

A reprint from
American Scientist
the magazine of Sigma Xi, The Scientific Research Society

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Lower Klamath Lake shrank. Waterfowl crowded together as farmers lashed out at bureaucrats, environmentalists and Indians. In the wake of multiple lawsuits, Interior Secretary Gale Norton convened a panel of experts to study the crisis. To date, the situation in the Klamath remains acrimonious and litigious.

Seeking Refuge does not provide policy recommendations. This concise, understated, well-crafted work allows readers to reach their own conclusions. Despite its narrow focus on the

activities of the Biological Survey and the Fish and Wildlife Service in Utah, Oregon and California, the book has wide relevance. Wilson quietly demolishes the dichotomy of preservation versus development, and challenges the language of environmental restoration. Wildlife is not “out there”; it is all around us, entangled in the places we live and work. Animals and humans share a “hybrid” landscape. Wilson suggests that wildlife habitat cannot truly be restored to its original state.

Like it or not, when we try to save nature we inevitably change it. This is true on the planetary scale and the local scale. By looking to the past, Wilson helps us peer into the future, as we try to imagine the consequences of our efforts and proposals to engineer our way out of the latest environmental crisis.

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COMMUNICATION

Speaking for the Data

Elsa Youngsteadt

ESCAPE FROM THE IVORY TOWER: A Guide to Making Your Science Matter. Nancy Baron. xxii + 246 pp. Island Press, 2010. \$55 cloth, \$27.50 paper.

EXPLAINING RESEARCH: How to Reach Key Audiences to Advance Your Work. Dennis Meredith. xvi + 357 pp. Oxford University Press, 2010. \$35 paper.

As a child, Joanie Kleypas was drawn to the television programs of Jacques Cousteau, and they played a role in inspiring her to become a marine ecologist when she grew up. But she never dreamed that she herself would get involved in communicating science to the public. Decades later, however, she was forced into that role when her research uncovered important information. Working at the National Center for Atmospheric Research, she was one of a handful of scientists investigating the effects of rising levels of atmospheric carbon dioxide on ocean acidity. When the first model results came in, showing that ocean acidity would increase greatly, the realization hit her that this would pose a huge threat to marine life. She had to excuse herself from a meeting to go throw up.

Kleypas had always shied away from promoting her own work, but the unpleasant revelation that ocean acidification was a very serious problem launched her reluctantly into the public sphere, as she resolved to help policymakers understand and address the matter. Her efforts have paid off: Public awareness of the problem has increased, and federal funds for research have been authorized by the Federal Ocean Acidification Research and Monitoring Act passed by the U.S. Congress in 2009.

Kleypas’s story, recounted in Nancy Baron’s *Escape from the Ivory Tower*, illustrates the resolve required for investigators to leave their comfort zones in the lab, the field and scientific journals in order to deliver bottom-line, jargon-free information to lay audiences. The book summarizes Baron’s decade of experience leading workshops for environmental scientists through the Communication Partnership for Science and the Sea. Her curriculum includes such topics as formulating (and sticking to) a clear message, talking with journalists and policymakers, and promoting a scientific paper. Like her workshops, Baron’s authoritative writing is studded with cameo appearances by researchers who have taken the plunge into the public sphere and have sound advice to offer. Some of America’s best-known science journalists weigh in as well.

The book is supplemented by an attractive, user-friendly website (<http://www.escapefromtheivorytower.com/>) that provides, among other things, exercises to help scientists decide how much advocacy they’d like to do, videos of scientists offering advice, and links to effective research-lab websites. Unfortunately, although the book was published in August 2010, three months later many of the online resources mentioned in the text still could not be found on the site.

Escape from the Ivory Tower joins a growing throng of recent publications that exhort, even scold, scientists to convey their work more clearly in order to save the world from environmental disaster and scientific illiteracy. These include Chris Mooney and Sheril Kirshenbaum’s *Unscientific America*, Cornelia Dean’s *Am I Making Myself Clear?* and Randy Olson’s *Don’t Be Such a Scientist*. Baron is not a scolder—she presents her guidance with a supportive, can-do attitude. And she defines her readership rather narrowly. “It’s time for the very best scientists to engage,” she writes, and she’s most concerned with high-impact environmental studies that address such problems as the ozone hole and fisheries collapse.

For everyone whose work may be merely fascinating, there’s Dennis Meredith’s *Explaining Research*, an encyclopedic volume of advice based on the author’s 40-year career as a public information officer at research institutions such as Cornell and Duke. Meredith largely dispenses with weighty altruistic reasons for scientists to speak up; instead, he emphasizes how to reach donors, funding agencies, potential students, collaborators and even a researcher’s own family. People do want to listen to scientists, he argues; the American public trusts scientists more than journalists and perceives them as heroes. (In his own assessment of 140 movies, Meredith found that heroic scientists outnumbered villainous ones by 6 to 1.)

Having bolstered the reader’s morale, Meredith proceeds to deliver an avalanche of guidance on every facet of explaining research, from giving compelling PowerPoint presentations to advising museum exhibits, shooting video, writing press releases, and talking with the media and with policymakers. On topics that are covered by both *Escape from the Ivory Tower* and *Explaining Re-*

search, Baron and Meredith offer largely concordant advice, but Meredith suggests for his broader audience a wider array of skills and media to pursue. Understandably, he emphasizes the value of working with one's public information officer and crafting successful press releases—not only in the main text but also in the supplemental booklet "Working With PIOs," which can be read online at the book's website (<http://explainingresearch.com/>).

Explaining Research includes some astonishing and useful minutiae: When writing for print or the Web, one should revise sentences that contain too many "short" letters such as *a*, *c* and *n*, because it's easier to read text that combines short letters with tall ones. Readers are reminded to go to the bathroom before participating in Web conferences, and to wear tall socks for television interviews, lest their calves peek out below their pant legs.

Unfortunately, preoccupation with so many details sometimes obscures

the big picture. This is particularly evident in Chapter 15, titled "Create E-Newsletters, Wikis, Blogs, Podcasts, Social Networks, and Webinars." Despite Meredith's general emphasis on defining and understanding one's audience, here it's not entirely obvious for whom and in what context these things should be done—and his examples, such as *Science* magazine's respected podcast, do not clarify how an individual researcher might use similar tools. That makes Meredith's advice no less valid, but it means that parts of his book will be most useful to scientists who already know that they want to pursue a specific means of outreach and just need instructions.

Baron and Meredith have each made admirable efforts to incorporate anecdotes, quotes and humor, but their books are undeniably instruction manuals. Most readers won't cozy up to these volumes in an armchair with hot chocolate, but they'll be grateful for the investment when they can pull either

book off the shelf in times of need. Aspiring journalists and public information officers will also find valuable insights into scientific culture and the way their own work is perceived. Even the more narrowly targeted *Escape from the Ivory Tower* should be embraced by a broad scientific audience; it's impossible to predict when, like Kleypas and many others, you may be jolted out of your comfort zone and forced to convince the world that your data matter.

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GAME THEORY

Honor Among Thieves

Cosma Shalizi

THE CALCULUS OF SELFISHNESS. Karl Sigmund. x + 173 pp. Princeton University Press, 2010. \$35.

Since the 1970s, a loose community of theoretical biologists, economists, political scientists, mathematicians and philosophers has been using the tools of evolutionary game theory to try to understand how purely selfish agents can come to cooperate, follow norms and even behave altruistically—to understand when honesty is the best policy. Karl Sigmund has been a leading figure in these efforts, and *The Calculus of Selfishness* is his latest attempt at an introduction to the field. In its exposition, the book focuses on reciprocity between self-interested individuals in certain elementary types of interactions.

Game theory (as laid out in chapter 1) models agents interacting with each other, in pairs or in larger groups, with a fixed set of moves available to them. (Sigmund mostly deals with two-player games, but this is just for simplicity.) An agent—Alice, say—has

a "strategy" that tells her what move to make at each step in the game, in response to another agent's moves and to the state of the external world (if the model admits that the latter exists). Alice's coplayer—Bob, say—also has a strategy, and together the two strategies determine the outcome of the game. At its end, Alice and Bob each get a *payoff*, according to a function that depends on the moves both have made. Their strategies are in equilibrium if neither of them could increase their payoff by changing their moves unilaterally.

Basic economics courses lead one to expect that there will be only one equilibrium and that it will be optimal for everyone. The games of relevance to the evolution of cooperation, however, are *social dilemmas*, where this expectation fails. Sometimes the problem is that the equilibrium is optimal for no one. Imagine that Alice and Bob are

two bandits, who can either *cooperate* in robbing villages and caravans, or *defect* by turning on each other. If they both cooperate, each will take \$1,000; if they both defect, neither can steal effectively and they'll get \$0. But suppose that if Alice cooperates and Bob defects by turning on her, he will get \$2,000 and she will lose \$500—and vice versa. Then regardless of what Alice does, Bob will be better off defecting. So by symmetry, the only way to achieve equilibrium is for both of them to defect—even though they'd both be better off, in purely selfish terms, if they both cooperated. When this type of problem was first posed at the RAND Corporation in the early 1950s, it was framed as prisoners being offered the chance to turn state's witness, so it is still called the *prisoner's dilemma*, and it is the archetype of many cooperation problems. A multiperson version of it is the *public goods* game, in which something like an open park is shared equally among all participants, no matter how much each of them has contributed to its creation or upkeep.

In other social dilemmas, there are many equilibria, some more favorable to one player than to another. If Alice and Bob can agree to cooperate as bandits, how should they