

## STRANGE ATTRACTORS: SCIENCE AND JOURNALISM IN THE 21<sup>ST</sup> CENTURY

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**W**ithin a few weeks of the announcement in October 2001, most U.S. scientists were aware that the year's Nobel prizes in medicine, chemistry, and physics had been awarded to, respectively, pioneers in the study of cellular reproduction, inventors of catalysts to control the chirality of molecules, and creators of the long-predicted but never before seen Bose-Einstein condensate. An extremely informal sampling of graduate students in geology and planetary science conducted a few days after the announcements were made (I walked down a hall at CalTech) revealed that many could name at least a few of the individual scientists honored in each category.

Yet these same graduate students, like many of the senior scientists under whom they studied, struck me as at best ignorant and at worst contemptuous of the profession by which they came to know of current laureates, by which not just the names of prize winners but new discoveries, theories, and directions for scientific research are universally disseminated. In a world where mass media dominates all communication, scientists, science journalists, and—as the principal liaison between the two—public relations experts have formed a mutually dependent triumvirate, with each branch advancing the others in far-reaching ways that are not always obvious.

Scientists and media professionals have much more in common than either group might care to acknowledge. They tend to work at far more mundane jobs than the general public is led to believe by movies, TV, and other popular entertainment. They tend to get a bad rap from popular culture—how many mad scientists and sleazy reporters populate the big screen at any given moment? They tend to be lumped together in the public consciousness with the quacks at the extremes of their professions. Yet in times of crisis or uncertainty—such as the anthrax scare now sweeping the nation—these professionals work together as the sources to which the public and government turn for information and understanding. Neither group alone could provide this essential public service.

Good scientists and reporters tend to share many of the same positive traits: They carry an innate curiosity about the world and the universe. They are unafraid to question basic assumptions, refusing to take any new or surprising revelation at face value. They feel compelled to journey personally into the field—no matter how remote or technically challenging “the field” happens to be—in order to gather original information firsthand. They share an ability to communicate, not just among peers, but also with the world at large, in language that is

both vivid and precise.

On the flip side of the same coin, lesser scientists and journalists also share many of the same traits: They unthinkingly repeat information provided them by others, even when that information is questionable or demonstrably false. They may religiously support the status quo in every case, simply because it is the status quo (or, conversely, some scientists and journalists alike constantly question authority solely because that's what they do). In their published work, they emphasize points of view that agree with their own, ignoring or belittling contrary evidence. They favor style over substance, seeking personal fame or fortune—or acting as proxy for the fortunes of their employer corporations and institutions.

For at least a portion of their careers, scientists may become journalists. Both journalists and scientists alike wind up working as P.R. officers for research organizations. More rarely, good journalists inspire or even participate in the advancement of science in the course of pursuing a story. For better or worse, the fields are intertwined, intersecting most visibly in the three arenas I choose to label P.R., News, and Art, each of which carries its own scientific rewards, duties, and pitfalls.

Any scientist employed by a university, research institution, or corporation involved in research winds up working with professional P.R. people whose job is to maximize press coverage—particularly positive coverage, of course—to many different specialized and general audiences. Without question, science P.R., more so than scientific accomplishment alone, influences grant awards, project budgets, government contracts, corporate investment, and, on the more mundane level, individual promotion, tenure, speaking invitations, and acceptance of papers at conferences and by journals. Usually, institutional P.R. people come from a journalism background, with some science, although they can also come from a science background, with some journalism. The best understand news value, finding stories and doing reporters' work for them. By doing this well and repeatedly, good P.R. people develop personal relationships with good reporters. Each relies on the other for stories that become worldwide news.

One of my beats is planetary exploration, and an example of one the best P.R. people in that field is the Jet Propulsion Laboratory's Ron Baalke. He and a small staff generate several press releases per day—this on an average day, when nothing special is going on, such as the approach of the Mars Odyssey toward its tricky orbital insertion maneuver. Many small news organizations—say, the hometown daily newspaper of one of the principal scientists on a research project—will carry a Ron Baalke J.P.L. press release verbatim, illustrated by the photos he provides. Larger newspapers, magazines, websites, and television networks will develop their own major stories using the information he provides as a jumping off point. I've personally published dozens of science news stories, on Discovery.com and in magazines, that in some form or another depended upon Baalke's work.

A scientist must make choices as to when a project is sufficiently developed to “go public.” At what point do you present a conference paper? Submit to a journal? Do you go for a small journal with preliminary results or wait and aim for *Science* or *Nature* later on? Likewise, many scientists consider at what point to issue a press release. Depending on the institutions where they work—that is, if the PR department doesn't have a Ron Baalke—many develop the skills of

writing at least the basic meat of press releases on their own. A well-timed, well-written, and accurate press release can do much to advance support and acceptance of a new scientific finding or theory.

However, there is a danger here. Because smaller professional, trade, and news media tend to take press releases at face value, I've noticed a tendency by some less scrupulous or ambitious scientists and organizations—especially those involved with drug research, the Internet, and consumer products—to practice science by press release. During the months preceding January 1, 2000, for example, news organizations repeatedly ran stories predicting dire consequences from the Y2K software bug. Yet in virtually every story I read warning of coming global economic collapse, the major source was a spokesperson from a company that made its principal income correcting Y2K for corporate and institutional clients. It was a classic case of *press release leads to coverage leads to sales*—and incidentally causes a public panic that should never have taken place. Sadly, I won't be at all surprised if in coming months we see “news” articles on various ways corporations and individuals should protect themselves from bioterrorism, articles that at heart are nothing more than someone pitching a product, whether or not it's effective, by means of press release.

Much better are press releases leading to scientific coverage that draw on actual science news values. What are “news values” in science? They are, it turns out, exactly the same as the values sought by the better journals in publishing technical studies. For example, the journal *Science* states in its editorial guidelines, “Priority is given to papers that reveal novel concepts of broad general interest.” The journal *Nature* looks for papers that report original research of “outstanding scientific importance” and “of interest to an interdisciplinary readership.” In short, the world's two leading research publications choose papers exactly as good journalists choose topics for reporting: from a broad liberal knowledge of science, intellectual history, and current events.

Breaking science news—an announcement of a new medical technique, say, or a detailed explanation of the strain of anthrax used in recent attacks—is often driven by the ticking clock of a reporter's deadline. The story may be generated by a press release or editor's assignment, but in any case it will usually have one, two, or at most three expert sources. If the reporter is any good, one of these will be an outside expert unaffiliated with any of the story's principal sources. With its requirements of understandable explanation and fact sourcing, science news writing, while often well crafted, is seldom more than a means to convey information in a workmanlike manner.

Yet occasionally, science writing goes beyond mere reporting, rising to the level of Art, Germanic upper-case A and all. Since writing itself began, influential scientific articles and books have periodically appeared that lead readers to deeper understanding, to a sudden *aha* of insight, to visions of previously unimagined possibility—to the very goals of science itself. Today, one finds this sort of science-writing-as-Art produced almost equally by professional scientists, journalists, and those whose cannot be wholly assigned to either camp. Books by such scientists as Carl Sagan, Stephen Jay Gould, Brian Greene, and Stephen Hawking show them to be great storytellers, just as books by journalists like John McPhee, Dava Sobel, James Gleick, and Diane Ackerman show them to have a thorough grasp of complex scientific fields. In the

first paragraph of Brian Greene's recent bestseller, *The Elegant Universe*, for example, readers understand instantly—and, for many, perhaps most, of the millions who have plunked down twenty bucks for the book, intuitively—that they are in the presence of a writer who understands the musical potential of language, the judicious use of tropes, the importance of conflict to plot, and both general relativity and quantum mechanics.

Such Art, I believe, is and should be the ultimate goal of both the scientist and the science journalist: To bring to the public mind a personal quest for knowledge and understanding. *How* one shares one's quest with the world is mere label. *That* one does so is the essence of the liberal arts.

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