Throwaway culture

Made to Break: Technology and Obsolescence in America
by Giles Slade
Harvard University Press: 2006. 336 pp. $27.95, £18.95, €25.80

John Emsley

The subtitle of Giles Slade's *Made to Break* suggests that the book is an update of Vance Packard's *The Hidden Persuaders* (Longmans, 1957), which I remember reading as a student in the 1960s. At the time I was surprised and shocked to discover that US industry was deliberately producing products with a short lifespan. Planned obsolescence it was called, but little did I realize that this was to be the secret weapon that won the Cold War for the United States. That little-known story is one of the intriguing *Made to Break*'s hidden gems.

In the 1970s and 1980s the Soviet Union was falling behind the United States in the manufacture of microchips and computers, yet it needed them if it was to exploit and export its vast reserves of oil and gas to earn desperately needed foreign currency. A US embargo was denying them the necessary technology, so Soviet agents resorted to covert methods to obtain it, while the CIA did all it could to thwart them. Then Gus Weiss, an economist and government security adviser, made an ingenious suggestion: allow the Soviet agents to succeed, but make sure they bought specially doctored microchips that looked like the real thing but had inbuilt obsolescence.

This inbuilt obsolescence included sudden catastrophic malfunctioning, such as suddenly instructing a pump to work at a pressure far higher than a pipeline could withstand. The result was a series of spectacular explosions, some so large that they were observed by satellites. One failure burst an oil pipeline, creating a lake more than 10 kilometres long and 2 metres deep before it was brought under control. This industrial sabotage ensured that the Soviet Union lost the cold war says Slade, and he makes it almost believable.

The phrase 'planned obsolescence' was first used by Bernard London in 1932. He proposed it as a possible solution to the Depression, which was being made worse because people had stopped buying. Planned obsolescence looked like the solution to economic stagnation in a world with abundant natural resources and unemployed labour. London's suggestion was at variance with the idea of the father of mass production, Henry Ford, who assumed that people would obviously want cars to last — and a 15 million Model Ts had shown that the idea had its appeal.

In fact many affluent people wanted an excuse to buy a new car, and by realizing this and pandering to it, General Motors (GM) was to become the world's largest company. In the late 1920s they began to boost sales by launching a new model every year, even if it was merely a style change. It worked — but it went too far. By the late 1950s, GM cars had become chrome-finned monstrosities and the US public went to the other extreme, beginning to buy small cars, such as the Volkswagen Beetle, that were built to last. Planned obsolescence had become self-defeating.

Booted out: technological progress has largely replaced planned obsolescence as a spur to consumerism.

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Made to Break is not just about planned obsolescence; indeed, it is more about the unplanned obsolescence that technological development brings. Slade tells the tale of the early days of FM radio and how the emerging television industry commandeered its broadcast frequencies, making all FM radios of the 1940s obsolescent. He also has a chapter on the introduction of nylon, but he misses a chance to explain how the hosiery industry, faced with apparently everlasting stockings and tights, introduced obsolescence by making the thread so fine it broke easily. Today we have technological obsolescence on a large scale — witness the dumping of PCs in favour of laptops — and the book ends with a chapter on mobile phones, where technological obsolescence is such that some users upgrade every year.

Made to Break is both entertaining and thought-provoking, but finally somewhat unsatisfying in that it does not say whether planned obsolescence is still with us. I suspect it disappeared 20 years ago because it was no longer needed. Perhaps it will re-emerge this century if the new method that keeps us spending — unlimited credit — fails. For a decade now that is what has kept the wheels of industry turning, at least in China. ■

John Emsley is in the Department of Chemistry, University of Cambridge, Cambridge CB2 1EW, UK. He is the author of several books including *Vanity, Vitality, and Virility* and *Elements of Murder*.

The politics of space

The Last of the Great Observatories: Spitzer and the Era of Faster, Better, Cheaper
by George Rieke
University of Arizona Press: 2006. 264 pp. $40 (hbk), $19.95 (pbk)

Steven Beckwith

Modern space observatories, in at least one respect, are like ancient monuments: planned by elders and built by their children for the benefit of their grandchildren. The creation of the Spitzer Space Telescope took 20 years from start to launch, encompassing nearly half of a scientific career. George Rieke, principal investigator on one of three Spitzer instruments, worked on the project from its inception in 1983 through to its launch in 2003. *The Last of the Great Observatories* chronicles the evolution of the project, its highs and lows, and the many near-death experiences due to political, management and technical problems. He also describes the emotional roller-coaster that a scientist whose career is wedded to one project's success rides along the way. For anyone who has taken part in a large space project or who wants to appreciate the commitment required to do so, this is a good read.

Rieke goes beyond telling a good story and tries to glean lessons for future projects from the Spitzer experience. Spitzer's 20-year genesis spanned several eras of NASA management styles. The book spends considerable time discussing the contrast between the Apollo-era command-and-control organization adopted from the military and NASA administrator Dan Goldin's "better, faster, and cheaper" era, as well as the individual-tinkering style appropriate to small university groups.

Rieke shows the difficulty of coordinating large teams from disparate cultures: scientists, whose rewards depend on individual achievement; contractors, who focus on fees and developing technical prowess; and managers, who worry most about time, money and team performance. Rieke's own preferences for working style are barely disguised in his writing, and his partisanship is on display when he compares Spitzer to other great observatories or discusses the contributions of different teams in the project, a subtle reminder of how difficult it was to keep the Spitzer team working together. He nevertheless manages to show how each style has its place, and acknowledges that each has strengths and weaknesses in coping with the different scales and complexities of NASA projects. Many thoughtful insights are unfortunately relegated to an appendix that might have made a nice final chapter.

The issues tackled in this book are not unique to space science — almost all large projects, from mediaeval cathedrals to the Brooklyn Bridge, required more time and money than their promoters believed at the outset. But the modern era poses unique challenges, with projects that depend more on the coordination of people's knowledge than on marshalling their physical labour. These challenges are nicely chronicled in Tracy Kidder's *The Soul of a New Machine* (Little Brown, 1981), a Pulitzer-prizewinning book about a team of engineers at Data General Corporation who created a new computer. They will be increasingly important for the future health of space science. Despite NASA's enormous reservoir of talented and well-intentioned managers, large missions and their inevitable cost overruns put pressure on the rest of space science.

The Last of the Great Observatories recognizes that although the Spitzer experience is not applicable to all space projects, the human emotions involved in the organization of these complex undertakings may well be universal. The description of these emotions will be a valuable guide to scientists and engineers ambitious enough to participate in large-scale, multi-decade projects. ■

Steven Beckwith is past director of the Space Telescope Science Institute in Baltimore, Maryland, and a professor of physics and astronomy at Johns Hopkins University.

SCIENCE IN CULTURE

The medium is the message

PowerPoint presentations and the culture of pitch.

Martin Kemp

Most scientists live in a world densely populated with graphic representations of data. The 15 June issue of *Nature* contained more than 70 graphs or graph-like presentations of results, to say nothing of a clutch of advertisements that incorporate such devices. Every graph or chart embodies analytical assumptions, and at a deeper level the implicit cognitive structures that shape every phase of a scientific study.

A graph is not only a crucial tool in plotting data within parameters that are taken as significant, but is also an integral part of the style of a presentation. It serves the rhetoric of irrefutable precision that operates whenever we aspire to proceed in a 'scientific' manner.

These remarks are occasioned by a coruscating attack upon PowerPoint presentations in Edward Tufte's latest book, *Beautiful Evidence* (Graphics Press, 2006). Tufte is an expert in public affairs at Yale University; he is also an expert in the presentation of statistical evidence and a sculptor, and has established himself as the world's leading analyst of graphic information.

Centring his attack on the revelations in the 2005 report on the 2003 Columbia space-shuttle disaster, Tufte lays bare the special kinds of hierarchies, abbreviations, neologisms, linguistic tropes and implicit cognitive structures that were embedded in the PowerPoint presentations used by NASA officials. While the damaged craft wheeled in orbit, their modes of presentation worked against a proper analysis of the complex uncertainties and risks occasioned by the foam debris that had struck the wing during take-off.

Echoing the criticisms in the report itself, and comparable strictures expressed by Richard Feynman at the inquiry into the 1986 Challenger disaster, Tufte concludes that "the pitch-style typography of PowerPoint is hopeless for science and engineering". The rat-a-tat style of bullet points, arranged in aggressive hierarchies and coupled with compressed jargon, insider acronyms and summary graphics, took over from the need to present supporting data, documentation and modes of analysis.

Rather than being narrative reports, capable of debating the complexities and laying them open for decision-makers, the NASA presentations relied on a series of PowerPoint slides, each typically containing 40 or so words (equivalent to a mere 8 seconds of normal reading). Typically, each slide is succeeded by the next in such a way that vital logical continuities fall between the gaps.

A typical template in PowerPoint is the standard line graph, such as the one of cancer survival rates pictured left. It is linked directly to a data sheet and can be adapted for any purpose in which such a display is desired. The three-dimensionality of the plot increases its graphic impact and enhances its air of reality. But we do not necessarily know anything about the nature of the data sets that lie behind it, nor of the methods of data gathering and modes of analysis. A 'result' is all too readily presented as 'significant' without meeting the statistical criteria for significance.

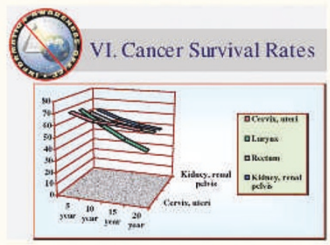
Such charts, delivered with pleasing facility by software packages, permeate business and other non-scientific subjects that generate quantitative information. Government and other official reports, and articles in the press on economics and the social sciences are permeated by facile graphics that look all too convincing. Of course, real science never resorts to such sloppy shorthand — does it?

Let us leave the last word to Tufte: "Making an evidence presentation is a moral act as well as an intellectual activity. To maintain standards of quality, relevance, and integrity of evidence, consumers of presentations should insist that presenters be held intellectually and ethically responsible for what they show and tell. Thus consuming is also an intellectual and moral activity."

Martin Kemp is professor of the history of art at the University of Oxford, Oxford OX1 1PT, UK.

Cancer survival (estimated relative rates, %)

	5 year	10 year	15 year	20 year
Prostate	98.8	95.2	87.1	81.1
Thyroid	96.0	95.8	94.0	95.4
Testis	94.7	94.0	91.1	88.2
Melanomas	89.0	86.7	83.5	82.8
Breast	86.4	78.3	71.3	65.0
Hodgkin's	85.1	79.8	73.8	67.1
Uterus	84.3	83.2	80.8	79.2
Urinary, bladder	82.1	76.2	70.3	67.9
Cervix, uteri	70.5	64.1	62.8	60.0
Larynx	68.8	56.7	45.8	37.8
Rectum	62.6	55.2	51.8	49.2
Kidney, renal	61.8	54.4	49.8	47.3
Colon	61.7	55.4	53.9	52.3
Non-Hodgkin's	57.8	46.3	38.3	34.3
Oral cavity	56.7	44.2	37.5	33.0
Ovary	55.0	49.3	49.9	49.6
Leukemia	42.5	32.4	29.7	26.2
Brain	32.0	29.2	27.6	26.1
Myeloma	29.5	12.7	7.0	4.8
Stomach	23.8	19.4	19.0	14.9
Lung, bronchus	15.0	10.6	8.1	6.5
Esophagus	14.2	7.9	7.7	5.4
Liver, bile duct	7.5	5.8	6.3	7.6
Pancreas	4.0	3.0	2.7	2.7



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