



Afterword

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All the articles in this special issue engage with business to some degree. It is therefore useful to consider how, and to what degree, product designers, entrepreneurs, and inventors seek to understand the future. They operate with at least three different time horizons, which depend upon their aims. Product designers look ahead only two or three years. Their goal is not to develop a revolutionary device, but rather to improve an existing one. They confront such questions as: Should new television screens be slightly curved, or not? What kinds of wireless sound systems will consumers want? Product designers are projecting the immediate future, and usually they extrapolate from existing trends. Their projections are linked to large economic investments, and the corporations that employ them engage in extensive public relations and advertising in an effort to convince the public that their conception of the future is desirable. As discussed in Grant Wythoff's essay, Hugo Gernsback was in this marketing situation when writing imaginative advertising copy in 1910.

Entrepreneurs and corporate leaders need to take a longer view. They try to forecast the next generation of devices that will make current products obsolete. Their public relations and advertising also contain stories about a better world that inevitably will come. Between 1851 and 1939, World's fairs were the most notable venue for these forecasts, often presented in exhibits as already existing prototypes. The 1939 New York "World of Tomorrow" featured tractors and automobiles that did not need drivers and were controlled by radio beams. These imagined products of the future often combine familiar technologies; in this case, the automobile and the radio. The Digital Earth Project discussed in Andrea Ballatore's essay also exemplifies this approach to the future. Sometimes the synthesis proves difficult to realize in practice. The federal government did not complete the Digital Earth project, but sold it for commercial development, and the driverless vehicle has only recently returned to prominence as Google and other private firms have sought to realize this dream using advanced digital technologies. Other products are technologically realized, but failed in the marketplace. The AT&T Picture Phone worked and was ballyhooed at the New York World's Fair of 1964. However, it sold poorly and the company eventually abandoned it (Lepartito, 2003). The picture phone ended on the large, often forgotten scrap heap of commercial failures that includes the air-conditioned bed, the Newton tablet, the Betamax VCR, and the Edsel automobile. These ironies of

commerce demonstrate just how difficult (and expensive) prediction can be.

The third and most difficult form of prediction deals with the longest time horizon. It conjures up entirely new devices. These breakthrough inventions are a challenge to imagine, and they are often hard to comprehend even after they exist: people often do not immediately find a use for them. When Samuel Morse invented the telegraph, the device was celebrated; yet, few invested in it. Contemporaries could not see what could be done with it (Blonheim, 1994, p. 31). When Thomas Edison invented the phonograph he thought it would be used in talking dolls, as a device for making public announcements, as a substitute for writing letters, and as a way to preserve the voices of ancestors and famous persons. For about a decade, no one realized that it would be most profitable as a device for playing music (Israel, 1998, p. 147).

Breakthrough inventions commonly come from outsiders, not market leaders. The personal computer was not developed and championed at a large typewriter manufacturer or at IBM; instead, it emerged from new companies such as Atari, Apple, and Wang. The smart phone was not developed and sold by an established telephone company, but by Apple. The Internet was not developed at a postal, telephone or telegraph company, but by engineers working for the US Department of Defense. Even after it had been invented and was being used by scientists under the name “the Arpanet,” it took almost a decade for people to understand the Internet’s commercial potential (Appate, 1999, pp. 43-81). Because both corporations and consumers need time to discover the uses of breakthrough inventions, the telegraph, phonograph, personal computer, and the Internet spread more slowly into the market than upgraded versions of existing products.

The differences between projecting immediate improvements in existing products, forecasting medium term innovations that combine existing technologies, and predicting longer-term fundamental breakthroughs, provide an overview of how inventors and business people attempt to prognosticate the future. The imaginative works of American fiction, film, and television emerge against this background of business cultural practices. In the early twentieth century, when science fiction was emerging as a genre, the advertising copy for new devices contained many narratives that stretched forecasting into long-term prognostication. As Grant Wythoff notes, “magazines like *Radio News* and *Science and Invention* followed technological developments through to their most logical, and sometimes extreme, conclusions.” A company selling small electrical devices was also selling visions of the future. Hugo Gernsback later issued the first science fiction magazine, *Amazing Stories*, but before 1910 he was already practicing a form of futurology. Indeed, in Gernsback publications, speculations on future devices and on new applications for existing technologies were always presented “through a lens of supposedly scientific rationality.” Early science fiction shared some assumptions with businessmen about how new technologies could deliver mankind into a marvellous future. It was only a few steps from imaginative advertising to scientific journalism to science fiction.

Andrea Ballatore notes that these imaginative projections have been both utopian and dystopian. They have coalesced “around virtually every major technical invention, including electricity, wireless telegraphy, steam power, air travel, telephony, cinema, television, nuclear energy, and space travel.”

Exemplifying how digital technologies can be used to construct representations of reality, Ballatore examines the creation of Digital Earth, which provided a visualization of statistical information, calculated to demonstrate the history and condition of the planet. In his reading, Digital Earth was “a techno-scientific myth” that imagined a child exploring geography, history and culture in an experience of the “digital sublime.” The technology, championed by Al Gore during his vice-presidency, lost federal funding under George Bush, and it was acquired by Google, emerging later as Google Earth, which can be downloaded to any computer. While this software may appear to be merely descriptive, it promotes a vision of wholeness and integration, in which human beings and the earth are reconciled in a totalizing system.

Representations of the future are often pessimistic or nostalgic for futures envisioned during earlier times. As an example of such nostalgia for yesterday’s tomorrows, Benjamin Beil shows how current science fiction makes little effort to project “the future of media technologies. It rather seems more inspired by its own genre history, creating a pastiche of ‘prediction’ and ‘nostalgia.’” It follows that “a significant portion of contemporary science fiction tends to tone down the representation of current computer and telecommunication technologies replacing them with older or ‘classical retro-future’ media devices.” This “retro” strategy plays with older representations of the future, correctly assuming that its audience understands out-dated technologies featured in such shows as Dr. Who or Battlestar Gallactica.

These contrasting attitudes toward the future can be placed in the larger perspective provided by a history of the technological sublime. The renaissance of interest in the sublime that occurred in the eighteenth century largely focused on encounters with enormous or powerful objects of contemplation such as a Niagara Falls, a volcano, or a tempestuous storm. Edmund Burke also noted, however, that some human creations such as large buildings or bridges could evoke the sense of sublimity. Yet the sublime is not necessarily the attribute of any object; rather is a human experience that proves possible for some but not all observers. Niagara Falls or a rocket launch at Cape Kennedy usually call forth this response, but not always and not in everyone.

The technological sublime can also be seen in small or even microscopic objects, such as devices that compress an enormous range of technologies into a volume smaller than a pack of playing cards. The smart phone of 2014 contains many devices, including a microphone, a calendar, an internet connection, a radio, a camera, a calculator, a photograph album, a music library, and a music player, as well as being the host for many apps that provide a wide range of additional services. If someone who had been in solitary confinement for twenty years were suddenly presented with such an object, it might well seem a sublime example of human ingenuity. And yet such feelings about man-made objects usually do not persist. Railroads seemed sublime in 1840 but not in 1890; airplanes seemed sublime in 1914, but few find them so today. The smart phone is similarly becoming “natural.”

When I wrote *American Technological Sublime* in the early 1990s, the miniaturization of computer and communication devices was well underway, and I considered writing an epilogue on this potentially new form of the sublime. However, that book focused on physically large objects, such as railroads, suspension

bridges, and skyscrapers, and it seemed more appropriate to maintain that emphasis, rather than introduce a new topic in the final pages. Symptomatically, the computer I then used was far larger than any sold today, but it had less than one megabyte of memory. Nevertheless, to a generation that grew up with manual typewriters, it seemed nearly miraculous, and possibly sublime. The authors of these articles have taken up this subject two decades later, when miniaturization is far greater, and there are many more examples to discuss. The implications and possibilities seem clearer than they were then, but as Jens Schröter notes, much of the discourse surrounding new technologies is laced with dubious assumptions, such as the idea that digital devices will continue indefinitely to become smaller, more powerful, more ubiquitous, and more sensitive, until they constitute a sensitive and totalizing environment. The devices, we are asked to assume, will create a cloud of data, transforming us into inhabitants of “sensory-atmospheric media environments.” His point is that whatever technological developments in fact occur, the social structure will not be a stable backdrop but rather will be simultaneously changing. If technologies are in rapid evolution, so are the societies in which they are deployed. The plethora of advertising and public relations coming from major corporations depicts a positive future, but as Schröter notes, other possible futures exist too. These do not include a widely shared high standard of living and personal empowerment; rather they are characterized by competition, mass unemployment and resource depletion.

Attempting to see the technological future has always been extremely difficult, and for precisely that reason, audiences remain interested in science fiction, constructions such as Google Earth, or televised evocations of the futures past. This special issue engages venues of the digital imagination, demonstrating how inextricably they combine utopia and dystopia, commerce and whimsy, the massive and the microscopic, the ironic and the sublime.

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