NSF and the American Institute of Biological Sciences in subordinate roles to his NRC Biology Council. Both NSF and Weiss's former patron Warren Weaver of the Rockefeller Foundation saw this arrangement as conflicting with the mission Congress had assigned to NSF, and they opposed the plan unless Weiss's Biology Council would work in conjunction with NSF to set priorities in the biological sciences. In the end, the competition was at least somewhat destructive: Weiss's Council could have covered some functions and areas not covered by NSF, but as Appel notes "biologists, fragmented as ever, provided it little moral support." Though NSF took a key role in undermining Weiss's plans, the other federal agencies also feared formation of any central authority over biology, especially one having the aura of the National Academy. "In the end, no one had the resources to take a broad view of biology." Indeed, unlike astronomers, no group of biologists or any of the various biological societies attempted any kind of organized promotion of biology for NSF support.

Although NSF had a lofty initial vision and showed noteworthy independence for a federal agency during the McCarthy witch hunts, it was not, of course, immune to political pressures. The area in which politics most decisively came to affect the organization was in regard to its support of "pure" research. During its first 15 years, NSF defended a sharp distinction between pure and applied research; it favored basic research that it deemed much less likely to be funded by other agencies. By the mid-1960s, however, Congress was pushing NSF toward more applied research. A 1969 Act of Congress explicitly directed NSF to support applied research, and the trend towards greater funding of such proposals continued into the 1970s. The ups and downs of NSF support for interdisciplinary and multidisciplinary research—a topic revisited in the last decade with a new wave of enthusiasm for these approaches—also make a fascinating, if complex and winding, tale.

All in all, Appel has done a remarkable job. No subsequent historical work on NSF and the biological sciences can begin without building on the solid foundation she provides in *Shaping Biology*.

NOTA BENE: SCIENCE AND TECHNOLOGY

For the Curious

At the heart of science is the attempt to answer questions of why. Clifford Stoll includes a description of his final oral exam in *The Cuckoo's Egg* (Doubleday, New York, 1989). His answer to "why is the sky blue?" began with the properties of light and passed through discussions of oscillator theory, electricity and magnetism, thermodynamics, and even quantum mechanics as he was asked for ever more detail. Engineers favor questions of how: "how does this work?" or when all goes wrong, "how do we make this work?"

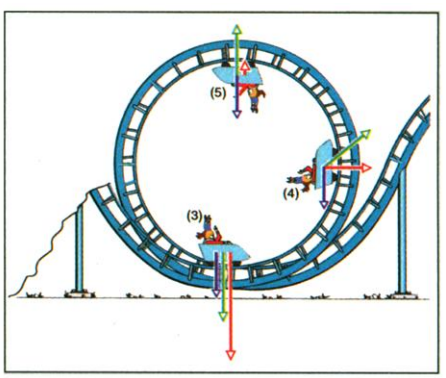
How Things Work The Physics of Everyday Life. 2nd ed.
Louis A. Bloomfield
Wiley, New York, 2001. 536 pp. Paper, $74.95. ISBN 0-471-38151-9.

***Scientific American* How Things Work Today**
Michael Wright and Mukul Patel, Eds.
Crown, New York, 2000. 288 pp. $29.95, C$49.95. ISBN 0-375-41023-6.

Two recent books address such questions by examining aspects of everyday life. Louis Bloomfield developed *How Things Work: The Physics of Everyday Life* out of his popular physics course for nonscientists at the University of Virginia. Bloomfield's textbook draws on numerous examples of ordinary objects, including roller coasters (see image), baseballs, automobiles, microwave ovens, and sunlight. The comparison of a bicycle to a tricycle illustrates unstable and stable equilibria, and readers learn that physicist David Jones deliberately designed and tested unridable bicycles to learn which factors affected their dynamic stability.

The book is supported by a Web site (www.wiley.com/college/howthingswork), which provides supplemental material on subjects discussed in the text and covers topics offloaded from the first edition. In some cases, entire chapters have simply been shifted to the Web; other sections have been moved to new positions within the book. Unfortunately, the index no longer includes some of the scientific principles covered in the online sections. The Web site helps students make connections between different topics and place phrases into context, key elements of the learning process. Bloomfield provides answers to inquiries, evidently from individuals of all ages and backgrounds, prompted by his explanations of everyday objects. He answers these expressions of scientific curiosity in detail and impressively tailors his responses to the questioner's level of understanding.

In a quite different vein, *How Things Work Today* is not limited to physics. Based on the "Working Knowledge" column in *Scientific American*, it samples a wide range of subjects from "The Urban and Domestic Environment," through "Transportation," to "Space." Individual topics are generally presented in two-page layouts built around photographs and explanatory diagrams. Many of the images are three-dimensional, cut-away illustrations, which often provide more detail than can be absorbed in a single sitting. Readers will encounter objects as ordinary as vacuum cleaners and as specialized as particle accelerators. There are accounts of how locks work (for those locked out with nothing more than toothpicks and a credit card) and of how police put together composite images (for fans of murder mysteries).



The book has two weaknesses. In some instances, the placement of topics within subjects seems haphazard. Ceramics, for example, are featured in "Medicine and Research" instead of "Power and Industry" despite the fact that two of the applications cited for these materials are superconductivity and insulators for electricity transformers. There is also the lack of cross-referencing among topics. As a result, the compartmentalization of individual topics obscure the links between related subjects, and so readers are not encouraged to make logical connections and comparisons.

Despite their individual shortcomings, both books are useful references, and in many ways they complement one another. Leafing through *How Things Work Today* is an easy way to learn a little about any number of curiosities in a visual and self-contained fashion. Bloomfield's *How Things Work* is first and foremost a textbook, complete with questions to test one's understanding, problems, and case studies. Bloomfield, however, also makes it easy to delve into a specific topic without needing to read entire chapters. For those curious about the whys and hows of our world, both books offer a lot of answers.

—MARC LAVINE

CREDIT: FROM *HOW THINGS WORK*/COURTESY L. BLOOMFIELD AND WILEY