SCIENCE COMMUNICATION

Faulty Transmission

Audra J. Wolfe

Science on the Air
Popularizers and Personalities on Radio and Early Television

by Marcel Chotkowski LaFollette

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Writing a history of print journalism is a fairly straightforward process: microform and now digital collections have made even obscure, short-lived publications widely available. But radio? That's a different story. There is no such thing as a comprehensive *Reader's Guide to Periodic Literature* for radio, and what listings are available tell little about what exactly happened on the shows. For science journalism, the problem is compounded by the fact that science programming rarely made it onto the networks, appearing instead as filler on regional stations. And yet, in the fascinating *Science on the Air*, Marcel LaFollette manages to suss out most of the major players in science popularization in the first three decades of broadcast journalism. It is a remarkable achievement.

Ironically, LaFollette's task was made somewhat easier by the rarity of scientific programming in the golden age of radio. The book focuses on the story of how American scientific institutions failed to grasp the power of broadcast media to shape public attitudes about and understanding of science. Their few forays into the medium were marked by a profound unwillingness to take the concerns of audiences, advertisers, and network executives seriously. The few examples of commercially successful science programming that LaFollette, an independent historian, unearths were mostly developed by corporate interests.

It didn't have to be this way. The story opens in 1923 with a phone call from a station manager at WRC, a Washington, DC–based affiliate of RCA, to the secretary of the Smithsonian Institution, Charles D. Walcott. Like many of his peers, this station manager was open to suggestions on how to distinguish his station's offerings from the typical fare of sermons, jazz bands, and sports. The call was passed along to Austin Clark, an ambitious curator and invertebrate biologist, who was soon scheduling lectures by Smithsonian scientists on such topics as "Creatures That Fly and How They Do It" and "Animal Terrors of Past Ages."

For Clark and his colleagues, radio was an extension of the Smithsonian's public lecture programming. Many of the scientists who appeared on the show did not own radio sets, had never listened to radio programming, and did not understand that the airwaves were mostly dominated by musical performances. Clark further insisted that his guests don tuxedos at the recording booth in keeping with the dignity of science. This level of stodginess was acceptable in 1923, when much of the radio dial was occupied by earnest, amateurish programming, but fell out of favor during the wave of consolidation that soon affected the industry. Whereas station managers defined a successful program by the number of listeners (and potential advertising rate), officials at the Smithsonian judged the show by the caliber of the guests and Clark's ability to get the lectures published as pamphlets or magazine articles. WRC canceled *Radio Talks* in 1927.

LaFollette tells a nearly identical story for programs developed by the Franklin Institute, the American Museum of Natural History, and a few entrepreneurial scientists, including naturalist Thornton Burgess and Harvard astronomer Harlow Shapley. The American Psychological Association and the American Medical Association were slightly more successful in developing programs that could sustain listener interest in the 1930s, largely because they were forced to respond to the charismatic hucksters who peddled quack remedies over the airwaves. All of these organizations emphasized education over entertainment. The lone voice advocating a more popular approach belonged to Watson Davis, first as managing editor and later as director of Science Service, Incorporated, a news syndication service that produced a long-running audio news digest called *Science Service Talks*. That Davis's contributions—theme music, introductions by nonscientists, interviews instead of straight lectures—were seen as radical gives some indication of how tedious early science radio programming must have been.

Innovation in science radio was instead left to the corporate giants who had the necessary resources both to produce quality programming and to purchase air time. General Electric, Westinghouse, and, especially, DuPont created lavish radio productions that incorporated dramatization, fictionalization, and quiz shows into scientific programming. DuPont produced nearly 800 episodes of its *Cavalcade of America* for radio, followed by an additional 200 for television before finally taking it off the air in 1957. The critical acclaim and popular success of this program finally convinced the staid American scientific establishment to

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Advocate for popularization. Beginning in the 1920s, Science Service journalist Watson Davis (right) used a series of radio programs to deliver news about science and scientists.

The reviewer is at the Chemical Heritage Foundation, 315 Chestnut Street, Philadelphia, PA 19106, USA. E-mail: awolfe@chemheritage.org

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experiment with broadcasting from planetariums and scientific expeditions, but it was too little, too late. By then, the airwaves were being controlled by the national networks, and the networks' gatekeepers had decided that science couldn't pay its own way.

The pattern would be repeated in the early years of television, where complex production requirements, expensive sets, and demanding visuals left little room for amateurish productions. As on the radio, the most creative uses of the medium for science popularization came from media behemoths like ABC and Disney rather than scientific institutions.

LaFollette minces no words in referring to the "imaginative failures" of the American scientific establishment in making use of mass media technologies. Commenting on an effort to increase the amount of educational programming on 1930s-era radio, for example, she argues that the scientific organizations' "inability … to cooperate with each other, their intellectual snobbery and undisguised disdain for the very medium they were supposedly trying to utilize, and their unwillingness to invest significant resources in production of quality programs all hobbled their effectiveness." LaFollette's extensive use of archival collections, including meeting minutes and personal correspondence, offers ample support for her damning conclusions. Her criticism is bracing but fair. Now, she argues, podcasts, online video-sharing sites, and blogs are giving scientists another opportunity to communicate directly with the public. The question is: Will they take it?

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NEUROSCIENCE

Who Are We?

Ralph Adolphs

It is blatantly apparent that humans are quite different from all other animals, in ways both good and bad. But articulating what that difference consists of and uncovering the biology behind it have formed a large and difficult project tackled by biologists, anthropologists, psychologists, and philosophers. Michael Gazzaniga's *Human: The Science Behind What Makes Us Unique* provides a masterful overview of what we know, who the key players are, and what the future might hold. The book is at once dense with facts (there are 748 endnotes) and an easy read; it is both entertaining and informative.

Gazzaniga, a professor of psychology at the University of California, Santa Barbara, is the director of the SAGE Center for the Study of the Mind at UCSB. There he has been absorbing the views of scholars in residence who visit for weeks to months, a rich source of information reflected in the book's contents. *Human* is organized into four parts: The first describes some of the genetic, cellular, and behavioral ways in which humans may be unique and sets the stage for the subsequent sections, which emphasize cognition and the brain. The second and third parts treat topics ranging from morality to empathy to art and conclude with two chapters discussing consciousness. The fourth part provides a view to the future, exploring such possibilities as brain-machine interfaces and artificial intelligence. Roughly speaking, the book becomes more speculative, and tackles tougher topics, the further on one reads.

Although the majority of topics that Gazzaniga discusses in the book are contentious, many of them highly so, his treatment of them is scholarly and balanced. No grand conclusions are drawn, and he does not offer specific theories of his own so much as survey those of others. The book is also highly accessible, quite a feat given its scope and density. Brief interludes provide the science background for those who need it. For instance, the last chapter includes, sandwiched between discussions of fyborgs (functional cyborgs) and cyborgs, a wonderful 5-page introduction to cellular neurophysiology to help readers understand what follows. Each chapter also ends with a brief conclusion, which summarizes the main points. The author is clearly someone who has written textbooks and knows how to teach.

Perhaps not surprisingly, Gazzaniga favors a modular view of the mind informed by evolutionary psychology, a view he previously advocated in *The Social Brain* (*1*) and one in line with people he frequently cites (Steven Pinker, Leda Cosmides, John Tooby; the latter two colleagues of his at UCSB). Modules make fun reading and serve to quantize the exposition. But how do they work together? The penultimate chapter tackles the issue of how various modules coordinate their activity and selectively contribute to the contents of our integrated conscious experience. It begins with a brief reminiscence of how the author once lost consciousness as an intoxicated college student (he was at the time a member of the original Animal House at Dartmouth) and quickly moves on to survey some of the most popular theories and review his own. In one of his early books [(*2*), co-authored with his student Joseph LeDoux], he introduced readers to "the Interpreter": a left-hemisphere mechanism that analyzes our actions, integrates the outputs from many modules, and generates a narrative that constitutes our stream of conscious experience. Yet Gazzaniga clearly notes that our ability to consciously experience the world is shared with many other animals, even though the nature of human consciousness may be unique.

So what are the aspects of cognition that make humans unique? Gazzaniga considers a long list: control over our thoughts, emotions, and actions; planning into the future; self-reflection and self-consciousness; language; aspects of imitation and social learning; episodic memory; imagination; creativity; cooperation and altruism; theory of mind; and many more. Trying to find a single theme that ties all these together or subsumes them is daunting. Nor is it clear whether these are differences in degree or in kind. Gazzaniga does not attempt an answer here, although he hints at one in the book's short Afterword: "Just like other animals, we are constrained by our biology. … But the ability to wish or imagine that we can be better is notable. No other species aspires to be more than it is. Perhaps we can be." This ability to step outside of ourselves—to view the world and us in it from arbitrarily abstract perspectives—does indeed seem uniquely human, and it cuts across many of the specific abilities in the above list. It makes us responsible for our actions and inactions in a way that other animals are not. It is our burden and yet offers hope for our species and our planet.

Human delivers what the best popular science writing should. Gazzaniga tackles the most difficult questions, provides an expert survey of the field, and, most important, instills a sense of wonder and enjoyment about the subject matter. Lay readers and young scientists alike should benefit, and perhaps our species will too.

Human
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by Michael S. Gazzaniga
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References
1. M. S. Gazzaniga, *The Social Brain: Discovering the Networks of the Mind* (Basic, New York, 1985).
2. M. S. Gazzaniga, J. E. LeDoux, *The Integrated Mind* (Plenum, New York, 1978).

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The reviewer is in the Division of Humanities and Social Sciences 228-77, California Institute of Technology, 1200 East California Avenue, Pasadena, CA 91125, USA. E-mail: radolphs@hss.caltech.edu