BOOK REVIEW

Selection of books for review is based on the editor's opinions regarding possible reader interest and on the availability of the book to the editor. Occasional selections may include books on topics somewhat peripheral to the subject matter ordinarily considered acceptable.

BAD SCIENCE *The Short Life and Weird Times of Cold Fusion*

Author	Gary Taubes
Publisher	Random House, New York, New York (1993)
Pages	503
Price	$25.00
Reviewer	Nathan J. Hoffman

INTRODUCTION

Written on the back page of the book jacket of this potential best-seller is a sentence from Nobel Prize winner Mel Schwartz that is the key to understanding this work. Dr. Schwartz's advance acclaim blurb states, "The story of cold fusion *as told* [italics are mine] in this marvelous volume reads like a combination soap opera and mystery." Gary Taubes is an enormously talented chronicler of the dark side of science. His horrific biography of Carlo Rubbia, *Nobel Dreams*, was an acid-etched portrait of scientist as brooding potential sociopath. When "cold fusion" arrived in March of 1989, Gary must have been delighted, for here was a subject perfect for his talented dissections of scientists. As most of us know, cold fusion, as announced in late March of 1989, applied initially to the proposed room temperature fusion reaction between two deuterium nuclei inside a palladium lattice. This deuterium-deuterium (D-D) fusion within the metal solid solution was postulated to create the same nuclear particles, electromagnetic radiation, and heat as the well-characterized D-D reactions within plasmas. I was eager to read his book because I know and respect the main characters, both pro and con warriors, in the cold fusion battles. When I opened his book, I turned to the index to see how various of my friends were treated. What I found was an enormous amount of imaginary detail, some of it negative, but not all of it. After just perusing the index for selected pages of text, I was initially quite puzzled why Gary flooded the facts in his text with this imaginary detail. As I began to read the text from the beginning, his reasons became clear. Gary was creating "a combination soap opera and mystery" that would lead to a best-seller. He was creating heroes and villains, continuity out of scattered facts, rich texture to his tale, and, incredibly, even a resolution of the mystery, in order to manufacture, or rather, to fabricate, a best-seller. Whatever one may think of the morality of presenting such a treatment as history, the book is a great read.

THEMES IN THE BOOK

Gary is very explicit as to the themes in his tale, actually labeling the major subdivisions of his volume as three themes: "Book I: Delusion is the Better Part of Grandeur," "Book II: A Collective Derangement of Minds," and "Book III: The Tail of the Distribution."

"Book I: Delusion is the Better Part of Grandeur" is devoted mainly to the goings-on in the state of Utah prior to the famous news release on March 23, 1989. This theme, however, is not just the difference between the "heat from fusion" claims of Pons and Fleischmann working at the University of Utah on one hand and the "neutrons above background levels" claims from Steven Jones et al. from Brigham Young University on the other hand. Gary skillfully adds connotations of probable impropriety or impossibly blind faith. One example of Gary's technique is in Chap. 6 of Book I. He combines a quotation at the head of the chapter with a non sequitur but colorful assignment of a patron saint to cold fusion. The quotation under the heading of Chap. 6 is "I seen my opportunities, and I took 'em"–George Washington Plunkett of Tammany Hall. That chapter starts out, "If cold fusion had a patron saint, that dubious honor would probably go to Blaise Pascal. . . . Pascal renounced a life of science for one of faith, which many of the proponents of cold fusion seem to have done." Gary goes on to link this faith with the advantages of wagering "on the side that God exists" for Pascal or wagering "that cold fusion exists" for the Utah scientists. But, I was disturbed because Gary was emphasizing religious distortions as possible sources of bad science. On p. 32, he quotes Al Anderson from the state of Idaho, the leading statistician investigating cold fusion, as follows: "You have a person who has a special relationship with God . . . and sees God leading him to a discovery. And when God is leading you to a discovery, it has to be there." Here, Gary blends a quotation from a corrupt Tammany Hall politician, a reference to a religious conversion in the 17th century, and some

idle conversation from a non-Mormon working mainly with Mormons to create thoughts in the mind of the reader that Gary never states directly: The state of Utah is full of not only just "bad science" but also corrupt opportunity taking and religious delusions when it comes to cold fusion.

The theme of "Book II: A Collective Derangement of Minds" is best exemplified by one of the quotations at the beginning of Book II from the old 1841 book by Charles Mackay, *Extraordinary Popular Delusions and the Madness of Crowds*: "Men, it has been well said, think in herds; it will be seen that they go mad in herds, while they only recover their senses slowly, and one by one." In this book, Gary gives examples of experimenters who came out positively with their initial experiments and then painfully retracted their confirmations. Gary does this book straight, with good reporting of details and no apparent attempt to lead the reader into suspecting anything darker than temporary derangement or delusions on the part of scientists finding anomalous particles or heat.

It is in "Book III: The Tail of the Distribution" that Gary seems most unfair. I am still curious about his title for this book, and for once, his quotations at the beginning do not clarify for me his choice of title. His first quotation from Feynman has been the theme of the pro-cold fusion warriors, but Gary is surely not using it to support their position. Richard Feynman is quoted as follows: "If science is to progress, what we need is the ability to experiment, honesty in reporting results—the results must be reported *without somebody saying what they would like the results to have been* [my italics]—and finally—an important thing—the intelligence to interpret the results."

During the first 2 years, experiments on both sides of the fusion wars were poor, mostly because electrochemists were trying to do physics and physicists were attempting to do electrochemistry. Even experienced electrochemists were electrolyzing impurities out of the lithium deuteroxide to the extent that palladium was quickly out of contact with the electrolyte. Articles that were pro-cold fusion were rejected by such journals as *Nature*, which, during the same period, would publish terribly sloppy anti-cold fusion work *because the magazine personnel knew what they would like the results to be*. It was in the tense period of the spring of 1989 that Glen Seaborg asked John Huizenga and Norm Ramsey to chair a U.S. Department of Energy (DOE)-created committee to examine cold fusion claims. In the 1992 to 1993 period, the experimentation would improve tremendously, but the DOE blue ribbon Huizenga-Ramsey committee was examining the pro-cold fusion experiments during the period of sloppy experimentation. The zenith of Gary's reporting is on the interactions within this panel, particularly between Will Happer, whom Gary quotes as saying "the thing I didn't have the nerve to do was say that just by looking at these guys [Pons and Fleischmann] on television, it was obvious that they were incompetent boobs," and Norm Ramsey, who, Gary believes, is the man who told the *New York Times* that the committee "found no show stoppers and no major errors and no smoking gun." Gary then states that "Ramsey had seemed the most credulous of the panel members through the meetings." (Ramsey soon became a Nobel laureate in physics while Happer went on leave from Princeton University to become the leading scientist within DOE.) To this reviewer, Ramsey's lack of ability to see prominent scientists on television and know that they are incompetent boobs is a plus for serving on a review of those scientists. Gary disagrees but reports these interactions faithfully.

The absolute nadir of Gary as reporter is associated with a graduate student at Texas A&M University (Texas A&M). Gary needed to script in a villain in his soap opera. One of the members of the Huizenga-Ramsey committee was Jake Bigeleisen, an expert on tritium. He had warned the Texas A&M experimenters that "you have to be very careful with tritium to prevent contamination." Data presented by the graduate student could be interpreted as getting a spike of tritium. Gary had an ideal way to generate interest in his impending book. He could use the possible spike to make a formal accusation of fraud, to create a circus trial atmosphere for the student, and to pressure Texas A&M into becoming involved in an explosion of publicity for his book. Gary seems proud of this incredibly cruel ploy. Let me quote Gary as he described his actions. "*Science* magazine had an article in the works [written by the author] that would accuse Bockris and the A&M administration of doing virtually nothing to investigate or define the accusations of fraud." When *Science* actually printed his cynical ploy, I, among others, called *Science* to complain about this crucifying of a student for the sake of prepublication publicity for the author's book. A university has very little defense against a cynical reporter applying pressure because of the professional competitions within a university and even between universities, for Gary had stirred up other Texas universities as he describes in his book. And so, Texas A&M was forced by Gary Taubes to investigate the student for fraud, though the university had enough humanity to call it a "cold fusion review panel" rather than the "fraud investigation" demanded by Taubes. *Science*, perhaps sensitive to the accusations that they had been expertly used to promote Gary's book, assigned another reporter, Robert Poole, to report on the investigation instigated by Gary. In the subsequent *Science* article, Poole quoted Texas A&M provost Dean Gage as follows: After "conducting exhaustive hours of inquiries and reviewing much documentation and research data," the panel "found no evidence of scientific fraud or other improprieties." The student obtained his PhD with all tritium work relegated to the appendixes of his thesis. That should have ended Gary Taubes cynical puff strategy. He had gained enormous publicity as his strategy had worked to perfection. Oddly enough, in Book III, he rehashes his cynical scenario in detail, trying to convince people his role was for the good of science instead of for the good of Gary Taubes.

In the book section labeled "EPILOGUE," Gary is faced with a really tough problem. The title (... *The Short Life*...) and whole theme of the book had been that cold fusion had died about the time that he had completed most of his book, circa 1991. But, in 1993, as his book was about to be published, he saw that Technova, a Japanese company, was putting serious money into a laboratory in southern France run by Pons. He knew that the powerful Ministry of International Trade and Industry, the Japanese government-backed organization formed to exploit Japanese technology, was solidly backing work in this area, now renamed to emphasize anomalous heat from hydrogen isotopes rather than D-D fusion. He knew that Japanese universities and industry were reporting positive results. In short, he had greatly exaggerated the death. Faced by this contradiction, Gary lamely states in his epilogue, "Cold fusion—as defined by Stanley Pons and Martin Fleischmann, or Steve Jones, or as modified by John Bockris or Edmund Storms and Carol Talcott, or Bob Huggins-Stanford or whomever—did not exist. It never had. There was at least as much empirical evidence, if not more, to support the existence of any number of pseudoscientific

phenomena, from flying saucers to astrology." Thus, I suppose, Gary gets around his premature cold fusion death notice in the body of his book. If cold fusion never existed, who cares when it died.

CONCLUSIONS

I was greatly disturbed by all the embellishments in this book of those facts that I knew to be true. I began to wonder if the Carlo Rubbia that Gary Taubes presented in his first book, *Nobel Dreams*, was really the dark force so chillingly described by Gary. I even questioned in my mind such detail as whether the "incompetent boobs" quotation from Will Happer, known as a gentleman as well as a brilliant scholar, was distorted or taken out of context. But, then another thought came to me. I am a history of technology buff. The most honestly (and intensely) researched technology history book I have ever read is *Ores to Metals*, by James Fell, published in 1979 by the University of Nebraska Press. It went quickly out of print, and it is most difficult to locate a copy today, either from used book stores or in libraries. In comparison to the Fell book, I suspect Gary Taubes's book will become a tremendous technology history best-seller, perhaps the top technology history best-seller of all, in print for years, and on library shelves everywhere. That surely was the "end" desired by Gary Taubes, and he surely has demonstrated that he is the master of the "means" for getting there.

Dr. Nate Hoffman has been involved in both inertial and magnetic confinement fusion for many years. For the last 4 years, he has been examining the pre and post palladium from experiments on cold fusion performed in the United States, Japan, and Russia. Dr. Hoffman is writing a book on the anomalous near-background nuclear effects that have been reported in cold fusion experiments.