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6 Ayesha Jalal, *Self and Sovereignty: Individual and Community in South Asian Islam since 1850*, London and New York, 2000, pp. 41–2.

7 Frantz Fanon, *Black Skin, White Masks*, London, 1986, p. 109.

8 See my *Autobiography, Travel and Postnational Identity: Nehru, Gandhi and Iqbal*, Basingstoke, 2007 for a discussion of these issues from a different angle.

9 Jean Baudrillard, *The Ecstasy of Communication*, transl. Bernard and Caroline Schutze, 1987, New York, 1988, pp. 79–80.

10 Brian R. Tomlinson, *The Economy of Modern India*, Cambridge, 1993, chap. 4.

11 Richard J. Lane, *Jean Baudrillard*, London and New York, 2000, chap. 3.

12 The recent essay by Chakravarthi Ram-Prasad on India's middle class in contemporary India is interesting in this respect; although it does not use Baudrillard, it continues the theme of the failure of that class, especially in relation to its apparent lack of commitment to politics and social reform: 'India's Middle class Failure', in *Prospect*, September 2007.

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The Birth of Now
by Daniel C. S. Wilson

David Edgerton, *The Shock of the Old: Technology in Global History Since 1900*, Profile, London, 2006; 270pp, £18.99; ISBN: 1861972962.
Bernhard Rieger, *Technology and the Culture of Modernity in Britain and Germany, 1890–1945*, Cambridge University Press, 2005; 319pp, £55; ISBN: 0521845289.

The period extending from the final quarter of the nineteenth century through to the first quarter of the twentieth appears from today's vantage point transformative. Under the glare of bright electric lights, these were Charlie Chaplin's 'Modern Times'. Along with the famous *fin-de-siècle* gloom came radical innovations that changed the world. Key markers of change in this period were to be found in its cultural productions, political ideas and social relations. But the real signifiers of change were *things*: the new material artefacts that appeared in people's lives, affecting them in unprecedented ways. The importance of these things is evident from the rise of the many cultural forms that sought to engage with them, from science fiction to the techno-fetishist imaginings of the Futurists and eventually the Modernist movement, with its particular ambivalence toward technological change. These developments found parallels in politics, where national governments moved quickly to encourage, and to restrict, technological

innovations which would eventually have far-reaching implications for both work and home lives.

Considering how much our world has been affected by machines it seems urgent that historians attend to these developments. Did the atom bomb cause the end of the Second World War, the automobile the rise of the suburbs, the Pill the 1960s sexual revolution? In other words, does technology drive history? The question, posed by Leo Marx and Merritt Roe Smith in 1994 and now central to the emerging field of the philosophy of technology,[1] has received scant attention from historical scholars. Historians find it difficult to analyse 'things' because ascribing agency to inanimate objects is too fraught with difficulties. Nonetheless the mainstream presses are busy marketing micro-histories of objects, from tea and coffee to mini-skirts, airplanes, and car-bombs. Academic histories of technology, on the other hand, tend to remain outside the grand canvas of History. Sequestered and isolated, falling between disciplines, the history of technology is often left to 'in-house' or 'company' historians whose approach has been not so much history-from-below as history-from-below-the-bonnet: uncritical story-telling that remains in thrall to its subject. It is perhaps with such writing in mind that David Edgerton opens *The Shock of the Old* with the comment that 'Much of what is written on the history of technology is for boys of all ages. This book is a history for grown-ups of all genders'.

In the course of fulfilling this claim Edgerton's first popular book seeks to address such shortcomings. His aim, as the subtitle suggests, is to connect the stories of technology to the global story of the twentieth century. At first sight *The Shock of the Old* brings to a general audience points that Edgerton has been making for many years. However, as well as introducing vivid new material from a wide range of sources, Edgerton has taken this opportunity to hone his arguments into a taut and persuasive polemic which argues for a recasting of the entire field.

Edgerton's claim is that the discourse of technology – whether conducted by historians discussing its past or by governments deciding investment priorities for the future – is coloured by a deep and pervasive bias towards 'innovation'. This focus on the 'new' arises because the stories we tell about technology come mainly from the interested promoters of new technology themselves. In answer to the question 'does technology drive history?' Edgerton's response would be 'yes, but not in the way we think it does'. If we truly want to determine the significance of a given technology then we need a range of analytical approaches which consider not only its novelty but its usage. This shift in emphasis from innovation to use has been the central concern of Edgerton's work and is achieved here by refocusing the lens through which we view technologies.

Using a number of thorny counter-examples, Edgerton queries our deeply-held assumption that technology is best understood through narratives of innovation. Instead of focusing on the conventional historical

indices of technical change such as invention and institutional processes, Edgerton shifts our attention to production, dissemination and usage. The bicycle, for example, is a technology 'of' the nineteenth century which is commonly presumed to have been superseded by the motor car, yet more bicycles are produced today than ever before and more bicycles are used today than cars. These facts make the bicycle a resolutely modern machine which should feature as much in any history of twenty-first-century technology as of the nineteenth. The same can be said of military technologies which, despite our perennial fascination with the latest inventions, follow long-established patterns of usage. Traditional histories of twentieth-century warfare have focused on the awesome mechanical power of weaponry, with the Second World War in particular associated with V2 rockets, tanks and the atom-bomb. Yet the use of horses in warfare rose dramatically during the century. The British army had around 25,000 at the start of World War One. By 1917 this figure had risen to 591,000 horses, 213,000 mules, 47,000 camels and 11,000 oxen. This was not due to some nostalgic attachment to the use of cavalry; rather, horsepower was crucial to the transportation of men and materiel on the Western Front. The same was true of the Second World War, by the end of which the Wehrmacht had accumulated 1.2 million horses, the basic means of transport for the German Army. More horses were used in Hitler's invasion of the USSR than by Napoleon in his march on Russia: the use and availability of horses were crucial to warfare right up to 1945. Conversely, the V2 rocket can be seen as a spectacularly ineffective waste of resources. The German determination to develop the V2 betrayed an irrational addiction to novelty which proved very expensive and detrimental to their war effort. The cost of the V2 project was so huge that the Germans could have built around 24,000 fighter aircraft in its stead. The V2 also has the dubious distinction of having killed more people in the course of its production than actually died from being hit by it.

Edgerton makes similar revisionist arguments across a wide range of technical settings. As well as the military, technologies of farming, transport and the home are investigated to startling effect. Edgerton scrutinizes the inflated claims made for new technologies using a series of illuminating counterfactual histories that pit innovation against the best available alternatives – a much fairer test, as he says, of their significance. Through close analyses of the economic outputs of both companies and nation-states, Edgerton reveals that their over-hyped and over-funded Research and Development programmes have been consistently unimpressive in achieving the results that they promised, whereas the refinement and adaptation of old technologies has in fact been the major driver of growth around the world.

Edgerton's confident deployment of quantitative data leaves the reader with the vertiginous sense of being truly at the edge of current knowledge. He ranges expertly over social, political and economic issues with clarity and precision yet, crucially, keeps his eyes firmly on the bigger questions.

This is engaged historical research, fuelled by the belief that an error in how we see our past acts to the detriment of our future. With what might be called radical common-sense, Edgerton works hard to broaden our understanding of what technology actually is by shifting our attention 'from the new to the old, the big to the small, the spectacular to the mundane, the masculine to the feminine, the rich to the poor'. Most accounts of global technology entirely overlook the developing world, because they are only interested in innovation as conducted by governments and corporations. Edgerton's rich chapter on 'creole' technologies – that is, creative local adaptations of Western inventions – redresses such imbalances. History must include not only the highly visible technologies of the rich, white world but also those with the widest impact which, on closer inspection, often turn out to be 'old' technologies. Innovation-centred histories have room for the likes of Bill Gates, but history must also tell the story of Ingvar Kamprad, the founder of IKEA, who is estimated to have got even richer than Bill Gates by selling wooden furniture.

Edgerton attacks the multiple mythologies of technology, reminding us that our 'weightless' knowledge economy in fact relies on a merchant-shipping network which transports more heavy raw materials than ever before, and a global manufacturing sector producing more goods than at any point in history. Throughout his book he uncovers the enduring importance of the 'old' with a relish that at times lends the book the air of a reactionary tract. He has acquired some unfortunate champions in the media who lionize him as a Luddite. But this is to caricature his argument. Edgerton admires some old technologies not for their oldness but because they are still so widely used. The truly significant technical changes of the twentieth century tend to have occurred a generation earlier than is commonly supposed; the tools which made our world have been with us for much longer than we think. While email may, indeed, allow information to be transmitted with much greater ease, the claim that it has changed global communications like nothing before ignores the existence of inter-continental telegraphs, which performed a comparable function over a hundred years ago.

The costs of a bias toward innovation can be high, diverting resources away from where they are most effectively deployed. In case the issue seems merely academic we should recall the story about Keith Joseph giving each member of the Thatcher cabinet a copy of Martin Wiener's *English Culture and the Decline of the Industrial Spirit, 1850–1980* (1981), which famously argues that Britain's economic decline from the late nineteenth century was due to its cultural bias against science and technology. The thesis has strong historical precedents. As far back as 1831 Charles Babbage, the originator of mechanical computing, initiated a similar debate about Britain's 'decline' when he claimed that politicians did not sufficiently understand the importance of science for the national interest. Babbage was instrumental in the foundation of the British Association for the Advancement of Science,

which to this day promotes science and innovation to politicians and the general public. Pro-technological rhetoric continued to intersect with nationalism throughout the twentieth century as achievements in, for example, aviation were heralded simultaneously by Americans as proof of American supremacy, by the British as proof of their national suitability for airmanship, and by the Soviets as proof of the superiority of the Soviet system. Such sloppy generalizations continued to abound into the 1980s – when, for example, the Japanese were praised for their natural capability in electronics – and unfortunately have been reproduced in the historiography. The history of technology is dominated by national stories when, in fact, the trans-national nature of its proliferation makes it questionable whether the nation-state is a useful unit for a diachronic analysis of technology at all.

Edgerton's book offers a convincing account of the prevalence and consequences of neophilia. But it does so only on the supply side of the obsession. It would have been interesting to read more on the origins of the public demand for innovation. Moreover Edgerton can be too eager to dispense with the 'new' altogether, and so does not engage with the indisputable cultural importance of novelty. While the V2 rocket may have been, in one sense, ineffective, it certainly struck deadly fear into the heart of the enemy. While an obsession with newness may not produce an adequate analysis of technology, the undiminished public appetite for the new still needs to be explained.

It is with the public that Bernhard Rieger is mainly concerned in *Technology and the Culture of Modernity in Britain and Germany, 1890–1945*. Like Edgerton, Rieger draws the focus away from elite innovators and experts, but in sharp contrast to Edgerton he concentrates entirely on the impact of innovation. Rieger argues that the influential 'systems approach' to the history of technology (pioneered by Thomas Hughes among others, in his *Networks of Power: Electrification in Western Society, 1880–1930*, 1983) has fostered the widely-held assumption that, whatever the debates over new technology among industrialists and politicians, there was widespread public assent to innovation. As is often the case it was the public who found themselves at the sharp end of the effects of technology, and it is how these effects were conceived and received that Rieger examines. Given that new technology often aroused much public anxiety, how was it possible to create a climate which was conducive to rapid technological innovation? The answer lies with the 'technological laypersons upon whose consent technological change was contingent'. The crucial element was the non-expert, whose immediate anxiety was transformed into a technological bullishness which could then be mobilized – both in Britain and Germany – for the national cause.

In this fascinating study, spanning the second industrial revolution of the 1890s to the Second World War, Rieger identifies two contrary tendencies within public discourses of technology. On one side was technophobia; on the other the euphoria that greeted the astonishing technical progress

of the period. The new technologies which proliferated between 1890 and 1945 elicited a bewildering set of responses. Rieger groups these as 'fear and wonder', and says they often operated simultaneously in individuals, creating a 'specific form of ambivalence'. The formulation allows him to go beyond existing studies of late-Victoriana which have described the 'magical' or 'uncanny' nature of the technological encounter. While such vocabulary may be useful it is ill equipped to account for the perennially double-edged relationship between mankind and its machines.

Rieger links technology-anxiety to the 'culture of modernity' that emerged in *fin-de-siècle* Britain and Germany. The 1890s were characterized by claims to historical uniqueness. The powerful rhetoric of 'modern times' rendered time itself qualitatively different from – almost incommensurable with – what had come before, as if the extraordinary innovations of the period had caused a rupture in the temporal order. To be a modern subject was to perceive oneself as living through 'profound, irreversible and man-made changes' whose instability stimulated widespread anxiety.

Marshall Berman and others have noted modernity's Faustian aspect, combining as it does creativity with destruction; and it is this insight that Rieger develops and makes concrete with his case-studies of aviation, shipping and cinema. Anxieties particular to these technologies fell into two main categories. The first were straightforward fears about risk and danger which became acute after serious accidents. The second were more complex anxieties related to the epistemology of modernity. With the innovation process hidden from view, new technologies seemed to appear from nowhere. Laypersons, as Rieger calls them, were confronted with things they could neither understand nor account for. The technology of cinema, for example, was impossible to explain. It worked by a perceptual trick which made static frames appear to move, which in the absence of an explanatory model made it seem magical and bewitching. This led to suggestions that the moving images could have pernicious or even pathogenic effects, heightening people's fears about incomprehensible technology. Concurrent public debates about technological risk should, therefore, not be 'misread' as resistance to technology but rather must be understood in their wider political and cultural contexts. Both Britain and Germany operated robust 'risk containment' strategies that helped their publics to accept new technologies. To be at ease with new technology became the mark of an advanced nation, as contrasted to the ignorantly fearful responses of primitive peoples. Britons and Germans were called upon to show courage in the face of change.

Both Britain and Germany invested their hopes for the future in technology, Britain looking to technology as a means of maintaining its international pre-eminence while Germany aimed to use it to achieve its growing international ambitions. This remained true in the Nazi period. The Nazis are often described as having an equivocal relationship with modernity and technology, but Rieger rebuts this, arguing that despite the archaic and

nostalgic elements of their political pageantry the Nazis were straightforward adherents of modernity.

There are problems with the comparative dimension of Rieger's study. While it is true that pre-war Britain and Germany were technological, industrial and, eventually, military rivals, they were nations with very different scientific and industrial traditions. The country that both considered their fiercest long-term rival was the USA, which is present throughout the book without ever becoming an explicit focus of discussion. Two of Rieger's chosen technologies have a strong transatlantic aspect (shipping and aviation) while the third (cinema) was dominated entirely from its inception by the USA. Debates surrounding the deleterious effects of film did indeed involve anxieties about its mysterious operations on the human mind – as Rieger ably demonstrates – yet these fears were rarely separate from nervousness about an American cultural invasion of Europe. America is Rieger's elephant in the room, and it's a pity that it wasn't more fully integrated into his story. Nonetheless, as an insightful and persuasive account of the doubts and fears surrounding new technology, his book is enormously welcome.

In his appeal for a focus on 'use' instead of 'innovation' in the history of technology, David Edgerton provides an important corrective to the existing historiography. However his provocative title risks obscuring the equally important 'shock of the new' which has pervaded our culture from the end of the nineteenth century and maintains its hypnotic power today. Rieger's work shows that a sophisticated attention to innovation can still yield important results. His account of the 'fear and wonder' that greeted innovation allows an empathetic glimpse of that elusive moment in which a new technology is first encountered by the public. These two books deliver handsomely in their attempts to write about human artefacts in global history. In different ways, they augur well for a more mature and sophisticated history of technology which will illuminate mankind's love and fear of its material creations.

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