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Democratic Experiments: Problematizing Nanotechnology and Democracy in Europe and the United States by Brice Laurent

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This book is the first monograph in English from Brice Laurent, a leading scholar on the topics of public participation and emerging technologies. In it he draws on a wealth of empirical material summarising a decade's work on public engagement with nanotechnology in Europe and the United States.

The aim of the book is to compare how the relationship between nanotechnology and democracy has played out in the European and US contexts, exploring the multiple spaces in which these objects have been problematized and the relationship negotiated, from science museums to public protests. Laurent does this by weaving together vignettes from his own fieldwork observations and interviews in these contexts, creating an evocative and densely ethnographic insight into emerging nanotechnologies and democratic procedures. This all contributes to a broader argument for what he calls 'critical constitutionalism', referring to the need for continual close empirical study of the sites and moments at which both democracy and significant technical objects – in this case nanotechnology – are being negotiated and remade.

Intended primarily as a contribution to the Science and Technology Studies (STS) literature, the book appears in MIT Press's recent 'Inside Technology' series. Laurent brings together the French engineering school tradition of ANT-infused STS with the more overtly political American approach. Accordingly, two key concepts thread through the whole narrative of the book: *agencements* – using Michel Callon's (2007) term to refer to the heterogeneous sociotechnical configurations shaping action and problematizing nanotechnology – and *co-production* – using Sheila Jasanoff's (2004) idiom to theorise that the problematization of nanotechnology is intimately connected with the problematization of democracy. Following Foucault, Laurent uses the term problematization to refer to the definition and articulation of key elements; for his purposes the objects, futures, concerns and publics of nanotechnology.

The book will be of interest to those studying or developing nanotechnology or other emerging technologies, as well as those with interests in public participation and democracy. The richness of the empirical material and the nuance of the argument presented do not make for a straightforward read or for easy answers to the challenge of governing emerging technologies and democratic procedures. Yet the book rewards close reading, making significant contributions to the study of democracy and public participation, and to debates about how scholars can usefully intervene in the multiple *agencements* he describes. Those without a background in social science are likely to find this a challenging read, but will be impressed with Laurent's detailed grasp on and insights into both the science and governance of nanotechnology. For those willing to consider new perspectives on nanotechnology and explore new sites where it is being negotiated this book is very rewarding.

If you come to this book looking for a concise definition of nanotechnology and a guide to the appropriate procedures through which to manage and construct public engagement around it, you will be disappointed. Laurent makes clear from the start that both technical and regulatory definitions of nanotechnology remain ambiguous and contested – this is the subject of chapter 4. Furthermore, he treats both nanotechnology and democracy as contested objects which are 'in the making', arguing that they are co-produced. In the introduction Laurent announces: "I hypothesize

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that democracy is at stake in the places where public problems [around nanotechnology] are made explicit and potential solutions are publicly explored and selected” (pp15), encapsulating the book’s approach.

This book should be viewed in the context of a broader turn in STS and cognate disciplines to go beyond discrete accounts of public engagement processes around emerging technologies, towards more systemic accounts of participation and democracy in the context of developments in science and technology. This impulse has also inspired a related interest in democratic and participation experiments – thus the book’s title – to capture the broader ripples in sociotechnical configurations caused by instances of participation, as well as the potential for academic interventions in these processes (Lezaun et al. 2017).

Laurent addresses this systemic imperative by taking the reader on a tour through the different sites at which democracy and nanotechnology are being co-produced, namely: science museums; deliberative public engagement processes; regulatory decisions and frameworks; responsible research and innovation (RRI) agendas; public protests; and sites of academic social science intervention. It is rare – perhaps even unprecedented – to see this range of sites covered and compared in one work. But it is by doing this painstaking work that the author is able to give such an authoritative and comprehensive account of the co-production of nanotechnology and democracy; something which would be impossible with a focus on just one of these sites or even one *agencement*. Recent books by Ellen Stewart (2016) and Sally Eden (2017) have offered similarly systemic accounts of public participation around health systems and environmental issues respectively, in a UK context. Yet Laurent adds an extra dimension to his account by exploring all of his sites in both the US and European contexts, with additional examples from the French national context and from international bodies, offering a broader perspective on how nanotechnology, democracy and publics are being differently configured and constructed.

Through the empirical chapters of the book Laurent considers the problematization and co-production of nanotechnology and democracy, firstly through *agencements* which seek to represent nanotechnology and its publics (namely science museums and public participation procedures), secondly *agencements* which seek to govern them (regulatory categories and RRI), and finally those which seek to engage them (protests and interventions from social science academics).

Laurent’s first site for the co-production of nanotechnology and democracy in chapter 2 is the science museum. He examines two deliberative public dialogue processes, one orchestrated by science museums in the US and one in France. In doing so he brings out the contrasts between two apparently similar processes, exposing broader differences in approach between the US and Europe. Laurent characterises the approach taken by a prominent science museum in Grenoble in France as an attempt to generally be more open than they had been with other emerging technologies, particularly Genetically Modified Organisms, and to engage citizens as part of a democratic process. Whereas in the US, though a deliberative public participation processes was carried out and supported by a network of science museums in a similar way, it was understood by its orchestrators as primarily helping to prepare the market for these emerging technologies, and was generally seen as a fringe project. Thus the scope and influence of these two public dialogue projects were very different.

The book then moves on to consider in chapter 3 the standardisation of different public engagement approaches around nanotechnology. Laurent first considers an extensive ‘national debate’ orchestrated under President Nicolas Sarkozy’s French Government, which produced a report co-authored by seven different Government ministries. This is contrasted with a US Consensus

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Conference on the same topic which was similarly high profile, but treated as a means to verify a social science technique for engaging citizens around emerging technologies. Through his careful descriptions of the chosen procedures and their outcomes Laurent reveals their normative orientations through their framings of the issues, the participants involved, and the modes of engagement. He also draws on his own experience working at the OECD as part of a project which aimed to standardise approaches to public engagement with nanotechnology in order to, as Laurent concludes in his analysis, construct a global market for the technologies. He notes that in this case the recommendations became detached from any specific concerns or issues related to nanotechnology, and instead were entirely based on generic expertise on democracy and participation.

Chapter 4 considers the development of regulatory categories for the governance of nanotechnology, zoning in on the practical and political problems experienced in trying to identify and define nanotechnologies in order that their risks be categorised and anticipated. The International Standardization Organization attempted to define nanotechnologies according to their size in order to reduce these uncertainties. However, regulatory bodies in US and Europe found that this definition did not enable them to fully address the risks, so opted to deal with these technologies on a case by case basis. In Europe this then resulted in the creation of new categories for regulation.

Of particular interest to readers of this journal will be chapter 5 where Laurent focuses on RRI procedures. He notes that RRI was hailed as a principle for the development of nanotechnologies right from the start, and in Europe procedures around nanotechnologies were explicitly framed as experiments in the definition of RRI. Laurent describes with his customary careful detail how these processes led to the production of responsibility at both individual and collective levels, through initiatives from science policy organisations to anticipate potential concerns. However, Laurent's main reflection in this chapter is that in both the European and US contexts RRI processes have been somewhat reduced down to a more narrow concern with 'ethics' which may obscure broader questions about responsibility and power.

Though RRI is largely treated as a topic of empirical interest in this book, it offers a number of broader lessons for its practice which will be challenging to implement. The first is that we cannot take key categories for granted when initiating RRI processes – the task of defining the problem and the objects in question is a complex and contested part of responsible technology development and governance. The second lesson is that RRI has itself increasingly become a key actor in the innovation processes in which it seeks to intervene – it is never a neutral arbitrator. The final lesson is that to take RRI processes seriously may require science policy organisations to shift their attentions towards a much wider set of spaces and processes, including public protests and sites of regulation.

In chapter 6 Laurent considers sites of public protest against nanotechnology, drawing only on empirical examples from France but comparing between two contrasting civil society organisations. He describes how through their protests these organisations also played a role in defining nanotechnology, so should be considered alongside the negotiations taking place in other sites described in the book. In particular, he notes the similarity between the work done by these protestors and the task faced by social science scholars studying democracy and nanotechnology. He does this not to suggest that social scientists should necessarily resist or oppose (or support and promote) emerging technologies like nano, but rather to draw attention to the important critical work which protestors often do by challenging key definitions and assumptions.

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Finally, turning to the role of critical social science in the sites and negotiations described throughout the book in chapter 7, Laurent argues that there is no clear dichotomy between the tasks of describing and intervening in these processes. In doing this he reflects on the very different roles he has played in the case studies presented, from being an actor in his own right in the OECD standardisation project, to being a critical friend or passive observer in others.

The book concludes with a strong call to move towards a more empirical democratic theory, rather than the abstract models of democracy and engagement which pepper the discourses of RRI and public participation. While some may be inclined to criticize Laurent for not offering a clear theoretical framework for the comparison between countries and sites, this is a robust comparative approach. This approach and his argument lead him to propose the concept of 'critical constitutionalism' which he defines as the need to conduct analysis in the midst of processes of problematization of technologies and democracy – rather than waiting until everything is settled and stabilized. He also argues for the need to extend the sites at which democracy is seen to be at stake and make visible current transformations in democracy. This kind of analysis is constitutional in the sense that it makes states and state-like entities topics for study in their own right, attempting to understand the allocation of roles and capacities for action in different political institutions. It is critical in the sense that this kind of analysis hopes to identify critical moments and sites where much is at stake and being revealed, but also in the sense that Laurent believes this kind of analysis should have a normative charge (albeit one which is well-informed and context-specific). At the heart of this proposed project, then, is a politically engaged social scientist prepared to make a wide variety of different interventions to constantly question the functioning of democracy as an empirical and normative task.