.[29] This is the significance, I think, of Lippmann's and Dewey's insistence that the public presents a problematic mode of issue entanglement: the problem of the material public is not something to be *resolved* by theoretical means.

By defining the public in terms of a problem of relevance, pragmatism undid two persistent attempts to solve the problem of material publics by conceptual means: the tendency to either internalize or to externalize the problems of the public. They warned against the attempt to externalize public affairs, and to assume that issues are simply 'out there', and all that is required for effective public action upon them, is an adequate (expert) understanding of these 'objective' problems. Rather, the public's problems are also internal problems: they require some kind of mobilization on the part of social actors. However, the pragmatists equally warned against the attempt to conceptually resolve problems of the public by 'internalizing' the issues, and by suggesting that public issues are at heart a problem with people's inability to take them seriously.[30] From the standpoint of the problem of relevance, the problem is not one of human nature – it is not a problem with its given epistemic, emotional or psychological constitution (illiteracy, indifference, short-sightedness). But neither are the issues at stake exactly 'out there', as an objective problematic that impacts on humans actors from an external environment. From the pragmatist perspective, the actors in here are not necessarily de-mobilized, and the problem is not necessarily all 'out there', but this does not necessarily solve much, as the question remains how relations of relevance can be established when actors are intimately affected by problems in which they have little investment?

We could say, then, that to understand the public in terms of a distinctive type of ontological trouble is to re-*distribute* the problem of

the material public. From the perspective of the problem of relevance, we should resist the temptation to assign blame for the problems of the public unequivocally: to resist the urge to place all the blame on either the actors or the institutions or the issues. The question, rather, is how problems of the public are distributed among the various entities that make up environments of participation: settings, technologies, issues, institutions, actors and so on. In the next chapter, I will argue that material devices of participation play a crucial role in the distribution of public problems. That is also to say, the ontological trouble that marks the material public can be approached as at least in part an empirical problem. One way to stop expecting that the problems of the material public are to be resolved by theoretical means is by turning our attention to the role that devices of participation play in the (dis-)articulation and (re-)distribution of these problems.

3

Engaging Devices: The Inter-articulation of Technology, Democracy and Innovation

Introduction

The question of the role of technological devices in engagement may be posed of any form of public participation but it acquires special relevance in relation to material participation. The latter form of involvement as I discussed in Chapter 1, can itself be characterized in terms of the attempt to foreground the role of objects, technologies and settings in the organization of publics. There is also a second, similarly 'reflexive', reason why the question of devices becomes especially important in this case. Insofar as material participation today presents a distinct form of public action, it poses a challenge to the understanding of the role of things in the enactment of participation proposed in prevailing accounts of material politics. As I will discuss, this work has treated the material constitution of participation as an implicit feature, as something that requires the attention of social and political analysts to acquire saliency. However, when material participation acquires the status of a distinctive public form, materiality becomes an explicit feature of participation, one that is *generally* recognized as part of the practices under study. This has implications for how we conceptualize and value the materiality of participation in this case: I will argue that it invites a much more *ambivalent* appreciation of it.

What may be called a 'device-centred perspective' on public participation has been developed in recent empirical studies of a broad range of technologies of engagement, in the sociology of science, technology and politics. What these studies have in common is a focus on the role of 'empirical technologies', an emphasis long customary in the

social studies of science and technology. Thus, recent studies of the opinion poll (Osborne and Rose, 1999), the home interview (Callon and Rabeharisoa, 2004), the focus group (Lezaun, 2007), the museum exhibit (Barry, 1998; Heath and Lehn, 2008), the advertising poster (Cochoy, 2007), the Powerpoint presentation (Girard and Stark, 2007), each bring into view 'methodological instruments' of participation: material artefacts that embody particular empirical and experimental methods of engagement (see also Felt and Fochler, 2010). In focusing on these instruments, these studies brings a broadly performatist understanding to bear on the study of participation, detailing the role of artefacts and settings in its enactment and organization. But they also evoke a specific theoretical argument about the constitution of public participation: they suggest that participation can*not* be adequately accounted for in terms of abstract procedures or general methods only, as has been widely assumed in political theory.

Evoking holistic arguments from the sociology of science and technology (Duhem, 1906 (1982)), studies of participatory devices suggest that *in practice* it is impossible to distinguish between the methods of participation, on the one hand, and the techniques, objects and settings deployed in their enactment, on the other.[1] From the standpoint of their effects, these studies can be taken to suggest, it is impossible to say whether the accomplishment of public participation must be attributed to either the procedures deployed or the material settings in which it takes place. It then becomes important to acknowledge and investigate the mutual imbrication of methods and techniques, objects and settings, in the performance of public participation (see on this point Didier, 2009; Lezaun, 2007; and also Adkins and Lury, 2009).[2]

To adopt such a device-centred perspective on material participation as a distinct public form, however, poses a particular challenge. The device-centred studies of participation listed above are distinguishable by their attention to the material dimensions of participation, but they have mostly construed this dimension as a latent one, which usually remains under-articulated in both theory and practice. (This latent normativity is sometimes referred to as the 'sub-politics' of technology.) Instruments that explicitly frame participation in terms of everyday material action disrupt this conception of 'constitutive' materiality, insofar as they present us with a *form* of participation that is specifically material. Here I will consider a particular set of technologies of material participation, namely everyday devices of carbon accounting, which can be said to 'materialize' participation in a distinctive way.

A variety of agencies in the United Kingdom and elsewhere, from governmental bodies to community-level organizations, have in recent years promoted the adoption of instruments designed to take into account the environmental costs of everyday activities in the very conduct of those activities.[3] These technologies enable the calculation of energy costs associated with everyday activities, adopting the metric that is now customarily used to quantify the environmental harm associated with energy production and use, namely 'carbon.' But, I will argue, these devices are also deployed to materialize engagement with the environment. As such, they present a notable instantiation of the 'materialization' of participation, the project of locating participation in everyday material practice.

Distinctive about the performance of participation by material means in this case, I will argue, is the deployment of particular tropes and ideals of democracy as well as technology. Everyday technologies of carbon accounting codify participation in distinctively liberal terms, namely in terms of the *effort* invested in its performance. This codification of public engagement evokes classic liberal ideals of participation, such as the ideal of 'involvement made easy', which, as we already saw in the first chapter, is frequently mobilized in the specification of environmental engagement in material terms. However, codifications of participation in terms of effort also evoke specifically pragmatist ideas. Thus, John Dewey favoured a conception of engagement in terms of practical investment, arguing that the actual efforts people make provides a more adequate expression of their engagement with public affairs than 'what they say about it' (Dewey, 1955 (1908)).[4]

Recent studies of environmental participation, furthermore, have drawn on this pragmatist idea to argue that people's engagement with environmental issues should be understood as a consequence of practical involvement in them (Agrawal, 2005). This could perhaps be translated into the slogan: 'the more invested, the more engaged', which invokes a rather different logic of participation than the notion of 'involvement made easy'. Which is also to say: attempts to locate environmental participation in everyday material practice may involve and enable *many different* codifications of it. The question for a device-centred perspective is then that of how to make sense of multiple conceptual resonances in accounting for the materialization of participation.

Another reason for adopting a device-centred approach, in this respect, is that it can help to make sense of what I will call here below the normative 'multi-valence' of material participation. Social studies of participatory devices have directed attention to the role of these devices

in the 'co-articulation' of different spheres, such as those of economy, politics and research (Callon, 2009; Cochoy, 2007). Such a conceptual focus seems especially useful if we are to make sense of material forms of participation: as participation is located in everyday material practice, it inevitably becomes associated with other modalities of action, such as innovation and economization. In this respect, material participation challenges an assumption that has long been current in wider research and theories regarding public participation: the notion that participation can in principle be contained in a singular space of political or moral engagement (e.g. a public debate forum). This phenomenon of the co-articulation of participation is then critical, I think, for understanding the normative implications of the materialization of participation. A crucial question to ask about participation here concerns the logic according to which it is co-articulated.

Everyday technology of carbon accounting, I will argue, represents an 'experimental' device of sorts – a device that is designed and taken up in many different ways. This device can be said to materialize participation according to a number of different logics, and for this reason it offers an especially useful case for exploring what becomes of the technological politics of participation – and of the participatory politics of technology – under conditions of its materialization. These devices allow for multiple, diverging co-articulations of economy, politics and innovation, enacting the politics of contestation in a material modality.

The augmented teapot: a technology of 'easy' participation

> This Tea Light constantly polls the national power grid to see how it's keeping up with demand from everyone watching The Apprentice, and subsequently whether your next cuppa will be a particularly carbon intensive one.
>
> If there's spare capacity on the grid, the tea light glows green, it's basically saying:
>
> 'Go ahead! Make some tea! Knock yourself out!'
>
> If there isn't, the colour shifts to red, saying:
>
> 'Now's not the best time for that cuppa, give it a little while.'
>
> The main idea here is that you can glance at the globe from across an office or co-working space, to get an idea about whether making that cup of tea is a good idea right now, without having to think too hard about it.

Chris Adams, 'Tea, Arduino and Dynamic Demand', 24 April 2009, http://chrisadams.me.uk

Everyday devices of carbon accounting present a special case of what have become known in the social science literature as 'technologies of participation' (Thrift, 2008). On a basic level, these devices can be both compared to, and distinguished from, other engagement technologies: everyday devices of carbon accounting, too, are deployed to enact public engagement, but in this case technologies are used to enact a distinctively material form of participation. Everyday carbon accounting tools, like the Tea Light (Figure 3.1), have the capacity to turn everyday material activities into forms of engagement with the environment, at least according to the promotional accounts that accompany them (Darby,

Figure 3.1 'Tea, Arduino and Dynamic Demand', Chris Adams and James Gardner, 24 April 2009

2010; Michael and Gaver, 2009; Marres, 2010). In these cases, technology is said to enable an explicitly material form of participation: adopting the guise of a material object (an old-fashioned tea pot), the Tea Light foregrounds an everyday material action (tea-making), and frames it as a form of action upon the environment, which is itself given a physicalist definition (to engage with the environment here means to take into account the amount of CO2 emissions associated with a given everyday activity). Insofar as this apparatus helps to constitute public participation as everyday material action, it deviates from the devices of public engagement on which social studies of science and technology have tended to focus, such as public consultations and citizen conferences. Whereas the latter technologies have generally been characterized as only latently material, a device like the Tea Light is used to define participation in explicitly material terms.

It may be helpful here to make a distinction between the *constitutive* and *constituted* materiality of public participation (see Latour, 1993). Social studies of participatory devices have mostly attended to materiality in the first sense. Studies of devices like the opinion poll (Osborne and Rose, 1999), or the focus group (Lezaun, 2007), or research on modes of demonstration such as the anti-road protest (Barry, 2001), have extensively documented how material objects, technologies and settings enter into the enactment of public participation. In doing so, however, they could assume that the role of things in facilitating participation remained *under-articulated* in the staging of participation itself, which in these cases took a discursive form, patterned on the model of 'public debate', of either the consensual or the antagonistic variety (Callon and Rabeharisoa, 2004; Irwin and Michael, 2003; Marres, 2009; Marres and Lezaun, 2011).[5] The materiality of public participation is here limited to its *constituent* components: to objects, technologies and settings that enter into the performance of participation, but the contribution of which is not accounted for in the staging of publicity. By contrast, in the case of an environmental technology like the Tea Light, a material device of participation becomes itself the object of a 'public performance': the staging of participation focuses on the material device that facilitates it and this device is presented as enabling a distinctively material form of participation. In a careful arrangement of a teapot, blog and arduino software,[6] the device configures public participation as a form of material action on the environment.

When objects and devices become the focus of the public performance of participation, the study of its material dimension requires a different analytical strategy from the one adopted in studies of 'latently'

material devices of engagement. One could say that the question here becomes that of the *materialization* of participation, rather than that of its *materiality*. That is, we should not just consider how material entities enter into the enactment of participation – to a certain extent this question is addressed by the device itself – but how the material form of participation is actively accomplished with the aid of devices. Technology, that is, is here used to achieve the materiality of participation as a performative effect: in the small scenario outlined above, a teapot is performatively invested with the capacity to facilitate engagement by material means. The materiality of participation is then the result of a highly artefactual undertaking: to approach public engagement in its material aspect requires devices of its own, such as those that 'overlay' everyday material practice and environmental engagement.[7] Social studies of technologies have not always appreciated this artificial nature of materiality, but still they have some important concepts to offer to help clarify processes of the materialization of participation. It may be useful, for instance, to consider how an engagement device like the 'carbon teapot' enables the *de-composition and re-composition of* everyday action (Verran, 2012).

In presenting CO2 emissions as something to be taken into account as part of the activity of making tea, the Tea Light can be said to *de-compose* this everyday material routine into constituent elements and conditions: the supply of electricity, the fluctuating emissions associated with power generation, the time of day, and so on. However, in one and the same go, this set-up can also be said to *re-compose* the routine of tea-making as an activity in which it is possible to take these environmental, technical and social conditions into account ('Give it a little while'). Arguably, the mundane activity of tea-making is re-constituted, in this process, as a way of engaging with and acting upon the environment.[8] Seen in this light, we can begin to appreciate how a material device of engagement like the Tea Light helps to enact a particular *form* of environmental participation. An accounting technology, the Tea Light makes it possible to take the environmental 'costs' of everyday living into consideration, while at the same time providing the means to mitigate these costs without problematizing or altering the activity itself ('Go ahead. Make some tea'). This device thus enables what we can call the 'change of no change', in a variation on Sharon Traweek's (1988) phrase,[9] facilitating a mode of participation that requires only a minimum of effort.

Such an examination of how an accounting device re-constitutes everyday practice as a form of environmental action brings into view

a distinctive feature of materialization, as opposed to materiality. Materialization entails the *codification* of participation in material terms. As long as materiality could be taken to refer to an under-articulated dimension of participation, it could be approached as an un- or under-described zone – A 'great unformed' region open for empirical and conceptual exploration. Technologies that materialize participation, by contrast, grant participation a particular logic – or, rather, logics, as I will describe below. I use the word codification for this process to highlight that it is not just a matter of adding an 'ideal' or 'theoretical' slogan to a material or technical practice. Rather, materialization is the result of an operation afforded by the device, that of the de- and re-composition of everyday material action, an operation that codes this action in particular terms, namely those of the 'minimization of effort'.

The ideal of 'involvement made easy', however, also receives an explicit formulation in Chris Adams' online presentation of the Tea Light. It comes through especially clearly in the scripts for environmental engagement that he provides, as in the 'scenario of use' quoted above.[10] Further down on the same page, Adams observes:

> Placing [the tea light] in a relatively high traffic co-working space, full of people working in totally unrelated fields is a great opportunity to speak to them about the ideas inspiring this little toy, and get lots of interesting feedback, and see how best to communicate on issues related to climate change and how massively energy intensive our life styles are.[11]

The notion that participation in public affairs must somehow be made 'doable' for everyday people – who lack the time, space and shared knowledge that political engagement requires – has been an important trope in liberal theory. It played a significant role in the formulation of distinctively liberal conceptions of the public, as in the work of John Locke (Pateman, 1989a). His defence of representative democracy included the argument that people are too busy to perform the duties that full-fledged participation in the political community requires. The constraints that everyday life allegedly places on participation here came to justify a conceptual distinction between two different domains of engagement with public affairs, something which Carole Pateman (1989b) describes as the 'doubling' of the public: the separation between a domain of professional politics and that of a wider public engagement with politics.

Importantly, however, accounts of participation in terms of its doability do not just evoke ideals of political theory (ideals that, we could then say, are 'applied' to the world of technology, as for instance in the case of the augmented teapot). The doability trope has been especially prominent in relation to the role of *technology* in organizing political and social life.[12] It played a central role in twentieth-century debates about the 'problem' of public engagement in technological societies, where both the busyness of life and the complexity of issues were said to militate against effective public participation (Lippmann, 2002 (1927); Marres, 2005a; Oswell, 2008). The trope of 'making things easy' has also figured prominently in the history of *domestic* technology. As feminist studies of the 'industrial revolution in the home' have famously argued, the introduction of modern domestic appliances at the turn of the twentieth century was accompanied by a distinctive ideological theme: the idea that technology 'saves labour' (Schwartz Cowan, 1983; 1976; Wajcman, 1991). The introduction of appliances like electric stoves, vacuum-cleaners and refrigerators into middle-class households then was legitimated in terms of the capacity of these technologies to 'make things easy' for modern housewives. It thus seems no coincidence that contemporary attempts to 'environmentalize' households – or even society as a whole – would deploy these same domestic technologies and evoke this same capacity for saving labour and making things easy.

One of the merits of studying devices of material participation, then, is that we can explore how they allow for particular connections between technology and democracy. A device like the Tea Light constitutes everyday material action in terms of the investment of effort. In it we do not just observe the application of ideas from liberal theory in technological practice: rather, the device evokes tropes that are as much associated with technology as with democracy. The question then is how exactly the 'codification' of participation in material terms produces connections between technology and democracy (and engenders more or less creative confusions between the two in the process). In taking up this question, I would like to pay special attention to the wider normative consequences of the codification of participation in terms of effort.

As the feminist scholars cited above have made clear, invocations of the idea that things must be 'made easy' for everyday subjects have particular normative implications, including the bifurcation of two domains of engagement with public affairs – one for professionals and one for laypeople, one for insiders and one for outsiders. This

effect has also been foregrounded by feminist scholars of technology: the codification of domestic appliances in terms of their capacity to make things easy contributes to the framing of domestic life as a private sphere of leisure, set against the professional sphere of work. Furthermore, they have emphasized the deception involved in the codification of technological practice in the home as easy and/or fun, arguing that it involves, instead, a displacement of labour from a visible to an invisible economy (Leigh Star and Strauss, 1999). It raises the question how these well-documented effects play out when material devices of environmental participation are introduced as ways of making engagement easy. Whether, in other words, devices that are framed as turning environmental engagement into something 'easy' or 'fun' contribute to a similar bifurcation of the public, and a related displacement of labour.

Spaces of multivalent action: participation, innovation, economy

The intensification of connections among domains – between politics, the economy, science, and so on – has long been recognized as an important effect of the proliferation of technology in society (Callon, 1986a; Latour, 1988; see on this point also Barry and Slater, 2005). This effect takes on special significance in relation to devices of carbon accounting, insofar as these instruments do not just generate *relations* among different spheres, but enable the enactment of a range of organizational *forms* associated with science, politics and the economy. Technologies of carbon accounting, that is, allow for what Michel Callon (2009) has usefully called 'co-articulation'. In his account, an important distinguishing feature of the European Greenhouse Gas Emission Trading System, the EU carbon market, is that it simultaneously facilitates the implementation of new market arrangements, an experimental process of inquiry and learning about these arrangements, and the involvement of stakeholders in opinion-, decision- and policy-making about it (see also MacKenzie, 2009; Blok, 2010; Asdal, 2008). Carbon markets, then, enable action in a number of different registers all at once: business, research and participation.[13] Something similar can be said of everyday technologies of carbon accounting. But to the extent that these are everyday material devices, co-articulation here has a further implication for participation: it disrupts the assumption that public participation requires the disembedding of actors and action from everyday life.

The production of alignments between different registers of action is first of all a formal feature of technologies of carbon accounting. The paradigmatic device of carbon accounting today, the smart electricity meter, displays three measures simultaneously – kilowatts, Pounds Sterling and CO2 emitted. As such, it conjures up what Donald MacKenzie (2009) has called a space of equivalence, in which energy use and its financial and environmental costs are seamlessly translated into one another. Crucially, this ability to frame action in multiple registers is also often singled out as what distinguishes smart electricity meters as participatory devices. Thus, Gavin Starks, the founder of DGEN, a London-based energy profiling company, sees everyday carbon accounting as enabling 'a shift from awareness-oriented to action-based engagement with energy' (pers. comm.). The statement echos the pragmatist idea that the actual efforts people make provide a more adequate expression of their engagement with public affairs than 'what they say about it' (Dewey, 1955 [1908]). More specifically, the notion of 'action-based engagement' clarifies what enables the co-articulation of participation in this case: a key feature of everyday action is that it can be framed in multiple registers, from participation to innovation and economy.[14] As Starks put it in an interview:

> As Tim O'Reilly said, people want to work on stuff that matters. People want to save money and we can help with that by making consumption more visible, and secondly we can help particularly with a reduction in footprints and consumption.[15]

Everyday devices of carbon accounting, then, are explicitly attributed the capacity to evaluate action along multiple axes, from ethics to consumption to innovation. As such, these devices facilitate a mode of co-articulation of participation that is more comprehensive than that of 'involvement made easy': they enable the organization of spaces of multivalent action, in which a routine act like making tea is at once a technical, economic and ethical act. This also becomes evident in the empirical presentation of everyday carbon accounting devices. The journalist Adam Vaughan, a.k.a. the Green Guy, published on his blog a small demonstration involving a smart electricity meter hooked up to an electric kettle, showing the 'carbon costs' of making one cup of tea. Presented under the title 'Ethical stuff that anyone can do', the entry notes that 'the unique selling point of the home CO2 meter is a bargain £40 price tag [*sic*].[16]

This framing of engagement as just one aspect of multifaceted everyday actions suggests that it is a mistake to consider the facilitation

of participation by devices of carbon accounting in isolation. The defining feature of these engagement devices is that they are also devices of economization, innovation and so on. In this respect, they imply a departure from a classic condition for public participation: the assumption that public participation requires a domain of its own, a dis-investment from the material associations, habits and interests that mark everyday life.[17] This dissolution of the requirement of disentanglement may well be a constitutive feature of attempts to locate engagement in everyday material practices, or as I describe it here, of the materialization of participation. It raises the question of how *else* the efficacy of participation may be secured. Co-articulation, that is, has consequences for the normative analysis of participation.

No doubt the most familiar normative interpretation of attempts to locate participation in everyday material practice is the critique that they allow one register of action to dominate or subsume others. Everyday carbon accounting is said to imply the 'economization' of participation (Rutland and Aylett, 2008; Cooper and Mitropoulos, 2009). Carbon accounting, the criticism goes, reconstitutes the environmental citizen as a calculative individual, fixated on keeping a balance of the quantifiable environmental costs and benefits of individual actions. Critics have also noted how locating participation in the intimate setting of the home leads to its 'privatization' (Anderson and Braun, 2008; Slocum, 2004; see also Hinchliffe, 1996).[18] Others have made the opposite argument: that the location of environmental engagement in the household involves the 'politicization' of everyday life. In a variation on the feminist ideal of making the personal political, intimate domestic routines like cooking and washing are here configured as sites where our political implication in matters of public concern can be rendered visible (Dobson, 2003; see also Marres, 2008).

However, from a co-articulation perspective, what stands out is the fact that these opposing interpretations are possible all at once. The device is capable of generating a multiplicity of effects: whether it codifies everyday action as primarily economic – rather than, for instance, ethical – varies from one situation to the next. Which register of co-articulation ends up being predominant then depends on how devices are deployed. Furthermore, if co-articulation in this sense can be regarded as an inherent feature of material devices of participation, the fact that they allow for the codification of action in other than participatory terms is not necessarily problematic. In considering co-articulation, we may appreciate in positive terms the multiplicity of normative effects generated by environmental accounting devices:

it highlights what we could call the normative ambivalence of technologies of participation (Woolgar, 1999; see also Hawkins, 2011) or their 'performative flexibility'. The latter term amends a concept proposed by Trevor Pinch and Wiebe Bijker (1984), that of the interpretative flexibility of technology. Where Pinch and Bijker's term, in good social constructionist fashion, locates flexibility in the different interpretations that actors may bring to technology, performative flexibility highlights the adaptability of devices themselves: they may be differently assembled to perform participation in different modalities. However, I want to argue here that if we are serious about understanding participatory devices in this way, then we do well to expand the analysis of co-articulation.

By elaborating the notion of co-articulation, I want to propose, we can further develop our understanding of the normative adaptability of technology. Case studies of environmental technologies like recycling and ecological home improvement have noted that such initiatives may serve a variety of normative agendas. The devices have been shown to embody regimes of 'green governmentality' (Darier, 1999), as they discipline subjects into behaving according to rationales of population government, but also to facilitate creative moral practices and to enable embodied ways of attending to our entanglement with things (Hobson, 2006; Hawkins, 2006). However, normative ambivalence may not only pertain to technologies themselves, it can also be applied to the *modes of co-articulation*. I discussed earlier the focus on the 'minimization of effort' as a way of bringing the registers of participation and technology into alignment. But everyday devices of environmental accounting bring other logics of co-articulation into play as well, as I will describe next. Critical attention, then, does not have to be limited to the dominance of some registers of action over others, but may also be directed at the *different logics* according to which action is co-articulated. Indeed, an appreciation of the variability of logics of co-articulation is crucial, it seems to me, to understand why accounting devices do not necessarily enable the economic register to dominate others.[19]

A different logic of co-articulation: the more invested, the more engaged

Everyday technologies of carbon accounting can be described as experimental devices in several senses of the term. For one, the device is configured differently depending on the case, and this has implications for participation. Carbon accounting can take the form of

an Internet-based platform, like the Carbon Diet or Carbonrationing.org, which facilitates the management of personal energy data, from electricity bills to transport information (miles travelled; means of transport), and the monitoring of individual efforts at energy demand reduction on this basis. In other cases, carbon accounting adopts a more informal aspect, as on green blogs where individuals document their efforts to reduce their energy use in diary-style entries, for instance on the blog 'the Greening of Hedgerley Wood' ('one family's attempt to save CO2') which includes reports on things like the installation of a ground heat pump, or rabbits ravaging a vegetable garden.[20] Materially speaking, the 'device' of carbon accounting is also composed of variable elements, from an Excel spreadsheet documenting energy use and its translation into carbon emissions according to conversion factors (which is one of the things provided by the company DGEN), to a blog narrating the experience of renovating a house in rural Buckinghamshire. This variability of the device is mundane on one level, but it has important implications for the analysis of participation: the space of engagement can accordingly be understood as variably composed (Kelty, 2008).

To begin with, the variability of the device reminds us that it would be a mistake to assume that forms or logics of participation are somehow inherent to technologies. Thus, everyday devices of carbon accounting are sometimes attributed participatory potential of a fairly classic, representational kind, as in the case of Carbon Unlimited, an Internet-based platform for personal carbon trading hosted by the Royal Society for the Advancement of the Arts, Manufactures, and Commerce (RSA) in London. A report accompanying its launch sets out its rationale as follows:

> There was little to no public involvement in the process leading to the implementation of the EU ETS [the European Emission Trading Scheme], while there is actually great appetite for public engagement, which is what the Carbon Unlimited project is addressing.[21]

But in other cases, as we have seen, carbon accounting is presented as an innovation in public participation, as a way of co-articulating participation with innovation and economy. And here the variability of devices takes on special significance: co-articulation can be done according to varying logics.

One predominant mode of co-articulation we have encountered already in the discussion of the ideal of 'the minimization of effort'. Another example of how everyday technology enables co-articulation

can be found in a promotional trial organized by the RSA Carbon Unlimited project. This demonstration was conducted in partnership with British Petroleum and a data management company called Atos Origin, and invited subscribers of the online personal carbon trading platform to use loyalty cards at BP petrol stations. When subscribers used their Nectar cards at BP stations, carbon units could be automatically deducted from their personal carbon accounts. The project generated a fair amount of publicity, and the resulting accounts in the media and elsewhere emphasized the ways in which the project required minimum investment on various levels. As the Guardian put it:

> The trial is intended to show policy makers that personal carbon trading is both logistically and financially possible within the existing technological systems used by retailers and utility companies. The RSA believes that loyalty reward cards – half the population now carry a Nectar card – are the quickest and most cost effective method to record and monitor an individual's 'point-of-sale' carbon emissions.[22]

The trope of minimum investment recurred in the account of the form of participation the device of carbon accounting enabled in this particular case. The leader of the project suggested that one of its advantages was that participation here took *no effort at all*: 'participants didn't even need to know that they were participating in it, as the project relied on the existing informational infrastructure of the loyalty card system' (pers. comm.). The demonstration can thus be taken as instantiating a more comprehensive version of the liberal trope of 'involvement made easy' – one that revolves around the minimization of participatory, economic and technological costs. In this case everyday carbon accounting is said to facilitate simultaneously (i) easy participation, (ii) minimum investment and (iii) little to no disruption to existing infrastructure. The technology here too helps realize the 'change of no change'.

There is, however, an alternative co-articulation of participation, innovation and economy at play in carbon accounting, which we could describe as 'the more invested, the more engaged'. An example of this can be found on the 'Greening of Hedgerley Wood' blog, which also values everyday material action in multiple registers, but in a different way. The entry about the installation of a ground heat pump, for instance, can equally be said to codify action in terms of (i) the investment of

effort by everyday actors, (ii) monetary cost and (iii) infrastructural disruption, but according to a rather different logic. The post includes a photograph of men working in the garden, digging trenches for the pipes, under the heading 'This garden may look like a first world war zone.' The page also shows a copy of a sheet specifying how much the installation cost (£13,071), and dutifully notes the amount of carbon emissions avoided.[23] This blog then measures everyday material action along the axes of the effort invested, the monetary costs borne and the disruptions tolerated in order to take the environment into account. However, here these investments are proudly put on display: rather than their minimization, the point seems to be the amplification of costs, efforts, disruptions, as a way of documenting the 'costs' of environmental change.

At least two different co-articulations of participation, technology, economy (and the environment) can then be discerned in demonstrations of everyday carbon accounting: some centre on the minimization of the cost, effort and disruptions involved in taking the environment into account, while others are committed to rendering visible the amounts of work, investments and modification of habits and habitats involved in this process. The latter could be said to follow a pragmatist logic: environmental engagement must here be understood *as a consequence* of investing effort in particular practices (for suggestions for a labour theory of engagement, see Agrawal, 2005; Kelly and Geissler, 2011). No doubt further modalities of co-articulation could be discerned in the accounts generated with the aid of the device of carbon accounting. But here I would like to consider the wider implications of co-articulation for public participation. In the rest of this chapter I will therefore return to the feminist analysis of the codification of technology and participation in terms of labour-saving, and discuss whether and how the normative effects these studies noted play out in the case of carbon accounting. My argument is that the multiplicity of co-articulations on display in the field of everyday carbon accounting makes a small but important difference in this regard.

Consequences of co-articulation: redistributing the costs of involvement

Technologies of carbon accounting can be attributed many of the effects highlighted in feminist critiques of 'labour-saving' devices.

These technologies, too, can be said to encourage the bifurcation of the public sphere into two separate domains of professional and lay participation. The Carbon Unlimited trial in petrol stations, for instance, heavily relied on the construct of the 'average Nectar card user', while at the same time the sample of participants in the trial consisted mostly of expert users, people who found it interesting to (as the project leader put it) 'be at the cutting edge of information capture'. The 'lay participant' figured here as a mute template, deployed in the organization of a technological – if not outright 'geeky' – practice.[24] A second important feminist critique of 'labour-saving' technologies is applicable here as well: while technology is promoted as a way of reducing the level of effort required, it effectively redistributes it. Thus, Schwartz Cowan (1983)'s famous study of the domestication of technology showed how the very stoves, washing machines and thermostats that were advertised as making 'things easy' for housewives, in practice ended up producing more work for everyday actors (e.g. washing machines helped to generate more laundry (see on this point also Shove, 2003)). Indeed, this is what made the trope of labour-saving so devastating: it provided a cover for a de facto redistribution of work, with modern technology enabling the displacement of labour onto individual housewives in ways that were not accounted for.

Everyday devices of carbon accounting can also be attributed the twin effects of bifurcating spheres of engagement and redistributing labour (for an analysis of public participation in science and technology as a redistributive undertaking, see Hayden, 2007). But there is an important difference with the object of feminist critiques: in the case of carbon accounting, the critical effects of these devices are *not* altogether unaccounted for; being accounting devices, they help generate critical analyses as part of the project of environmental accounting itself. Thus, the RSA's Carbon Unlimited project commissioned various reports to evaluate its experiment in personal carbon accounting, and several of these argued that this form of environmental action brings with it certain 'hidden costs', thereby problematizing, if not undoing, the promise of easy engagement. A public consultation report documented, for instance, the various reasons why individual attempts at energy reduction are likely to be more costly in practice than anticipated: people's efforts will be constrained in terms of their geographic location, financial situation and access to information and services. An economists' report provided evidence that, even if personal carbon accounting is technically feasible, reductions in energy use will require significant investments that are unlikely to pay off in the short or

the long term.[25] Other reports also noted distributional effects, such as the fact that some domestic subjects are more likely than others to do the nitty-gritty work of energy saving, and that only high-income groups are likely to profit financially from energy reduction (Preston and White, 2010). These kinds of analyses provide almost as effective an undoing of the trope of 'involvement made easy' as feminist studies, showing that everyday carbon accounting is likely to involve more investments, labour and disruptions than promotional narratives of the minimization of effort assume.

However, while these critical evaluations bring into view the limits of the trope of 'the minimization of effort', they do not necessarily problematize this logic: evidence that interventions may be more laborious and costly than anticipated is mostly presented as a conclusive argument *against* everyday carbon accounting and the concentration of environmental change initiatives on households. Indeed, several of the reports cited above conclude with arguments against participatory approaches to environmental change.[26]

It is here that the alternative co-articulation of participation as work makes an important difference: projects that deploy the trope of 'the more invested, the more engaged' turn the redistribution of labour into an object of exploration. Rather than demonstrating how unobtrusively devices of environmental accounting can function, these projects document the considerable effort involved in attempts to take the environment into account as part of everyday life. Thus, a community initiative around carbon accounting in East London, the Hackney-Islington Carbon Rationing Action Group (CRAG), generated innumerable reports of the work involved, the obstacles encountered and the costs incurred as a consequence of its members' attempts at reducing energy use: 'Jax: Found it very cold on boat this winter, and hard living off-grid. Has to go to library to use internet.'[27] Others have third parties to accommodate, such as 'a boyfriend who has the internet on 24/7'. Another member of the group confessed: 'at a personal level I find it a chore to put these numbers together'.[28]

These projects, then, follow a different logic of environmental accounting, and as such they enable a different politics of participation. Carbon accounting involves in this case the specification of the consequences of letting carbon 'into one's everyday life', along three different axes: (1) the efforts involved, (2) the monetary costs incurred and (3) the more or less disruptive modifications of habitats and habits. And, in doing so, these projects can be said to produce inventories of the material, social, or economic effects and implications of taking

the environment into account. Thus, the blog entitled 'Trying to be green in a world that is not so keen', presents a semi-serious list of '37 consequences of going green' – from a house that smells of vinegar, to boring your colleagues with stories of a domestic life lived differently.[29] Importantly, these various 'costs' of environmental involvement do not map neatly onto a predefined grid of currencies (as the smart electricity meters that calculate CO2 emissions, Pounds Sterling and kilowatt do). There is rather a proliferation of measures, like work-related constraints: a participant in the Hackney CRAG notes that as a gardener she cannot get rid of her car, since part of her job is to 'drag bags of soil around' (the alternative would be to clean a rental car every single day). Perhaps we could say that this co-articulation of different registers, of participation, economy and innovation, leaves room for a more experimental exploration of what may be relevant measures for the valuation of environmental action.

Finally, this alternative co-articulation of participation also enables a different – more constructive? – analysis of the redistribution of costs among the actors involved in environmental change. Debates among the members of the Hackney-Islington CRAG provide various examples of this. One meeting discussed whether participants who subscribed to Green Energy Tariffs – the environmentally certified energy packages offered by utility companies – deserved a 'discount'. The conversation soon turned to the fact that one particular company 'did not even retire as much as 10% as ROCs [Renewable Obligation Certificates]'.[30] It led to the conclusion that no more than a 10 per cent discount was in order, since these companies were not making sufficient contributions to reductions in carbon emissions themselves. Far from a distraction, the provocation of such debates seems to be what the CRAG sought to accomplish. Thus, the group's coordinator, John Ackers, explained to me that 'yes, it is a nuisance' to keep track of your train tickets and energy bills and calculate your carbon footprint every month. But the point of doing so was to show that it is possible for the average person to live on a carbon budget: 'if we can do it, without any resources, why can't government and industry?' (pers. comm.). The public display of people bearing the efforts, costs and disruptions involved in taking the environment into account may then be a way of producing a particular performative effect: that of publicly raising the question of the wider societal distribution of the 'costs' of environmental change. The device of everyday carbon accounting may thus enable participation in a politics of redistribution that goes well beyond the household.

Conclusion

A device-centred perspective then makes it possible to attend to the different, contending modalities of the co-articulation of participation, and of its materialization. It brings into view a 'politics of co-articulation', insofar as it directs our attention to the ways in which devices of participation produce connections between economy, participation and innovation in contestational ways. A device-centred perspective on participation brings into relief the *normative variability* of enactments of engagement with the aid of everyday technologies – suggesting that such variability is crucial to a technologically-enabled politics of participation. Furthermore, the two different co-articulations of participation that I have foregrounded here can also be said to *materialize* participation in two contending ways.

In the first mode, that of involvement made easy, the location of environmental participation in everyday material practices aims at the minimization of effort, costs and disruption. It enacts the 'change of no change'. 'Materialization' accordingly takes the form of a virtual or intangible process: the objective here is the insertion of the environment into everyday practice, without causing or requiring any significant material change of the practice itself. The 'de-composition' and 're-composition' of everyday practices, so as to include environmental issues, entails here ideally no change in the state of the things, settings or stuff involved.

By contrast, the second way of enacting environmental participation as work actively seeks to produce material effects: the insertion of the invisible, odourless and indeed abstract 'environmental' entity of CO2 into everyday settings is shown to translate into a range of more or less surprising material effects, like a house smelling of vinegar or the garden turning into a war zone. One could say that these initiatives turn to everyday settings precisely in order to render environmental change as a material process: to demonstrate the material, social and technical transformations involved in taking the environment into account. I have suggested that this mode of materializing participation enables a wider politics of redistribution: it provides a way of problematizing the societal distribution of the work, costs and effects of environmental change. The very variability of devices here enables a particular politics of participation: precisely insofar as technology is deployed to achieve certain distributional effects, such as the displacement of the costs of environmental change onto households, it can also be used to problematize these implications. In the latter case, to materialize environmental

change is to problematize it. And this also has implications for how we understand the 'problem' of participation that its materialization is supposed to address.

As we have seen, the location of environmental participation in everyday material practice has been promoted as a way of making it more doable. Materialization then figures as a solution to the 'problem' of public engagement with the environment. Action-based forms of participation are seen as an alternative to epistemic framings of it: they suggest a set of simple actions to engage in, rather than requiring citizens to grasp the complexity of environmental issues. In this respect, it seems to me, the co-articulation of participation as work has a further important contribution to make: it brings into view the innumerable ways in which environmental engagement is *not* quite doable in practice, and here this is part of the point of the exercise.

If the point of everyday carbon accounting is to render visible practical constraints on environmental change, then it can be seen to dismantle the notion that participation is predicated on doability. To engage in carbon accounting may be a way of articulating problems of public engagement, and perhaps indeed of 'materializing' them. Attempts to take the environment into account are here *visibly* constrained by the material, social, technical and economic relations of inter-dependence that constitute everyday life – car rental services, bags of soil, employers, Renewable Energy Obligations, the municipal council, electricity suppliers and boyfriends. In this respect, technologies of carbon accounting in everyday life also enable a *redistribution* of the problem of environmental participation itself (on this point, also see Wynne, 2008). The problem here is not just with 'people who aren't interested', or with 'issues that are too complex', but just as much with the socio-technical-material arrangements that facilitate or rather fail to facilitate environmental action. And the question then is not whether 'materialization' works as a solution for the problem of environmental engagement, but whether it allows for the redistribution of the problematic that participation inherently is (I will discuss further this in Chapter 6).

But the empirical examination of everyday carbon accounting presented in this chapter does not just open up a perspective on how technology inflects the material politics of participation. It also raises wider questions about the role of empirical technologies in the enactment of democracy. Does it matter that the devices of environmental participation that I considered here are empirical technologies, technologies, that is, that are specifically designed to render everyday

practices measurable, recordable and thereby accountable? Does this have consequences for the type of politics of participation that technology enables in this case? If so, what does this imply for our understanding of the wider relations between the empirical, technology and democracy? This question is especially important from a device-centred perspective insofar as such a perspective implies a sensitivity to the ways in which technologies, empirical methods and political and moral procedures may cross over into another. In the next chapter, I will therefore unpack further how empirical devices enable the deployment of settings, objects, techniques and methods in the enactment of 'environmental' participation, or as I will argue, the *investment* of these things with specific capacities for participation.

4

Sustainable Living Experiments or a 'Coming Out' for the Politics of Things

Introduction

To foreground the role of technologies of accounting and measurement in the enactment of public participation raises broader questions about the place of experiments in democracy. Philosophers, historians and sociologists have long reflected on the privileged status that experimental science is accorded as a form of inquiry in liberal democracies (Stengers, 2000; Barry, 2001; Turner, 2003; Ezrahi, 1990). The relative prominence of empirical technologies of observation, data analysis and display in the enactment of environmental engagement could be understood as a further expression of this. Indeed, it could be interpreted as indicative of, and contributing to, an ongoing 'scienticisation' of democracy: the capture of public culture by scientific formats of publicity. However, a body of recent work that has become known as the 'sociology of demonstrations' has sought to complicate this type of diagnosis. This literature draws on the social studies of science and technology to develop a broader analysis of the role of public experiments, tests, trials and empirical presentations in social and political life (Barry, 1998; Girard and Stark, 2007; Rosental, 2005; Latour, 2005b; Muniesa and Callon, 2007; see also Adkins and Lury, 2009). Analysing demonstrations in a variety of settings, from political activism to architecture and software development, these works propose that not just the presentational styles of experimental science, but *a range of different genres of empirical display* are deployed in public demonstrations.[1]

Demonstrations in the above fields, these studies suggest, often draw on several different traditions of experimentation, which cannot all be

reduced to those associated with natural science.[2] Thus, in situ protests in agricultural fields trialling genetically modified crops fuse the genre of the scientific experiment with the trope of the political demonstration, as 'white suits' appear to cause havoc in these fields (McNally and Wheale, 1998). Demonstrations of architectural models in public presentations enact studio-based modes of display while increasingly also drawing on the format of the software demonstration (Girard and Stark, 2007; Yaneva, 2009b). Finally, a genre that I will consider in more detail in this chapter, the experiment in sustainable living, brings together forms of *moral* experimentation with technological demonstrations and social research: they present at once exercises in living 'well', demos for household gadgets and investigations into the material conditions of everyday life.

To note the multiplicity of empirical traditions invoked in demonstrational practices, from activism to architecture and mundane technologies, is to propose a particular perspective on the role of experimental devices in democracy. Most importantly, it suggests a different way of appreciating the experiment, one that differs from the critical view which interprets the uptake of this public form as an indication of the cultural and political dominance of science in our societies. If public demonstrations draw on a whole range of genres of empirical display, not just scientific ones, then the question becomes what forms of knowledge and action are enabled by the *combination* of scientific, moral, aesthetic, technical and/or political traditions of experimentation. This also has implications for our understanding of the affordances of empirical devices for the performance of participation, more specifically.

Drawing on science and technology studies, the sociology of demonstrations has emphasized that public experiments enrol audiences by socio-material means. Andrew Barry (1998) and Frank Cochoy (2007) have argued that public experiments deploy material settings and objects to captivate actors in their capacity of embodied, sensory beings. As such, public experiments can be said to have distinctive affordances for what I have called material participation: they make possible the enactment of participation in settings that are *not* customarily allocated this function. Indeed, public demonstrations enable the enactment of forms of witnessing and accountability *in almost any kind of setting*. They provide an instrument for enacting engagement in non-traditional sites: the home, the workplace, the great outdoors (Davies, 2010; Gomart and Hajer, 2003; Marres and Lezaun, 2011). In this respect, this public form can also be aligned with a different project than that of the 'scientisation' of democracy: public experiments provide a way of extending

public participation beyond a limited set of privileged settings (the election platform, the public debate), and beyond the exclusive focus on deliberation as the trademark format of public action, to include material action in the household, the workplace and so on.[3]

In what follows I will argue that this project, like related projects discussed in this book, must be understood as normatively ambivalent. On a positive note, the extension of public engagement to new locations can be connected with the socialist and feminist project of extending political participation to actors and sites historically excluded from it. However, it can equally be associated with the (neo-)liberal project of 'governmentality': the implementation of invasive modes of controlling social life by a variety of public and private agencies. I will return to this specific issue of normative ambivalence in the next chapter. Here I will focus on a theoretical question, namely the question of what concept of material politics is opened up by an understanding of the public experiment as a 'heterogeneous' or 'multifarious' genre of participation. The type of material politics that living experiments enable, I will argue, deviates on a number of significant points from understandings of the politics of things, technologies and settings developed in STS in the sociology of demonstrations, and science and technology studies more broadly.

The previous chapter already alluded to this difference: social studies of science and technology have traditionally focused on the ability of experimental settings to captivate audiences *surreptitiously*. But public experiments can be seen to invest material entities with *explicit* powers of engagement. Here I will explore this divergence by examining a particular genre: the experiment in sustainable living. This form of experimentation involves the modification of habits and habitats according to a protocol, and has become especially popular in recent years, when it was featured extensively in publicity media. These experiments, I will argue, enable a particular form of material publicity, as they turn mundane household objects, natural substances and other stuff into foci of public attention. And this, in turn, opens up a particular perspective on what it means to do politics with things: it here involves the *explication* of material powers of engagement.

Public experiments as sites of participation: epistemic, discursive, ontological, material

At least since the 1980s, social studies of science and technology have discussed the special affordances of public experiments as sites

of participation, but these studies have conceptualized this in very different ways. We can distinguish at least four different perspectives on the experiment as an instrument of public engagement: epistemic, discursive, ontological and material. Each of these accounts entails a different understanding of the role of experimental settings, objects and technologies in the organization of publics, and of the significance of experiments as sites of participation in social and political life. On a more general level, these four perspectives also each imply a different approach to the public experiment as a site where relations become visible between, on the one hand, politics and democracy, and, on the other, science, technology and nature. Initially, social studies of science and technology turned their attention to the public experiment as a site of engagement with *science and technology*. However, more recent work in this field has come to appreciate public experiments as sites of public participation *in their own right*.

No doubt the most familiar understanding of the public demonstrations is the *epistemic* one, which approaches the experiment as a pedagogical device for the transfer of knowledge between science and its publics. This perspective considers experiments conducted in public as first and foremost a means for communication about science and technology to wider audiences. As a consequence, the merits of the public experiment as an engagement device are here defined in terms of its ability to transfer adequate knowledge, and an adequate understanding of scientific methods, onto audiences (Carnap, 1966). An example of this approach can be found in a well-known study of a public experiment by Harry Collins (1988), in which a train was deliberately crashed to demonstrate the safety of the transport of nuclear materials by rail. In his account of this experiment, Collins focused on the question of whether this mediatized experiment was able to communicate scientific knowledge to audiences, and asked whether the experiment lived up to norms of scientific knowledge production. He argues that it did not, and on this basis concluded that public demonstrations may easily be deployed as sensationalist devices that fail to pass the epistemic test, that is they fail to comply with scientific standards of reliability, validity and so on. This kind of approach, then, turns the public experiment into a site for the (re-)instatement of a particular distinction between science and society: it posits a separation between a scientific domain where norms of knowledge production are, or can be, respected and a societal domain in which they often are not.

A second, discursive perspective on public experiments complicates this essentially pedagogical vision of the relation between

science and its publics. It offers a more expansive account of the public experiment, approaching it as a distinctive form of publicity deployed in social and political life. Loosely drawing on the work of Michel Foucault, this work approaches experiments as a defining *genre* or *literary form* of public politics in liberal democracies. (Ezrahi, 1990; 1995; Jasanoff, 2005a; see also Shapin and Schaffer, 1989).[4] As discussed in the first chapter, this approach emphasizes the strong commitment to empiricism that is characteristic of much of progressive politics today: the insistence that opinions are formed and decision made on the basis of the facts. This investment in empiricism, the argument goes, enters into the very forms, genres, architectures, and indeed the dramaturgy, of liberal democracy. The idea of public experimentalism, here, directs attention to the 'theatre of accountability', a literary, spatial and technical arrangement of publicity that evokes tropes from experimental science: the careful presentation of empirical evidence; an impersonal style in which actions rather than persons are judged; and the citizenry figuring in the role of reliable witness or critical spectator who testifies to the 'unbiased' nature of what is presented. However, while the genre of public accountability bears the traces of scientific culture, this does *not* mean that it must be understood as a scientific form.

A discursive perspective on public experiments differs from an epistemic one, insofar as the former does *not* treat the relation between experiments and public life as an external one, whereby a scientific format is introduced into public life as if from the *outside*. As Steve Shapin and Simon Shaffer (1989) have famously demonstrated in their socio-historical analysis of Robert Boyle's classic demonstration of his air pump at the Royal Society, the public experiment has taken the form of a genre of publicity *from the very beginnings* of modern experimental science. In their account, the invention of the experimental mode of knowledge production already involved the invention of 'the empirical' as a form of publicity – one that revolves around the careful recording of measurements and the reliable description of sensory observation, so as to enable 'virtual witnessing' by wider audiences. It would therefore be wrong to understand the relation between the experiment and publicity as an external relation. Furthermore, discursive approaches see the public experiment as a form that is distinctive of political or governmental cultures associated with liberal democracy. For this reason, it must be appraised on its own terms, rather than judged on the basis of criteria developed for the evaluation of scientific knowledge, as epistemic perspectives suggest. This also has

implications for the role of public experiments as devices of participation: this may well be an inherent and not an accidental feature of experiments.

The affordances of experiments for public engagement is very much foregrounded in *ontological* accounts of public experiments. These accounts, associated with actor-network theory (ANT), propose that the public experiment presents not just a form of knowledge production. Public experiments also provide an occasion for the introduction of new *entities* in social and political life. Here the public demonstration is seen as a ceremonial event, a kind of initiation ritual that structures the process of the domestication of non-humans in society, from neutrinos to vaccines and diesel engines and the electric car (Latour, 1988; Callon, 1986a). A crucial proposition of ANT, furthermore, is that the introduction of new entities into society involves much more than the *addition* of objects or knowledge to social and political life. It equally entails the *reconfiguration* of the social-material relations among which new entities are to be accommodated. One could say that the public experiment here comes to be understood as a site for the performance of 'socio-ontological' change. And this, in turn, has consequences for our understanding of the public experiment as a site of participation, and the role of material entities in this regard.

As mentioned, an 'ontological' perspective on public experiments is in line with discursive ones, insofar as they both approach the facilitation of engagement as an inherent feature of experiments.[5] However, in the former case, this point follows from the analysis of the public experiment as a device of ontological intervention: if we recognize that the accommodation of new entities in social life requires the *reconfiguration* of wider socio-material relations, then it is clear that this process of domestication requires *active efforts* on the part of social and political actors. This means first of all that the public experiment must be understood as facilitating the *necessary* engagement of social and political actors in projects of the societal accommodation of new entities. Participation is not just as an 'optional' feature of public experiments: if the domestication of techno-scientific entities in society *requires* the re-ordering of socio-material relations, then the process of their accommodation *depends on* the collaboration of social actors. The public experiment is then understood as an attempt to secure the necessary involvement of social actors in the process of the domestication of scientific, technological, natural and-so-on entities in society. It is also to say that an ontological perspective grants a much more *active* role to both humans and non-human actors in public experiments,

as compared to the 'tamed objects' and more or less passive 'spectator publics' that figure in epistemic accounts of empirical democracy.

It should be noted here that an 'ontological' understanding of public experiments as sites of participation entails a very particular understanding of, precisely, ontology. It can be taken to imply an approximation of the categories of the empirical and the metaphysical in such experiments. This is because, if the public experiment is seen as a ritualistic moment in a process of the reconfiguration of social ontologies, the experimental form of knowledge production can no longer be understood in a positivistic spirit, as the other of metaphysics. Instead, the empirical mode of presentation that is characteristic of experiments – involving measurement, recording, visualization and detailed reporting – is here seen to enable the performance of a particular form of metaphysics in its own right, one that is characteristic of technological societies. It is an experimental form of metaphysics, one that is done rather than proclaimed, and which involves the tentative shifting of the entities and relations that form the background of social life (Mol, 1999; Cussins, 1996).

A fourth and final perspective on public experiments as sites of participation both draws on, and must be differentiated from, the three previous ones. This perspective, which has been developed in the sociology of demonstrations, approaches public experiments as devices of participation in their own right. This work offers a material account of public experiments: it emphasizes that public experiments enable the 'doing' of participation with things rather than only with words. In this respect, the sociology of demonstrations can be said to expand and specify the 'ontological' account developed by ANT: it ascribes to public experiments not only special affordances for public engagement *with science, technology and nature*, as distinctive objects of political and social life; rather, public experiments here are approached as participatory devices in and of themselves. The sociology of demonstrations shares with discursive approaches an appreciation of the public experiment as a distinctive form of public life. However, in making this point, it highlights the distinctive affordances of public experiments for the enrolment of actors by *material* means.

Social studies of demonstrations have examined in detail how specific experimental settings facilitate public engagement: a science museum exhibit, an art tour in the English country side and PowerPoint presentation by architects, each of these arrangements is ascribed distinctive capacities for engaging audiences by material means (Barry, 1998; Macdonald, 1998; Davies, 2010; Girard and Stark, 2007). Thus, in his

study of experimental set-ups in the London science museum, Andrew Barry (1998) has argued that experiments have special affordances for public participation by virtue of their empirical mode of display, and the materio-affective mode of involvement that this facilitates: experimental installations appeal to people's senses, and, as material set-ups, they address audiences as embodied actors, allowing for playful forms of interaction.[6] This notion of the public experiment's special capacities for participation is suggestive of what I have so far called material participation. However, the account I am developing here also differs from that offered by the sociology of demonstrations, something that I will discuss here through an examination of sustainable living experiments.

In many respects, green living experiments present good instantiations of many of the claims made about public experiments that I discussed so far. Green living experiments tend to showcase new domestic technologies like eco-kettles and smart electricity meters, and as such appear to be an all too literal instance of the attempt to 'domesticate' new technologies in social life, foregrounded in ANT. The sustainable living experiment can also be seen as a participatory device in its own right: this genre deploys the intimate setting of the home, as well as the popular medium of the blog, to enact public involvement by material means – through cleaning, renovating, cooking, and so on. But the living experiment also invites a further elaboration of this understanding of the public experiment as a material device of participation: insofar as it enables the enactment of material participation as a distinctive public form, it presents a different type of material politics than the one described in the ontological and material accounts discussed here.

Living experiments as articulation devices

Sustainable living experiments present a clear example of a publicity genre that is adaptable to different styles of public experimentation. In recent years, the genre has risen to prominence as a new media format, with the proliferation of 'carbon blogs' on the Internet, with individuals reporting in great detail on their efforts to lead less resource-intensive lives, as already discussed in the last chapter.[7] The format was subsequently adopted by popular media, and for a period at least, could be encountered 'on all channels', from popular television to local newspapers and green consumerist websites. Some of these projects are undertaken by journalists, as in the case of the *Guardian*'s Green Guy or the Toronto-based 'Green-As-A-Thistle'.[8] But sustainable living

experiments have been undertaken by a whole range of professionals and amateurs, from the director of an environmental NGO (on the blog 'The Greening of Hedgerley Wood'[9]), to a farmer ('Trying to be Green in a world that is not so keen'[10]), mothers ('Busy moms go Green'[11]) and independent media makers ('No Impact Man'[12]).

The framing and equipment of the household as an experimental location for changing people's habits has also proven relevant to a spectrum of organizational initiatives, in sectors ranging from architecture to energy provision housing development and information technology, community activism and urban planning. In these fields, the genre of the sustainable living experiment has been taken up in marketing campaigns, or as a more integral component of demonstrational projects, as in the case of eco-show homes that I will discuss in the next chapter. Here I want to examine a feature of sustainable living experiments which is especially relevant to understanding the form of material politics they enable:[13] sustainable living experiments can be brought in alignment with multiple experimental *traditions*.

The very notion of the 'experiment in living' harks back to a particular liberal tradition of moral experimentation.[14] The term was apparently first used by the nineteenth-century philosopher John Stuart Mill to designate a practical approach to the moral and aesthetic improvement of society, and wider processes of cultural change. He advocated experiments in living as a way of valuating different modes of living by actually trying them out:

> As it is useful that while mankind is imperfect there should be different opinions, so is it that there should be different experiments of living; that free scope should be given to varieties of character, short of injury to others; and that the worth of different modes of life should be proved practically, when any one thinks fit to try them. (Mill 2002 (1859): 58)

This notion of an everyday praxis of change also resonates with feminist ideas about the importance of intimacy and embodiment in the performance of morality and politics. As Gay Hawkins has noted, practices of environmental living exhibit a distinctive modality of moral and aesthetic inquiry,[15] one which 'involves the intensities of the body' (Hawkins, 2006, p. 7), and entails a search for more intimate ways of 'understanding how new habits and sensibilities emerge' (see also Murphy, 2006; Grosz, 2005).[16]

Furthermore, the format clearly displays features of the technological demonstration, as many green living experiments concentrate on the domestication of new technologies, such as smart electricity meters, as in the formula of 'living with smart meters', which I will turn to below. They also evoke the literary genre of the experiment in ecological writing: sustainable living initiatives can be traced back to the 'returns to nature' undertaken by educated men, and some women, in the late nineteenth century, and their attempts to live a simpler rural life and reconnect with their surroundings, which they recorded in diaries and philosophical writings (Rowbotham, 2008; Heyting, 1994; Bowerbank, 1999).[17] And then there is the aspect of socio-psychological experimentation, as many of these projects tend to enrol household members in endeavours that can be characterized as 'behavioural change': they expose domestic subjects to experimental constraints and ruses of various kinds, as in the case of the *No Impact Man*, whose girlfriend made it clear in an online documentary that she had enough of 'the heater being always switched off'.[18]

To add one further instance to this expansive range of relevant experimental traditions, but one that is especially relevant to the discussion here: sustainable living experiments also invoke a particular type of *sociological* experiment. They can be likened to the experimental technique for researching everyday life developed by the ethnomethodologist Harold Garfinkel and his disciples in the 1960s, the so-called breaching experiments. Like these famous exercises, sustainable living experiments involve the controlled disruption of ordinary situations (Garfinkel, 1984 (1967)). Breaching experiments challenged social conventions according to a simple but strictly defined set of rules, for instance by asking experimenters to stand too close to colleagues during conversations, or to address their parents as strangers over breakfast. Sustainable living experiments, too, dismantle everyday ways of doing things according to a basic experimental protocol. These protocols may take various forms, with some dictating 'one simple change a day', while others set a quantitative target, such as reducing energy use or waste by X percent. This, for instance, is the description of the 'Carbon Rationing' project of a South London-based filmmaker:

> local film-maker Polly Nash will spend a month living within an allowance of 1.15 tonnes of carbon dioxide per year – just a 10th of what the average person in the U.K. uses. As she adjusts to a more sustainable way of living, she will blog about what that life looks like – how much change is required, what's good, what's hard, what choices she has to make.

> 'I think I'm going to be heading back to the 1940s: pressure cooking, using buckets, weighing food, airing clothes, extra jumpers and reading books under blankets.' – Polly Nash.
>
> She will be living according to the 'Ration Me Up' book, created by local artist Clare Patey, working as The Ministry of Trying to Do Something About It. The book encourages people to think about their daily activities and is an excellent source of information about the carbon cost of a huge range of activities, from buying socks or taking a train journey.[19]

Furthermore, like breaching experiments, sustainable living experiments turn the disruption of established ways of doing things into an opportunity for the detailed documentation of social life. Just as the sociological experiments, sustainable living experiments involve the meticulous recording and reporting of the effects of the modification of everyday habits and habitats, in this case by installing cameras in kitchens, regular note-taking on mundane interactions, and so on.

However, insofar as sustainable living experiments do this, they also present a particular variation on the sociological method of breaching, one we could call 'object-centred'. The classic breaching experiments specifically targeted social conventions, that is the tacit rules governing interpersonal communication, but sustainable living experiments tend to focus on material habits. They deploy things to produce disruptions of social life: they typically involve the addition, removal and modification of everyday objects, like introducing a smart meter into the kitchen, selling the car, or switching from liquid to green soap. Arguably, then, sustainable living experiments present attempts at 'environmental breaching'. Polly Nash described 'using her parents' bathwater' to wash her hands, thereby providing a reminder of the role that fresh running water plays in sustaining our forms of life.[20] Less disturbingly, the Scottish John Nicol documented the effect of switching to natural cleaning materials like vinegar, noting how his home acquired a noticeably different smell, something to which visitors responded in various ways.[21]

In treating the disruption of established ways of doing things as an occasion for the production of empirical accounts, sustainable living experiments do not just evoke sociological experiments. They also evince a more general 'dynamic of articulation' to which twentieth-century sociological and philosophical research has drawn attention. According to ethnomethodologists, the disruption of everyday routines generates insights into social life insofar as it invites or compels social

actors to account for these routines: in the words of ethnomethodologists, disruption 'render[s] everyday habits and settings visible-reportable-and accountable for practical purposes' (Filmer, 2003; Garfinkel, 1984 (1967)). A similar dynamic has been foregrounded by sociologists and philosophers of technology, from Martin Heidegger to Bruno Latour: they too have argued that the breakdown of established material, social and technological arrangements renders the elements composing these arrangements visible and thereby analysable (Harman, 2002; Latour, 2005a).[22] Now sustainable living experiments can be said to actively deploy or 'stage' disruption as a dynamic of social articulation: in modifying everyday material habits and habitats, these experiments generate practically endless lists of the more or less mundane things that populate everyday, mostly middle-class environments. Thus, the living experiment by the Canadian journalist Vanessa Farquharson, in which she committed to making one 'green' change a day for the duration of one year, resulted in a list of 100 everyday household objects and routines on her blog, and thereby, a demonstration of a particular North American middle-class lifestyle:

Switching to natural body wash
Using chemical-free, reusable cloth static-cling sheets in the dryer
Unplugging anything that isn't in use
No more disposable plastic cutlery or plates
Not driving my car on weekends
Putting away my humidifier for good
Using a thermos for coffee and tea
No more gift wrap
Changing all my light bulbs to CFLs
Switching to Eco-Dent floss
Only drinking fair-trade, organic, locally roasted coffee
Using only beeswax candles; or soy-based, as long as there's no paraffin
Returning my wine bottles to the Beer Store so they're recycled properly.[23]

The initially rather abstract carbon rationing project of Polly Nash eventually resulted in close-up observations of material operations in the home:

> Some of the things I have done during this period have been marginally more time consuming, brushing the carpet for one, filling up

> buckets and moving them from room to room, but I spend less time in the bath room washing [...] I have stopped running the tap without either a carton, a cup, a pan or a bucket underneath or at the very least the plug in. Rather than automatically turning the tap to wash my hands, I reach for the margarine tub and scoop out some old water from a bucket and pour it over them. I see no reason why not to continue with this. I only wish we could get a water meter.[24]

These listings of everyday actions, things, and attempts to change them may be taken as so many *demonstrations* of our personal entanglement with things, bringing into view more or less subtle differences among them. In this respect, sustainable living experiments can be said to *create* the type of experimental moments to which sociologists, as well as philosophers of technology, have directed attention. They undertake a particular type of what Fabian Muniesa and Dominique Linhardt (2009) have called 'trials of explicitness': they orchestrate occasions in which the technical-material-social arrangements that condition everyday living can be rendered legible. In Farquharson's account, her attempts to minimize her use of electrical appliances bring into view the role that the supermarket and associated materio-technico arrangements played in her life. She noted how, after unplugging her fridge, lots of stuff available in supermarkets became superfluous, while other things – like yoghurt and strawberries – turned out to do surprisingly well in the absence of all this infrastructure[25] (see on this point Shove, 2003). Living experiments then can be said to specify certain background, or environmental, conditions of social life, which are not usually considered noteworthy: that we use fresh water for every wash, the substances involved in something as banal as cleaning one's home, the way our hair is supposed to smell.

Insofar as sustainable living experiments produce such specifications of the things, substances and settings that condition everyday living, we might say that they provide demonstrations of the 'powers of engagement' that domestic things and settings are capable of exerting on us. Like some of the carbon accounting exercises that I discussed in Chapter 3, sustainable living experiments can be read as so many accounts of how engaging domestic things and environments are, as they provide endless pictures and anecdotal accounts of the role these things play in our lives, from the fridge which only once it is switched off tells of our reliance on it, to a tomato plant on a balcony that adds a homegrown flavour, cardboard boxes which can be turned into children's costumes in a few minutes, and biodegradable cat litter which

is hard to get used to because of – again – its smell.[26] The protocols of living experiments, like 'one simple change a day', then enable so many public demonstrations of 'thing-powers' of engagement (Bennett, 2004; see also Verbeek, 2005): they put on display the ability of household objects and devices to engross or implicate us, both in their capacity as relatively simple mundane things, as well as in their role as emissaries from a world of wider techno-materio-environmental entanglement.[27] However, this suggests an analysis of the public experiment as a device of participation which deviates from the 'ontological' and the material understanding of the public experiment discussed here above.

Redistributing the politics of things: settings, objects, formats, actors, analysts

In some respects, living experiments fit very well with the idea put forward by the sociology of demonstrations, that experimental arrangements have special affordances for public engagement: these experiments equally enable the enrolment or 'captation' of social actors by material and affective means (Barry, 1998; Cochoy, 2007). In sustainable living experiments too, socio-material settings – in this case the sites of domestic life – are made to do part of the work of engaging audiences. However, living experiments also complicate this type of analysis, because of the ways in which material participation here becomes an object of performance itself. Sustainable living experiments can be understood as attempts to explicate the normative capacities of things, as they provide demonstrations of their powers of engagement. This challenges an assumption shared by ontological and material accounts of public experiments: the idea that the politics of objects must be understood as a purely latent force that material entities exert on human actors surreptitiously, entangling them beyond their notice. And this, in turn, has implications for how we understand the *division of labour* between settings, objects, actors, formats and analysts in the enactment of material politics.

Another example can help to make this clear, namely a particular version of the living experiment that the Guardian has dubbed 'living with smart meters'.[28] In this particular scenario, which could be encountered on green blogs and the websites of newspapers in recent years, an individual reports on his experience of spending a set period of time with smart electricity meters installed in various spaces in his home, from the kitchen to the living room. Virtually all of these initiatives emphasize the special ability of these devices to engage people.

Thus, the *Guardian*'s Green Guy, who lived with three different smart meters for a week, refers to the remark by Dale Vince, the founder of the renewable energy company Ecotricity, who described his experience of bringing a smart meter home, and 'how his wife and two children went round the house switching off lights one by one, watching the watts go down'. And 'how surprised he was by the degree to which it engaged them all'.[29]

It is not difficult to recognize in an account like this ideas from the sociology of demonstrations about the efficacy of public experiments as instruments of involvement. Such an account is in line with Andrew Barry's proposal to understand the experiment as an interactive technology that is capable of seducing actors. However, reports on life with smart meters also deviate from this proposal, and this insofar as they extend the script of the experimental encounter beyond the dyadic interaction between the experimental device and its subjects. These accounts equally ascribe powers of engagement to substances, such as electricity. Thus, smart meters are said to make it possible for users to enjoy the flow of energy: 'My son in Germany says that one of his greatest pleasures is to see the electricity meter turning backwards as Dachs feeds into the grid.'[30] In another case, the meter is ascribed the ability to bring to life domestic settings, and thereby raise questions about energy use: smart meters are said to 'drive home the realisation that devices that heat things, like kettles and toasters, really do lap up the volts, and our homes are full of nasty little things that use electricity without telling us'.[31] These public experiments in living with smart meters, then, do not just confer powers of engagement onto the experimental device of the smart meter, but also onto environments, things and substances. They turn familiar surroundings into engaging environments, demonstrating that the socio-material arrangements of the home can do the work of engaging people.

Importantly, these capacities for engagement are themselves accounted for in different ways as part of living experiments. In some cases, the conferral of the ability to engage onto a device like a smart meter is couched in an empirical language, one that draws on the classic trope that 'seeing is believing', in order to make the point that 'seeing is engaging'. Thus, Peter Armstrong's account of using smart meters at home highlights the way meters make domestic energy use visible in a lively way: 'The display will show kW being used, cost or the amount of carbon being produced. It provides a really vivid way of seeing the effect of turning on an extra electric fire or leaving too many lights on.'[32] But some present a different account, foregrounding not

so much the ability of empirical technologies to visualize and inform, but rather, their ability to transform mundane settings and things into objects and environments of participation, as in the case of Dale Vince's playful homecoming. In these cases, experiments in living with smart meters ascribe powers of engagement to wider material arrangements, including domestic settings, domestic energy and the 'wider environment' – to the point that the distinction between material entanglement and public engagement become effectively confused.

In doing this, living experiments produce an effect which is in some ways similar to that foregrounded in critical analyses of commodity objects, which note the ways in which objects come to life when considered in their capacity of fetish object, as in the case of the famous 'dancing table' conjured up by Marx in *Capital* (and beautifully analysed by Jacques Derrida in *The Spectre of Marx*). The critique of commodification focuses on the capacity of objects to embody the political economic system and ideology which gave rise to them. But my analysis of living experiments as a 'device of engagement' highlights a mode of 'enlivening' the object which is both more particular and more open-ended. In this case, the investment of the object with normative capacities signals a much less determinate effect, as the publicity format of the sustainable living experiment turns out to be capable of investing objects with a whole range of different 'powers of engagement', from a materialist fascination with 'stuff' to a critical engagement with materialism, from a green 'consumer culture' to an activist politics of climate change mitigation. And these different normative capacities are not fully determined by the format, setting, object or actors involved, but rather are a consequence of how the device of sustainable living is (re-)assembled in particular cases. Which is partly why in the sustainable living experiment the 'enlivening' of the object is disclosed as at least partly an 'artefactual' or 'arteficial' accomplishment: here, the particular socio-material set-up of domestic experimentation – the sustainable living experiment – is clearly critical to enabling the investment of things with powers of engagement. As such, the sustainable living experiment has a set of specific implications for how we understand the relation between materiality and participation, and that between ontology and politics more broadly.

Accounts that play up material powers of engagement can be seen to fuse different modes of being involved: engagement of the senses, by seeing or reading energy consumption measurements; engagement of the body, in the sense of being absorbed in play; and involvement, socio-materially speaking, in the sense of being implicated by means of

familiar things in the home in energy flows, and the wider issues that they open up.[33] Insofar as sustainable living experiments produce this particular confusion, they reduce or perhaps even annul the analytic distance between 'material entanglement' and 'public involvement' in issues.[34] In sustainable living experiments, material entanglement can*not* be said to happen at a different 'level' from that on which the frames, genres and procedures of public participation come into play. It is in this that they differ markedly from the ontological and the material understandings of public experiments as sites of participation.

As we have seen, ontological; accounts of public experiments attribute to these arrangements surreptitious powers for the enrolment of social actors. The public demonstration provides a way of enlisting or 'binding' stakeholders and audiences into the trajectory of a given technology, scientific proposition, aesthetic entity, political object and so on, without which these entities would not be likely to 'make it'. Yet, the argument goes, this engagement effect of experimental arrangements tends to remain under-acknowledged in the 'official' accounts of what public experiments are about. An ontological understanding of public experiments, and their 'material powers of engagement', then itself goes against the standard account of public experiments: while the accomplishment of engaging audiences is conventionally understood as purely a *consequence* of a successful demonstration, an ontological approach posits it as a precondition for its success. In making this point, the ontological perspective on experiments locates their ability to facilitate engagement by material means on a particular level, that of the 'sub-discursive', or 'sub-political', presenting it as something that requires the analytical sharpness of the sociology of science and technology for it to become apparent.

Such a sub-political conception of material powers of engagement also leaves its traces in socio-material analyses of public experiments, and in those accounts that emphasize the affordances of experiments and demonstrations as participatory devices in their own right. Material entanglement here too features as a largely *implicit* alternative to explicit and dominant procedures of public involvement: the capacities of experimental set-ups to implicate actors in their role of embodied beings does not feature in meta-narratives about public participation.[35] Like other proponents of ANT, then, the sociology of demonstrations presents material entanglement as an under-articulated phenomenon that is unlikely to ever be recognized as a viable form of involvement in official, public discourses (Law and Mol, 2008).[36] And both these approaches, then, maintain a rather strict analytical distance between,

on the one hand, the *modes* of 'material entanglement', the materio-technico-fleshy-and-so-on means by which actors are implicated in public affairs, and on the other hand, the *forms* of public involvement operating on the discursive level (and which tend to be located elsewhere, in debate forums). Material entanglement here is valued precisely to the extent that it operates on a different level than that of predominant public discourses (see on this point also Callon and Rabeharisoa, 2004).

Sustainable living experiments disrupt this analytic distance between material entanglement and public participation, as they format socio-material practices in the home, like running up and down the stairs, as forms of 'environmental engagement'. They challenge the notion that socio-material entanglement largely plays itself out outside the limelight, as these experiments turn 'socio-material entanglement' into an object of public performance. In this respect, living experiments can be said to re-distribute material politics among the various entities involved: they grant different roles to the setting, actors, things, genre and analysts in the enactment of material participation than in the sub-political repertoire, and this in two ways in particular.[37]

First, in sustainable living experiments, the publicity genre of the experiment plays a notable role in the formatting of entanglement as participation. In the sub-political version of material politics, the *material* effect of actor enrolment is assumed to operate more or less independently of the publicity frames deployed. But in living experiments the performance of material engagement is directly dependent on particular *devices of publicity*. Here, specific genres and formats and methods of publicity – the digital device of the smart meter, the blog, the genre of the sustainable living experiment – facilitate a distinctive material form of engagement. Material participation then does not operate at another level than the public form of the experiment, but is continuous with it.

Second, sustainable living experiments help to make clear that social, cultural and political analysts do not have a monopoly in the framing of material politics. These experiments can be said to deploy a research technique that these analysts have tended to reserve for themselves: *here it is the experiment that exposes the normative powers of material entities*. Sub-political accounts of material engagement tend to suggest that socio-material entanglements require sociological description if their normative powers are to receive proper appreciation, as these often go unrecognized. By contrast, sustainable living experiments remind us that sociologists are not the only ones to perform such articulation

work: the devices, actors and settings under scrutiny may equally play a role in putting on display the normative labour performed by things, settings and environments.

However, it certainly does *not* follow from this that a device like the sustainable living experiment performs basically the same task as the sociology of technology. These publicity experiments tend to articulate a very particular set of material entanglements and not others: accounts of smart meters, for instance, tend to focus on 'unnecessary' power consumption and changeable domestic routines. These accounts have little to say about rather more 'constraining' or inescapable entanglements, such as, for instance, energy infrastructures and landlords, or the regulatory arrangements of measurement and monitoring that smart meters may or may not enable in the future. They conveniently highlight socio-material relations that can be reconfigured through individual intervention, by switching appliances off or installing saving devices. The re-distribution of the material politics of engagement, in sustainable living experiments, then opens up again the question of what distinguishes the contribution of social science perspectives, and especially those of the critical variety.

The shifting registers of political ontology

A concept that has been crucial in re-thinking the role of social research in relation to public experiments, and science and technology more broadly, is that of 'ontological politics' (Mol, 1999; Law, 2004a). This concept draws on the idea of empirical metaphysics introduced above, and makes particular inferences about the role social analysts should take on in relation to scientific and technological practices. It proposes that insofar as science and technology do not just represent but intervene in the world, it becomes the task of social research to grasp the effects of these interventions, especially those that tend to go unacknowledged and remain invisible. Techno-scientific interventions inevitably have normative implications as they help to strengthen the reality of some entities and weaken that of others. Furthermore, insofar as there is something inevitable about this mode of intervention – science and technology cannot *not* intervene in the world – it becomes important to imagine different modes of intervening, or as Law and Mol call it: interfering. What they call ontological politics denotes the explicit, proactive orientation of research practices towards the political-ontological effects of science and technology: the advertent strengthening and weakening of some 'realities' over others.[38] However, insofar as the

account presented here moves the focus towards the public display of material intervention, it opens up a somewhat different understanding of political ontology, and by implication, of the role of social research.

The understanding of political ontology opened up by material participation will be the subject of the next chapter. But to begin to clarify the issue, we should note that there is a whole range of different ways in which the concept of ontology has been used in social and political studies. One way of differentiating between these different understandings is to distinguish between different *levels* on which ontology can be situated. First and foremost is the theoretical level, which is where social and political theory classically locate ontology. It then refers to the basic assumptions of social theory regarding the entities and relations that constitute social reality. What can equally be located at this conceptual level is the 'turn to ontology' in social theory, or at least some versions on it. Thus, authors like Schatzki (Schatzki et al., 2001; see also Woolgar et al. 2008) have proposed a particular theoretical version of the ontological turn: Here, a commitment to ontology is presented as the commitment to take non-human entities seriously as constitutive components of social, epistemic and other realities.

In contrast to this theoretical conception of ontology, however, there are approaches that situate ontology on another level, namely the empirical. This perspective is closely associated with ANT, and the notions of empirical metaphysics and ontological politics (though also see Hacking, 2004). This approach entails a critique of the prescriptive tendencies of theoretical ontology: the concept of empirical ontology calls into question the assumption that the discourse of social or political theory is the relevant plane at which the existence of entities is posited. Empirical ontologists direct attention to the role of social, knowledge and material practices and events as sites for the articulation of entities (see Fraser, 2008). In this vein, ontology also acquires a historical dimension, as the empirical focus leads these authors to recognize that the entities and relations making up social reality change over time (and sometimes, space (Mol, 2002). Finally, an empirical conception of ontology also involves a specific empirical claim, namely that the sociomaterial composition of societies must be understood as dynamic – not in the least because the development of science, technology and industry over the past centuries has resulted in the proliferation of new entities across societies (Latour, 1993; Brown, 2003).

Third and finally, recent social and political theory has proposed to understand ontology in terms of a particular 'techno-normative' undertaking. This register of ontology is quite close to the previous one, in

that it too directs attention to the changing socio-historical roles of objects in social, moral and political life. However, those who foreground this dimension of ontology are not only concerned with socio-historical changes in the kinds of entities that populate societies, but also highlight a particular twentieth-century normative *project*, namely the rise of design regimes under which objects are to be deliberately equipped with moral and political capacities, such as 'the capacity to engage'. Thus, authors like Nigel Thrift (2008) and Scott Lash and Celia Lury (2007) have directed attention to the contemporary convergence between design and marketing and publicity, arguing that objects today are increasingly *designed* to function as devices of enrolment, as 'thing-media' that are to involve/entangle users with a service, brand, product, political party, leader and so on.

Sustainable living experiments also direct attention to this third register of ontology, insofar as the socio-technical assemblage consisting of the home, including the material setting, domestic objects and digital devices, like smart meters and blogs, here seems to be quite purposefully deployed to enact involvement. However, living experiments also invite us to add a further constructive point to the understanding of the politics of ontology in terms of a techno-normative project. As we have seen, one of the main effects of the re-conception of ontology in relation to science and technology – and, more in particularly, in relation to experiments – has been to 'empiricise' ontology. Public experiments have been portrayed as sites where the question of which entities compose the world is given an experimental, historically variable answer.[39] However, in this account of empirical ontology, the role of the public experiment, understood as a distinctive genre of publicity in and of itself, can appear to be rather limited: actor-network theorists like Latour, Mol and Law have tended to characterize the process of socio-ontological change that public experiments facilitate as a largely inadvertent process, which plays itself out beyond the scope of publicity media.

In contrast to this, sustainable living experiments publicize the process of the reconfiguration of socio-material relations. Here the public experiment features as a device for putting on display the process of the socio-material reconfiguration of domestic life, and perhaps indeed, the world beyond. As mentioned, this does *not* necessarily mean that 'ontological politics' – the very effects of worldly transformation which 'empirical ontologists' located beyond the realm of publicity – now turns out to be performable in public. In the performance of material participation, too, some entanglements remain un- or under-recognized. However, it

does mean that material entanglements here do not only proliferate beyond the limelight: they also figure as an object of public scrutiny, display and dramatization. One implication of this seems especially relevant in relation to our understanding of political ontology: ontological intervention, or more precisely, the performance of socio-material change, itself turns out to rely on a particular, experimental assemblage of publicity, involving devices like smart meters, a digital media format like the blog and the place of the home. In this respect, living experiments remind us that if we are serious about 'empiricising' ontology, a move in the opposite direction is required as well, that of 'ontologizing' the empirical.

This, one could say, is what device-centred accounts of material participation seek to accomplish, as I will explore in the next chapter. At the very least, these accounts can be said to 'materialize' the empirical, by demonstrating how experimental devices of scripting, accounting, measurement, witnessing and so on enable specifically material modes of intervention. The question, here, is whether and how experimental forms of *publicity* involving measurement, reporting and display enable social actors to do material or ontological work, that is, to articulate and shift socio-material entities and relations, in politically or morally significant ways. Whether this deserves the name of 'ontological politics' remains to be seen, but to pose the question is to grant special attention to publicity arrangements as sites and devices of socio-material intervention. Furthermore, such an approach carves out a particular role for social research. The (over?-)publicized socio-material effects that we encountered in sustainable living experiments clearly require a different approach than the study of latent ontological effects. The latter is often said to require the resources of ethnographers, who distinguish themselves through their sensibilities for all things tacit. The former may rather require the more formalist skills of media analysis, as I have discussed elsewhere (Marres and Rogers, 2008). In this case, social analysts do not so much adopt the role of a detective who finds patterns in places where others are expected not to look. They simply add their capacities of explication to those already in evidence in the practices under study.

Conclusion

Sustainable living experiments, then, provide forceful examples of what we could call the 'coming out' of the politics of things (see also Marres, 2010). They invite us to consider socio-material change, or the

socio-material mode of engaging in processes of change, as a more or less *explicit* feature of public experiments. As devices of material participation, sustainable living experiments reduce the distance between material practices and forms of publicity, a distance which both critical and affirmative accounts of material modes of involvement, in ANT and the sociology of demonstrations, have tended to maintain. This change of status of material participation also suggests a change in the division of labour of social research: if we can no longer assume, as a matter of course, that 'ontological work' happens beyond the realm of publicity, but may partly be performed in – or at least with – publicity media, then social and political theorists and researchers are clearly not the only ones out there documenting effects of 'ontological politics'. They come to share this task with the 'actors themselves', at least to an extent. And this is not without implications for the wider debates in social and political theory about non-humans.

Generally speaking, one could say that sustainable living experiments direct attention to the *artefactual* nature of thing-power (Bennett, 2010). As living experiments highlight the role of auxiliary entities – like publicity genres, household members and domestic settings – in the conferral of 'political capacities' onto things, they suggest that these capacities depend at least in part on how these things are *equipped*. For some, this kind of argument might seem to grant too prominent a role to human actors in our account of the politics of objects. Thus, the philosopher Graham Harman (2009) has argued that to adequately understand the normative capacities of objects, we must cease to take recourse to the human dimension, and stop assuming that humans are a necessary reference point for all things normative. From this vantage point, to insist on the ways in which various forms of equipment 'facilitate' the politics of objects might be understood as an attempt to turn our attention back to the role played by humans behind the proverbial curtains of 'object-centred politics'.[40] But I have something different in mind.

To recognize the artefactual nature of the politics of things is to adopt a particular type of 'non-exceptionalism': Rather than suggesting that it is wrong to privilege the human perspective over the non-human one in our account of politics and ethics, we then say that we should treat the politics of objects as we would other forms of politics. *Like* other forms of politics, we then say, the politics of objects is best approached as a performative politics. For no entity, whether human or non-human, institution or thing, it suffices to posit on theoretical grounds that they '*have'* political capacities. For all entities, agential capacities depend at

least in part on how these entities are *equipped* – on the configuration of an assemblage of further entities that enable the explication of their normative capacities. This is why, somewhat paradoxically, in order to grasp the politics of objects, we must pay attention not just to objects, but also to the technologies and settings which enable them to operate. We must investigate how particular devices make possible the investment of things with political capacities. Or to say this in yet another way: it is not just that things and devices enable a performative politics, in the sense that they facilitate the enactment of particular political phenomena, say 'participation'. The investment of things and devices with normative capacities must be understood as a performative accomplishment just as well. In the next chapter, I will discuss a particular shift in focus that such a performative understanding of the politics of objects invites. Rather than concerning ourselves with the *general* question of the political and moral agency of non-humans, it invites us to examine the investment of things with *specific* normative capacities.

5

Eco-homes as Instruments of Material Politics: Engagement, Innovation, Change

Introduction

When, in the late 1980s and early 1990, social and political theorists turned their attention to the issue of non-humans, they focused mainly on the question of whether these beings qualified as actors (Harbers, 2005; Latour, 1992; Callon, 1986b; Cussins, 1996). They proposed that non-human entities deserved more recognition as constituent elements of social and political life and this recognition was made to hinge on their capacities for action. This approach has been criticized for its latent anthropomorphistic assumptions, that is, for unfairly suggesting that non-humans must be able to act like humans if they are to be accorded political capacities.[1] But the device-centred perspective on material participation that I am developing here suggests a somewhat different take on the matter: it proposes that we examine how material entities *become invested* with specific capacities, like powers of engagement, in particular settings and at certain times. From this vantage point, there is another problem with the debate about non-human agency besides anthropomorphism: it wrongly suggests that the crucial issue is whether nonhumans are 'naturally' endowed with capacities for socially or politically significant action, or not. This is why I think we need a more radically performative take on the question: instead of seeking to resolve *once and for all* whether non-humans qualify as participants in social and political life, we must ask how these entities acquire and lose such powers in specific circumstances. In this chapter, I will discuss the implications of such an approach for our perspective on material democracy, and argue that it invites an experimental understanding of it.

As discussed in the previous chapter, various understandings of political ontology have been put forward in recent social and political theory, each making different assumptions about what is the relevant plane on which to posit the existence of entities. Where some are happy to provide a theoretical outline of the 'building blocks' of social and political reality, others seek to establish how new entities emerge historically and empirically, in events, practices, or in specific technological, scientific and aesthetic settings. The approach I explore in this chapter falls, broadly speaking, in the latter category: following work in the social studies of science and technology (STS), I will explore conceptual issues through an examination of a particular empirical setting, eco-show homes, of which I visited a number between 2007 and 2010 in the greater London area. Eco-show homes offer a plethora of examples of attempts to equip settings, devices and objects with the capacity to facilitate participation in public affairs. Indeed, the understanding of material participation that I advance in this book – as involving the deliberate investment of things with normative capacities by experimental means – occurred to me during the series of house visits to eco-show homes that I will discuss in this chapter. It then offers an especially useful site for exploring further the wider question of social and political theory that is central to this book: that of the role of empirical instruments of measurement, reporting, and public display in the politicization of material things, and their endowment with a significant role to play in democracy.

As suggested in Chapter 1, demonstrational eco-homes present us with an 'empirical site' in several senses: they not only provide us social and political analysts with a clearly delineated setting in which to observe a social and political phenomenon (material participation). Environmental show homes themselves are also equipped with an array of devices for the measurement, documentation and monitoring of the behaviour of materials, environments and people. Here I will argue that this feature plays a crucial role in the configuration of these settings as devices of participation, and, more generally speaking, as instruments of material politics. Analysing the eco-show home as a material instrument of engagement brings into view a particular *experimental* form of material politics, what I will call here a material politics of experimental variation. This material politics differs in some important respects from the ontological politics to which earlier work in STS and actor-network theory (ANT) drew attention. To start with, however, I would like to discuss some of the challenges that non-humans pose for democratic theory, because an experimental perspective on material politics may offer, if not a solution, then at least a way of making them tractable.

The paradox of material democracy

In some ways, it is all too understandable that the debate about non-humans in social and political theory in the 1980s and 1990s became so focused on the issue of their agency. 'Actor-hood' has long been central to conceptions of both society and politics, and this perhaps especially in Western cultures, with their commitment to 'methodological individualism'. Here, the figure of the individuated subject with capacities for action has often been considered the essential building block of social and political formations.

It is then not just an idealization of the 'human', but a particular conception of society and politics that renders the issue of agency so crucial to the debate about non-humans. Furthermore, as long as the agenda of social and political theory was to *make room* for non-humans in the analysis of social and political life, the concept of agency served their purposes quite well. To make the case that non-humans deserve to be included in our vision of society and politics, the idea of agency – or, in an attempt to strip the term of its subjective baggage, 'actan-cy' (Latour, 1992) – was rhetorically useful: by insisting that non-humans play far more active roles in social and political life than human-centred theories of the social and the political recognized, these theorists made it clear that non-human entities made an important normative difference to our way of life, which had to be interrogated further (see Suchman, 2000). However, by making the inclusion of non-humans in accounts of social and political life dependent on their agency, these approaches also brought to light a particular paradox.

The extension of actor-hood to non-human entities, it turned out, has two partly contradictory effects: *it both broadens as well as limits the space for social and political action*. This paradoxical consequence has been discussed in both social and political theory, but has been a special focus of recent work on material democracy (Bennett, 2010; Frost, 2008; Thrift, 2008; see also Latour, 2005a). This work helps to explain why the idea of 'politically active' material entities both challenges and re-invigorates theories of democracy. Especially crucial, in my view, is the tendency in political theory and elsewhere to conceive of the inclusion of non-humans in social and political arrangements as *a project of extension*. Here, the debate about the normative capacities of non-human entities often concentrates on the issue of whether the *existing* machinery of politics, morality and ethics can be extended to include these unorthodox entities. From this perspective, material democracy appears as a paradox in the following way.

On the one hand, the conferral of political capacities onto non-humans presents a clear attempt to extend democracy, as it broadens the category of participation to include a whole range of entities which political theory had sought to exclude from the domain of politics and democracy proper: animals, substances, objects, infrastructures and so on. To recognize the contribution of things like buildings and food to the enactment of politics (and morality) is to radically widen the range of entities that count as participants in political and moral life. And, approached in this way, the attribution of agency to non-humans is clearly an act of democratization, or what some have called after Giddens, the further democratization of democracy (Irwin and Michael, 2003). On the other hand, however, the very same gesture can be said to highlight the *limits* of democratic concepts of participation, and, indeed, to challenge their viability. This is because the idea of non-human agency poses problems for certain conceptions and ideals of democratic subjectivity.

The attribution of political agency to non-humans problematizes customary understandings of democratic subjects, principally because it challenges their autonomy and, especially crucial for democracy, their capacity for self-determination (Frost, 2008; Bennett, 2004; see also Marres, 2005a). To attribute to material entities the capacity to influence social and political action is to problematize a distinctive ability of human subjects, one that is supposed to set them apart from non-humans and has been presumed to make them 'fit' for democracy: the capacity to remain impervious to external influences.[2] Indeed, sociologists have long recognized this particular challenge of a social and political theory of non-humans to understandings of the human, but in their case this was less of an issue, as sociologists have *always* been sceptical about the ability of social actors to be driven by internal motivations alone. This is in many ways what the concept of the social is supposed to demonstrate. Political theorists, however, have special reasons to be concerned about the non-human challenge to human autonomy: many theories of citizenship and public engagement explicitly require from human actors that they are capable of making 'independent' and 'unbiased' judgements, and indeed, these theories make citizens' capacities for politics, democracy and morality dependent on this (Frost, 2008).

There are good reasons, then, why many democratic theorists have preferred *not* to attribute agency to non-humans: as long as the influence of non-humans on humans could be disregarded, at least for theoretical purposes, it was much easier to sustain the democratic ideal of human self-determination. Attributing agency to non-humans is even

more troubling for democratic theorists than for social theorists, as it calls into question the ability of humans to comply with democratic ideals of autonomous judgement and action. (As mentioned, social theorists have long accepted these limits to individual actors' capacities for self-determination, indeed these very limits are what necessitates inquiry into social formations.) From this vantage point, the consequence of extending agency to non-human actors is that *no* entity, neither human nor non-human, turns out to be capable of satisfying the requirements that democratic theory places on participation: that action and judgement are autonomous, independent, self-determined, unbiased.

To challenge democracy was certainly *not* the intended effect of social theorists advocating the inclusion of non-humans in the analysis of social and political life (Callon et al., 2009 (2001); Latour, 2005b).[3] These authors have subsequently proposed at least two different ways of dealing with the trouble caused by non-human agency for human democracy. One of these, the distinction between constituting and constituted action, I have discussed in the previous two chapters. By making this analytical separation in the study of democratic phenomena, like public debates, it becomes possible to accommodate non-humans in the enactment of democracy *on a certain level only*. Thus, actor-network theorists like Michel Callon, and post-Foucauldian scholars such as Nikolas Rose and Carl Novas (2004) have proposed that we locate the contribution of non-human entities – like for instance chronic diseases – to democratic life in the 'constitution' of action only.

In such an approach, non-humans actively inform the enactment of democratic life, but they do not necessarily touch upon or modify the *forms* of democracy themselves.[4] This solution has been characterized as 'sub-politics', the idea that the politically significant effects of non-humans occur below the level of public discourses or official political intercourse (De Vries, 2007; Latour, 2007; Marres, 2007).[5] The distinction between constitutive and constituted action then protects ideal forms of democratic action, like 'public debate', from being contaminated by non-human agency: as material entities, practices, and settings only entangle and envelop human actors *in practice*, democratic forms can continue to be accounted for in the ideal terms that we have grown accustomed to. The constituting/constituted distinction, one could say, provides a principle for the 'regulation' of the participation of non-humans in social and political life, by saying: yes, non-humans may inform the constitution of various phenomena, including public participation, but for an actor to *count* – to be defined, performed, or

constituted – as a 'participant in' political life or a 'member of' the polity is a very different thing. By extending only constitutive action to non-humans, this formal privilege continues to be reserved for humans (see Callon and Rabeharisoa (2004) for a version of this argument).[6]

In previous chapters I have discussed some of the difficulties with this solution. Here I wish to flag that this argument does make good sense in one key respect. It declines to accommodate non-humans in democracy by extending full political *agency* to them. However, I think it is clear that the analytic separation between constitutive and constituted action cannot be maintained, if we are to account for material participation as a public form, as in the case of sustainable living. In this case, non-humans come to matter on the formal or ideal plane of public and democratic action, and accordingly it becomes impossible to limit the politics of non-humans to constitutive action only (see also Marres, 2010). The question then is, what other ways are available to deal with the paradox of material democracy?

In recent years political theorists have sought to address the problem of non-humans for democracy: previously discussed work by authors like Frost, Bennett and others proposes that the paradox of material democracy is in part an artefact of a particular style of theorizing politics, morality and ethics, one that is heavily indebted to the Cartesian mind–body separation (Frost, 2008; Bennett, 2004; Dish, 2010). The discomfort caused by extending agency to non-humans can partly be blamed on an ultimately Cartesian requirement that is customarily placed on participation, that human judgement is shielded from material and physical influences. Once the distrust of matter in normative thought is traced back to such specific philosophical distinctions, it becomes possible to offer different genealogies for thinking material politics. Thus, the above theorists have examined alternative traditions of theorizing the non-human, from Lucretius to Hobbes, in order to demonstrate that non-human agency may well be accommodated in conceptions of political subjectivity. However, here I would like to suggest that these critical and constructive manoeuvres in political theory, while crucial, cannot in and of themselves take care of the paradox of material democracy. This is because, in returning to classic-modern theorists like Thomas Hobbes, this work risks reinstating a particular theoretical style of engaging with questions of political ontology, thereby threatening to undo some of the progress made by actor-network theorists, who have developed a dynamic, empirical approach to ontology (Latour, 1988; Mol, 2001; see on this point also Marres and Lezaun, 2011; Bennett, 2010).

In saying this, I certainly do not want to diminish the contribution of political theory. The aforementioned authors have convincingly demonstrated that if we are to accommodate non-humans in democracy we must rethink specific concepts of political and social theory. The fact that non-humans seem to pose so much trouble for democracy may derive in part from the tendency in earlier social and political theory to conceptualize their role on *too general* a level. The debate about whether non-humans 'have agency' misses the point, to an extent, because it assumes that the significance of non-humans to political and democratic life must be established *once and for all*. But non-humans do not play an equally significant role in different situations and in relation to different aspects of social and political life. Their contribution is both more dynamic and more specific than the general idea of non-human agency allows us to acknowledge. Non-human entities come to matter – and, sometimes, cause trouble – in particular settings and situations, and under such circumstances they become invested with *specific* normative capacities (or, as the case may be, disinvested of them). It is then a task of social and political research and theory to attend to this circumstantial or empirical *specification* of the normative capacities of non-human entities (Marres and Lezaun, 2011; Marres, 2012).[7] Rather than debating the agency of non-humans in general, political and social research and theory must consider the *specific* normative capacities of non-human entities, and the particular challenges this poses for specific normative concepts and ideals. The question then is not whether, in general, the existing machinery of politics, morality and ethics can be extended to include non-human entities. Instead, the issue is whether and how the project of 'letting things in' transforms specific categories of social and political life.

In previous chapters, I have concentrated on the concept of participation, proposing that material practices of engagement enable a distinctive form of public participation, one that can be distinguished from other forms – such as the deliberative form of 'the public debate' – and which brings with it particular problems, aspirations and indeed ideals. But another concept that has an important function in mediating the role of non-humans in democracy is that of the 'empirical base': the idea that adequate political and moral judgement is made on the basis of empirical facts.[8] Authors working on the interface of social studies of science and technology and political theory have drawn attention to this concept, as what should be a central focus of attempts to re-think the relations between democracy, ontology and experiments (Latour, 2004b; Sismondo, 2007; Thorpe, 2007). These authors have pointed at

the ways in which the concept of the empirical base enabled democratic theory to bracket the role of non-humans: it makes it possible to subsume the material and physical world under the notion of 'facts', on the basis of which political opinions, judgements and decisions are formed. If we are serious about recognizing the contribution of non-humans to democracy, they argued, we must open up for questioning this role of the empirical in democracy. In the preceding chapters, I have made steps in this direction too: my critique of the concept of the community of the affected and my accounts of the role of devices like everyday carbon accounting and the living experiment in the materialization of participation sought to complicate the role of the empirical in democracy in various ways. Smart electricity meters, we saw for instance, do not necessarily comply with customary understandings of the empirical base of democracy: they do not just provide information or knowledge *about* the world, but enable people to become affected by material and physical things in their capacity of embodied beings.

In this chapter, I want to further unpack the idea of the 'empirical base' of democracy, and propose that it offers a productive conceptual site for addressing the problem that non-humans pose for democracy. However, I want to do this work of conceptual unpacking by empirical means, and I will therefore turn to a particular setting, that of the demonstrational eco-home, and examine the role that empirical devices play here in the political articulation of material things. In environmental show homes, the deployment of empirical devices enables something very different than the provision of a 'neutral' evidentiary basis for democracy: it facilitates the investment of material entities with capacities for engagement. I will argue that this process of politicization (or 'normativization') of things is *not* well accounted for by attributing political or moral agency to non-human entities. In the setting of the demonstrational eco-home, material entities like electricity meters and buckets acquire explicitly normative capacities, but the critical issue here is certainly *not* whether these things qualify as 'actors', as 'full participants' in political or moral life. Instead, what is crucial to the enactment of material democracy, in this instance, are the *experimental variations* in the normative powers of things, something that is, at least in part, facilitated by the empirical equipment of the eco-home. I would like to show that such an appreciation of the 'experimentality'[9] of material politics provides a way of stepping out of the argumentative loop in which the ascription of normative capacities to non-humans at once extends and undermines democracy. Which is also to say: to adequately account for the role of

non-humans in democracy, we must consider again the connections not just between ontology and politics, but with the empirical as well (Adkins and Lury, 2009).

The empirical site of the eco-show home: research, participation and change

Demonstrational eco-homes can be understood as a more elaborate version of the empirical devices for the environmentalization of everyday life that I have discussed so far. Just as everyday carbon accounting technologies and sustainable living experiments, environmental show homes provide a format for the material modification of everyday habitats and habits, with the aim of taking into account the environmental effects associated with these habitats and habits. And demonstrational eco-homes, too, employ instruments of publicity to facilitate this process. However, eco-show homes present a more intricate, or more thorough, version of this project: here domestic *architectures* are transformed to enable the public enactment of environmental change (Lovell, 2007; Guy and Moore, 2005).[10] Especially of interest to me are the various empirical technologies with which eco-show homes are equipped and the distinctive issues these raise regarding material democracy: the setting of the eco-show homes allows us to further investigate the role played by devices of monitoring, documentation and display in the investment of non-humans with normative capacities, and their enrolment in the enactment of public politics.

In examining this, I will principally draw on materials that I gathered during the aforementioned visits to sustainable show homes in and around London. The demonstrational homes that I toured came in different shapes and sizes. I first went to BedZED, the pioneering eco-community designed by Bill Dunster's architecture firm in South London, which has featured in numerous media stories and social studies (for an overview see Chance, 2009). Among the first comprehensive projects of this kind to be developed in the United Kingdom, the firm has been organizing weekly public tours of the BedZED development for many years. I also visited the Sigma and Kingspan Eco-houses, both prefab show homes that were exhibited in the Innovation Park of BRE (the Building Research Establishment) in the satellite town of Watford in 2007. Another first, Kingspan attracted substantial media attention because it was the first to receive 'carbon-neutral' status under the UK government's Code for Sustainable Homes, while the Sigma House was called Sigma II, reportedly because the first version

Figure 5.1 Insulation display, Sigma Eco-house II, BRE Innovation Park, Watford, July 2007

failed to gain accreditation under this code. I also participated in public tours at refurbished social housing projects that were administered by municipal governments in collaboration with partners, like the Camden Eco-home and Islington's 'Green Living Eco-retrofit' demonstration property. And then there was the Victorian house in Hackney that friends had recently refurbished to a high environmental standard, and which in 2009 participated in Open House, a yearly event in which homes and buildings all over London open their doors to the public.

Whatever their differences, however, each of these houses came equipped with technologies of display of various kinds. Given that they were all demonstrational homes, this should come as no surprise: such houses are expressly designed for the purpose of generating publicity (Cockburn and Furst-Dilic, 1994). Thus, virtually all of the eco-homes I visited featured information displays on walls and doors, showcasing innovative technologies, policies, processes and materials, and in some cases, parts of the interior carried labels identifying distinctive features, as in the Islington Council retrofit property, where a label on the living room window identified the fortified, triple-glazed window panes that had been flown in from Japan. Another home had translucent panels embedded in walls and floors that revealed things like insulation (Figure 5.1), or, in an ostensible attempt to turn the home inside out, a part of the sewage pipes. Finally, during the Open House weekend, my friends had hung posters on the walls of their home, showing newspaper

clippings covering the politics of oil exploration and climate change controversies, as well as a postcard from the environmental activist and filmmaker Fanny Armstrong, and a transcript of telephone exchanges with the London council of Hackney, which provided a taste of the long and tortuous process of gaining building permission for their 'extreme refurbishment'.[11]

This empirical equipment of demonstrational eco-homes seems key to understanding their role as devices for intervening in environmental policy, architecture, and politics. Indeed, social studies of environmental architecture have directed attention to precisely this feature of demonstrational eco-homes, and they offer various suggestions as to how to understand their mode of intervention. Heather Lovell (2007) has flagged the affordances of sustainable show-homes for what she calls the 'politics of exemplification': in her account, the material artefact of the demonstrational eco-home provides a key rhetorical device for those seeking to secure environmental policy change as if from the 'outside' (Lovell, 2007; see also Guy and Moore, 2005; Ganzevles, 2007). It is not strange, then, to think of the eco-show home as an instrument of material democracy. But what especially stands out from a device-centred perspective is that demonstrational eco-homes intervene *in multiple registers*: the equipment of eco-homes with empirical devices does not just turn these homes into instruments of public advocacy. It equally helps to transform domestic settings into sites of public participation, technological innovation, social and environmental change, sometimes all at the same time.[12] In other words, eco-homes facilitate what I described in Chapter 3 as a material politics of co-articulation.

Crucial in this respect is that the empirical equipment of eco-homes does not only serve the purpose of publicity, but also a wider array of purposes, including, but not limited to, scientific research.[13] Many if not most eco-show homes are equipped with devices for monitoring the performance of materials, environments and inhabitants – such as sensors embedded in walls that measure humidity, and, of course, smart electricity meters. Such devices facilitate various forms of data generation, research and publicity. The aforementioned sensors were featured in a full-colour brochure showcasing the 'Green Living eco-retrofit' in Islington. In the case of the Camden Eco-home, a website hosted by the project's scientific partner, the Department of Building Research at University College London, promised online access to the energy data gathered at this site. In the case of the Hackney eco-home, an 'air-tightness test' performed on the house provided material for

a feature on the 'Zero Champion' blog on sustainable innovation.[14] Finally, during the public tour of the famous BedZED eco-community in Bedford, it was made very clear that I was not the first social researcher to visit the project: the tour guide repeatedly referred to social surveys and other empirical studies of behaviour change conducted on its site, both by internal staff and external agencies. Here, then, the empirical equipment of the eco-show home was extended to the generation of social data.

The empirical equipment of eco-show homes seems crucial to the performance of co-articulation in the demonstrational setting of the eco-home, and indeed may well be crucial to enabling it. A poster encountered on a door during the tour of the Green Living Eco-retrofit in Islington can serve as a telling example. This Edwardian terraced house had recently been renovated to a reasonably high environmental standard by the local government in collaboration with a housing development corporation called United House as an example of sustainable social housing. I was invited to this public tour by a member of the local Carbon Action Rationing Group, and one of the first things I noted upon entering the small house was a poster attached to the door opening into the living room, which stated:

> Carbon saving = 50% the technology & 50% the way the tenant uses it!!

This poster went on to list a number of different ways of 'how we engage with residents, to help them make the best use of their eco refurb', including 'provid[ing] pictures and graphics where possible e.g. label local thermostat showing cost', and 'putting a limit on some bad practice e.g. window opening in cold weather' (with the added caveat that 'such measures are probably not allowable!' [sic].) It finally noted that 'a Working Party with professionals [is] already working on this problem: Dr Mike P., a psychologist at Univ Hertfordshire'.[15,16]

The poster provides a good indication of the range of connections between participation, innovation and change enabled by the empirical device of the demonstrational eco-house. First, equipping residential homes with empirical devices like labels showing environmental costs of heating ostensibly made it possible for tenants to engage with environmental issues. Second, this equipment equally enabled the display of social housing as an innovative site for achieving governmental targets for carbon emission reduction. Third, the tour guide alluded to the possibility of sharing energy data with the Energy Saving Trust, which

is building a large database with environmental performance data. This could give one the impression that the real project here was the integration of social housing into the emerging information economy of carbon accounting. In the Islington show home, the eco-refurbishment of social housing was presented as enabling all these things at once: public engagement, technological innovation, economic governance, as well as the enrolment of social science in these projects.

However, the deployment of the eco-show home for purposes of co-articulation also suggests another theoretical point: it shows how inappropriate it would be to conceive of the empirical as some kind of 'neutral base' for politics and democracy in this case. Insofar as the eco-show home co-articulates participation, innovation and change, it clearly does a lot more than, and many other things besides, providing an evidentiary base for normative action. The empirical here exceeds the limited role assigned to it in the classic concept of the empirical base of democracy: it enables the activation of normative regimes for the disciplining of subjects, the doing of governance, the valuation of information and so on. Importantly, however, eco-show homes suggest that another way of understanding the political significance of empirical devices would be equally inappropriate: the normative capacities put on display in these empirical settings cannot be adequately accounted for by recognizing the political or moral *agency* of non-humans.

If we are to grasp the normative capacities of the empirico-material device of the eco-show home, the main point is surely *not* that settings, technologies and objects here make an 'active contribution' to politics. At issue here is not so much whether non-humans count as 'participants' in politics or democracy, but rather, the facilitation of distinctively material forms of participation and politics. Here I want to further examine this form of politics, by considering the multiplicity of co-articulations that can be enacted with the aid of eco-homes. That is, just as in the case of the everyday devices of carbon accounting discussed in Chapter 3, what seems crucial to understanding the politics of an empirico-material device like the eco-show home are its affordances for a 'politics of co-articulation': its capacity to produce *very different kinds of* connections between participation, innovation and social change. I will concentrate on the question of how exactly this multiplicity of co-articulations translates into a form of material politics. But before doing so, I want to further clarify the question of how demonstrational eco-homes enable the performance of politics by empirical means.

The politics of demonstrational buildings: from discursive difference to experimental variation

Architectural demonstrations provide a useful site for re-examining the relations between the empirical and democracy, and the role of material entities in mediating these relations. Recent social studies of architecture, informed by actor-network theory (ANT), have turned to this phenomenon to examine what we could call the material politics of demonstration (Yaneva, 2009a; Girard and Stark, 2007; Guggenheim, 2009). These studies – some of which I already referred to in the previous chapter – analyse public presentations of buildings, in architecture studios and public consultations, and propose that the process of 'making buildings public' is crucial to the performance of politics by architectural means. Focusing on building as a process, they bring into view a specifically material politics of publicity: they show how architectural demonstrations perform at once the material work of bringing buildings into being, and the political work of organizing interested and affected parties with or around buildings-in-the-making (Latour and Yaneva, 2008). By making architectural demonstrations the focus of social studies of architecture, these analyses open up a distinctive way of conceptualizing the politics of buildings:[17] they bring into view an empirical politics of buildings, one that can be distinguished from idea-centred or discursive understandings of architectural politics.

As Michael Guggenheim (2009) has pointed out, much work in the social studies of architecture takes its cue from classic architectural research and theory, which relied heavily on the concept of the 'building type'. Just as these architectural studies focussed on the identification, description and interpretation of building styles, from the Romanesque to the gothic and so on, so social studies too have concentrated their efforts on identifying, describing and interpreting ideal types in relation to buildings. They have seen it as their task to document the 'social forms' that buildings embody, like 'Catholicism' or 'the school', and to account for the connections between building type and social type. In this regard, the merit of ANT is that it offers an alternative way of connecting buildings and the social (Guggenheim, 2009; Yaneva, 2009a; Latour and Yaneva, 2008. This point can be extended to the connection between sustainable buildings and politics: the preoccupation with ideal types can be recognized in studies of this topic too.

An influential study by Guy and Shove (2000) of energy and buildings exposes the normative models of socio-technical change these buildings embody: they analyse the normativity of buildings in terms

of the different concepts of change instantiated in different buildings and approaches to building – in policy, engineering and research.[18] Recent studies of sustainable architecture have extended this approach. These studies more explicitly theorize architectural politics in terms of the contestation among different values and ideas of environmental building and dwelling, but they remain very much concerned with the models and ideas embodied in green buildings (Guy and Moore, 2005; Karvonen and Moore, 2008). Thus, Karvonen and Moore offer a typology of environmental building types – including self-builds, retro-fits and pre-fabs – and connect these to different environmental concepts and values, from 'carbon-neutrality' to 'local sourcing'. According to these studies, buildings derive their politics to a significant degree from the alternative concepts and values embodied in them.

In some sense, it is all too understandable that social studies of environmental architecture conceive of the politics of buildings in terms of 'ideal types'. An architectural focus on building type finds a ready match in the preoccupation in policy analysis, and political science more widely, with the 'politics of discourse'. The notion that politics is concerned with the promotion, influence, contestation and transformation of concepts, ideas and values, which are embodied in text and image, is easily transposable onto buildings (Hajer, 1995).[19] By combining a focus on building type with the politics of discourse, then, we arrive at a politics of architecture which centres on the embodiment of alternative models, ideas and values in buildings. Such an approach has the ostensible merit of politicizing architecture (and architecture studies). But the contribution of material entities – in this case buildings – to politics remains less clear in such an account: what about their capacity to inform or transform normative values and ideas, and just as importantly, understandings of politics? It is here that the contribution of ANT to architecture studies can be located, as it provides a language to account for the contribution of non-humans to the politics of building and buildings (Heur et al., 2009). Importantly, however, ANT-informed studies of architecture also make a difference in another respect: they bring into view an *experimental* politics of buildings.

From an ANT-informed perspective, the normativity of architecture does not so much have to do with the material embodiment of ideal forms in buildings. ANT locates the politics of architecture instead in the process of the material, technical and discursive *transformation* of buildings, whether from 'idea' to actual building, or in the mode of 'before' and 'after' renovation (Yaneva, 2009a; Guggenheim, 2009). (Some eco-home demonstrations also foreground this transformative

Figure 5.2 'Site Progress', Victorian conversion, Hackney, 2009

aspect of environmental building. My friends' blogposts on the refurbishment of their Hackney Victorian House included a number of photos, among them that of a formerly domestic space turned into a mere skeleton (see Figure 5.2).) Central to the politics of building, from an ANT-informed perspective, is the process of their assembly or re-assembly: the normative challenge of architecture is to (re-)compose materials, technologies, actors, sites, concepts and so on into a coherent architectural assemblage (Yaneva, 2009a; Latour and Yaneva, 2008). From this perspective, the politics of buildings is spread out across the process of the (re-)composition of disparate elements into a more or less well-composed building-proposition. This amounts to an experimental and empirical approach to the politics of buildings.

The 'experimentality' of the ANT approach no doubt comes out most strongly in its preoccupation with the successive transformations of buildings-in-the-making. The ANT idea of building-assembly is a decidedly experimental one, insofar as (1) there is no pre-ordained order to this process of composition and re-composition, no fixed way in which ideas, materials, actors, sites and so on are to be combined or fit together

and no natural end-state. And (2) empirical instruments play a key role in facilitating this process. Experimental devices like the building prototype – or the show home – have special capacities for specifying the assembly of disparate elements (Kelty, 2010). Adopting a processual and device-centred perspective on building, examplary buildings prove capable of opening up a space for politics: they help to configure an experimental space for the (re-)assembly of materials, plans, technologies, actors, locations and concepts of democracy, and so on (Gomart and Hajer, 2003). This idea applies well to environmental show homes. The demonstrational home administered by Islington Council, for instance, seemed specifically designed to strengthen connections between social housing and the carbon economy. The walls, brochures and the website of this Green Living 'retrofit' carried graphics showcasing 'carbon savings', energy performance models, as well as information on new schemes for the private financing of social housing. Here, then, the demonstrational setting of the eco-show home was deployed to strengthen connections between social housing, governmental commitments to climate change mitigation and private financial economies of construction.

But ANT also opens up an experimental perspective on the politics of buildings in a different sense. Insofar as ANT proposes to understand the politics of building as a politics of assembly, this should not be taken as an alternative *model* for politics (see on this point also Farías and Bender, 2010). The politics of assembly is an experimental politics: the type of political or normative process that building-assembly amounts to depends on how and what devices, components and connections are deployed. In the empirical-ontological style that ANT is well known for, the concept of the politics of assembly then offers not a model but an analytic perspective for investigating how assemblages are configured by experimental means. This is to say that the 'logics' by which buildings acquire a politics are themselves empirically variable: an ANT perspective invites us to treat what Heather Lovell (2007) has called the 'politics of exemplification' as an empirical question in its own right (on this point see also Muniesa and Callon, 2007). In the case of eco-show homes, different devices are deployed to equip these homes as exemplars *of different kinds*. In the Islington retrofit, a poster with the title 'Street Properties PFI' (For Private Finance Initiative) states, 'United House has been contracted to refurbish 6500 houses over 3 years by Islington Council'. Here, the alliance between municipal councils and construction companies is rendered crucial to the spread of ecohousing. By contrast, one of the earliest green home blogs in the United Kingdom featured a picture of a sizeable solar panel standing in a small London back-garden, with the caption: 'what if everybody

did this?'.[20] In this case, it is the politics of contagion that would ideally enable the spread of environmental adaptations of the home. The logic of exemplification then varies from one eco-home to the next.

This suggests something else: the experimental politics of buildings is probably best understood as a 'politics of variation'. As typological studies of sustainable architecture have shown so well, any account of the politics of buildings is incomplete if it does not consider the variations between different buildings, and between different versions of the same building type. However, a focus on the *differences* between buildings may also end up undoing the experimental take on the politics of buildings. This would happen if, to get at normatively significant differences, we would engage in *freeze-framing*: to establish differences among buildings, we would then fix their 'types', and identify contrast among them.[21] Such an account of the politics of buildings practises what we might call a 'politics of difference', and would constitute a return of sorts to a rather rigid politics of type. However, the merit of adopting an experimental perspective on buildings was precisely that it offered a *more dynamic* approach to the politics of buildings. From this vantage point, the facilitation of variation and variability among the entities and connections that make up the environmental home may constitute a significant political accomplishment in its own right.

To sum up, the point of bringing ANT to bear on buildings was that it dispenses with the need to adopt a static theoretical framework, which predetermines the politics of building as a matter of the material embodiment of type. In shifting attention to the process of building-assembly, ANT promises a more dynamic, open-ended and varied account of material politics: the politics of buildings here is not reducible to the embodiment of general types, but involves the ongoing production of building-assemblages made up of connections between specific entities. Here I want to propose that ANT's experimental conception of the politics of buildings needs to be experimentalized further, if it is not to collapse into an idealistic politics of type, namely one that captures the normativity of buildings by identifying ideal-typical differences among them. The significance of the empirical device of the eco-show home is then that it allows us to introduce yet more 'experimentality' into our account of the politics of buildings.

Experimentalizing political ontology

Variation and variability have long been recognized as crucial to understanding the connections between experiments, ontology and

democracy.[22] As we saw in the previous chapter, John Stuart Mill valued experiments precisely for the variation in life forms that they enable ('giving scope to varieties of character, [...] and that the worth of different modes of life should be proved practically, when any one thinks fit to try them' (Mill, 2002 (1859)). According to ANT, too, the normative affordances of experiments – that which renders them political – have everything to do with their capacities to enact what Bruno Latour (1988) has termed variable ontology: ANT defined experiments as crucial theatres of politics and democracy insofar as they are capable of effecting ontological change, by adding entities and shifting relations in ways that modify the composition of the world.

Subsequent contributions to ANT have expanded this argument by proposing that we must look for politics in the variation among different experimental enactments of the same or a similar entity (Mol, 2002; 1999; Law, 2004b). This work argued that variation in the performance of certain realities – say, a disease, or, why not, sustainable housing – in different experimental settings creates opportunities for 'ontological politics'. In this view, there is variation in what the world is made to be in different practices (Law, 2009; Mol, 2002). Ontology is then variable insofar as a given object is enacted differently across different practices in space as well as time. This politicizes ontology in a different way: if ontologies vary over time and across settings, then the matter of what exists may be transformed from a given into an issue at stake. My analysis of eco-show homes, however, suggests a somewhat different understanding of the connections between ontology, politics and the empirical, and the importance of variation in this regard.

To start with a point that is already familiar from previous chapters, in a demonstrational setting like the eco-show home, 'ontological change' – or something very much like it – is turned into an object of empirical performance itself. These settings, one could say, offer spaces for the enactment of social, technical, political and environmental change by experimental means. Indeed, they tend to enact a very specific version of environmental change, proposing specific 'solutions' to the problem of unsustainable living. Thus, the 'carbon-neutral' prefab on display in the Building Research Establishment (BRE) Innovation Park in Watford enacted what I previously called 'the change of no change'. This home was shown to *require no lifestyle change on the part of its inhabitants whatsoever*: the tour guide described a 2-month test run in which showers, televisions and other appliances would be switched on according to a 'normal' schedule, *and still this home came out as carbon-neutral*. According to the guide, 'innovative

building solutions' made it possible to secure 'radical' reductions in energy demand by technical means only. In other cases, the importance of engagement on the part of inhabitants is recognized, but care is taken to minimize the demands placed on them: in BedZED, the guide insisted that tenants are required to keep their doors closed in the summer, because of the thermal mass solutions designed to keep these homes naturally cool in the summer. But they are *not* expected to be 'committed environmentalists'. Here, one can recognize the participatory regime of 'small changes': environmental change here comprises elements of technical and behavioural change, but the latter are not defined in explicitly political, moral or otherwise demanding terms.

Finally, the Hackney extreme refurbishment undertaken by my acquaintances among other things offered a demonstration of the *barriers to change* that projects of eco-refurbishment encounter, and the levels of engagement required to deal with these. Commenting on the project, my acquaintance wrote in a blog post: 'We didn't anticipate it being easy, but 20 months after completing the purchase of our dream home cum exemplar low energy project, we had expected to have achieved more than the demolition of two small shed-like rear extensions. How could we have made so little progress despite so much effort by all involved?'[23] The unresponsiveness of the London council of Hackney, and the complaints of residents of the conservation area in which this eco-home was located, which caused delays in the process of gaining building permission, formed a big part of the answer.

The eco-show home, then, can also be understood as a device for performing the *comprehensive* kind of change that is involved in the re-ordering of social, material, technical, economic, political-and-so-on relations. Eco-homes are configured as devices for technological change, the transformation of lifestyle, the democratization of environmental governance, the exploration of alternative culture and so on.[24] For this reason, however, eco homes disrupt ANT accounts of the relation between ontology, politics and experiments, and this insofar as these accounts located ontological change *outside* the frame of the empirical, strictly speaking. Even as ANT rendered ontology empirically variable, it proposed that ontological change occurs beyond the limits of what is empirically demonstrated.[25] Eco-show homes raise the question of whether ontological change – the type of comprehensive transformation of the world that operates at once in the social, technical, material and political dimension – may also figure as an object of public politics.

If we answer this question in the affirmative, one could say that the eco-show home 'experimentalizes' ontology further than actor-network

theorists thought possible: occurrences which ANT deemed to be of the order of 'the ontological' – in the above 'outside-of-the-frame' sense – are here turned into objects of empirical performance. However, it is also possible to argue that eco-show homes challenge the very notion of empirical ontology. If these devices can be said to experimentalize the 'ontological' effect of socio-technical-material-environmental-moral change, by turning it into an object of empirical performance, should we not conclude that ontological change here dissolves into the empirical (Lezaun and Lynch, 2008)? It is possible to question, that is, whether comprehensive forms of change still deserve to be called 'ontological', if they can ostensibly be brought within the frame of the empirical.

One reason to reject the characterization of the type of comprehensive change performed with the aid of eco-homes in ontological terms is that comprehensive change is here performed in the register of *promotional culture*. As Thrift and French (2002) proposed, social studies of public demonstrations are concerned with empirical theatres, not of proof, but of *promise*. In this respect, the ontologies performed with the aid of demonstrational devices must be categorized as 'aspirational' ontologies. However, this does *not* necessarily imply that we can reduce these ontologies to 'merely' empirical or publicity effects – which would have little to do with either ontology, in the classic sense – the theory of what exists – or democracy, for that matter. If eco-show homes need to be placed firmly in the register of promotional culture, then it is not really possible to maintain an innocent idea of democratic politics in relation to these devices. In this setting, indeed, participation is not necessarily a good thing. On the other hand, to adopt a non-innocent view of democracy is not necessarily a loss. At the same time, it seems a mistake to understand demonstrational homes as little more than 'publicity machines', with no true experimental, ontological and democratic capacities. And this is because these devices are used to fill in the project of comprehensive change *in varying ways*.

Instead of taking up again the rather worn positivist trope of the dissolution of ontology into the empirical, then, it seems more productive to me to attempt a further experimentalization of our conception of ontology. The demonstrational device of the eco-show home invites us to do just this, as it enables us to understand ontological change as an even *more variable* phenomenon than ANT made it out to be (more variable, that is, than suggested by the ANT concept of variable ontology). As the eco-show home brings comprehensive – socio-technical-environmental-and-so-on – change within the experimental framework, one could say that ontology itself here becomes subject to the variability of enactments that

experimental settings enable. The Kingspan show home, the BedZED eco-community and my friends' extreme refurbishment each articulate an alternative proposition of social, technical and political environmental change. As environmental, social, technological and political change features as the object of empirical performance, such a comprehensive form of change itself appears less as a given, and more as an issue at stake. Eco-show homes, then, do not just enable a politics of co-articulation, but also an experimental politics of variation.

A material politics of experimental variation?

One explanation for why material politics would take the form of a politics of variation rather than a politics of difference has been provided in political and cultural theory. Political and cultural theorists have recently invoked 19th-century theories of vitalism in order to account for the engaging capacities of things (Bennett, 2010; Hawkins, 2011; see also Coole and Frost, 2010; Fraser et al., 2006; and Grosz, 2005). Proposing terms like the 'vibrancy of matter' (Bennett, 2010), they have directed attention to the quasi-animate capacities of supposedly inanimate things, insisting that this is critical to the capabilities of material entities to play a political or moral role. This work suggests that fluctuations in the normative capacities of things constitute an important aspect of material normativity: it directs attention to the ways in which objects may acquire (or lose) a political or moral charge, like plastic water bottles, which sometime during the 2000s turned into examplaries of the exploitation of labour and planet. A *variable* normativity is then distinctive of the 'vital politics' of things.

In suggesting this, vitalist political theory could be said to radicalize the ANT concept of variable ontology. ANT had argued that there is a politics to ontological variation, because such variation produces shifts in the balance of force that mark social and political collectives. By contrast, vital political theory presents variability as something that renders ontology normative in and of itself: variation in the normative charges of things – what Rogers and I have elsewhere called their issuefication (Marres and Rogers, 2005) – is how politics *happens* in the ontological dimension. The analysis developed in this chapter gives a further twist to this argument. It proposes that we need to consider this normative variability of material objects empirically, as an effect that is achieved in specific settings.

My analysis of demonstrational eco-homes suggests that variable normativity – or 'vital politics' – is partly an accomplishment of

experimental settings. Another example can help to make this clear: the blog 'The Greening of Hedgerley Wood', which reports on 'one family's attempt to save CO2 ' in a rural house in Oxfordshire by means of various more or less drastic house renovations, narrates how water acquired the capacity to engage. An entry on this blog covered the installation of a ground heat pump, as already discussed in Chapter 3, and the post ends with an account of the blogger himself and his wife taking a bath after the new pump has been installed. It describes them as both 'enchanted' by the warm water provided by the freshly installed heat pump.

In this example, the fluctuating normative capacities of material entities and settings – the water, taking a bath - are at least in part experimentally generated, that is, they are at least in part an artifact of the execution of a sustainable housing experiment. The 'liveliness' of matter here appears as key to the normativity capacities of things to engage but it also features as an acquired capacity. The dynamic normativity of things on display in sustainable living experiments is highly artificial in the sense that its explication depends on empirical devices, like the diary note (blog post) and photography. The political capacities of things, including their vibrancy, can here be characterized as an accomplishment of the setting (Garfinkel, 1984 (1967)). We are dealing here with an experimental type of normative variability. This complicates the concept of material politics, as it must now be understood as a performative phenomenon that varies among experimental settings.

Figure 5.3 'Filling Buckets', Ration me Up Blog, Polly Nash, April 2010

But it does suggest how a material politics performed with the aid of demonstrational devices may translate into a democratic politics. This can become clear if we consider the variability of experimental devices themselves. The very adaptability of a device like the eco-show home, it seems to me, significantly contributes not only to its normative capacities, but also to its 'participatory' potential. The affordances of a demonstrational device like the eco-show home for democratic politics derive in part from its appropriability: it can fairly easily be modified to enact alternative forms of participation, innovation and change by experimental means. One last example can help to make this clear.

Important political differences between eco-show homes can be traced back to rather small but critical variations in the empirical equipment of environmental homes. Adaptations of the demonstrational device then allow for participation, innovation and change to be performed in a different modality. As we have seen, the equipment of the Green Living eco-retrofit with devices of monitoring and display enabled the investment of the domestic setting with disciplinary capacities: a thermostat that does not go up beyond a certain temperature, a smart meter that makes it possible to detect 'some bad practice like opening a window', as the poster on the living-room door put it. The introduction of empirical devices here brings out the capacity of the home to control behaviour, so as to produce measurable (and commodifiable) forms of 'environmental' performance.

The 'Ration Me Up' living experiment conducted by Polly Nash of Herne Hill, discussed in Chapter 4, similarly involved the empirical equipment of domestic setting – in this case with a notepad, camera, and blog (though Nash also notes that she 'only wished we could get a water meter'). And in this case too, the effect was the transformation of the home into a setting for the monitoring and modification of material habits, but in *a different way*. Here, as in the case of The Greening of Hedgerley Wood, the recording of domestic material practice brought out captivating powers of a rather more enchanting variety: activities like scooping water and carrying buckets turned the domestic setting into a zone of living differently (Figure 5.3). Their documentation enabled a fascination with everyday substances – bringing out their moral capacities to render subjects environmentally aware. That is, the empirical equipment of the home here facilitated the cultivation of moral sensibilities through embodied material practices. Small but critical adaptations of the empirical equipment of the home then significantly modified the normative effects of what it means to transform the domestic setting into an 'engaging environment'.[26]

It surely would be impossible to conclusively establish the exact series of adaptations of the device of the eco-show home that would connect the eco-retrofit in Islington to the environmental living experiment in Herne Hill. It would be a mistake, that is, to presume that the various adaptations of the empirical dispositif under discussion here are, or should be, *traceable* to another (Michael, 2006). However, at the same time, the political affordances of a demonstrational device like the eco-show home seem clearly informed by its adaptability. *The very variability of the empirical device is what grants it its special normative capacities.* It is because of this that a range of actors was able to adopt the device to perform their particular versions of innovation, participation and change. Indeed, this feature perhaps more than any other defines the eco-show home as a participatory device. As a multiplying template, the eco-show home serves an expanding range of objectives, and carries multiplying normative charges.[27] The very proliferation of the device then informs its political capacities. Because of this eco-show homes could *render variable* the normative relations between participation, innovation and change. As an adaptable device that could be taken up by an expanding range of agencies, the eco-show home opened up a zone of *experimental* variability, in which connections between entities like environment, society, technology, democracy and so on, were rendered relatively optional. The question is whether a device that is capable of 'experimentalizing' phenomena in this way can be accorded not just normative, but *critical* capacities.

There are reasons to believe so. To a significant degree, it is because Polly Nash's Ration Me Up experiment takes up the proliferating template of environmental living, that her experiment can offer a critique of increasingly predominant, disciplinary adaptations of the device. However, at the same time, it would be foolish not to recognize that an experimental politics of appropriation may equally work in the opposite direction: the Islington eco-retrofit arguably 'capitalizes' on preceding efforts by social movements and NGOs to equip the home as a device for environmental participation. There are also other risks associated with a material politics of experimental variation. The continuous modification and fluctuation of the normative capacities of eco-show homes may end up turning it into an *indeterminate* device: the eco-show home would then end up generating a space in which it is impossible to establish any stable normative connection between participation, innovation and change. Indeed, according to Peet and Watts (2004, (1996)) this is the big danger associated with the politics of sustainability: discourses on sustainability according to them have

become inherently ambiguous, adaptable and susceptible to appropriation for different political agendas (see also Anderson and Braun, 2008; Miller, 2005). It is one of the reasons why it is so important to adopt a non-innocent perspective on material politics.

Conclusion

To examine eco-shows home as devices of experimental politics is tto take an empirical approach to elucidating the 'paradox' that troubles attempts to materialize democracy. This paradox states that, on the one hand, to materialize democracy is to extend the category of participation to non-human entities, a move that can be described as a further 'democratization' of democracy. However, on the other hand, this extension has been said said to place serious limits on democracy, as it problematizes central concepts of democratic theory, such as 'autonomy' and 'self-determination', which are widely seen as constitutive features of effective and legitimate public participation. If we recognize that non-humans contribute actively to the performance of participation, it becomes doubtful whether we can continue to assume that citizens are capable of intervening decisively in the course of affairs. In this chapter I have tried to show how a device-centred approach to material politics facilitates a number of critical operations upon this problematic.

First, the empirical setting of the eco-show home helps to dissolve problems of non-humans for democracy. Here, material objects are made to play active and visible roles in the enactment of participation, and in this way, eco-show homes help to prove that this is not an impossibility: absorption in material settings and activities – from taking a bath to carrying buckets – are central to the very enactment of environmental engagement. And as they demonstrate this publicly, these settings contribute to the normative project of carving out a role for material practices in public politics. However, this does not necessarily mean that the problem of non-humans for democracy is solved in these settings. To the contrary, eco-show homes also offer many articulations of the problems that material practices pose for participation. Here, more clearly than in many other settings, we can pose the question of whether and how material practices serve as traps in which human actors are held captive by trivial, immediate concerns, as in the Islington Green Living retro-fit. How can an activity like closing your window be taken seriously as a contribution to environmental change? On the other hand, environmental living experiments also offer a wealth of observations to demonstrate the fundamental importance of

mundane activities, and this by virtue of their very ordinariness, which ensures the generalizability of observations made in this setting: for every electronic device in our homes, there are a billion similar ones being switched on in other homes around the world. Again, this does not mean that eco-homes offer conclusive solutions to problems of material participation; they enable their articulation.

Eco-show homes are not just spaces where a more substantial role for everyday material practices in the enactment of participation is currently being carved out. They equally offer settings for the articulation of problems of material participation, and perhaps democracy. Should material absorption in the setting be welcomed or not in the enactment of environmental engagement? As we have seen, eco-show homes facilitate many different kinds of normative approaches to material participation, from the disciplinary to the affirmative, and as such they are normatively highly unstable settings. The point of adopting an experimental approach to material politics, I want to propose by way of conclusion, is to welcome and radicalize this destabilizing effect. This will not necessarily solve, in and of itself, problems of democracy, but it will go some way towards addressing problems with our conception of participation: in the analysis of participation, we have become too accustomed to fix phenomena in terms of their necessary or sufficient features or by locating them on this or that level. Gomart (2002) has characterized experiments as devices for producing indetermination, for suspending and/or undoing established ontologies. Especially with regard to participation, it seems important to learn to value experimental indetermination and variability. In theories of participation, the rush to overdetermination – to identify the procedure or apparatus that can secure public engagement and to codify a given device as either democratic or not – has been particularly strong.

We can then deploy for analytical purposes the experimental capacity of a setting like an eco-show home to produce indetermination and highlight variation and variability. Environmental participation as a phenomenon is here rendered normatively unstable. This can help us to examine its political potential, and indeed, the normative variability of things and settings contributes to the very political potential of experiments, the capacity to effectuate change. Again, this does not solve the problems that material practices pose for democracy; it repositions these problems. It values the investment of material entities with political capacities and the project of carving out a role for these entities in democracy as an project that is undertaken in experimental settings, but has not been completed yet. Such an experimental understanding

of material politics rejects the idea that the problem that non-humans pose for democracy is merely a problem of theory. It is also a problem of practice, and we should not assume any simple distinction between the two. In this way, an experimental approach to material politics simply elaborates a point long advocated by empirical philosophers and STS scholars, which is that attempts to conclusively separate the empirical from the theoretical, and to bracket the one while dealing with the other, do not do justice to what happens in practice. .

However, the experimental approach to material politics that I advocate here also gives a particular twist to a key idea from science and technology studies, the idea that the politics of objects, settings and technologies is a performative politics. But what do we mean when we say material politics are performatively accomplished? Do we simply mean that settings and things make significant contributions to the enactment of, say, public engagement? Here I have tried to formulate an different, experimental understanding of the performativity of material politics and participation: the successful implication of things in the enactment of politics and participation must be understood as something that *happens*. It is of the order of the event. This is also to say that there is nothing 'given' about the enactment of participation by material means: The 'politics of non-humans' is itself an experimental achievement that may succeed or fail. Material participation, then, is in part an accomplishment of technologically equipped environments and contingent media arrangements. These arrangements vary from setting to setting, but in some cases it seems right to call these by the name of democracy, even if this is to accept that this category loses some of its innocence.

6
Redistributing Problems of Participation

Introduction

What makes a device-centred perspective on participation so attractive? I have argued that it allows us to reformulate problems of participation, and we are now in a position to do so. Material participation, we have seen, is often presented as a solution to problems of participation. Locating participation in material practice has been promoted as a way of making tractable two important constraints on democracy in technological societies: the busyness of everyday life and the complexity of issues. By turning everyday practices into occasions for acting on public affairs, material participation promises to make engagement eminently doable. However, over the course of this book, we have encountered a range of problems associated with material participation itself, such as the relative amorphousness of materially engaged publics, or their perceived lack of agency. While I have been critical of these various definitions of the problems associated with material publics, I have also argued that it would be a mistake to opt for the 'non-critical' solution and argue that material participation does not constitute a problem at all. Instead, we should explore and develop alternative ways of problematizing material publics.

It is here that the American pragmatists Lippmann and Dewey have much to offer us, as they have proposed a more nuanced and constructive perspective on problems of material participation. In the pragmatist account, public involvement is marked by a distinctive problem of relevance, which says that publics are at once intimately and remotely involved in issues. This suggests that the problem with material publics is not *just* their inability to act effectively on complex issues, or their inability to distinguish themselves as a significant political force.

Instead, 'the problem' of material publics resides in the very *modality* of socio-material involvement that is distinctive of these publics: they are problematically entangled in issues. There may be mileage, Dewey and Lippmann's work suggests, in defining material publics as inherently problematic formations. However, while the grounds for adopting such a definition of material publics are partly theoretical, I have suggested that it is only through *practices* of material participation that these problems become fully specified. For this reason, I have fleshed out the pragmatist proposition in this book through empirical analyses of contemporary enactments of material participation, focusing on everyday devices of sustainable living, as one site among several others where these problems have recently come to a head.

In this concluding chapter, I would like to demonstrate that a pragmatistically informed, empirically oriented perspective offers a distinctive way of analysing problems of material participation, and I will do this in two ways. First, I will return to the pragmatist definition of the problem of material publics – the problem of relevance – and show how it differs from another influential definition of the problem of participation, what I call the 'problem of extension.' We have already encountered the latter problem in previous chapters, for example in my discussion of the concept of the 'community of the affected', in Chapter 2, and in my account of studies of public experiments in the sociology of science and technology, in Chapter 4. In summing up the differences among these two contending problem definitions, I want to clarify what we gain by focusing on problems of relevance. As I will argue below, it opens up a more symmetrical, dynamic and relational approach to problems of participation.

In focusing on problems of participation, I would also like to make a second, more general argument about the normative implications of adopting a device-centred approach to material participation. Distinctive about such an approach is that it allows for a *re-distribution* of problems of participation: if we consider how participation is performed in material practices, it becomes possible to treat as a *question* the issue of who – among the different actors caught up in participatory arrangements – must be assigned responsibility for these problems. To clarify this idea, I will consider different formulations of the problem of *environmental* publics I will compare the ways in which these different formulations attribute this problem to the different actors and entities involved. Finally, I want to discuss, however briefly, the question of the wider *spaces* of publicity in which participation is done. I will argue that if we are serious about developing an empirical approach to material

democracy, then we must develop a better understanding of the role of technology in the organization of these wider spaces of publicity. To develop this point, I will turn my attention to two specific devices: a digital technology that is only seemingly banal, namely the tag cloud visualization, and an artistic instrument called Spiral Drawing Sunrise. Both of these instruments, I will suggest, do not only enable participation, but they also help to organize the spaces in which participation unfolds.

Extending symmetry to material participation

This book has discussed several different formulations of problems of material participation, but in each case I argued that these problems deserve to be appreciated in more *positive* terms than is usual. I criticized some of the unequivocally negative understandings of these problems on offer in social and political theory, where a broad range of shortcomings has become associated with material publics: these publics have been said to be variously too ephemeral, unstable and weak to qualify as an effective and/or legitimate form of political organization. However daunting and plausible these shortcomings may seem, I have argued that they deserve a far more constructive treatment than they tend to receive: are not the inability of public formations to endure – or to use Dewey's word, 'to hold themselves' – and to intervene effectively in current affairs the very challenges which confront publics today? Rather than dismissing material participation because it brings into relief the very problems that publics are faced with, should it not be our role as analysts to examine the ways in which publics become capable of confronting and negotiating these challenges? Political and social theorists should learn to like their problems more.

But I equally criticized the unequivocally *positive* framing of material participation: the idea that the relocation of engagement in everyday material practices provides an effective solution to the long-standing problems associated with participation in modern life. As we have seen, significant hopes have been invested in material participation, with proponents of 'involvement made easy' proposing that to locate participation in everyday material practices is to strip it of the complexity, uncertainty and strangeness that hamper participation in technological, globalizing, professionalized societies. My analysis of everyday carbon accounting showed it does not quite work like this: material practices which were initially promoted as 'easy' ways of becoming involved with the issue of climate change – like taking public

transport or 'switching off' appliances – in second instance turned out to accentuate the difficulties of taking the environment into account in everyday life (there are no buses on this route, appliances have in-built standby modes).

Rather than offering a viable way to contribute to environmental change, these engagement practices then bring into relief the material, political, economic, social and technological *constraints* on our abilities to change our ways of life. To materialize participation is to problematize it. The problematizations enabled by material participation provide insight into myriads of environmental or structural constraints on individual action upon public affairs, but these constraints should not, it seems to me, be interpreted in unequivocally negative terms, that is, as proof that attempts at material participation are mostly pointless. Such experimental findings also open up for questioning prevailing models of environmental change, such as the ideal discussed in Chapter 3, of the 'change of no change' – the belief that we do not need to change our forms of life, only our technology, if we are to take the environment into account. Material engagement makes it clear that environmental change is likely to require efforts on the part of *a whole range of entities*, including domestic subjects, institutions, infrastructures, and so on. Material participation opens up the issue of the division of labour between citizens, governments and industry in the performance of environmental change.

Some important points follow from this regarding the status of problems of material participation. In redefining these problems, the point is not just to *change the normative charge* of these problems. It is not just about giving these problems a different, more uplifting spin or colour. Rather, to adopt an experimental approach to material participation is to propose that problems of participation must be *re-distributed*. Problems of participation, I have insisted in this book, are not just problems *with* material publics themselves. They do not just concern the everyday people involved in its enactment (or not), but pertain to wider participatory arrangements in which a spectrum of organizations, technologies, subjects, knowledges and things are involved and have a stake. Such a re-distribution of participation has long been advocated in the sociology of science and technology. Work in this area has long sought to dismantle the presumption that the failure of publics to engage can be blamed on inherent shortcomings of the actors constituting publics: as if *their* lack of literacy, interest, desire, energy and so on is the main thing that prevents participatory forms of politics and government from properly taking off (Irwin and Wynne, 1996; Irwin and Michael, 2003).

This literature suggests the blame must also be sought elsewhere, not least in the assumptions deployed in public engagement exercises, and more particularly in their presumptions about what counts as 'proper participation'.

The experimental approach to participation proposed here allows us to expand this project of redistributing problems of participation. It suggests that not only we, as analysts of participation, may take it upon ourselves to re-distribute problems of participation. Rather, the distribution of these problems may also be accomplished in the participatory practices under scrutiny. In Chapter 3, we have seen how the Hackney–Islington Carbon Rationing Action Group (CRAG) debated the question of who was to blame for the 'failure' of effective public participation in climate change mitigation. We could say that by introducing the device of carbon accounting into the participants lives, this initiative was able to explore, and to demonstrate, a particular distribution of the problem. Which actors are most responsible for undermining collective action on a public affair like climate change? Is the problem that most citizens fail to demonstrate serious commitment to energy demand reduction, or is it rather to do with the industrial–governmental energy complex, which turned carbon emission reduction into another opportunity for financial investment? In demonstrating that they, as everyday people, were perfectly capable of taking environmental costs into account in the running of their domestic economies, the Hackney–Islington CRAG sought to put the ball in the other court, that of the large institutions and corporations many of which, with far more resources at their disposal, failed to achieve significant reductions in fossil fuel use.

Lack of involvement, then, also featured as an object of demonstration in this carbon accounting experiment. The apportioning of responsibility among individual, governmental, non-profit and for-profit actors was one of the things at stake in this participatory experiment itself. Accordingly, we may treat the distribution of problems of participation as in part an empirical question. My reading of the CRAG experiment also suggests that lack of involvement may be best approached as a relational phenomenon: (in-)action on the part of the public must be seen in the context of (in-)action on the part of other agents implicated in the issues at hand. Which is also to say, problems of participation cannot easily be disconnected from the substantive affairs that participatory projects seek to address (Marres, 2005a). The relative distribution of (in-)action in relation to climate change is likely to differ from its distribution in relation to other issues. And the distribution of problems of

participation is likely to be *contested* as part of processes of issue formation (Marres and Lezaun, 2011).

These observations suggest a particular approach to problems not only of material participation – the distinctive form of public engagement that explicitly locates participation in material practice – but of public participation more broadly, namely a symmetrical one. The 'burden of participation', we then emphasize, does not necessarily fall on the side of the everyday actors thought to constitute 'the public'. Rather, how responsibility for the success or failure of participation should be apportioned among the actors involved is a *question* arising during and out of participatory processes.

A commitment to symmetry, of course, has long been a central distinguishing feature of science and technology studies. During the last decades, this field has identified an ever expanding set of concepts as deserving of a more even-handed, unbiased analytical treatment: truth and untruth, science and politics, humans and non-humans. As I flagged above, studies of public engagement in this field have also criticized the uneven distribution of the 'burden of participation' between science and the public (Wynne, 1992; 1996).[1] This critique explicitly targeted the tendency of intellectual and institutional programmes of public engagement to place the burden of understanding mainly on the side of the public: as if the main problem troubling the relations between science and its publics was that everyday actors failed to adopt the epistemic outlook proper to science; as if no transfer of knowledge, frames or anything else in the opposite direction was required.[2] However, these sociologists defined it as their own task to re-distribute responsibilities among the actors involved. By recognizing that the distribution of problems of participation is what is at stake in practice also, an experimental approach to participation allows us to expand the commitment to symmetry in this area.[3]

To further clarify how I would like to identify some general features that distinguish a symmetrical perspective on participation from an asymmetrical one. I will do this by listing some differences between two opposing formulations of the problem of material publics that we have encountered in previous chapters: the problem of relevance and the problem of extension. The latter problem, as the name suggests, is mainly concerned with *how far* participatory procedures must be extended, how inclusive processes of decision-, knowledge- and policy-making should be.[4] We have encountered this problem in various guises in this book: versions of it have been put forward in cosmopolitan democratic theory, but also by proponents of a critical rationalist

approach to the public understanding of science (Collins, 1988; Collins and Evans, 2002). My presentation below is somewhat of a caricature, but I think it is not so absurd that its features would not be recognizable in real life, or in real academic debate, and I hope it is excusable in the interest of clarity of argument.

The problem of relevance versus the problem of extension

To define problems of participation as 'essentially' problems of inclusion entails a rather *asymmetric* distribution of the publics' problems, it seems to me. Such a definition focuses on how many and which actors should be allowed to take part in a given social or political process; its main concern is with the scope of existing processes of knowledge-, decision-, and policy-making. For this reason, it distributes what we could call the 'burden of relevance' rather unevenly between the institutions hosting these processes and their outsides. As Sheila Jasanoff (2003b) and Brian Wynne (2003) have pointed out, to define participation in terms of the extension of existing political and epistemic processes is to bracket the issue of *what secures the relevance of these processes themselves*, or at least to consider it to be settled in a satisfactory way. What is it about *these* platforms, procedures and vocabularies that they rather than others qualify as the designated settings of public participation? Extensionists presume this question has already received an acceptable answer before the question of participation has a chance to arise. In assuming the appropriateness of the setting, the burden of relevance is here made to fall almost entirely on the side of the institutional outsiders assumed to constitute the public: the onus is on these outsiders – or their representatives – to justify why their presence and contribution would be legitimate or useful to consider in institutional settings of knowledge production and political decision-making.

From here on it is only a small step to understanding participation as an act of institutional generosity: outsiders should be grateful for being offered a seat on the table, or at least a place in the assembly hall. An extensionist approach, that is also to say, comes close to defining participation as an *optional* feature of epistemic and political processes. It suggests that participatory features may be added or subtracted more or less at will from processes of knowledge, decision- and/or policy-making. Participation here seems a kind of institutional gift that may or may not be offered to outsiders. This places serious constraints on the distribution of problems of participation: when the extension of existing procedures of decision-, knowledge- and policy-making is

adopted as the normative agenda, participatory failures are unlikely to be attributed to these procedures themselves.

By comparison, the problem of relevance that the American pragmatists first brought into view implies a much more symmetrical distribution of problems of participation. As we saw in Chapter 2, their work locates the problem of participation in the distinctive modality of the public's involvement in issues. According to Dewey and Lippmann, what sets the public mode of engagement apart from other modes is its particular combination of intimate entanglement in issues and distance from the sites of issue formation: publics consist of outsiders who are too entangled in issues for their indifference to these issues to be unproblematic, yet they are strangers to the current settings, languages and networks of issue formation. Such an account presents us with an unmistakable problem of the public, but it does *not* in itself presume a particular distribution of this problem among the various relevant settings, entities and actors. Is it the task of publics to familiarize themselves with ongoing processes of issue formation? Or should these processes rather be modified or displaced in order to accommodate publics?

The pragmatists do not presume there is a simple answer to this question. They suggest that the problem of participation must be located in the relations *between* the sites, procedures and vocabularies of issue formation and the settings, processes and languages of issue entanglement. For this reason, the problem of relevance, as they define it, presents a *mutual* problem: it is equally possible for publics to doubt the relevance of institutional processes of issue formation, as it is for institutional insiders to call into question the relevance of public contributions to ongoing processes of knowledge-, decision- and policy-making.

STS perspectives on participation, I have tried to show in this book, offer ways to further develop this pragmatist problem of relevance. Work in STS, as we have seen, has proposed particular re-distributions of the problem of participation. Besides the Public Understanding of Science (PUS), ANT has also offered a version of this proposal. Actor-network theorists have insisted that well before issues of 'public participation in science and technology' arise, everyday actors tend to be already implicated in techno-scientific issues, by virtue of their livelihoods, bodies and environmental practices (see Chapter 4). Furthermore, these theorists have argued that in relation to science and technology, participation presents not an optional feature, but a practical necessity. In their account, the accommodation of new entities – new technologies, non-humans, or more complex techno-scientific issues – in society *requires*

the active collaboration of social actors (see on this point also Schwartz Cowan, 1983). For this reason, the question cannot be whether social actors should or should not be 'allowed' to participate in processes of the social or political domestication of science and technology. Their enrolment is necessary for science and technology to work, and therefore the question is rather whether and how their contribution is *acknowledged*, framed and supported.

Work in STS on 'ontological politics', discussed in Chapter 5, also has implications for our understanding of public problems of relevance. Challenging unitary concepts of reality, this body of work proposes that any given object, however 'objective' or 'natural' it may seem, is articulated in multiple ways in different settings (Law and Mol, 2008; see also Marres, 2005a).[5] This work, then, targets deep-seated ontological assumptions about the unity of the physical world, but it also suggests another way of elaborating a relational approach to the public's problem of relevance. Of course, the pragmatists themselves forcefully challenged the unity of the universe, and their relational ontology of the public, more particularly, equally implies a challenge to unitary conceptions, this time of political process. But recent work on ontological politics suggest that if we define the problem of the public relationally it follows that we must attend to the *multiplicity* of enactments of participation. Once we define participation in terms of the challenge of establishing relations of relevance between different political, epistemic and participatory settings, it becomes crucial to investigate how different performances of participation relate to one another.

Taken together, these various contributions of STS to the analysis of participation then open up a symmetrical approach to problems of participation. The 'burden of relevance' may be distributed very differently among the institutions, organizations and publics involved in the enactment of participation, depending on the case, and such distributions are probably best understood as an accomplishment of practice. The adjustments that are required of different settings, languages and actor-groupings to secure their mutual relevance, we then recognize, are negotiated and contested as part of participatory processes. From an experimental perspective on participation, it would be a mistake to assume that such negotiations and contestations of relevance take place in some abstract space, away from the mess of ongoing participatory processes. Devices of participation, I want to propose, also have an important role to play in mediating and organizing relevance relations. To clarify how they might do so, I now want to differentiate a device-centred perspective from other sociological perspectives on public

relevance. In doing so, I will pay special attention to the assumptions about space and time that underpin these different perspectives, as they seem especially consequential for the understanding of public relevance.

Three versions of public relevance: positional, topographic, topological

The pragmatists, it is time to acknowledge, were far from the only ones to define the problem of material publics in terms of relevance. The notion is central to a range of twentieth-century accounts of the problems of the public. Indeed, the ideal of 'involvement made easy' can be traced back to a particular conception of it. This ideal, as we have seen, seeks to dissolve the difficulties that publics encounter in their attempts to relate to issues. As such, one could understand it as a tentative solution to the difficulty of establishing the public relevance of issues. However, the 'involvement-made-easy' way of dealing with the public's problem of relevance differs from the pragmatist way in several respects. The two approaches suggest very different accounts of what makes it difficult for publics to relate to complex issues, what is to be done about this and by whom, not to mention what material devices of participation may contribute in this respect.

The ideal of 'involvement made easy' is reminiscent of a classic conception of the public's problem of relevance, which appears in the famous report on *The Limits to Growth* (Meadows et al., 1972). This global environmental assessment report, which did perhaps more than any other to bring the environmental crisis into public view around the world, opens with a graphic representation of environmental problems, in which we can recognize the problem of the material public:

Figure 6.1 plots human concerns across time and space, moving from more immediate to distant times and spaces. It locates the majority of people's concerns in the here and now, and locates environmental problems much further away in time and in space. In doing so, the figure passes a very bleak verdict on the ability of the general public to take environmental problems into account. In a twist of the plot familiar from Chapter 1, the 'Human Perspective' proposes that the public has no talent for 'sustainability'. As the concerns of the majority of the population are spatio-temporally limited to the present, publics prove incapable of taking into consideration harmful effects that occur at a distance in time and space. The figure, then, defines the problem of environmental publics in terms of the limited scope of the populations'

Figure 6.1 The Human Perspective, *The Limits to Growth* (1972)[6]

sphere of relevance. More precisely, it provides a 'positional' account of the public's problem of relevance, as it defines this problem by locating the public in a given geometry of relevance once and for all.

One could say that the *Limits to Growth* figure distributes the publics' problem of participation in a highly asymmetrical way. The basic problem, according to the figure, is that people are unable to align the sphere of their concerns with the objective distribution of environmental problems. In proposing this, the figure does not leave room for questioning issue definitions, and in this respect it is reminiscent of the 'problem of extension' discussed above. (However, very much *unlike* extensionist theories of participation, the Human Perspective entails a strictly negative assessment of people's capacities to grasp the issues.) Furthermore, the 'positional' view of the public problem of relevance offered by *The Limits to Growth* can also be recognized in contemporary accounts of environmental publics. For instance, the analysis of public engagement with climate change provided by the Institute for Public Policy Research, discussed in Chapter 1, gave a similar explanation for why programmes of engagement had so far failed to get off the ground in a big way in this area: it proposed that publics are unable or unwilling to fully engage with problems that do not touch them

directly, thereby 'poisoning efforts at environmental change at the ballot box' (Lockwood and Bird, 2009).

A relational approach to the public's problems offers a clear alternative to this type of positional understanding.[7] Rather than singling out the public for its limited grasp of a predetermined set of issues, a relational approach foregrounds the difficulties of rendering different issue articulations relevant *to one another.* A relational perspective, that is, calls into question the wisdom of assuming a fixed geometry of relevance, and of assigning to the public a position in this geometry once and for all. From a relational standpoint, it is questionable whether environmental problematics can be located so unequivocally in time and in space, and it is equally questionable that the scope of people's environmental awareness would remain the same across different social settings and issues. Relationalism, to sum up, proposes a much more *dynamic* understanding of problems of relevance.

Such a relational view of public relevance, I have emphasized in this book, can be traced back to classic American pragmatism, but I want to flag briefly here that it has also been explored later in the twentieth-century in the sociology of knowledge. Writing in the 1960s, the post-pragmatist sociologist Alfred Schutz precisely challenged the idea that the sphere of public concern can be delineated once and for all. Drawing on James' and Dewey's theories of experience, Schutz developed a more dynamic, 'topographic' vision of relevance, which sought to take into account the social organization of knowledge. His work mapped out various spheres of relevance, which in his view characterize the social distribution of knowledge and the organization of reality in modern societies (Schutz, 1944).[8] According to Schutz, then, relevance is inevitably organized along social, technological and historical lines:

> The world seems to him [the social actor] at any given moment as stratified in different layers of relevance, each of them requiring a different degree of knowledge. To illustrate these strata of relevance we may – borrowing a term from cartography – speak of 'isohypses' or 'hypsographical contour lines of relevance', trying to suggest by this metaphor that we could show the distribution of the interests of an individual at a given moment with respect to both their intensity and to their scope, by connecting elements of equal relevance to his acts, just as the cartographer connects points of equal height by contour lines in order to reproduce adequately the shape of a mountain. (Schutz, 1944)[9]

In Schutz' account, topographies of relevance vary along two axes. First, social actors occupy different positions in the topography of relevance depending on their role. In his famous essay on the 'Well-informed Citizen' (1964), Schutz distinguishes three actor types, the everyday person, the expert and the citizen, each of which inhabit an expanded sphere of relevance in comparison to the preceding type. The citizen is the most open-minded type, as he 'will try to restrict, in so far as is possible, the zone of the irrelevant, mindful that what is today relatively irrelevant may be imposed tomorrow as primary relevance' (Schutz, 1964).[10] However, not just actors' spheres of relevance, but also cartographies of relevance themselves are rather less static or unmoveable in Schutz's account than the rigid space-time geometry of the Human Perspective. His isohypses of relevance are topographically, rather than geometrically, organized. In Schutz's words, they are not 'closed off, but intermingled, showing the most manifold interpenetrations and enclaves, [..] and creating twilight zones of sliding transitions' (Schutz, 1964, p. 126). These murky zones of relevance, moreover, are *historically and technologically variable*, as they are affected by things like the introduction of airflight and telephony, which bring things into proximity where before they were distant.

We are now able to see how the relational approach to relevance advocated in this book follows and deviates from the two previous, positional and topographic accounts. Following Schutz, a relational approach challenges the rigid concept of positional relevance, but it does this in a different way. Compared to Schutz's topographic theory, a relational approach renders the account of public relevance more dynamic still. This is because it rejects the idea that the establishment of relevance involves the projection of concerns onto a *given* spatio-temporal background, which can be grasped independently from these concerns. A relational perspective on relevance, that is, implies a 'topological imagination' of space and time (Latour, 1993; Michael, 2006; Lury, 2007). Rather than viewing cartographies of relevance as an external framework, onto which actors' spheres can be projected, it proposes to understand the emergence of relevance relations as an immanent process. Relevance, that is, is not established against the backdrop of a given spatio-temporal field, but figures as a relation, or set of relations, among a range of entities, which may or may not be accomplished. Relevance is an event that may or may not take place (Fraser, 2009).[11]

Such a 'topological' approach to relevance has been developed in some contemporary accounts of environmental democracy, such as Helga Nowotny's discussion of post-environmentalism. In an essay

reflecting on the current relevance of the *Limits to Growth* report (2002), Nowotny proposes that today environmental concerns can no longer be located unequivocally in time and space, but instead open up an 'expansive present' of environmental concerns. In this space-time, she argues, taking the environment into account no longer operates through a colonization of the future, but through a maximization of entities to be taken into consideration in the expansive present of social action.[12] It entails an understanding of the space-time of relevance as emergent and dynamic, and as such it envisions a rather different role for publics in relation to the environment, one that can be distinguished from both *The Limits to Growth* and from Schutz's account. According to the environmental assessment report, the principal challenge facing the public is to include that which is distant in space and time in the present, something at which it allegedly fails miserably. Schutz defined the aspiration of the citizen in negative terms, namely to 'reduce, as much as possible, the space of the irrelevant'. By contrast, Nowotny's concept of an expansive present proposes a constructive formulation of the public's task. It suspends the idea that cartographies of relevance are somehow given, and environmental publics here face a much more positive and daunting question, one formulated by Mariam Fraser (2009) in a simple but lucid way: what is it possible to make relevant?[13]

It is this type of question, I would hope, that a device-centred perspective on participation allows us to place front and centre. The relational problem of relevance that I extracted from pragmatist writings directs attention to a rather vaguely defined 'in-between', as the zone where relevance comes or fails to come about. A device-centred perspective can help to specify this 'in between', as it focuses attention on the role of settings, technologies and objects in the mediation of relevance relations.[14] Rather than positing relevance relations on a level that is independent from the settings of social and political life, we must then adopt a more experimental approach to relevance, and locate capacities of 'relevancing'[15] in devices of participation and variously 'devised' actors.[16] In proposing this, a device-centred approach brings into relief the artefactual nature of people's capacities to take environmental issues into account: these capacities are in part an effect of the settings, instruments and objects of participation that we rely on, and are highly variable at that.

To conclude this section, I would like to illustrate the relational notion of public relevance with an empirical example: a so-called issue cloud (Figure 6.2). This figure applies a popular technique of online

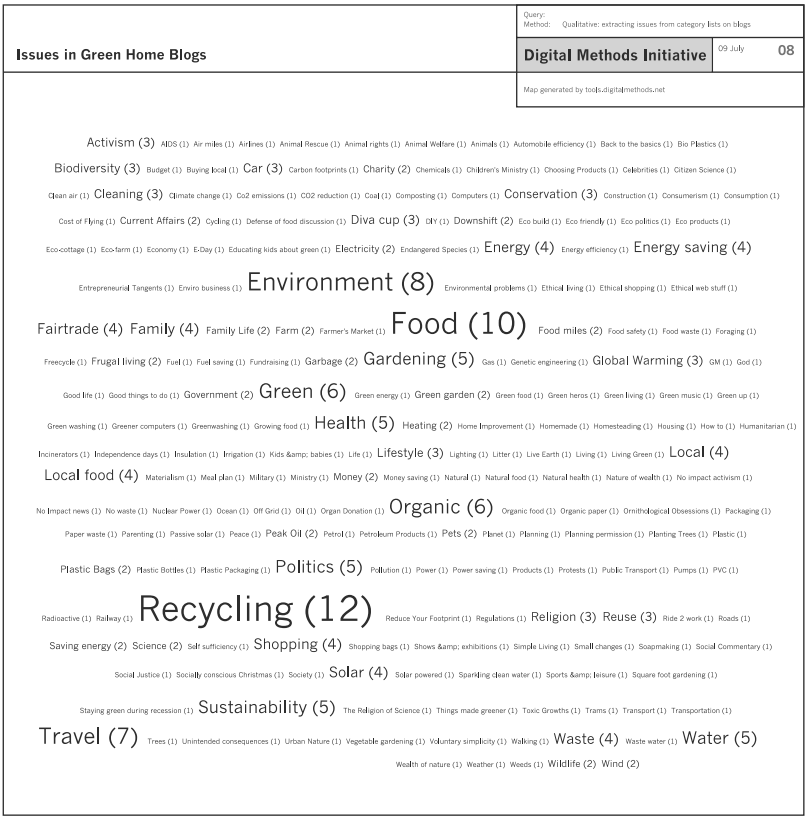

Figure 6.2 Issues on Green Living Blogs, July 2008

information visualization, the tag cloud, to display the relative prominence of issues in online media: it presents the aggregated categories used in online accounts of sustainable living experiments, on so-called green blogs. Can we recognize here the 'expansive present' discussed by Nowotny? If we treat blog categories as a proxy for concerns, the cumulative issue cloud may arguably be taken as indicating the spheres of concern opened up by green blogs.[17] The device of the tag cloud here makes it possible to plot issues without presuming a predetermined grid of relevance (say a timeline or map of the globe). Indeed, if we now consider the issue categories of green blogs, it turns out to be quite difficult, if not undoable, to locate their various concerns unequivocally in

time and in space. Is recycling a personal or an environmental concern? What about politics?

The issue cloud also suggests what a more symmetrical approach to relevance might look like in a specific case. It is striking that some of the issue terms that figure prominently in governmental programmes relating to the environment, like climate change, CO2 emissions and carbon, do not figure very prominently in this figure at all. One response would be to say that green living blogs fail to acknowledge the relevance of truly important issues. But we may also put the question the other way: why are not issues of fair trade or peak oil more central in governmental initiatives of public engagement with environmental issues? This is not the place to develop a relational critique of environmental policy. But the online issue analysis in Figure 6.2 suggests a way of undoing the assumption that spheres of relevance are fixed or given. When it comes to determining levels of 'out-of-touchness', it is not self-evident at all which actor groupings must be found wanting, green bloggers or the organizers of official public engagement initiatives.

Beyond debate? Devising spaces of participation

To adopt a relational approach to the public's problem of relevance has consequences for how we conceive of spaces of participation. From such a perspective, we have seen, participation cannot be understood as contained in a given spatio-temporal framework that is strictly external to it. Rather, the enactment of participation and the organization of the space-times of participation must be understood as inter-related processes. This complicates matters significantly, as theories and models of public participation often presume that spaces of participation can be defined independently from the actual participatory processes going on in these spaces. To make this point in the language of political theory, a relational approach to public relevance complicates the distinction between substance and procedure. It suggests that contamination may occur between these different levels of political reality: the content of participatory process and the formal organization of this process cannot be neatly separated in this case.

This, in turn, has implications for our analysis of the *problems* of material participation. The articulation of issues in participatory practice – say 'peak oil' – may spill over into the organization of participatory space – say the roles energy companies may or may not play in the facilitation of participation. This contamination among what are often conceived of as different levels of political reality may

also apply to problems of participation. We may have to accept that the articulation of problems of participation is going on at lots of different levels, which may not always be kept distinct: the problem of participation must be defined differently, depending on what issues are at stake in it, and what actors are involved, and so on.

However, it is not quite satisfactory either, from the holistic perspective on participation advanced here, to adopt a 'multi-level' theory of participation. Such a theory posits a series of guidelines for deciding which issues are to be addressed in which public platforms, on the local, regional, national or transnational level. However, the same manoeuvre that leads us to recognize the interrelations between different levels of political reality also turns the enactment of participation into an empirical question. From a relational perspective, that is, there are specific reasons to reject the idea that spaces of participation can be defined independently of what goes on within them. In practice, the organization of spaces of participation happens in much more specific ways than general, purely theoretical concepts of 'public space' or 'participatory space' can capture. The configuration of such spaces, we then simply say, is at least in part a consequence of evolving relations between entities involved in participation, which are different in each case. And problematization – the articulation of concerns, the distributions of problems of participation, and the configuration of issue spaces – is then best understood as a practical accomplishment. Rather than trying to generate a conceptual map that can clarify this complex process of overlapping problematizations once and for all, it seems more worthwhile to explore problems of participation empirically.

Such a proposal draws on ANT, but it also deviates from it. The concept of participatory space as a relational space of problematization has been a central contribution of ANT. This work proposed to place 'heterogeneous assemblages', or similar formations like the 'hybrid forum', at the centre of democracy (Callon et al., 2009; Latour, 2004a; Irwin and Michael, 2003). It identified the unfolding of problematic relations between humans and non-humans as a crucial organizing principle of publics (unwittingly echoing the pragmatists). However, at least in its classic formulation, ANT went only so far in extending this relational perspective to *spaces* of participation. As mentioned, work in this field has relied quite heavily on familiar institutional forms like the Parliament and the public debate to conjure up the space of democracy. And this is where a device-centred perspective on participation seeks to contribute. It makes it possible to account for the organization of spaces of participation in empirical and relational terms.

In some ways, the ANT idea of democracy as heterogeneous assembly goes directly against the static, abstract vision of participatory space upheld in many human-centred theories of democracy. It partly suspends the idea that public participation requires dis-entanglement, refusing to uphold the restrictive policy according to which only humans who have successfully extracted themselves from everyday life are allowed entry to the closed chambers of democratic participation. The concept of heterogeneous assembly highlights that everyday entanglements may *enable* public involvement. The implication of actors in material and physical tangles – of living bodies, livelihoods and living environments – not only may turn people into concerned citizens, it may also transform unremarkable sites of social and political life into happening settings of participation: places like architecture exhibitions, road construction sites and living rooms may be transformed into engaging spaces of participation. However, ANT accounts of participation in terms of heterogeneous assembly, on the whole, have not extended their relationalism into the institutional base of democracy.

Actor-network theorists have tended to invoke abstract models of democracy, like the debate forum or the parliament, and project these models onto the empirical entanglements under description (Latour 1993; Callon et al., 2009). In doing so, actor-network theorists suggested that if we are to account adequately for the transformation of actors into citizens, and topics into public issues, we need a conception of political space that transcends narrowly defined empirical settings, like a town hall, exhibition space or living room. There is also something else: it is as if actor-network theorists did not believe that enactments of participation would stand a serious chance outside the confines of established institutional forms. This tells us something about the peculiarity of democracy as a register of articulation. But for those who are experimentally inclined, it also is an invitation to try and extend the relational account of participation further, and ask why the space of participation should not be accounted for in terms of heterogeneous assembly as well. This is what a device-centred perspective on participation tries to do. It proposes to explore to what extent spaces of participation, too, unfold through the assembly of heterogeneous elements. Rather than conjuring up the space of participation by projecting institutional democratic forms onto empirical practice, we must investigate how the organization of participatory space involves a far more experimental assembly of specific technologies, settings and objects: smart meters, green living blogs, demonstrational houses and so on.

To clarify the implications of this for our conception of participatory space, I here want to oppose two different ways of conjuring up spaces of democracy. One way of doing this, we have seen, is to project the idea of debate onto practices, and another is to focus on the space-making capacities of devices. To be sure, the intellectual habit of projecting the metaphor of public debate onto empirical practices is not limited to ANT. It is a tried and tested gesture of political and social life that has itself attracted attention and commentary in political and social theory (Honig, 1993). To superimpose the concept of public debate onto practice is to conjure up a common space by abstract means, and some have argued that there is an especially strong need for this manoeuvre in a technological context. Here, complex devices of information and communication mediate publicity, something which makes it especially difficult to envision a common space (Peters, 1999; Warner, 1990). To project the debate metaphor onto empirical practices then provides a way of *dis-intermediating* publicity: it is to filter out the complexity of technological mediations, in order to establish a common space in which dispersed actors may all participate, and issues may be construed as public affairs. To direct attention to the role of devices in the organization of participation is to highlight something which the metaphor of 'public debate' is precisely designed to enable us to forget: the mediating role of technology in the organization of public space.

The projection of democratic shapes onto practice, then, is a manoeuvre made in a range of political theories and discourses. But here is an example from the field of social studies of technology, one that describes – to stay close to home – a public controversy about smart electricity meters in the United Kingdom in the 1990s:

> A context needs to be created in which utilities, manufacturers and communications companies can be supplemented with the missing voices of regulators and user groups, such as environmental and community organisations. (Marvin et al., 1999)

Such an account makes the argument in favour of participation by invoking 'missing voices' (including, troublingly, that of regulators), and the possibility of adding fresh perspectives to those already taken into account.[18] Participatory space, we can say, is here conceived as a space of extension, in which public engagement is about broadening the range of voices or viewpoints that are included in political process.[19]

A device-centred approach to participation opens up an alternative understanding of participatory space, as it highlights the role of

technologies, settings and things in their organization. To return to the device of tag clouding introduced above, this device can offer an empirical demonstration of how spaces of controversy are inflected by objects.[20] A tag cloud, like the metaphor of debate, conjures up a virtual space of publicity, but one that is differently constituted. Another account of public controversy about smart meters can help to make this clear. Figure 6.3 presents an issue cloud which displays the concerns that emerged during a more recent controversy around smart energy meters in the United Kingdom. This controversy flared up in the fall of 2009, after the publication of an impact assessment of 'smart metering of gas and electricity in the domestic sector' by the Department of Energy and Climate Change (DECC). In the week following the publication of this report, a range of news stories raised concerns in the news and on blogs, as the consumer organization Consumer Focus suggested that smart meters could be used by utility companies to switch off unpaying customers, and to collect user data.[21] Smart meters, these stories suggested, could provide a channel for 'third party services', consumer applications that would run on top of smart meters, and accordingly could amount to what the Daily Telegraph called a 'spy in the home'.[22]

To determine the engagement with these issues in broader publicity spaces, I used a web-based tool called the Googlescraper, which detects the resonance of specific terms on selected Web pages, and visualizes the results using the format of the tag cloud.[23] Querying a set of Web pages – blogs, and NGO, company and news sites – which all link to the DECC Impact assessment, I found the distribution of terms as shown in Figure 6.3. In the manner customary of tag clouds, the figure shows a range of concerns that have become associated with smart meters on the occasion of the publication of DECC's impact assessment report on the Web. As such, it provides an indication of whether and how a space of controversy unfolded in the wake of this report in this medium.

To be sure, a tag cloud visualization as in Figure 6.3 can be interpreted in several different ways. One possibility is to read the issue cloud as weighing issue terms according to the number of actors who lend their support to these terms on the Web, putting their weight behind certain issues and not others. This interpretation has been suggested by Bruno Latour and Richard Rogers who have proposed that issue clouding offers a way to take up an idea of Walter Lippmann, that media can be used to measure levels of 'actor partisanship' in public controversies (see also Rogers and Marres, 2002). But there is also another way of reading the issue cloud, one that plays up a relational view of publicity

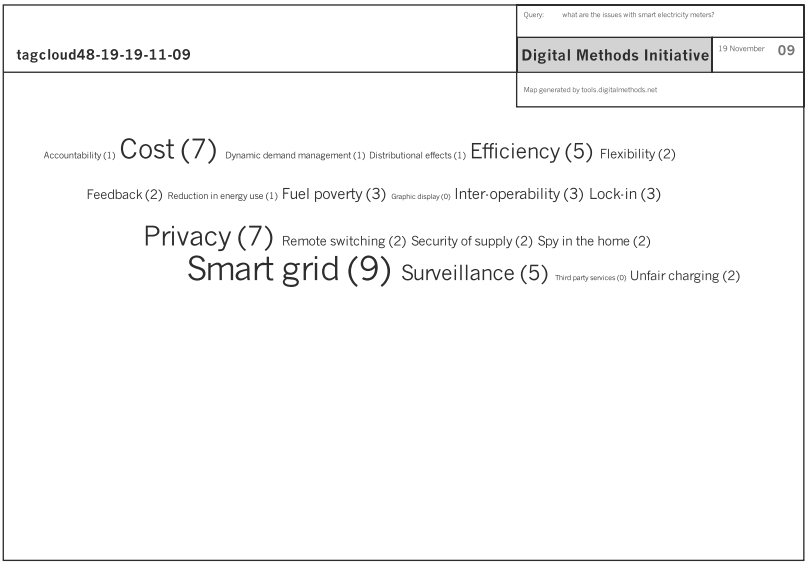

Figure 6.3 Issue cloud, smart meter controversy terms according to the Googlescraper, November 2009

space. The figure provides indications of the scope of terms that are currently active in controversies around smart electricity meters, and, as such, it can be taken to disclose the 'state of issuefication' of the object called smart meter. Here, the enactment of public controversy involves not so much the multiplication of viewpoints, but a process of the problematization of objects, one in which they become associated, or 'charged', with various social, economic, political and-so-on problematics or issues.

Such a reading of issue clouding suggests a relational view of the organization of spaces of publicity, insofar as the distribution of objects and issues, and the connections among them, here marks the contours of participatory space. Such a virtual issue space, in and of itself, does not qualify as a space of participation. But it does show how publicity spaces may be inflected by technology and (data) objects, something which is not recognized when participatory space is imagined by projecting the static metaphor of debate. And in this case, the space of publicity is not organized around the addition of viewpoints, but by the activation of issues. To imagine public space here does not require the deletion of technology from our account, but its deployment. When the

metaphor of debate is projected onto practices, technology, objects and environments are not really allowed to make a difference to the organization of spaces of participation. When deploying an instrument like a tag cloud in tracing the contours of a space of publicity, it becomes clear that devices may also enable the imagination of public space.

This also entails a subtle shift in status of the category of the 'heterogeneous assemblage'. In STS as well as in political theory, the development of a relational perspective on democracy has to a significant extent been framed as a matter of adopting a particular *conception* of it (the hybrid forum, the parliament of things). Something similar can surely be said of device-centred perspectives, but at the same time, such perspectives allow for a further expansion of the relational account of participatory space. Deploying a publicity device like issue clouding in the analysis of public controversy, the relational rendering of publics is *not* a purely analytic intervention, but at least in part an empirical operation.[24] Taking into account the current proliferation of tag clouds across online publicity spaces, it may not be an exaggeration to say that participatory spaces are today literally being organized by relational means. It is then not a purely theoretical statement to say that the organization of participatory space is here accomplished with the aid of devices of publicity.

To conclude, I hope that this brief excursion into the world of tag clouding has clarified further on what points a device-centred perspective on participation seeks to challenge the analytic and normative investment in the democratic form of 'public debate'. This challenge should clearly *not* be mistaken for some kind of attack on language, for an attempt to minimize or trivialize its role on the performance of participation. The target rather is the habit of conjuring up a space of participation by projecting the general and abstract metaphor of debate onto whatever issue area. It may well be time for social and political theory to take more seriously the implications of something that has been widely known on some level for a long time: there are many other ways to conjure up spaces of participation besides the metaphor of public debate. Conversation has been the privileged genre of public action since time immemorial – at least since Socrates engaged in dialogue in the streets of Athens. And to consider the accomplishment of participation by other means than conversation is not necessarily to argue against debate as a form of participation. Rather, it is to insist that we should be able to imagine democracy without the comfort of *disintermediation* offered by the metaphor of 'debate', and without needing to edit technology out of our understanding of participation.

Conclusion

Social studies of technology have long seen it as their principal task to demonstrate that technology does not meet the standards of democracy. In different ways, work in this field has shown how the concerns of users, the interests of citizens and the rule of law are disregarded or opportunistically enlisted in processes of innovation. In showing this, these studies have been able to make an important critical contribution. However, in doing so, they have also tended to uphold participation and democracy as theoretical ideals, while leaving these ideals themselves relatively un-interrogated. In this book, I have tried to open up for questioning this 'asymmetrical' treatment of technology and democracy in social studies of technology, by outlining an empirical approach that foregrounds the role of devices in participation. Such an approach views participation as a performative accomplishment, which involves the codification of practices in ideal terms, such as 'involvement made easy'. Empirical study of specific technologies of participation can help to bring such codifications into view, as I have shown in this book through case studies of material participation: devices like sustainable homes, living experiments and green household appliances help to articulate a distinctive mode of public engagement, one that locates involvement with environmental issues in everyday material practices. This also means that there is a close connection between the project of 'devising' participation – of adding technology to our account of it – and that of 'empiricising' it – of turning to practice as the site where the ontology of participation becomes specified.

One thing that I hope this book makes clear is that to adopt an empirical approach to participation does *not* mean that our job as analysts is reduced to merely describing it. Technologies of participation, like most other instruments, are under-determined in their application, to use the classic Wittgensteinian formulation. To use a more contemporary term, these technologies are marked by performative flexibility. As we saw in the case of everyday carbon accounting and eco-show homes, a given device may be adapted to perform participation in radically different registers, from 'involvement made easy' to creative experiments in living differently. This is why we must adopt a performative perspective on these instruments: only by considering their deployment in specific settings, can we determine what is the normative range of different devices of engagement. Do devices of everyday carbon accounting reduce the contribution of citizens to a competitive game where the point is to find out who has the most 'points'? Or do

Figure 6.4 Spiral Drawing Sunrise, Esther Polak, Amsterdam, 6 April 2009

these devices enable an activist engagement with climate change mitigation? This is a relatively open question. As we saw in Chapter 3, the Islington–Hackney Carbon Rationing Action Group was able to identify crucial weaknesses in governmental programmes of carbon trading, precisely because it had made this very format of environmental action its own. The democratic politics of technology here becomes, in part, a question of who appropriates whom.

Devices may also open up new ways of imagining material participation. To make this clear, I would like to discuss one last technology of environmental participation: Spiral Drawing Sunrise (see Figure 6.4). This experimental device was built by the Amsterdam-based new media artist, Esther Polak. It is a kind of sundial on wheels, or a sun-powered, mobile hour glass, which can be used to make recordings of the rising sun. The device is suggestive of a particular way of engaging the environment, I would like to propose, one that focuses on the rendering of the environment as a 'happening' (Marres, 2012). Using the Spiral robot-cart to record a sunrise on a public square in Amsterdam, Spiral Drawing Sunrise turned out to render its surroundings 'present' in a particular way. As the robot-cart made its slow circles across the square, it highlighted not only the path of the sun, but also the trams crossing the square, women walking their dogs and the unmovable dark glass building in the corner of the square that houses the Dutch National Bank.

In doing so, Spiral Drawing Sunrise suggested a mode of environmental awareness that is reminiscent of sustainable living experiments.

By modifying the everyday environment of the square, it accentuated the various trajectories that composed this environment, from trams to the sun, cyclists, and passers-by, making them stand out far more strongly than they would if you would cross the square routinely (as I did for many years). As such, Spiral Drawing Sunrise too raised the question I flagged above: What is it possible to make relevant?[25] Can we take a distant environmental phenomenon such as the rising sun into account as part of everyday living in a square? Can we recognize the goings-on in an urban square as participants in the happening of a sunrise? To be sure, these questions do not give us a model of participation, and they surely do not provide a solution to the predicament of environmental participation: they do not tell us how the mutual relevance of issues, actors and spaces of participation can be ensured. But, in invoking this predicament, Spiral Drawing Sunrise, like other devices in this book, does provide a way of articulating, and indeed dramatizing, the public's problem of relevance.

Some interpreters of pragmatism, like Richard Rorty, have suggested that to empiricise a problem is to deflate it. For Rorty, to understand classic philosophical problems as specific to a particular epoch or context is to witness their collapse, or even, to provide a way of making them disappear. ANT, too, has offered a version of this idea, as it suggested that to turn attention to heterogeneous networks in-the-making is to suspend certain classic problems of philosophy and sociology, like the famous 'gap' between subject and object, and that between individual agency and social structure. This belief in the power of history or the empirical to deflate philosophy's problems, it seems to me, involves a misreading of the pragmatist project: it mistakes the project of *re-constructing* the problems of philosophy as practical problems for a critical or deflationary one. But there are also other modes of empiricising concepts, which examine how weighty problems of knowledge, politics, and the real acquire their significance in specific settings. This is how I have approached the distinctive problems of the material public in this book: the problems of its influencability, instability, un-doability. These problems of participation are challenges of practice as much as theory, and our role as analysts should be to show that they deserve to be taken seriously as problems, and to prevent them from turning into excuses for not taking seriously the normative predicaments of material publics.

Notes

1 Participation as if Things Mattered

1. One could be tempted to ask whether this is a new situation. But I would like to join other constructivists in noting that the fact that we can pose the question at all may be more significant than its answer. When a phenomenon is emerging, the question whether it is new or not tends to be literally an open question, one that cannot really be disentangled from this process of emergence. Only when this process is well underway may we be able to answer it (or as the case may be, if it does not get underway after all). Which is why the question 'is this new?' seems misguided to constructivists: it supposes that we are dealing with a phenomenon that can already be disconnected from descriptions of it.
2. This means that the social study of material participation as I outline it here is a continuation of post-Foucauldian analyses of the materiality of citizenship. As I will discuss in what follows, to adopt a performative perspective on material participation is to break with the understanding of materiality as a *latent* dimension of participation. But it is also a way of elaborating the idea that participation may be usefully studied from the standpoint of the apparatus (dispositif) that makes it possible.
3. This and the following sections draw on the introduction to 'Devices and Materials of the Public' (2011) that I co-authored with Javier Lezaun.
4. The literature on the material dimensions of public life is rich and marked by multiple influences, from Michel Foucault's famous studies of public architecture to the work of Richard Sennett on the role of costume in the public spaces of eighteenth-century France. Also, matter has been the subject of a number of recent anthologies and edited collections in the social sciences and the humanities (Coole and Frost, 2010; Latour and Weibel, 2005; Hicks and Beaudry, 2012; Braun and Whatmore, 2010; Marres and Lezaun, 2011). These collections testify to a diversity of influences informing object-centred studies of social and political life, from phenomenology to existentialism. In this book I follow a particular trajectory, one that moves from pragmatism to ethnomethodology and actor-network theory (not necessarily in that order).
5. What I refer to here as the 'object turn' is closely related to other recent shifts in social and political theory, such as the move from epistemology to ontology (Law and Urry, 2004; White, 2000; Hacking, 2004) and performativity (Callon et al., 2007; MacKenzie et al, 2007; Butler, 2010). One could say that the object turn, like these other turns, is just one more attempt to explore and summarize the implications of a much broader philosophical movement, one that is associated with Nietzsche, Dewey, Wittgenstein and Foucault: the move from a representational to a

constructivist perspective sensitive to technology and materiality, from a concern with the capacity of knowledge, language and ideas to convey a given reality to the question of how phenomena come into being, under conditions of the circulation of objects, texts, technologies and forms of action. In social studies, much of this work has drawn on political metaphors of performance, negotiation and battles of force, and perhaps for this reason it has taken some time for this approach to be introduced in theories of politics proper.

6. This reticence has mostly been latent, but may have something to do with the fact that a material perspective on participation does not only challenge the modern twentieth-century critique of objectivity in social science but also the age-old republican critique of materiality and the way it renders participation as conditioned by dis-entanglement (see below).
7. Another way of putting this is to say that these studies seek to challenge a purely instrumental conception of the role of objects, according to which material settings, technologies and objects present no more than a passive context or tool for public engagement, which does not determine the enactment of participation in its normative dimension. Habermas' (1962/1991) is still the most famous and sophisticated formulation of this position. But I am suggesting that authors that are often placed at the other end of the social theory spectrum, like post-Foucauldian theorists, in a way fit this description too.
8. Another well-known example is Brian Wynne's (1996) sheep farmers, who could be portrayed as 'lesser' – less competent, less relevant – participants in public controversy as long as their 'ontological' implication in the issues at hand went unrecognized.
9. Political theorists, and some philosophers of science, have questioned the very idea that materiality was ever forgotten in Western political theory (Frost, 2008; Stengers, 2010; Bennett, 2010). They have turned to classic authors like Thomas Hobbes to recover a material account of the body politic that has been 'there' in the history of modern political thought all along (Frost, 2008; Skinner, 2009). To the extent that materiality has indeed been 'edited' out of some modern theories of democracy, it was not exactly forgotten, but rather actively subdued or put in its place, as required by a philosophical schema based on the Cartesian duality of mind and matter (Frost, 2008). Here I am saying that it is equally important to recognize that empirically speaking the claim of the 'forgetting of materiality' gets us only so far. The idea mainly works for those empirical cases in which the material dimension of participation remains under-articulated in practice and theory.
10. Deliberative approaches stand in a complex relationship to informational conceptions of citizenship discussed previously. The former are often presented as an alternative to the latter, but they share a number of assumptions, most importantly the idea of knowledge – being well-informed – as a precondition for adequate participation.
11. There is also a more general reason: much work in post-Foucauldian social studies and actor-network theory upholds the analytical distinction between the messy proliferation of stuff and socio-material attachments on the 'ground level, and the preservation of modern institutional forms of

science, democracy and so on, on another 'higher' level, as I will discuss in the chapters that follow.

12. These perspectives on participation can be variously characterized as 'object-centred' or 'ontological' (Leach et al., 2005; Lash and Lury, 2007; Marres, 2007; Michael, 2009). The latter term connotes a metaphysical approach, while the former suggests a post-metaphysical perspective. However, as I will discuss in chapters 2 and 4, the meanings of these terms are themselves opened up by the object turn, which is why I prefer the more minimal terminology for the moment.
13. I have used the concept of a democratic deficit myself in earlier work, but in a particular sense, namely in reference to the corruption of trajectories of issue formation. In what follows I will problematize the public in different, more positive terms. I will argue that the object turn invites a reformulation of problems of the public, namely as problems of relevance: when actors are already actively implicated in issues, but find themselves at a remove from platforms of issue formation, the question is how different modes of being involved in issues may or may not be rendered relevant *to one another*.
14. In addition, work in actor-network theory *empiricises* problems of engagement: it proposes that the challenge of fostering engagement, of enrolling social actors, is one faced by the actors themselves, as they go about their projects of building infrastructure, dealing with disease, governing cities and so on (Latour, 1988).
15. This kind of problematization of the public can also be seen as an artefact of economistic approaches to public participation. It seems in part a result of the proliferation of a particular method for the measurement of public engagement in the area of climate change, which is taken from the field of environmental economics: the measure of the 'willingness to pay' (Berk and Fovell, 1999). The popularity of this measure in public research on climate change can be made sense of in terms of the wider prevalence of economic formats in efforts at the societal 'domestication' of climate change (cap-and-trade, carbon budgeting, etc.). Such an economization thesis, however, is incomplete as an analysis of material participation. As I will argue in Chapter 3, we need to consider how devices of material participation allow for the *co-articulation* of economics, politics and science, as modes of articulation from each of these fields are linked up, so that it is not always clear which register will prevail over the others.
16. The term problematization is Foucault's and in his work is associated with the idea of a epistemic field in which the parameters of discourse are set (what can be true, what can be false, what is the problem, what are possible solutions) (Rabinow, 2005). But the term also resonates with the classic pragmatist concept of the problematic situation. Actor-network theory has interpreted the term as referring to an operator of social, epistemic, material and technical processes of articulation (Callon, 1980; see also more recent work by Latour (2007) on matters of concern). In Chapter 5, I will add the term 'issuefication' as a way of emphasizing the normative variability of objects that become subject to problematization.
17. One can ask whether this 'passivity' model of the public counts as a successor to the famous 'deficit model' of the public (Wynne, 1992). However, as I suggested above, the problem of the dis-invested public is perhaps best

understood not as a deficit thesis in general but as a particular reformulation of problems of literacy: in both problem definitions, the ability to act on issues tends to be correlated with access to information and resources.

18. These problems may further account for some of the hesitations on the part of social studies to fully extend the object turn to participation. As mentioned, it is striking how important representatives of the object turn in social theory have continued to privilege deliberative forms of participation.
19. This requirement, of course, has been challenged many times over in the history of social and political thought, from liberal political theory to Marxism and feminist thought. I will suggest that material participation, understood as a distinctive public form, only in some ways challenges this requirement of the dis-embedding of action from everyday material life, and in other ways fulfils it.
20. To account for the emergence of this claim in historical terms would require a book of its own, and here I am only arguing that an awareness of its historicity is important for its study as a contemporary form.
21. It is an open question whether this wider adoption and/or appropriation of the 'participatory agenda' in relation to science, technology and environment can be attributed to intellectuals and scientists associated with the science, technology and society movement. But it has in several cases threatened to reduce them to the Eliotesque exclamation: 'but this is not what we meant at all!' Here I will propose that, in response to this development, the ambivalent approach that STS has championed in relation to technology should be extended to participation.
22. This narrative, too, centres on the notion of a 'democratic deficit' associated with a politics informed by science and technology. This deficit has received different formulations, but Stephen Turner (2001) provides a useful one in his account of the 'problem of expertise for democracy': to the extent that science and technology constitute forms of power in modern societies, this is likely to threaten or undermine ideals of equality and inclusiveness in decision-making and social and political life more widely. The opening up of the domains of scientific knowledge production and technological innovation to the public is one notable solution to this problem, and has been advocated in social studies of science and technology. Helga Nowotny, for instance, has evoked the idea of a transition from the Platonist model of a king surrounded by wise men to the Aristotelian model of public deliberation on matters of common concern as symbolized by the Athenian Agora to point to a way forward forthe governance of technoscience (Nowotny et al, 2001).
23. There are of course many other political forms associated with the commitment to render science more central to politics, including nineteenth-century socialism, twentieth-century social democracy and the cultural libertarianism of the 1960s. But scientific liberalism has been an especially predominant form in the Anglo-Saxon context, and it is one on which much of the political and cultural contestation of empiricism in politics concentrates today.
24. There has been an odd asymmetry in social studies of science and technology in this respect: while work in this field rejected the diagnosis of

technocracy in relation to society, noting the proliferation of *socio*-technical systems, much of this work continued to frame its own contribution in terms of the fight against technocracy, thus upholding the democratization thesis.

25. Deliberative theories of public participation arguably have contributed to the persistence of this opposition between democracy and technology. While these theories frequently note the technological base of participation, the concept of deliberation also makes it possible to bracket the technological mediation of the public, by projecting the metaphor of the face-to-face exchange onto technologically mediated interaction (Warner, 1990). I will return to this point in Chapter 6.
26. Work in science and technology studies has argued that a concern with multiplicity is the logical outcome of treating the relations between, on the one hand, democracy, and on the other hand, science, technology and nature, as an empirical question. A discursive approach like Yaron Ezrahi's analysis (1990; 1995) of the 'civic epistemology' that can be found at the heart of twentieth-century liberal democracy still allows it to be treated in the singular. But an empirical approach requires us to recognize that relations between science, technology, nature and democracy are inherently variable (Jasanoff, 2005a). Much of the subsequent debate in STS has focused on the question of whether we should stick to a relatively straightforward empiricism, in which STS can deploy mainstream social science tools of comparative analysis, or whether we must adopt a more radical strategy and recognize the inherent performativity of all 'empirical' phenomena. In this book I adopt the latter approach, as I draw attention to the role of empirical technologies in the enactment of material participation, and the implications this has for our understanding of 'political ontology' – I return to this issue in chapters 4 and 5.
27. There are some problems with these labels: 'post-environmentalism' might be taken to suggest that it is possible to be 'done' with the externality of nature, and the concept of ethical consumption fails to capture that ethicization precisely breaks down the distinction between production and consumption, as it must inevitably refer to the broader trajectories of objects (Stassart and Whatmore, 2003). The category of behaviour change is a complex one, and I critique a disciplinary incarnation of the concept in Chapter 5. However, it seems to me the most promising of the three, as it might offer ways to develop further an experimental perspective on participation.
28. A focus on this site also means that my perspective on the role of non-humans in participation is effectively limited to objects that are part of the domestic landscape, on the intimate level or more remotely. Indeed, to adopt a performative perspective on participation also means that an adequate account of the role of different objects, say animals or large natural phenomena like volcano eruptions (Clark, 2010; Bingham, 2006), require a different type of empirical and conceptual engagement, and cannot simply be subsumed under the general rubric of the role of non-humans in politics and ethics.
29. I here use the term 'setting' in a technical sense which includes objects, methods and technologies, without it necessarily being possible to make a

neat distinction between the three (Garfinkel, 1967 (1984); see also Duhem, 1906 (1982) on experimental settings). This is also to say that participation is here constituted as 'environmental' in at least two respects: (1) as pertaining to environmental issues like climate change and (2) as accomplished through the modification of domestic environments.

30. The concept of device has a heterogeneous intellectual pedigree: it can be traced back to the Foucauldian notion of dispositif, but also to the work of Pierre Duhem who developed an important critique of the abstractability of theories and methods from experimental practice: from this perspective, to study devices of participation is to recognize the traffic between method, theory and setting as constitutive of the phenomenon in question (see chapters 3, 4 and 5).
31. This assumption has been famously critiqued in ethnomethodology, and it has also been elaborated in science and technology studies, where it has been argued that it is impossible to abstract experimental methods from the material settings in which they are deployed (Lynch, 1991; Latour, 1988). It can be traced back to the holistic philosophy of science of Pierre Duhem (1906 (1982)) who famously argued that the indistinguishability of concepts, methods and objects is a constitutive feature of experimental settings. In what follows I will apply this argument to experimental settings of participation. Duhem's argument also has implications for how we understand empiricist engagements with theory. There are different understandings of this project: for some it involves a move from normative to descriptive analysis, while for others it is about a shift from prescriptive to empiricist modes of valuation. However, Duhem can be taken to suggest a third version, which focuses on the relative indistinguishability of method, empirical content and theory in experiments. Applying this claim to a multiply appropriated research site like the environmental home, this raises a question about 'participatory' research. What is the appropriate division of labour between theory, method and data in these settings? This may be treated as an object of negotiation and contestation in which social research has its stakes.
32. To focus on devices is then also to reject any simple opposition between material and linguistic modes of involvement: a 'device-centred' perspective on material participation precisely enables us to move beyond the implausible opposition between linguistic and material forms of engagement. From such a perspective it is clear that the more 'material' forms of environmental engagement too, such as 'trying not to use one's hose pipe', clearly include informational components.
33. Mitchell's article on carbon democracy focuses on the power plant, the oil rig and the mining site as settings where the politics of energy is done. He seems to suggest that the supply side has more affordances for a participatory politics of energy than the demand site. A performative analysis of environmental homes, however, proposes a different distribution of politics, one in which the constitution of an environmental society in domestic settings is seen as a central component of the politics of energy today.
34. One important starting point and target of this project of re-specification is the ideal of 'involvement made easy', but Chapter 2 presents another

starting point – the understanding of the material public as a 'community of the affected'.

2 The Invention of Material Publics: Returns to American Pragmatism

1. Earlier work in the sociology of science and technology on the role of non-humans in the enactment of participation has been primarily empirical in orientation, with some authors suggesting that the analysis of participation in its material dimension can or should principally take the form of a project of empirical re-description (Callon and Rabeharisoa, 2004; Lezaun, 2007). Here I am questioning whether this limitation to the empirical is possible: a concern with the materiality of participation, in and of itself, may implicate us in theoretical projects, which we do well to examine critically.
2. The politics of problem-solving is not unique to scientifiic liberalism (see, e.g., Unger, 2007), but the idea that politics may be *reduced* to problem-solving, and that this provides a way to keep out power and ideology may well be particular to it.
3. Among concepts of the community of the affected we could also include theories of affective politics developed in recent cultural theory (Thrift, 2008; Terranova, 2007; Blackman, 2008). Such 'post-emotive' conceptions of the public propose to understand the mobilization of publics in terms of the quick and intense propagation of feeling through a population that sensationalist media make possible, in a quasi-epidemological way. Importantly, the rise to prominence of such affective publics is often traced back to precisely the period in which the pragmatists wrote their books about democracy in the technological society, the 1920s, and indeed, to these very works, insofar as they also discuss the new opportunities provided by mass media for the instant proliferation of passions and the creation of sensations, and relatedly, the increased possibilities for the manipulation of public sentiments, and their deployment for partisan purposes. (Walter Lippmann, moreover, holds a special place in this history as a member of the American national public propaganda committee during the First World War.) This affective public may arguably be understood as a technologically mediated version of the crowd. I have decided to exclude this community of the affected from consideration here, as it opens up a very different set of problems of the public than the ones I will focus on. The biggest problem of affective publics is arguably that of their 'overaffectation', an unsustainable, unproductive form of engagement in which mobilization does not translate into action. By contrast, the public problem of relevance that I will discuss highlights almost the opposite situation: the problem that public engagement requires significant investment from social actors in complex issues, to which there can easily seem to be no point from the standpoint of the public.
4. A related problem is that of descriptivism or sociologism. Studies that profess to merely describe the techniques, objects and architectures that come into play in enactments of publics are susceptible to a particular suspicion: by documenting the role of technology in the organization of publics,

they may implicitly subscribe to the 'technicisation' of publics, as a development that seems characteristic of advanced liberal, mediatised societies (see Chapter 1). Furthermore, there are some intriguing crossovers between classic liberal theories of democracy and constructivist concepts of the public developed in science and technology studies (STS) and related fields: Isabelle Stengers' cosmopolitical proposal, for instance, draws on elements of the classic liberal philosophy of Popper, such as his concept of reality as resistance (recalcitrance), and the notion that if we want to theorize politics, we must study scientific controversy.

5. A different version of this argument has been put forward in discussions about politics in science and technology studies. Here it has been argued that the ascription of politics to science and technology may result in 'emptying out' the category of politics, insofar as politics must now be said to be occurring in all sorts of places, from laboratories to the GP's waiting room, and if politics can happen everywhere, it loses its distinctiveness (Harbers, 2005; De Vries, 2007). More generally speaking, as Frank Ankersmit (1997) has also argued, the un-bounding of politics is often taken to signal its de-politicization (for a constrasting view, see Beck's writing on the becoming unbound of politics (*Entgrenzung*)). In this chapter, I focus on the concept of the public, and the issue of *its* relative uncontainability – something which I agree requires a different way of thinking about the public, but one which I argue has *already* been developed by John Dewey and Walter Lippmann.
6. As I suggested in chapter 1, we could posit that there is a 'deficit model' (Wynne, 1996) that is particular to the material public. In this case, the model would not focus so much on cognitive abilities, but rather on the failure to take responsible action. This might also be taken to imply that the understanding of the public according to a 'deficit model' is a more general phenomenon than suggested by critiques of it in the social studies of science and its publics: the public is all too frequently defined in terms of its shortcomings, whatever these may be.
7. This concept can be traced back to the pragmatist notion of the problematic situation, as I discuss below, and is a central concept of early actor-network theory (ANT) (Callon, 1980) and more recent incarnations (Latour, 2005b). To apply the concept to a theoretical category like the public is to use it in a different way than ANT: ANT tends to account for problematization as an operation on empirical relations. I turn to the issue of problematization as an empirical event in Chapter 4.
8. Not coincidentally, the currently available version of *The Public and Its Problems* (1991 (1927)), features a review from the Whole Earth Catalog on the back.
9. In her case: between gender theory, post-modernism, and theories of deliberative democracy. Mottier (2004) holds neo-pragmatists like Rorty partly responsible for the lack of exchange among these theoretical approaches, as he put the emphasis on very particular aspects of pragmatist writing, such as anti-foundationalism (see in particular Rorty, 1981, and also Festenstein, 1997). This obscures the resonance of pragmatism with, for instance, gender theory, and its positive conception of knowledge-making as embodied practice. Here I am making a similar argument: I too suggest that we need to move beyond an 'anti-metaphysical' reading of pragmatism to understand how it

prefigures various positive, object-centred concepts of the public: materialist, proceduralist and post-instrumentalist. I also agree with Mottier that the relational ontology developed by the pragmatists is particularly relevant if we return to pragmatism to retroactively enact encounters between such different approaches. More generally speaking, discussions of pragmatism rarely consider the conceptual resonances *between* the different twentieth-century theoretical traditions that draw on it, though for an important exception see Bernstein (2010), on pragmatism as a site of encounter between analytic philosophy of language and deconstructivism.

10. In this respect, American pragmatism may also be said to prefigure experimental concepts of ontology that have been developed in social studies of science and technology – in the work of Bruno Latour, Annemarie Mol and John Law among others. However, whereas Dewey made experimental ontology a central proposition of his theory of *democracy*, this recent work in STS has been more concerned with the *sub*-political effects of material intervention. I will discuss this in more detail in the chapters that follow.
11. See Muniesa (forthcoming) for a discussion of Dewey's dynamic concept of ontology and his attempt to think ontology in-and-as action. Importantly, however, Dewey's definition of the public highlights the practical necessity of action, rather than action itself – which in turn can be taken to mean that Dewey has also pre-emptively addressed a critique of ANT, that of presentism (Fraser, 2008). Dewey's ontological dynamic of problematization is *not* quite a dynamic of actualization.
12. This conception of the public arguably places Dewey in the liberal tradition going back to Locke: As the American political theorist Tracy Strong (2009) has suggested, Locke and others in the liberal contract tradition were precisely concerned with the problematics of 'material entanglement': the contract theory of political community is an attempt to resolve this predicament, according to which we are self-enslaved as long as we do not realize the consequences of our implication in wider material entanglements.
13. This is how Dewey defines the problematic situation in his essay on the practical character of reality (Dewey, 1998 (1908), p. 130): 'Awareness means attention, and attention means crisis of some sort in an existent situation: a forking of the roads of some material, a tendency to go this way and that. It represents something the matter, something out of gear, or in some way menaced, insecure, problematical and strained.'
14. This is also to say that, while Dewey called his own philosophy instrumentalism, it is clear that he meant something quite different from the utilitarian brand of 'means-ism'. More generally speaking, Dewey's insistence that publics come into existence in disruptive events sets his account apart from other consequentialist approaches to morality and politics, such as utilitarianism. Dewey *did* follow utilitarianism in defining the public in terms of consequences of action, but he certainly did not subscribe to its conception of politics as principally concerned with the maximalization of 'agreeable' consequences, and the prevention of disagreeable ones. Dewey appreciated the utilitarian insight that a focus on consequences helps us recognize 'the empirical character' of morality and politics. But he was extremely critical of the idea that it is possible to *calculate* future consequences of action, and of the distinction between means and ends on which such a calculative

approach is predicated. Dewey rejected the utilitarian identification of politics and morality as concerned with the determination of the proper means that will help to realize *specifiable* desired ends, because he could not accept the instrumentalist carving up of the world into means and ends that this implied (Dewey, 2007 (1922), pp. 222–7).

15. In this respect, Dewey could be said to have given an ontological charge to the definition of the public as a form of stranger relationality (Warner, 2002).
16. To emphasize this aspect of Lippmann's work is to complicate prevailing analyses of the Lippmann–Dewey debate, which tend to portray Lippmann's contribution in mainly negative terms, as offering a *critique* of classic modern ideals of participatory democracy (Robbins, 1993; Ryan, 1995). In such accounts, Lippmann figures as the journalist-thinker who courageously argued in favour of a 'reality check' on concepts of the public. As Robbins put it, Lippmann argued that political philosophy had been complicit in furthering an 'image of the public that is *so* hazy, idealistic, and distant from actual people, places, and institutions around us, that it can as easily serve purposes that are anything but democratic' (Robbins, 1993, p. xi). I do not think that such a reading of Lippmann is wrong, but I think his work also contains elements of a re-constructive project: it develops a conception of the public that is attuned to conditions for its organization in technological societies. In this chapter, I concentrate on the ways in which Lippmann's re-constructive account of the public brings into view a non-instrumental concept of the material public, though one which ultimately is also limited.
17. In this respect, Lippmann's concept of the public also prefigures the concept of the 'wicked problem', the social problem which is marked by uncertainty and resistance to established problem-solving strategies (Rittel and Webber, 1973; Rayner, 2006). However, the pragmatists theorize these problems not in epistemic terms – i.e. in terms of the knowledge strategies that they require – but in ontological ones – i.e. as implying a particular mode of problem-involvement by material means.
18. As a corollary to this, Lippmann also emphasizes in *The Phantom Public* that the articulation of public issues requires insiders to transform themselves into outsiders: those who are familiar with the issues need to 'go public' if the issue is to receive a public articulation. For Lippmann, the production of confusion over who counts as an insider and who as outsider to an affair is a good indicator that the public articulation of an affair is underway.
19. Lippmann's environmental specification of the public is then taken as an element in his critique of the myth of the 'omnicompetent citizen', his attack on a prevailing political imagination of the public which upholds an impossible standard of citizenship, assuming that everyday individuals possess political competences which not even full-time politicians can be assumed to have acquired, such as 'knowledge of the facts'.
20. In this respect, Lippmann's public prefigures a development that has been situated in a later historical period: that of the 'socialization' of citizens, and their (re-)specification as workers and household consumers in social research of the post-war period (Mort, 2006, p. 232).
21. Lippmann and Dewey did propose solutions to this problem, but in formulating these, they let go of their definition of the public in material terms.

Thus, later in *The Public and its Problems* Dewey reverted to a definition of the public as a social community, while Lippmann put forward a procedure of public consultation in the second half of *The Phantom Public* (for a discussion see Marres, 2005a). In both cases, however, these 'solutions' entailed a dissolution of their definition of the public in terms of the insider/outsider conundrum of the material public: Dewey's public as social community consists of insiders, while Lippmann's consultation procedure constitutes the public as consisting of outsiders.

22. *The problem of relevance* is the title of a book by Alfred Schutz (1970). This book offers a socio-psychological account of relevance, and as such substracts some of the progress made by the situational philosophy developed by Dewey (see footnote 14 in Chapter 6).
23. I derive the term from Alfred Schutz' concept of the isohypses of relevance, which I discuss in Chapter 6. The notion of an isoline of public relevance, moreover, echoes the concept of the uncertainty trough put forward by Donald MacKenzie (1990), though here again we should note that the pragmatists specify not an epistemic but an ontological dynamic of issue implication.
24. It is also to say that, according to Lippmann, publics have little to gain from direct involvement, as the issues at stake are of no *intrinsic* interest to them. For him, the main reason that public involvement in political affairs is ultimately called for is that it alone is able to break deadlocks in political affairs: outside involvement is capable of generating pressures no amount of stakeholding can. This understanding of the problem of the public prefigures subsequent arguments in favour of expertocracy, as in E. E. Schattschneider's (1960) *Semi-Sovereign People*, for which Lippmann serves as a point of reference.
25. In proposing such an empiricist understanding of ontology, the pragmatist approach is directly opposed to materialist assumptions, i.e. the idea that publics can be reduced to a homogeneous set of material relations that are constitutive of them. Relations of entanglement, instead, emerge continuously among entities that are unlikely to fit the straightjacket of an ontology that reduces the world to a set of 'basic building blocks'.
26. In Lippmann's account the tenuousness of public-issue-relations also translated into erraticness on the part of the public. Taking the notion of the *phantom public* from Kierkegaard, he noted the disorientation and unreliability of publics in the technological society. While this problem is often approached today as a problem with public media, their sensationalism and short time-cycles, Lippmann and Dewey equally emphasized problems related to the fact that in technological societies affectedness by issues can*not* be instantaneous. It is this latter problematic on which I concentrate here.
27. I take this term from Steve Woolgar (2005), but use it in a somewhat different way. For Woolgar ontology does seem to have a 'trans-empirical' status: in his chapter on ontological disobedience, at least, he seems to accept the distinction between a narrow empirical register of instrumental reason and a more fundamental register of ontology. Here I am suggesting that pragmatist ideas about 'problem ontologies' help us to re-think the distinction between the empirical and the metaphysical (see also chapters 4 and 5).

28. Wolin has described how the adoption of a problem-centric approach by progressive US administrations from the early twentieth century onwards did not result in the type of enlightened, participatory form of rule that Dewey was committed to (Wolin, 2004b, pp. 518–19). In practice, Wolin suggests, Dewey's object-oriented politics came down to a form of technocratic government that idealized expert-driven forms of policy-making, dedicated to narrowly defined ideals of 'problem-solving'. Ezrahi has equally presented Dewey as a precursor of instrumental modes of governance. Dewey's belief in the traceability of 'harmful' consequences, he notes, involves a commitment to an empiricist ideal of accountability, i.e. a belief in the possibility of documenting events and 'locating the trouble' without getting caught up in confusing complexities involving interests, obscure motives and political games of assigning blame (Ezrahi, 1990). These historical analyses have also been contested: Diggins (1994) for instance notes how irritated Dewey was by the New Deal. Here I am arguing that the reduction of pragmatism to this history, i.e. its portrayal as a precursor of instrumentalist rationalism is to ignore some of its conceptual potential. To characterize pragmatism as a conceptual site of encounter, as I do here, is to emphasize that multiple intellectual traditions and commitments can be traced back to it.
29. This implies a very different normative agenda from liberal theories of global democracy and their concept of the issue-based community. In the pragmatist account, to make democracy revolve around issues is certainly not to strip it of the 'hard stuff': territory, ideology, culture and so on. A characterization of the public as a mode of socio-material entanglement renders the question of the role of environments, settings, habitats and habits more rather than less crucial. However, it *is* to question the assumption, which notions like territory may imply, that the specification of the public is already accomplished.
30. As I suggested in Chapter 1, this dynamic can be observed in relation to environmental publics today, with 'post-environmentalists' suggesting that environmental problems are at heart domestic, social problems. The problem of relevance implies a critique of this idea: it suggest that even if environmental issues are not simply 'out there', this does not mean that their successful internalization in social practice can be assumed. Just as it was a mistake to assume the successful externalization of environmental issues (to assume that there were problems of nature, that could be delegated to natural science), so it is a mistake to assume their successful internalization (and the subsumption of the category of the environment by that of economy, society, psychology, or a combination thereof). Rather, the challenge is that of the articulation of relations of relevance when modes of issue-implication are both intimate and distant.

3 Engaging Devices: The Co-Articulation of Technology, Democracy and Innovation

1. Device-centred perspectives on participation, in this respect, can be understood as extending arguments from the philosophy and sociology of science to the study of participation, and democracy more widely: the idea of the

abstractability of experimental method from practice was a principal target of critique of the holistic philosophy of science and, later, constructionist sociology of science (Duhem, 1906 (1982); Kuhn, 1962 (1996); Lynch, 1997; Latour and Woolgar, 1979). I have previously criticized science studies for its asymmetrical treatment of method in science and politics, as it combines a radical critique of the concept of scientific method with a fairly uncritical acceptance of procedural approaches to public participation. But device-centred perspectives on participation *can* be understood as contributing to a more symmetrical approach in this respect. Furthermore, the critique of the abstractability of method is also relevant to the study of participation in other respects. For instance, insofar as abstractability is also a feature of method itself – i.e. as something that method makes possible – this critique challenges wider investments in abstraction in theories of participation: it also touches upon the idea that public participation requires the dis-embedding of action and actors from the material entanglements of everyday life.

2. To foreground this focus on methodological instruments is to situate social studies of devices in a particular theoretical tradition: it is to present them as further elaborations of ideas from the holistic philosophy of science (Duhem 1906 (1982)) and ethnomethodological studies of experimental settings (Lynch, 1991; 1997). Others have presented Foucault's concept of 'dispositif' as an important precursor of devices studies (Callon, 2004; see also Gomart and Hennion, 1999). From the standpoint I adopt here, however, the Foucauldian precedent is less useful insofar as it invites a 'subpolitical' perspective on the politics of technology, i.e. an understanding in which materiality is understood as a latent feature of participatory or political arrangements (see Marres and Lezaun, 2011).
3. This formulation draws on the vocabulary of ethnomethodology. There are some notable connections between this methodology of social science research and contemporary environmental accounting: both are concerned with deployments of everyday settings in order to produce accounts of social life as part of social life (Garfinkel, 1967 (1984)). For more on this connection, see Marres, 2012.
4. 'The measure of a value a person attaches to a thing is not what he *says* about its preciousness, but the care he devotes to obtaining and using the means without which it cannot be attained.' (Dewey, 1955 (1908))) Dewey was of course not critical of discourse in general, but of a particular tendency in the expression of moral sentiment, one that ends up 'merely wishing' that 'things were different' (Dewey 1955 (1908)), p. 15).
5. There we argue that materiality has often figured as an under-articulated, under-formatted undercurrent in the performance of public participation, participation that does not involve much *explicit* reference to its material constitution.
6. Arduino is an open-source electronics prototyping platform that can be used to translate sensor inputs into visual outputs.
7. Device-centred perspectives can be said to 'de-naturalize' participation: to stress the role of equipment in the enactment of citizenship is to deviate from a focus on philosophical anthropology in classic democratic theory: a focus on the nature of man and whether belief in this nature is justified,

i.e. in human capacities to develop citizenly abilities. This question was still central to early twentieth-century debates about democracy in a technological society, also to that between American pragmatists (Stears, 2010).

8. The Tea Light relies on information from realtimecarbon.org.uk, which provides carbon intensity data for the national UK energy supply, including whether it is above or below a given threshold. As such, this device arguably addresses a criticism that is frequently made of smart electricity meters (and carbon accounting more generally): that these devices rely on purely conventional measures of CO2 emissions. Carbon calculations are generally based on equations to extrapolate what amount of emissions are associated with energy use, and for that reasons fail to account for empirical variation. However, to the extent that the Tea Light itself constitutes a 'thought experiment', it too is limited by its speculative aspects.
9. Traweek spoke of 'the culture of no culture', in reference to scientific culture and its ability to erase its own particularity.
10. The term 'script' should here be taken in the literal sense, as referring to a dramaturgical genre, and not conceptually or metaphorically, as in social studies of technology as script (Akrich, 1992; Latour, 1992).
11. Chris Adams, 'Tea, Arduino and Dynamic Demand', blog post, 24 April 2009.
12. 'Doability' was introduced in the repertoire of the social studies of science and technology by Joan Fujimura (1987), who describes knowledge production, and more specifically the organization of cancer research, in terms of the formulation of 'do-able' research problems.
13. Classic feminist studies of domestic technology have also documented effects of 'co-articulation'. They showed how the framing of *technology* (in terms of 'labour-saving') had implications for the place of the household, and the housewife, in the wider *political economy*. But these accounts did not really consider the performative constitution of domestic subjects or action as at once technological, political and economic in nature.
14. The intersection of different activities has been described as a constitutive feature of mundane settings. Social studies of science and technology have offered a particular interpretation of everyday settings: they provide a space in which multiple, conflicting concerns, activities and values must be juggled or somehow brought into alignment (Murphy, 2006; Roberts, 2006; Michael, 2006; see also Deville, 2011).
15. 'Carbon-calculating data site Amee scores seven-figure investment', *The Guardian*, 11 December 2008, http://www.guardian.co.uk/media/pda/2008/dec/11/startups-carbon-footprints.
16. Adam Vaughan, 'Why you don't want to overfill your kettle', 13 May 2007http://thegreenguy.typepad.com/thegreenguy/2007/05/video_why_you_r.html
17. This requirement for participation of the dis-embedding of actors and action from everyday life has been problematized many times over in the history of political theory, as Javier Lezaun and I (2011) argue elsewhere: in the liberal, Marxist and feminist traditions. Furthermore, social studies of science and technology has argued that the aim and aspiration of participation in public affairs is precisely the problematization of restrictive framings of action and issues (Callon et al., 2009; Wynne, 2003; Irwin and Michael, 2003). Here

I am arguing that wider societal efforts at the location of participation in everyday settings create a situation in which this problematization features as an effect of participatory technologies themselves.

18. These two arguments can be combined in forceful ways, as in the claim that locating environmental engagement in the private sphere is a way of externalizing costs: the costs of environmental change are taken off the balance sheets of public and corporate organizations and displaced into the informal economy of the domestic sphere.
19. Consideration of different logics of co-articulation is also crucial for understanding why device-centred perspectives on participation do not necessarily have to be a subset of device-centred perspectives on the economy (see on this point also Deville, 2011). Many device-centred studies of participation, it should be noted, have been developed by economic sociologists, or as an extension of market analyses (Cochoy, 2007; Lezaun, 2007).
20. 'Days 7 and 8 – Groundworks Finished', 15 August 2005, The Greening of Hedgerley Woods, http://www.hedgerley.net/greening/index.php?paged=5 and Time for Mr MacGregor, May 13, 2008. The Greening of Hedgerley Woods, http://www.hedgerley.net/greening/?p=86
21. Prescott, Matthew, 'Personal carbon trading: The idea its development and design', Carbon Unlimited, RSA, interim recommendations, September 2007. A project like the RSA's on-line personal carbon trading platform fits Michel Callon's (2009) definition of an 'experimental market': it combines a market experiment with a stakeholder dialogue designed to enable 'learning' about the experiment. Over the 2 years that the online trading platform was active, Carbon Unlimited published a range of reports, debates and studies on the associated debate forum, identifying a range of emergent problems linked to carbon accounting. But a more general dynamic also requires consideration: accounting initiatives result in the proliferation of further accounts. This raises questions about the ways in which accounting practices (and not just market practices) may translate into the public performance of controversy.
22. *The Guardian*, 9 June 2008 http://www.guardian.co.uk/environment/2008/jun/09/carbonfootprints.carbonemissions
23. 'Days 7 and 8 – Groundworks Finished', 15 August 2005, The Greening of Hedgerley Woods, http://www.hedgerley.net/greening/index.php?paged=5
24. Carbon rationing initiatives then blur the public and the private in another way: they can be seen to *actively confuse everyday and professional modalities of engagement*. Engagement is here not only codified *as work*, rather than leisure, it is specified in relation to work, as in the case of the gardener mentioned above. More generally speaking, exercises in carbon-based living tend to be performed by people who are also professionally active in environmental communities: many, though certainly not all, participants have more or less 'relevant' professional roles, as employees of environmental NGOs, building engineers, journalists, civil servants and so on. Indeed, this confusion of roles, in which those professionally involved with the environment adopt the role of 'everyday subjects', suggests that the notion of everyday life, too, may have to be understood as a experimental construct in these cases, one that has special affordances for intervening in this issue area. As noted, the confusion of roles between 'insiders' and 'outsiders',

between those that are professionally entangled and those that may speak in the name of the public, has long been understood as an important aspect of public controversies (Lippmann, 1927).

25. Kerr, Andy and William Battye, Personal carbon trading: Economic efficiency in interaction with other policies', Report for the RSA Carbon Unlimited, June 2008.
26. Arguments about the 'hidden costs' of personal carbon accounting were taken up by Department for Environment, Food and Rural Affairs (DEFRA) in support of their decision against any significant investment in it.
27. Islington-Hackney CRAG meeting, Monday 5 January 2009. Note how this contrasts with a news media report of the same experiment: 'Using solar panels and a mixed bag of more rudimentary techniques – including reading by candlelight and converting the waste from her toilet into fertilizer – Jacqueline Sheedy has turned the former coal barge where she lives into a model of energy efficiency.' James Kanter, Local groups use peer pressure – and fines – to cut carbon emissions, *International Herald Tribune*, Tuesday, 16 October 2007, http://www.iht.com/articles/2007/10/16/business/crags.php?page=1
28. Group email, 30 June 2009.
29. Suitable Despairing, '37 Consequences of Going Green', Monday, 26 November 2007, http://suitablydespairing.blogspot.com/2007/11/37-consequences-of-going-green.html (accessed 30 April 2010).
30. Islington-Hackney CRAG meeting, Monday 17 June 2009.

4 Sustainable Living Experiments or a 'Coming Out' for the Politics of Things

1. The sociology of demonstrations presents a broader literature that draws on actor-network theory (ANT), post-Foucauldian sociology and related constructivist approaches in science and technology studies. What I referred to in the previous chapter as device-centred studies of participation are a subset of this literature.
2. To be clear, classic studies of public experiments like Shapin and Schaffer's (1989) already suggested that different modalities of publicity come together in the public experiment, such as social technology and literary devices. However, the main topic of their and related studies is modern experimental science, whereas the sociology of demonstration explicitly expands the study of public experiments beyond the world of science.
3. The privilege accorded to a few discursive formats of public action, such as public debate and deliberation, oddly, also returns in studies of science and technology, which have done so much to unearth the covert 'politics' going on in ostensibly 'non-political' places, like the laboratory (Callon and Rabeharisoa, 2004; Rose and Novas, 2004).
4. The discursive perspective developed by Shapin and Schaffer differs slightly from that adopted by Ezrahi and others: the former focuses explicitly on the deployment of literary, social and virtual *technologies*. As such, it prefigures devices perspectives in important respects (see below).

5. As such, this approach implies a move beyond what Collins and Evans (2002) have called the problem of extension. It does not conceive of participation as an optional feature that may or may not be added to existing epistemic and political processes. Rather, participation is always already going on in experiments, whether officially authorized as 'public participation' or not. I return to this point in Chapter 6.
6. Interestingly, Barry explicitly phrases this argument in terms of do-ability: It is because the experiment is able to seduce in this way, that it helps to make involvement doable – both for those intent on engaging audiences and the actors who are to be engaged. Barry argues that this is increasingly important in a time when public institutions must prove their validity by demonstrating that they are able to draw in crowds, and audiences can decide to stay away. But in view of the last chapter we can also characterize this focus on doability as a distinctively liberal concern.
7. There are a number of online portals for carbon and green living blogs: http://uk.oneworld.net/section/blogs/carbon ; http://www.bestgreenblogs.com; http://greenblog.ir/en/ The number of blank green blogs on the Web may be taken as an indication that it is on its way to become a media format.
8. http://thegreenguy.typepad.com/, http://greenasathistle.com/
9. http://www.hedgerley.net/
10. http://suitablydespairing.blogspot.com/
11. http://www.busymomsgogreen.blogspot.com/
12. http://noimpactman.typepad.com/
13. Here I consider small-scale, individual living experiments, as they bring into relief the formal features of this type of experiment.
14. The term has also been taken up by John Dewey, and invokes the pragmatist concern with the experimental application of science and technology in social and everyday life to progressive purpose.
15. Such a characterization of the sustainable living experiment as a mode of inquiry also contrasts interestingly with more narrow definitions of it as a participatory device, which tend to characterize participation in terms of behavioural change or economic action, and not the contribution to public inquiry.
16. More generally, feminist theorists have also designated 'experiments in living' as a site or genre for the 'reinvention' of politics. Here, the experiment in living figures as a topos for 'a politics of surprise, a politics that cannot be mapped out in advance [..], directed more at experimentation in ways of living than in policy and step-by-step directed change, a politics invested more in processes than in their results'. (Grosz, 2005). In another resonance with feminist thinking, experiments in living can be approached as 'enactment of intimacy in public' (Berlant, 1997, see also Habermas, 1991 (1962), Warner, 2002). One could say that the experiment in living extends this modality to the material world, as it enacts intimacy with things in public. Finally, the genre also resonates with the domestic experiments of reality television, where intimacy makes possible a moral or ethical discourse of 'self-improvement', albeit of a potentially oppressive type (Wood et al., 2009).

17. As a site of environmental engagement, the experiment in living evokes societal reform movements of the early twentieth century, as for example the UK Garden Cities Movement, and their efforts to realize living environments in which people could reconnect with nature, in cities that are open to the skies and built from local materials (Carter, 2007).
18. Colin Beavin, *No Impact Man*: The Movie. http://www.noimpactdoc.com/trailer.php
19. Polly Nash, about the Ration Me Up Blog, 24 March 2009. The project is hosted on the Herne Hill Climate Action Network Website and according to this site was commissioned by the New Economics Foundation. http://www.hernehillcan.org/rationmeup.
20. Polly Nash, Day Thirty, final day, 24 April 2009, http://www.hernehillcan.org/rationmeup
21. Suitably Despairing, '37 Consequences of Going Green', 26 November 2007, http://suitablydespairing.blogspot.com/2007/11/37-consequences-of-going-green.html
22. In these accounts in the philosophy and sociology of technology, the moment of breakdown tends to be characterized in terms of an *accident*, but in sustainable living experiments this moment features as an *object of performance*. In experimentally removing or adding or modifying objects of everyday living, sustainable living experiments can then be said to produce *staged versions* of this pivotal moment in the philosophy and sociology of technology. They offer modest, artificial versions of 'breakdown' as a moment of articulation: selling the car, using a smart meter, cleaning with vinegar here constitute *deliberate* attempts to specify the socio-technical-materio components that constitute everyday living.
23. http://greenasathistle.com/green-listed/
24. Polly Nash, Day Thirty, final day. Herne Hill Climate Action Network, 24 April 2009 http://www.hernehillcan.org/rationmeup-blog/day-thirty-final-day.
25. http://greenasathistle.com/2007/05/17/hopelessly-fridgeless-day-78/
26. Green as a Thistle, 'The Final Post', 29 February 2008, http://greenasathistle.com/2008/02/29/the-final-post/; http://21stcenturymummy.blogspot.com/2008/03/robot-in-making.html
27. In another departure from the breaching experiment, sustainable living experiments open up the horizon of a morally problematic material disorder (as opposed to the social order that is put on display in breaching experiments). Alternatively, it could be argued that sustainable living experiments open up an inherently *dynamic* space of socio-environmental, technological and-so-on change (i.e. they enact change and not order).
28. Adam Vaughan, 'Smart meters turn up the heat on those with money to burn', 14 June 2007, http://www.guardian.co.uk/environment/2007/jun/14/energy.utilities.
29. Adam Vaughan, 'Smart meters turn up the heat on those with money to burn', 14 June 2007, http://www.guardian.co.uk/environment/2007/jun/14/energy.utilities. Many experiments in sustainable living reported on the Web have a gender bias. It typically involves a male experimenter reporting on the behaviour of female household members, in effect treating them as

experimental subjects, often without discussing issues of consent, or joking about it, or calling these household members collaborators when the relationship is clearly asymmetric. In several cases girlfriends are presented as reliable witnesses to the experiment because they have no interest in technical matters.

30. Anna Shepard, 'Energy for All', 25 August 2006, http://timesonline.typepad.com/eco_worrier/2006/08/energy_for_all.html
31. Nigel, 'Watt fun: smart meter games', 19 June 2007, http://www.nigelsecostore.com/blog/2007/06/19/108/
32. The Greening of Hedgerley Wood, 'Great Gadgets', 12 April 2006, http://www.hedgerley.net/greening/?p=64 The BBC reported a similar view: 'When people can see how much energy and money they are saving when they switch off the TV rather than leaving it on standby, they immediately become more engaged in the whole issue of energy efficiency.' Mark Kinver, 'Bringing meters out of the closet', 18 May 2006, http://news.bbc.co.uk/1/hi/sci/tech/4754109.stm
33. One can wonder whether the environment is invoked as an 'external authority' in these practices, something which is not without consequences for the type of consumer-citizen being performed here. Where the postliberal citizen-consumer has been described as self-regulating, self-validating and consequently rather self-absorbed, green living experiments present us with an implicated subject, tied into the physical, economic and environmental assemblages of energy use.
34. In this respect, one could also say that sustainable living experiments present us with a specific distribution of entanglement and disentanglement. However, such an account can take us only so far, as sustainable living experiments equally display logics of disentanglement: locating the experiment in the domestic setting, for instance, partly enables the disentanglement of energy issues from professional and bureaucratic networks.
35. More generally speaking, much work in ANT upholds the analytical distinction between the messy proliferation of stuff and attachments on the 'ground level', and the preservation of modern institutional forms of science, democracy and so on, on another, 'higher' level.
36. This kind of asymmetry in material or 'ontological' perspectives on engagement has been partly undone by recent analysis of socio-technical forms of participation. Some sociologists have emphasized the crossovers that may occur between projects of public engagement and practices of socio-material entanglement. Thus, Thrift (2008) and Lash and Lury (2007) have proposed that certain object-centred forms for engaging publics, such as the distribution of freebies and platforms for user-involvement in product design, precisely disrupt the distinction between being implicated and being involved, between being caught up in something socio-materially speaking and being engaged in it as a social or political actor. However, in other respects, the latter accounts also can be said to maintain an analytic distance between socio-material entanglement and public involvement, insofar as they too present the former as an aspect of public involvement that remains underacknowledged in dominant framings of it.

37. This notion of a re-distribution of labour among heterogeneous entities is of course not alien to sub-political perspectives on the politics of things, to the contrary. Sociologists of technology, including actor-network theorists, have long emphasized that the normative effects that we might be tempted to ascribe to a given device or technological arrangement in fact have a much more diffuse provenance. We often say things like 'computers dull our senses' or 'cars speed up our perception', but actor-network theorists insist that such effects can only be adequately understood as produced in broader socio-materio-technical arrangements, composed of, so the language goes, 'heterogeneous entities': ways of talking, institutions, designers, and so on (Bijker and Law, 1992). Here I am exploring the extension of this kind of account to explicitly moral and political forms of action.
38. As I will discuss in the next chapter, I am not sure that the term reality is really appropriate in this context: as ontological politics posits the performative status of entities and relations, the existence of these things becomes relatively optional, while I take the term reality to refer to stable, inevitable or recalcitrant entities. I explore this further in the next chapter.
39. To complicate matters, sociologists of science and technology can be said to undertake a turn to ontology *in multiple registers*. These accounts, after all, involve both an empirico-historico claim – about the reconfiguration of worlds as a consequence of the introduction of new techno-scientific objects – and a shift of *conceptual* perspective – namely the commitment to recognize non-humans as constituent components of social practices, and to conceive of configurations of humans and non-humans as dynamic 'all the way down'.
40. From this perspective, object-centred theory carries the promise of a plane not dictated by human presence in which volcanos bubble and leaves rustle, and accordingly the call for a device-centred account of object-ontologies may seem to draw us back into a 'social' space tainted by traces of human presence. Here I take issue with this equation of a performative perspective and a human-centred one.

5 Eco-homes as Instruments of Material Politics: Engagement, Innovation, Change

1. Advocates of non-humanist politics tend to criticize their opponents for falsely suggesting that non-humans must be like humans if they are to qualify as political actors. I agree this is a problem (indeed, if we consider how things are *equipped* with politics, we can understand better why these politics must be understood as specific to these things). However, I do not think this critique of anthropomorphism takes us far enough, insofar as it continues the debate on the plane of theoretical ontology (it lets itself be drawn into a debate about what capacities non-humans are 'naturally' endowed with).
2. The ontological turn has also been associated with other problems of democracy: earlier arguments in science and technology studies (STS) on the capacity of science and technology to re-order socio-technical and onto-political relations have been interpreted as diagnoses of democratic deficits of

the technological society, as they highlight the limits of formal democratic arrangements to regulate social change in this context (Marres, 2005a).

3. Some authors associated with ANT have however interpreted the focus on ontological politics as fitting with the wider intellectual project of the radical left to pitch politics against democracy.
4. Callon and others have of course made significant contributions to democratic theory – no doubt, the most important of which being the concept of the hybrid forum (Callon and Rip, 1991; Callon et al., 2009). Interestingly, however, even as this concept puts heterogeneous assemblages at the centre of democratic life, it upholds the format of public debate as the key form of democratic action (see for a discussion Marres, 2007). In some ways, this state of affairs is reminiscent of asymmetries in the philosophy of science, where irreconcilable differences between the accounts of scientific practice and of scientific forms were justified in reference to the distinction between the context of discovery and context of justification.
5. Here I prefer to focus on the distinction between constituted and constitutive action, rather than 'sub-politics', as the former seems of wider significance to understanding ANT, and its solution to the problem that non-humans pose for concepts of normativity, not just in political sociology, but moral, political and democratic theory as well.
6. There is also another, anti-constructivist way of dealing with this problem to which I alluded in Chapter 2. Proposals to extend participation to non-humans could be criticized for creating confusion between two distinct modes of involvement, which modern democratic theory has worked hard to keep separate: that between the physical state of 'being affected' by things, events or issues, and 'political' forms of involvement in political affairs. From this perspective, to include non-humans in democracy is to muddle two different modalities of being 'caught up' in issues: de facto material implication and de jure political or moral forms of participation. In Chapter 4 I offered a different interpretation of this confusion, namely as a deliberate effect produced in the performance of material participation. ANT has also directed attention to the practical impossibility of keeping physical and political involvement separate: its concept of 'enrolment' signals at once complicity and engagement (though ANT presents this confusion as a sub-political phenomenon, not as a performative and/or public accomplishment).
7. This is the problem with approaching the politics of non-humans as a question of *theoretical* ontology. Because it specifies the normative capacities of non-human on the theoretical plane, it allows only limited appreciation of the empirical dynamics of non-human normativity.
8. The sociology of demonstrations can be read as an elaborate critique of this understanding of the empirical base of democracy, but to my knowledge work in this field has not specifically addressed what I call here the paradox of material democracy.
9. Experimentality is the name of a programme intiated by Bron Szerzsynski at the Institute for Advanced Studies, University of Lancaster.
10. Some authors have questioned the usefulness of the home as a unit of environmental change (Hommels, 2005), proposing the city as the more relevant unit (infrastructurally, and policy-wise). This argument is in many

ways convincing, but in recent years the eco-show home has nevertheless become one of the most pubicized sites for its enactment (see footnote 23).

11. Sustainability from rhetoric to reality. The green refurbishment, part four 5 August 2009, by Phil Clark. http://zerochampion.building.co.uk/2009/08/05/the-green-refurbishment-part-four/
12. Social studies of 'buildings as technology', to use Wiebe Bijker and Bijsterveld's (2000) useful term, have precisely drawn attention to this usage of empirical devices to transform domestic environments into spaces for the enactment of technological innovation, societal change and public participation (see also Murphy, 2006). Bijker and Bijsterveld have analysed housing as a form of democratic technology in a study of women advice committees in the Netherlands, which sought to involve prospective users in the public evaluation of prototype social housing, giving them a say in home design. Other studies have also highlighted the connections produced between empirical research, democratic involvement and societal transformation in everyday settings, as in Ann Kelly's work (2011) on the use of 'experimental huts' in participatory research on malaria in Tanzania. David Oswell's (2008) study of the introduction of audio-visual media in the home in the twentieth century carefully documents the material adaptation of domestic settings to the demands of new technologies of publicity, with the introduction of the television requiring the rearrangement of furniture and the adaptation of wider living room arrangements. And in this case too the introduction of new technology in the home was accompanied by appeals to the public and democracy. Each in different ways, these studies then foreground the confluence between empirical equipment and the material transformation of everyday spaces into more or less 'ideal' settings of public engagement.
13. In this respect too, eco-show homes resemble sustainable living experiments and everyday devices of carbon accounting.
14. Sustainability from rhetoric to reality. The green refurbishment, part four 5 August 2009, by Phil Clark. http://zerochampion.building.co.uk/2009/08/05/the-green-refurbishment-part-four/
15. The Islington Green Living eco-retrofit was defined as a site of participation in a variety of ways. The United House website, for instance, reports on a number of initiatives of community engagement that it has undertaken in relation to this project. The public tour I took (on the invitation of a member of the the Hackney Carbon Rationing Action Group) included several people from the neighbourhood. Incidentally, the quoted slogan on carbon saving also suggests that the STS concept of the 'co-production' of technology and society may require empirical treatment these days.
16. These points seemed to be underlined by a smart electricity meter that just happened to stand on a nearby coffee table, hinting at the possibilities of gathering data and providing feedback about domestic energy use in so-called real time.
17. Unlike some other devices examined in this book, environmental homes are explicitly analysed in the social scientific literature as instruments of material politics (see especially Guy and Moore, 2005).
18. Guggenheim has criticized the pre-occupation of social studies of architecture with building type, insofar as this pre-empts an appreciation of the building as a site and device of socio-technical *change*. In his account, a

focus on the embodiment of types in buildings makes it difficult if not impossible to meaningfully analyse the transformation of buildings, such as refurbishments. I here develop a similar argument, though it seems to me that an ideal typical analysis of buildings *can* be extended to models of change, as in the case of Guys and Shove's (2000) analysis of energy and buildings. My analysis emphasizes the political significance of demonstrational buildings as sites for the *performance* of change.

19. Guy and Moore (2005) have drawn on theories of antagonistic democracy to conceive of the politics of buildings in terms of discursive contestation among different values of sustainablility. In this chapter I focus on the re-conception of material politics in empirical terms, but place similar emphasis on the importance of antagonism to democracy (see for more explicit treatment of this, Marres, 2010).
20. Rowan Langley, A Londoner's back-garden renewable energy project, 9 January 2006 http://uk.oneworld.net/article/country/826/
21. Latour (1999) examines this issue of how successful ANT has been in transcending the epistemic trick of freeze-framing in the chapter on reference. Where he finds a solution in the concept of the chain of reference, I turn to concepts of variable normativity.
22. Variability is of course a classic feature of the modern scientific experiment: Carnap (1966) defines this form of knowledge in terms of the possibility of modulating the variables or 'settings' of the experimental set-up.
23. Robert Cohen, 'Green refurbishment the hard way', 26 January 2009. http://zerochampion.building.co.uk/2009/01/26/green-refurbishment-the-hard-way/
24. Such a performative perspective on change can be contrasted with non-performative understandings, as for instance that of Hommels (2005). If I understand her correctly, Hommels argues that because so much of socio-technical change is 'merely performative', we must inquire into the obduracy of socio-technical arrangements, i.e. their resistance to change. I am not unsympathetic to the approach, but think we should also take an interest in *the incredible spread of environmental demonstration projects and performances of environmental change themselves*. During a renewable energy conference in Trondheim in 2009, a presentation on Zero Emissions Buildings started off with the question: how do we get market penetration, with the presenter pointing out that 'at the moment we have only demonstrational projects'. However, there seems to be something about the eco-home that makes it work *specifically* as a demonstrational device (something which has to do with its top-heavy equipment with empirical devices of monitoring and display). I would almost say: it *is* a demonstrational device.
25. A trace of such resistance to approaching ontological change as a performative phenomenon can arguably be found in Steve Woolgar's (2005) discussion of 'ontological disobedience' as opposed to 'instrumental disobedience'. Where the latter aspires to changing society, he notes, the former enacts a continuous mode of disruption, continuously sensitizing us to our dependence on social orders. The concept of change, it seems, is here relegated to the domain of the instrumental. Though, as I argue here, there are good reasons for this association, it may also be important to resist it as well.

26. In this respect, we can also note that these projects draw on very different experimental traditions: on the one hand, the 'positivistic' tradition of empirical building research (Ganzevles, 2007), and on the other hand, the counter-cultural genre of the 'experiment in living' (Hawkins, 2006; and see Chapter 4).
27. Ontological variability can be distinguished from ontological multiplicity, in a number of ways. Accounts of ontological multiplicity in STS have relied on the ethnographic specification of the device. The account I develop here is less informed by ethnography and more by a media-logical approach, or more minimally, by following the proliferation of a trope. Furthermore, whereas multiplicity has been presented as somehow intrinsic to ontology, the normative variability I discuss here is at least in part an artefact of experimental settings.
28. Part of the reason for this distinction was probably that work in STS concentrated on the difference between an epistemic and an ontological understanding of science: its principal concern was the shift from representation to intervention, as the principal mode in which science operated. I am arguing that with the increased acceptance of intervention as technoscience's default mode of operation, the distinction between instrumental and experimental modes of intervention now especially requires our attention.

6 Redistributing Problems of Participation

1. To my knowledge, the contribution of STS to the study of participation is not often characterized in terms of symmetry, in the sense of even-handed, empirical treatment of participation and non-participation.
2. Whereas work on the Public Understanding of Science sought to re-distribute knowledge (and ignorance) among science and its publics, actor-network theory (ANT) offered what we could call an ontological re-distribution of participation, focusing on the socio-material implication of everyday actors in processes of the domestication of science and technology.
3. The radicalization of the symmetry principle has, in some sense, been the bread and butter of science and technology studies, as most significant strands of work in this field, from the strong programme to ANT, claim to undertake such a radicalization (the strong programme proposed a symmetrical treatment of true and false science, and ANT applies symmetry to humans and non-humans). This circumstance makes my suggestion here somewhat tongue-in-cheek, but not entirely so – I am serious about the need for a re-distributive approach to problems of participation (see on this point also Hayden, 2007).
4. In particular, my presentation of the problem of extension unduly simplifies the work of Collins and Evans (2002), who have used this phrase in their prescriptive analysis of public participation. Among others, their approach is more sensitive to institutional flaws and shortcomings then my account of this problem suggests. Nevertheless, it is true of their work too that it displays little or no interest in questioning the relevance of established platforms of political and epistemic process, and virtually no

recognition of what I term here the problem of relevance. In developing this account, I draw on the critiques that Sheila Jasanoff (2003b) and Brian Wynne (2003) published in response to the extension article by Collins and Evans. However, where their critique assumed a theory of discursive politics as their framework, my version of the problems of relevance focuses on the socio-technico-material relations between settings of participation,

5. This work has a metaphysical target, in that it challenges the unitary ontologies that underlie conventional understandings of the role of science in society – the idea that objects are singular, and multiplicity is limited to human perspectives on them. In engaging with this issue of political ontology, this work must be differentiated from other approaches foregrounding multiplicity in the study of democratic government and governance. For example, work on multi-level and multi-sited politics and governance precisely limits its account to epistemic and political multiplicity, excluding ontological multiplicity.
6. The caption of this image reads: 'Although the perspectives of the world people vary in space and in time, every human concern falls somewhere on the space time graph. The majority of the world's people are concerned with matters that affect only family or friends over a short period of time. Others look farther ahead in time or over a larger area – a city or a nation. Only a very few people have a global perspective that extends far into the future' (Meadow et al., 1972).
7. Fraser (2009) provides a different lineage for relational relevance, tracing it back to the work of Alfred North Whitehead. In this concluding chapter, I am focusing on the broad outlines of an experimental, device-centred analysis of participation, and am not doing justice to the more subtle differences between different relational and topological approaches developed in sociology, geography and STS.
8. In *The Problem of Relevance* (1970) Schutz further develops his account of relevance, distinguishing between topical, situational and motivational relevance. In doing so, he explicitly takes issue with the pragmatist conception of relevance, which in his view relies too much on situational relevance: in his view, Dewey overemphasizes the ability of problematic situations to effectively constrain thought and action. Schutz may be right in criticizing the pragmatists for an instrumental over-determination of relevance. However, his retreat into a socio-epistemology of multiple zones and forms of relevance does not necessarily help matters. Schutz also deemed the pragmatist concept of relevance too environmental – something which I consider one of its big advantages, and as something that may well make up for its sin of over-determination: by attending to environmental devices, we may account for the determination of relevance as not an epistemic effect, but as an accomplishment of the setting.
9. Schutz (1964) distinguished between three zones of relevance: primary, secondary and tertiary, which loosely map onto the categories of human perspectives: it moves from that which is socio-ontologically proximate to that which is far removed in space and time.
10. Note how the definitions of citizenship and sustainability here nearly collapse into one another: both can be defined in terms of the effort to maxi-

mize the entities to be taken into account in social action, or conversely, the attempt to reduce the zone of the irrelevant.

11. To use the word 'event', here, is to highlight that an immanent view of relevance does *not* necessarily bring its accomplishment further under human control. A topological conception of social and political space has long been advocated in social and political theory more widely (Latour, 1993; Michael, 2006; Massey, 2005; Connolly, 2011). In STS, reliance on a Euclidian conception of space and time – on rigid notions of linear time and geometric space – has been held responsible for a certain misconception of problems of public engagement. In this field, the notion that technology should in principle spread unimpededly through social space – without encountering obstruction from social forces – has been associated with the persistence of Euclidian geometry: the static space-time grid, in which objects remain stable as they spread outwards along the x and y axes. And this idea of unimpeded technological diffusion, in turn, has suggested a conception of public engagement in extensionalist terms: it makes it seem that the diffusion of technology does not *depend* on the active engagement and commitment to their uptake on the part of social actors.
12. Nowotny here draws on a familiar trope in STS: the maximization of the entities to be taken into account is also the principal accomplishment, according to ANT, of dynamics of problematization, as in public controversies. Also, we should note that, in positing such an expansive ontology, Nowotny's account clearly differs from the version of post-environmentalism discussed in Chapter 2, which proposed a much narrower notion of lifestyle, or social-material practice, as limited to the here and now.
13. To focus on this question is to propose that relations of relevance emerge on a much higher level of specificity than Schutz's still largely scalar notion of the 'zones of relevance' (see note 9) allows for: relations of relevance are then viewed as co-emergent with entities.
14. A device-centred approach also implies a different account of the sources of variation in distributions of relevance. Schutz, following the tried and tested ways of post-Kantian philosophy, offers us the choice between either subjective or objective sources of variation – he traces differences among the spheres and isolines of relevances back either to differences among actor-types or to historical changes. A relational perspective, by contrast, directs attention to the 'in-between' or media res. Here, the establishment of relevance relations between issues and actors is a mediated process. From here it is only a small step to focus on the role of settings, technologies and objects in the mediation of these relations. We then locate variation in spheres of relevance at least in part in the devices that mediate and organize the relations between publics and issues.
15. This term draws on a move proposed by Steve Woolgar, namely the move from governance to governancing.
16. Such a device-centred conception of relevance makes it more dynamic. Schutz seemed to assume that topographies of relevance only change at the glacial pace of grand history. Whenever he talks of such changes, he adopts the solemn language that belongs to long-term, all-encompassing developments. In 'modern civilization', he writes, we have become, 'subject to everybody's remote control. No spot of this globe is more distant from the

place where we live than sixty airplane hours. Electric waves carry messages in a fraction of a second from one end of the earth to the other; and very soon every place in this world will be the potential target of destructive weapons released at any other place' (Schutz, 1964, p. 28, 29).

17. The figure presents a cumulative view of the tags used by a sample of English-language green living blogs to categorize their own postings (including most of those featured in the preceding chapters). The tag cloud assigns different sizes to terms based on word frequency analysis. The visualization was made using software developed by The Digital Methods Initiative (DMI) at the University of Amsterdam. DMI has used tag clouds as a tool for what Rogers and others have termed cross-spherical analysis (Rogers, 2009; Schneider and Foot, 2005). This mode of analysis seeks to compare different web spheres, like blogs, news and web, and the relative resonance of terms in them, and as such implies and enables the symmetrical approach to relevance that I am discussing here. I discuss the connections between a device-centred analysis of participation and these digital methods elsewhere (Marres, 2012).
18. This citation makes it clear that the idealization of participation, and the imagination of heterogeneous assemblies, does not happen in an ideological vacuum: it happens in the context of projects and debates regarding the 'withdrawal of the state'. In previous chapters, I have tried to show that this connection is an under-determined one, insofar as participation is used both as an opportunity to strengthen and to challenge this project.
19. The invocation of public debate here entails the projection of perspectival space onto practice. Perspectival space, in turn, is closely associated with a geometrical rendering of political, social and cultural space, as in the appropriately named 'human perspectives' figure discussed above. A geometrical concept of participatory space is rarely far away when the metaphor of public debate is invoked.
20. Mapping controversies was the focus of the collaborative EU-funded project Mapping Controversies on Science for Politics (MACOSPOL) initiated by Bruno Latour, which brought together several international researchers including Kristin Asdal, Massimiano Bucchi, Cordula Cropp, Marieke van Dijk, Dominique Lindhardt, François Mélard, Valerie November, Richard Rogers, Albena Yaneva, Andrei Mogoutov and myself. http://www.mapping-controversies.net
21. Consumer Focus, 'Reduce risks and increase benefits of smart meters', press release, London, 30 September 2009.
22. Alastair Jamieson, Smart meters could be 'spy in the home', *Daily Telegraph*, 11 October 2009.
23. The Googlescraper was designed by govcom.org and the Digital Methods group at the University of Amsterdam, both led by Richard Rogers. I also discuss this case study in a forthcoming article called 'The uses and abuses in the social analysis of technology' (*Theory, Culture and Society*, forthcoming.)
24. To suggest a topological analysis of public controversies is certainly not to propose something new: social studies of technology precisely invoked topology to develop a better appreciation of the controversiality of technology (Mol and Law, 1994, Latour, 1993). And at least since the 1980s, controversy analysis has drawn on *methodological repertoires* that can well

be characterized as topological, which significantly include network and textual analysis, which have translated in conceptualizations and visualizations of science and technology that explicitly assume a post-Euclidian frame, as for instance in co-word analysis and citation network analysis (Marres, 2012). However, whether the use of these methods also translated into an explicitly topological concept of public controversy is another matter. One could say it mostly did not, as conceptions of controversy as public debate remained long prevalent in social studies of science and technology too.

25. A device-centred account of material participation also suggests that it matters when and where we pose this question. We should probably not get stuck on the question of the expansion of the zone of relevance: to expand the range of entities is surely a good thing, but how could we, in view of our highly variable attention spans, *not* agree with Whitehead's point that civilization means that we can increase the things we do *without* having to take more things into consideration?

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