BOOK REVIEWS

Bad Surprises

Why Things Bite Back. Technology and the Revenge of Unintended Consequences. EDWARD TENNER. Knopf, New York, 1996. xiv, 349 pp. $26.

"The best laid schemes o' mice an' men gang aft a-gley." So lamented Robert Burns, a poetic sentiment at odds with the modern spirit. After all, hasn't the progress of science and technology allowed us to prosper, transcending the insecurities that haunted earlier times? Don't our knowledge and power allow us to move forward with great certainty, improving the world through well-planned projects?

Edward Tenner sets out to shake this self-confidence, citing troubles deep enough to rekindle Burnsian humility in even the most enthusiastic technophile. He writes about "revenge effects," the unintended, destructive consequences of practical measures that often mock any anticipated benefit. Antibiotics marshaled against disease have spawned new varieties of highly virulent drug-resistant bacteria that pose new threats to human health. Methods for preventing forest fires have been so effective in preserving the dry underbrush that wildfires are now enormous conflagrations, destroying forests that survived lesser flames for centuries. Cleverly engineered structures that have altered the contours of rivers and beaches have unwittingly contributed to the lethal force of "natural disasters" that now vex civilization. Improvements in the equipment of skiing, football, and other sports have produced a rash of injuries far more serious than ones common in earlier periods. Business firms have spent countless billions on new information technology, expecting rich returns on their investment, only to find that productivity lags while signs of physical and psychological stress in computerized workplaces steadily mount.

Tenner offers literally dozens of capsule histories about these "revenge effects," describing their perverse logic in lively, often amusing prose. A cascade of examples from medicine, environment, office technology, and sports reinforces the impression that similar gremlins lie in wait regardless of the field of planning and application. Troubles arise, he suggests, when noble but narrowly focused goals enter the complex interactions that make up nature and society. Unable to foresee which complexities need attention, we forge ahead blindly, always expecting the best. Chlorofluorocarbons, introduced as refrigerants to replace potentially explosive chemicals, eventually wreak havoc when they float to the stratosphere and deplete the ozone layer. Safety-enhancing gear for mountain climbing paradoxically makes the sport more dangerous because it encourages climbers to take greater risks. Productivity in offices sags rather than surges as computer software is introduced, for reasons we all secretly know but never admit: the most talented and productive people in the organization waste precious time quietly "de-bugging" the software and training their perplexed colleagues in its use.

As he spins these sobering tales, it becomes clear that the effects that Tenner writes about are not limited to our dealings with new technology. These are ironies, predicaments, and disasters that arise in the course of human action of whatever kind. In search of love, people often enter into relationships that turn out to be combative, even hateful. In search of satisfaction, a great many turn to substances that offer addiction, sorrow, and death. Ancient dramatists understood this situation full well. Greek tragedies reveal that the very steps taken to avoid calamity are often ones that bring calamity about.

Not content merely to describe our situation, Tenner offers some solemn counsel. Dismissing glib claims that current troubles are merely transitional ones that the next generation of hardware and software will surely fix, he suggests that the recurrence of revenge effects demands continuing vigilance. "Technological optimism means in practice the ability to recognize bad surprises early enough to do something about them. And that demands constant monitoring of the globe, for everything from changes in mean temperatures and particulates to traffic in bacteria and viruses" (p. 277). Although he is clearly right on this score, I wonder how helpful this advice can ever be in practice. Tenner's own analysis shows that unhappy results usually come as bolts from the blue. What can individuals or organizations do in such circumstances? Expect the unexpected? What does it mean to be vigilant about events one simply cannot anticipate? The Oedipus plays of Sophocles show people being vigilant all right, but it is precisely their vigilance that destroys them.

One disappointment I had in reading the book was that it did not explore developments that might produce revenge effects in the 21st century. Although Tenner devotes three chapters to plant and animal pests that arise from the introduction of foreign organisms into new ecosystems, he does not speculate about similar prospects posed by the new hybrid organisms of biotechnology. Similarly, his treatment of the physical and social maladies that accompany computers in the workplace does not prompt him to envision what lies in store for a society bound and determined to saturate homes, schools, and personal lives with digital technology. Stressing the need for caution and humility, Tenner himself grows a little timid, reluctant to step beyond historical cases to suggest strategies for managing innovation. Just as well; his readers will be challenged to propose new strategies to deal with nemeses quietly percolating in today's best laid schemes.

At a time in which it has become fashionable for popular writings on technology to revel in fantasies of power and transcendence, it is refreshing to find a book that asks why our artifice so often disappoints and vexes. But will we ever learn anything from the kinds of episodes Tenner so richly documents? Our society's sense of technological possibilities still resembles that of the cartoon character Wile E. Coyote, whose repeated attempts to use complicated contraptions to catch the Road Runner always come crashing down. It often seems that . . . Uh, oh. I've got to stop now. There's the delivery truck pulling up. Oh good, it's another box from the Acme Corporation!

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Approaches to Prions

Prion Diseases. HARRY F. BAKER and ROSALIND M. RIDLEY, Eds. Humana, Totowa, NJ, 1996. xvi, 317 pp., illus. $89. Methods in Molecular Medicine.

It is by now a truism to characterize prion diseases as unique. Unique they are indeed, and in many ways. Not only may they introduce revolutionary concepts regarding pathogenesis, they have a uniquely rich and