and Out of Time will certainly dispel any notion of Peter as a safe, cozy character.

Editors Donna R. White and C. Anita Tarr, professors of children's and young adult literature, have collected essays whose diversity attests to the complexities of the Peter Pan story, some of them evident from the rubrics in the exemplary index: adults, ambiguity, childhood, death, desire, flying, gender, growing up, hero, identity, innocence, manhood, mothers, sexuality, time, and youth. Useful as well are the sixteen Works Cited lists, which, if coalesced, would constitute a substantial, up-to-date *Peter Pan* bibliography. What amazes is that, aside from some important quotations and the use of a few key critical sources (among them the work of R. D. S. Jack, Jacqueline Rose, and Jackie Wullschläger), there is very little overlap from one essay to another, further evidence of the richness of Barrie's story and of the diversity of interpretations. The combined work of the book's eighteen contributors—they range from established scholars to doctoral candidates and recent PhDs—exemplifies not only how this children's classic continues to fascinate young readers, but why *Peter Pan* is also a surprisingly—often shockingly—adult story.

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Creating the 20th Century

Vaclav Smil. *Creating the Twentieth Century: Technical Innovations of 1867–1914 and Their Lasting Impact.* New York: Oxford University Press, 2005. ix + 350. $35.00

READERS with a penchant for contemporary science fiction or twenty-first-century futurology might well have heard of the so-called "technological Singularity." This is the idea that technical development has reached a critical point of acceleration and that we are on the cusp of a profound and radical transformation, usually connected to the emergence of machine intelligence. By 2015 or 2030, these breathless accounts declare, we will have entered a posthuman world. In utopian accounts, this means symbiosis with machines that deliver, amongst other delights, human immortality. In dystopian accounts, the machines will think for a split second before realizing that humans are an irrelevance to their efficient operation. This writing always tilts headlong into the rush of the future, without a care for the rubble of history. Yet those who imagine a prospective Singularity might do well to read Smil's informative book, for his claim is in effect that a kind of Singularity happened over one hundred years ago, and that we are still

working out its consequences. The years 1867 and 1914 mark "the time when the modern world was created, when the greatest technological discontinuity in history took place." These "truly revolutionary innovations not only changed the course of the innovating societies but also were eventually translated into profound global impacts." To avoid any dispute about whether this constituted the second Industrial Revolution or not, Smil names the epoch The Age of Synergy, "a profound technological singularity."

Smil defends his periodisation by arguing for a cluster of significant inventions around 1867: electric dynamos, open-hearth furnaces that industrialize steelmaking, Alfred Nobel's patenting of dynamite, the first typewriter, and the first mass-produced paper production. He also adds that Marx published *Das Kapital* in 1867, "a muddled but extraordinarily influential piece of ideological writing," as he rather disarmingly summarizes it. Then 1914 presents another cluster: Ford's assembly line, the patent for tungsten filament lightbulbs (which renders them a reliable means of illumination), Niels Bohr's description of atomic structure, and Goddard's patent for a multiple-stage rocket. As one can guess, modernity here is defined by technical inventions, and this raises early on the issue of technological determinism. The introduction wants to resist a "deterministic, techniques-driven interpretation of modern history," yet only two pages later Smil argues that energy technologies are pivotal "in setting the pace and determining the ambience of a society." The priorities are clear.

In his four central chapters, Smil examines technical innovations in electricity, the internal combustion engine, new synthetic materials or processes, and new communication devices. These technical histories are interspersed with capsule inventor biographies and the chapters are lavishly illustrated with photographs, diagrams, graphs and technical drawings of machines and processes. For literary and cultural historians, some of this material will be quite familiar: exemplary texts such as Stephen Kern's *Culture of Time and Space* link together innovations in telephones or gramophones with late-Victorian and early modernist cultural production, and a whole field of media studies has developed around Friedrich Kittler's proposal that a particular "discourse network," emerging in around 1900, meant that technical innovations transformed forms of inscription and thus writing and thus subjectivity. However, Smil is not very interested in these kinds of cultural impact. There is an expression of regret that he could not "follow concurrently those fascinating artistic developments" identified as

modernist, not least because "the world of technique left many brilliant imprints on the work of art." Sometimes a literary reference will appear (Toad's maniacal driving in Kenneth Grahame's *The Wind in the Willows*, in one charming instance). Yet, for the most part, this is a history written within the framework of a rather traditional "science and technology studies" (STS) approach: it does not really seek interdisciplinary connections until the sixth chapter, and then in a relatively narrow socioeconomic way.

Reading straight STS history has its virtues. Readers of *ELT* will know about the importance of Ford's assembly-line production or Edison's invention of the lightbulb and perhaps something of his early experiments with the gigantic dynamos that provided the first electrical supply to homes and offices on Manhattan's Lower East Side in the early 1880s. But Smil's history also brings a wholly different perspective on what might be considered important inventions of the time. How about Osborne Reynold's calculation of the smooth laminar flow of fluids through pipes? "Reynolds numbers" help determine streamlining of boats and aircraft and reduce vibration. Or how about the Haber-Bosch ammonia synthesis? This allowed the development of nitrogen-enriched fertilizers, which led to massive increases in crop yields. Smil argues that this is the single most important invention of the era, allowing the global population to increase throughout the twentieth century without catastrophe. The book also makes a strong case for transformers (which extend the distance electricity can be transmitted by stepping voltage up and down) as a vital yet unsung element of modernity. I was continually startled by the new prospects Smil opened up, and happy to entertain the claims that these now "invisible" (because fully embedded) inventions and industrial processes had helped shape the contours of modern life. Some passages appear a little daunting to the nonscientific specialist, but on the whole Smil explains technical details well, with attention to the needs of a general audience.

All the same, there are limits. A number of influential writers in the STS discipline have sought different ways of situating the history of science and technology, not just thinking about their impact *on* society (as if they came from somewhere outside it, the pure asocial space of the laboratory), but perceiving them as thoroughly cultural from their inception. Technological determinism is replaced with something like a *network* where science, politics, industry, nature, society, capitalism and labour, experts and amateurs, professional institutions and public opinion are always mutually imbricated, without a necessarily sta-

ble hierarchy of influence. It is from this matrix of competing interests that scientific practices emerge and dictate which inventions might develop and become successful. This sort of history may be associated with Simon Schaffer, Steven Shapin, Andrew Feenberg or, most prominently, Bruno Latour. The new history of science that has emerged from these authors over the last twenty years would have been a very different kind of history from that of Smil, who shows no interest in these methodological developments. Where Smil separates inventions from his passages on the unfortunate "eccentricities" of the inventors, other historians suggest an absolutely intrinsic connection between, say, Oliver Lodge's radio experiments and his interest in proving telepathy and the survival of bodily death, or Lord Kelvin's physics and his adversarial Protestantism. Where Smil writes a history of progressive technical improvement, others have pointed to the weird irrational beliefs that have always attended electricity, or have connected the rise of "Big Science" and the symbiosis of inventor and capitalist speculator with the emergence of multinational industrial conglomerates from the late nineteenth century. The year 1914 might have been an endpoint in another way, rendering explicit the convergence of technological innovation with state power and the military machine: the military-industrial complex arrived long before Eisenhower coined the term in 1959.

None of these avenues really interest Smil, and this meant his book felt limited by its unreflective historical method. However, in its favour *Creating the Twentieth Century* is rich in extremely useful technical detail, the illustrations alone making it a handy resource. It is work, then, which provides an impressive density and range of primary material. One can only hope cultural historians, who after all have their own disciplinary blindnesses, can pick this up and use its rich materials for more nuanced historical readings of the technical aspects of this crucial transitional era.

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Ulysses in Critical Perspective

Michael Patrick Gillespie and A. Nicholas Fargnoli, eds. *'Ulysses' in Critical Perspective.* Gainesville: University Press of Florida, 2006. 225 pp. $55.00

JAMES JOYCE CRITICISM, and particularly that on the author's single most celebrated work, *Ulysses*, can hardly be said to be in short supply. All the more reason, then, for the appearance from time to time of a volume that attempts to stand back and take stock, surveying the