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Atoms, Bytes & Genes –

Public Resistance and Techno-Scientific Responses,

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Chapter abstracts

Chapter 1

Introduction: Movement Redirected by Resistance

In a world dominated by claims to scientific and technological revolutions, resistance is considered futile. The book challenges this view decisively, both conceptually and empirically. Its main thesis is as follows: *It is not the 'resistance' that needs an explanation but its absence; and if there is resistance, what it means, and how we rise to the challenge, are the key questions.* Resistance is the key to achieve a sustainable future. Resistance is the reality principle of techno-scientific imagination. We must ask the counter-factual questions: for example, had the USSR registered resistance to nuclear power, the Chernobyl disaster of April 1986 might have been averted; and the same might be said of Japanese mindsets leading up to Fukushima in March 2011. This book offers a functional analysis of resistance grounded in a social psychology of mobilisation.

Chapter 2

Mobilising a Different Future

Techno-scientific developments take the shape of collective actions that mobilise public support to change society. Social movements are about grievances, values and identities. Nuclear power led us into the atomic age, where electricity would be 'too cheap to meter'. Information technology revolutionises the way we make war and peace, communicate, work, commemorate and think of ourselves. Biotechnology changes evolution, our 'nature', and the moral foundations of society. This chapter will elaborate the idea that techno-scientific developments are best understood as social movements recruiting social values and social identities. I rely on research on social movements and on the social psychology of group formation and social influence. Three questions guide this argument. How are scientists and their support aligned into techno-scientific projects? Can these processes be typified as community building, normalisation, assimilation and accommodation of dissent? What is the role of the public sphere and public opinion, if any?

Chapter 3

The Atom: Bombs and Power

Atom bombs and the production of nuclear energy are watershed events of modern societies. What ended WWII and was deemed to be the energy source of the 21th century – 'too cheap to meter'– came to a grinding halt in the 1980s. In this chapter I will trace this historical trajectory of a dual use technology by raising the following questions: how has the nuclear imaginary changed since the 1950s? How and why did public support for nuclear energy fade away? How did the nuclear community respond to public resistance? What is the legacy of this resistance after Three Mile Island (1979), Chernobyl (1986) and Fukushima (2011)?

Chapter 4

Environment, Safety and Sustainability

Once the equivalence between *technology <=> progress* has become questionable, independent criteria are needed to evaluate the contribution of techno-science to social progress. I argue that the past 50 years have seen the rise of two benchmarks against which emergent technologies are evaluated: safety and sustainability. These benchmarks were carved into 'common sense' by social movements: the ecology movement urging sustainable living and the consumer movement fighting for product safety and transparency. I will chart the rise of this new common sense of sustainability by showing how representations of 'nature' have changed and how activism that started locally on the right became global on the left and ushered in the present 'green' mentalities. The way most people nowadays think about 'nature' differs from the ways of the 1950s and earlier. Changing attitudes to the environment are grounded in a shifting representation of nature. Can we trace the influence of mindsets such as environmentalism on climate change? Nonsense, climate has no politics! Maybe not such nonsense: the strict dualism of 'nature' and 'culture' has lost much credibility.

Chapter 5

Ten Propositions on Learning from Resistance

In this chapter, the main ideas of this book are elaborated in theoretical terms. Techno-science is a quasi-social movement mobilising material and symbolic support. How in this context does the problem of resistance arise? The social movement literature focusses on the mobilisation of dissent against techno-scientific developments, for example against nuclear power and genetic engineering. I will turn the issue on its head and ask: how does the techno-scientific mobilisation, a 'revolutionary' movement, deal with the resistance that it encounters? This raises the follow-up questions: how is 'resistance' construed? How is resistance registered or ignored in mobilisation effort? What are the effects of resistance being registered? What makes possible

a relation between 'resistance registered' and collective learning? Social mobilisation mindsets display a lack of reflexivity and 'learning difficulties' which threaten sustainability. These difficulties and opportunities are explored in 10 propositions on self-monitoring of collective action.

Chapter 6

The Bytes of Mainframes, PCs and Social Media

Among post-WWII technologies, computing and information technology (IT) is a transformative factor of the economy. But, in relation to resistance, IT is like Sherlock Holmes' 'Silver Blaze' puzzle: significantly, we note, the dog did *not* bark. The question central to this chapter is: Why is there so little resistance to computing and IT? The chapter traces the IT 'revolution' from mainframe to internet, supply rather than demand led, through various cycles of public concerns. Although there are numerous concerns raised over the past 70 years of computing, none of these mobilised a critical mass of public opinion in the way nuclear power did. What mindsets prevent this resistance from becoming active?. While there was little mass protest, resistance was nevertheless effective at the level of organisations and local communities, which is less visible.

Chapter 7

Public Opinion and its Discontents

Nuclear power has shown the relevance of public opinion for science and technology. In this chapter, I will show how the nuclear debate alerted scientists, engineers, activists and politicians to the fact that public opinion must be built, can be lost and may be regained. The nuclear and biotechnology controversy show the social sciences in innovative spirit: new 'names' were coined for recalcitrant publics. Scientists and engineers adopted what social

scientists elaborated: the public understanding of science (PUS) resonates among scientists, risk perception (RIP) more among engineers. Both notions deal with a recalcitrant public that is doubtful about nuclear power, genetic engineering or information technology. Exploring these two master frames as mindsets of mobilisation, I situate them among ideas about the public sphere, public opinion and opinion measurement in general.

Chapter 8

Genes, Biotechnology and Genomics

People are witnessing, living and disputing the genetic engineering of microbes, cells, plants, animals and humans for the past 40 years. This history is very much in the making. This chapter addresses three questions: how did the genetic engineering movement come about? When, how and over what issues did public resistance arise? What were the responses of biotechnology to this resistance? Two watershed events, GM crops arriving in Europe in 1996, and Dolly the sheep of 1997, created globalized controversies. Shifts in public opinion created a new strategic situation to which genetic engineering and its protagonists had to adapt. Biotechnology is a good illustration of how resistance matters and makes a real difference.

Chapter 9

Some Further Observations on Resistance

The last chapter returns to the theoretical points of this book: when faced with the challenge of resistance, how does a social mobilisation effort adapt: turning from external to internal attribution; from avoiding blame to taking responsibility, and from assimilation to accommodation of resistance. This problem is fruitfully elaborated on the pain analogy: resistance like pain has transformative potential. Resistance challenges techno-science in several

respects: it draws attention to neglected issues and stimulates reflexivity; it evaluates given directions and opens new pathways, and it thus enables collective learning given the right conditions. Resistance turns a social movement from assimilation into accommodation mode. These points are elaborated with a view towards a 'general resistology' of the social sciences in the search for social change.

Appendix 1

Notes on Social Movement and Social Influence

Additional notes at the end of the book offer two didactic excursions: on key notions of the sociology of social movements, in particular on resource mobilisation, and on key notions of the social psychology of social influence presented as modalities of social normalisation, assimilation and accommodation. These notes provide additional materials to ground the theoretical points made in this book: techno-scientific developments must be understood as social movements that recruit social influence in society and in doing so will have to face up to the challenges of resistance.