

Summer 2013 Book and Media Recommendations

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ABSTRACT: For most teachers of chemistry, summer brings welcome relief from the day-to-day teaching grind, unless, of course, you happen to be teaching a summer session. Four *Journal* reviewers present a smorgasbord of book and media selections for you to peruse on those long summer days. Enjoy!



KEYWORDS: General Public, Biochemistry, History/Philosophy, Interdisciplinary/Multidisciplinary, Public Understanding/Outreach

For most teachers of chemistry, summer brings welcome relief from the day-to-day teaching grind, unless, of course, you happen to be teaching a summer session. Four *Journal* reviewers present a smorgasbord of book and media selections for you to peruse on those long summer days. Enjoy!

■ CHERYL B. FRECH

Wonderful Life with the Elements: The Periodic Table Personified by Bunpei Yorifuji

If you collect books about the periodic table, *Wonderful Life with the Elements: The Periodic Table Personified*¹ is a must-have. Japanese graphic artist Bunpei Yorifuji, in consultation with a physicist and a pharmacist, has created a most unusual periodic table system. Each element is represented by a human figure. The elements are then organized by families, with hairstyles representing chemical properties, clothing signaling element usage, discovery year as age, and atomic weight as body mass. (See Figure 1.) Thus, carbon, discovered in antiquity, is presented as a slim bearded man with an all-purpose outfit and “intelligent” hair. Cesium is a clean-shaven floppy-haired fellow in a suit. The book comes with a small foldout poster, so you can view the entire collection at a glance and process the trends quickly.

Quite honestly, after reading this book, I do not look at an ordinary periodic table the same way anymore. Instead, I see robots, beards, hats, and feet (or lack thereof). My lab assistant and a number of students each enjoyed this book, and one of them immediately ordered it on her smartphone. Have some fun with the periodic table and read this book.

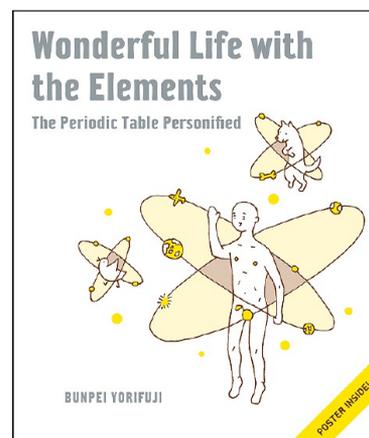


Figure 1. *Wonderful Life with the Elements*¹ cover image provided by No Starch Press and reproduced with permission.

What Teachers Make: In Praise of the Greatest Job in the World by Taylor Mali

Most readers of this *Journal* are professors or teachers of chemistry who face students nearly every day, semester in and semester out, year after year. Some days we question our sanity or cringe in frustration. We live for the rare sincere note of thanks or a visit from a graduate many years later. We almost certainly do not continue to teach because of the financial rewards.

Published: June 14, 2013

Taylor Mali is a poet for the 21st-century media age. He has a TED talk² that was filmed at a club in the Bowery in New York City, he reads poetry on National Public Radio,³ and you can follow him on Twitter (@TaylorMali). He is a former teacher who now considers himself a “teacher advocate”. (And, wow, do teachers need advocates these days!) The title of this book⁴ is related to the title of perhaps his best-known poem, “What Teachers Make, or Objection Overruled, or If Things Don’t Work Out You Can Always Go to Law School”.⁵ The book is a series of essays about teaching and touches on questioning students, wise parents, technology, and that neighbor who does not really understand what you do when you are not teaching or grading. Poems are interspersed with the short essays and inspirational quotes.

I received this book as a gift and left it on the coffee table. My husband, much more jaded by years of teaching than I, picked it up and read it cover to cover. You can easily read Mali’s poems online, but purchase several copies of this slim volume: save one for yourself and give the others as gifts to meaningful teachers in your life.

Face of the Earth by Doug Raber and Linda Raber

*Face of the Earth*⁶ falls into the category of “lab lit”, a recently defined genre that realistically portrays scientists and laboratory culture in novels, plays, and film. At least two Web sites^{7,8} are devoted to this classification, although this 2012 book has not yet been included in their lists.

The two primary scientists in this novel are Sarah Lockford, who earned a Ph.D. in molecular biology and is now (inexplicably) an investigative reporter, and Jake Overman, a medical researcher at the Centers for Disease Control. An outbreak of smallpox has occurred on a Navajo reservation in New Mexico. The government, fearing a terrorist incident, is poised for a military response. Sarah’s college roommate teaches on the reservation and alerts her to the situation, shortly before the town is quarantined. Sarah and Jake travel to New Mexico to unravel the mystery and return to Washington to head off the government.

The authors are both chemists who have worked in public policy at national science agencies, and you may recognize Linda Raber’s name from *Chemical and Engineering News*, where she worked as a reporter for 20 years. The book is well referenced, both to the primary literature and the popular press. Despite a slightly uneven writing style and some rough editing, this science suspense novel will be enjoyed by chemists. A Kindle edition is available for you to download and read at the beach. The Rabers have two additional novels in the works, one of which also features Jake Overman.

Heads in Beds: A Reckless Memoir of Hotels, Hustles, and So-Called Hospitality by Jacob Tomsky

In addition to teaching classes and conducting research, teachers of chemistry attend meetings to talk about teaching and research. Most of these meetings involve out-of-town travel and a stay in a hotel. Before your next scientific meeting (or family vacation that involves a hotel stay), read *Heads in Beds*.⁹

Thomas Jacobs is the author’s pseudonym for that anonymous hotel employee that you encounter worldwide. He begins his career in hospitality as a valet car parker, and rapidly moves up to staff the front desk, with a stop in housekeeping management along the way. Tom’s first hotel was in New Orleans (and I must confess that I tried to figure out which one it was at the recent ACS meeting held in that city).

Jacobs offers tips for guests: how to get a better room, how to avoid mini-bar charges, how to avoid late cancellation fees. The appendices are among the funniest parts of the book and include Things a Guest Should Never Say, Things a Guest Should Never Do, Things Every Guest Must Know, and Finding Your Agent. The book is an enjoyable and easy read (and not for the faint of heart or easily offended).

Bakewise: The Hows and Whys of Successful Baking by Shirley Corriher

It is no secret that many chemists are good cooks. The similarities between cooking and wet lab work are numerous: in both cases, if you follow directions with amounts, time, and heating, you usually get a reasonable outcome. Baking, however, involves more precise chemistry than, say, grilling a steak. To bake a cake with a finely textured crumb, you need precise ratios of fat, leavening, and flour.

Enter Shirley Corriher, chemist and cook, author of *Bakewise: The Hows and Whys of Successful Baking*.¹⁰ Shirley is a tireless promoter of the chemistry of cooking and the 2013 winner of the American Chemical Society’s James T. Grady–James H. Stack Award for Communicating Chemistry to the Public.¹¹ Shirley is the consummate storyteller: you may have seen her at a meeting or talking with Alton Brown on the Food Network. She writes just like she talks, in a conversational southern style.

Bakewise is divided into five quirky chapters: Cakes; Puff; Pie; Cookies; and Breads. Puff, you ask. What is Puff? An entire chapter is devoted to those tricky airy substances that have a high probability of failure: meringues, buttercream icing, soufflés, genoise, and popovers. Shirley Corriher expertly explains, in her own ineffable style, why that chocolate frosting never set up or why your cake looks like the surface of the moon. My favorite feature of each recipe is “what this recipe shows”, which summarizes the science and chemistry behind successful cooking.

After the recipes you will find a detailed index (including some chemical names), references, bibliography, and sources. A section of color plates is included in the center of the book. This 2008 cookbook belongs on the cookbook shelf of every cooking chemist.

■ BRIAN P. COPPOLA

11/22/63 by Stephen King

I have never read one of Stephen King’s novels before, although I am long overdue in reading the *Dark Tower* series. That said, I am a sucker for any sort of time travel story, good or bad, and this is a good one. In recent years, in television shows such as *LOST* and *Fringe*, or in movies such as *Star Trek* (2009) and *Looper*, the usual time travel shticks—paradoxes, fate, destiny, free will—have been accompanied by time and history, being personified as forces of nature. History is obdurate, King tells us, prone to course correction when bumped, and fated to spin wildly out of control when you mess with it too much. Things happen for a reason, so it is best not to muck around; the Law of Unintended Consequences lurks behind every good deed.

Within the first few pages of *11/22/63*,¹² King establishes the ground rules. It is 2011, and there is a time portal that connects the current day with a particular date and time in 1958. Walk through, and you are there and then. You can do anything while you are in the past (well, not without consequence), and you can return to 2011. Only two minutes have passed while you were away. You can see (or not) the consequences of the changes you have made, and you can re-enter the portal. But

when you do, everything is reset. It is once again that same date and time in 1958, and you have another go at it. Think: *Groundhog Day*.

King's novel operates on multiple levels, and he pulls the strings masterfully. The *prima facie* motivation, clearly signaled by the title, is to prevent the assassination of President Kennedy. By the time King's protagonist, Jake Epping, a teacher, deals with events in the Dallas book depository, we are treated to a thriller that protracts this day of days out over many pages, as Epping quite literally fights history. In between and along the way, the bulk of the book is a stunningly captivating meditation on the nature of the past. Through Epping, we face people, things, events, and lost love, and all the details that we forget until we are faced with them in photographs or movies...or, in this case, a visit.

For those of us whose lives bridge these eras, King creates an irresistible temptation: we want to walk through that portal. Not to save Kennedy, but just to get some more perspective on how stunning the changes during the latter half of the 20th century have been, and how we are finally all old enough to appreciate them.

2312 by Kim Stanley Robinson

Not far into this 550-plus-page novel, Robinson has introduced us to many key elements of the year 2312. At the same time, he succeeds in slowing down your reading of it through rich, dense, descriptive text. If digressions into detail are not your cup of tea, this might be a frustrating book for you. If you appreciate incredible coherence—scratch that: credible coherence—about how the worlds of an imagined tomorrow might operate, then you will be treated to more than you can imagine.

Global warming has ravaged Earth, humans have mostly adapted, and China is in control. Colonization of the solar system has happened, and humans, through technology and chimeric DNA, have adapted and in some cases diverged. Asteroids (lots of them) have been hollowed out and turned into, well, just about everything you can think of and a few you cannot. Quantum computers (qubes) are implanted in human brains and might well be functioning independently and with purpose. Against this backdrop, the all-too-human foibles of a classic *noir* emerge and tangle together: political intrigue, a murder mystery, and a love story.

Swan Er Hong, keen on Mercury, possesses avian brain tissue and designs bioenvironments for those asteroids. Fitz Wahram, an imposing, burly diplomat from one of Saturn's moons, is Swan's antipode in many ways. Together, this unlikely pair, along with Inspector Jean Genette of the asteroid league, follows the clues that begin at the funeral of Swan's possibly murdered grandmother. The situation escalates when one of the large, rolling cities on Mercury is attacked.

While the travails of Swan and Wahram drive the narrative, Robinson often turns away from them to give us the exceptional detail of how things are and how they work in 2312.¹³ Nearly all the time, the detail serves its purpose as one or both of the protagonists stumble into it. The author is particularly good at building tension and conveying the danger of threatening situations in a way that involves the reader, while the longer and nearly bucolic passages bring welcome calm between the storms.

Robinson strikes an interesting balance between utopian and dystopian ideals, because despite the technology and despite the advances, the solar system is still profoundly human and

subject to those things, good and bad, for better and for worse, that have driven our species throughout history.

1491: New Revelations of the Americas before Columbus by Charles C. Mann

Two things have had a profound effect on my understanding of the history of the Americas: the first time I visited the National Museum of the American Indian, which the Smithsonian opened in 2004, and when I read *1491*.¹⁴ (See Figure 2.)

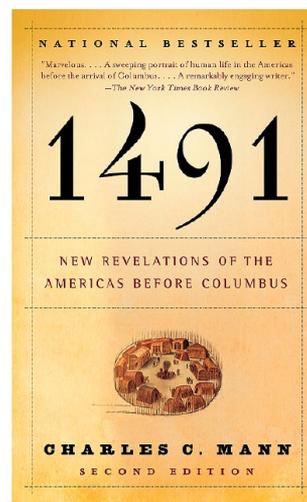


Figure 2. *1491: New Revelations of the Americas before Columbus*¹⁴ cover image provided by Vintage and reproduced with permission.

Mann is a science journalist, not a historian, and that may be why the accounts in this book are so compelling. He uses the same strategy used on the top floor of the museum, namely, the presentation of evidence, and the posing of a simple, Occam-fueled question: what is the most likely explanation that fits the data without going beyond it?

Mann sifts and winnows the accounts from all sources, explaining his reasoning as he teaches rather than exhorts. He paints a picture of the Americas of 1491: home to perhaps 100 million people, as diverse in their cultures and traditions as the Europeans, in command of agriculture, and with a strong and well-organized commerce and cultural exchange that ranged from the Andes to the Rockies. And Aztec cities with everything from running water to paved and sculpted roads probably predate the Giza Necropolis.

Although the exact numbers can never be known, it is estimated that 90–95% of the population in the Americas was decimated by the arrival of smallpox, and other diseases, with the Europeans. By the time New England was being colonized in the early 17th century, only 150 years later, the colonists would have been facing the surviving, rag-tag refugees from these lost civilizations.

In his most thoughtful insight, Mann reminds us that the greatest tragedy of all was the loss to humanity of the chance to learn of these civilizations through the normal hybridization that takes place when cultures collide.

1493: Uncovering the New World Columbus Created by Charles C. Mann

In *1491*,¹⁴ Mann brings us to understand the history of the Americas by his cool and even-handed treatment of the evidence for a thriving set of diverse cultures in the world before Columbus. In *1493*¹⁵ (Figure 3), Mann updates a key

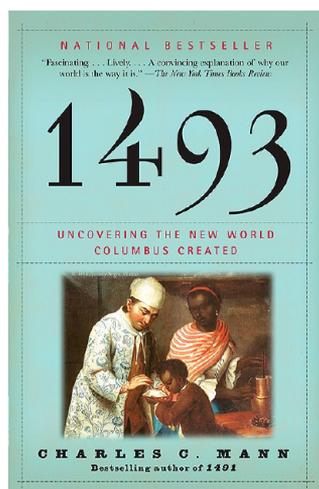


Figure 3. *1493: Uncovering the New World Columbus Created*¹⁵ cover image provided by Vintage and reproduced with permission.

component to the model of globalization since Columbus: the unprecedented movement of ecological materials around the planet that overwhelms, if not drives, the social and cultural changes.

Mann does his homework, synthesizes complex amounts of information, and then takes on a strong pedagogical voice in the way he conveys ideas. Drawing from the scholarship of diverse fields, Mann ties the “Columbian exchange”, this unprecedented ecological and economical cross-fertilization, to the emergence of the Industrial Revolution, the rise of Europe, the entrenchment of Chinese imperialism, and the ultimate rise of the United States.

I found many of Mann’s stories interesting, and he writes in bursts around a list of topics under the thesis that migration (of people, germs, plants, animals), spurred by the ability of humans in a post-Columbus world to move around, played the central role in shaping the modern world. From slavery to potatoes, Mann uses his journalistic style to convey the facts he uncovers. Because he is not vested in a particular point of view, at least not the way historians or anthropologists might be when they write their own books, you get a balanced sense in these stories.

Telling the 500 years history of the modern world is necessarily incomplete, and so this ecological perspective does not dwell on technologies (trains) or technological inventions (refrigeration), as his are the stories of the groceries rather than the trucks.

Mann does not attempt to connect the dots in that “forces of history” way that historians do. But at each step, he does remind us that the world today is an exercise in “what if?”—a construction based on circumstance and accident, and so not inevitable. Take a time portal to 1491, jiggle the events just a bit, and you are not likely to recognize the world when you come back through.

Web Site: Shorpy.com

This Web site, Shorpy.com,¹⁶ is a time portal, and the entry fee is curiosity. If you have ever come across an old photograph and seen it as a message in a bottle—who is this person and what could they have told me?—then this is a trip you will like to take.

The namesake of this site is Henry Sharpe “Shorpy” Higginbotham, a teenage coalminer from Alabama, ca. 1910,

whose image inspired the curiosity of some photographic adventurers who were sifting through the thousands and thousands of images deposited at the Library of Congress.

Now, those adventurers are mining the archives, as well as other sources of found images (from eBay to garage sales), and they feature and index a few of them every day. Join the Shorpy site and you can become one of the crowd-sourcing historians who manage to dig up interesting bits of information about each image. Most of the outdoor images of urban areas end up with a fascinating “now and then” comparison, as someone figures out where the site is today and then posts the contemporary view found on Google Maps.

Most of the images are in the public domain, or the permissions can be tracked down through the Library of Congress’s index. The owners of Shorpy.com take the raw images and clean them up and offer high-quality prints, in various sizes, in case you are interested. But this is not necessary to appreciate the incredible, high resolution that late 19th and early 20th century photography produced. Click on any of these images and you are transported, as your computer screen fills with a detailed picture of the past.

I routinely share this site with artists, particularly those who paint or draw in particular times or locations, because it is easy to search for subjects. It had never occurred to me to search on the word “chemistry” until I was writing this review; I was not disappointed with the result.

Fringe (Collected DVD Sets from the Television Series)

Every so often, a terrific television series bubbles up from the murky undertoad. *Fringe*,¹⁷ over the course of its five-season run, was one of those shows.

It is as easy to describe *Fringe* as it is impossible; a science fiction—fantasy drama built on the love between a father and a son. Along the way, we have to live through the first episodes of the first season, driven by their monsters-of-the-week, as we learn about these characters at exactly the same pace that they learn about one another. It is one of many bold moves made by these writers over the run of this series.

By the end of the first season, we see that a much (much) larger context is operating, where decisions made by scientists and decisions made by fathers have collided to create a reality that history (perhaps) or its observers (perhaps) need to correct. The plotting on *Fringe* was remarkably coherent, and nearly all the seeds laid down early on end up germinating. And right through the last moments of the last episode, the story makes internal sense.

The character of Walter Bishop, played by John Noble, is nothing short of an amazing delight. Hallucinogenic drugs, as it turns out, actually give you a glimpse of other realities, and this quirky scientist drives himself, and everyone (everyone!) else, along on the consequences ride that this discovery implies. He changes history, and in doing so, opens up the question of what others would do, knowing that history can be changed.

“The time we had together we stole”, Walter ultimately says to his son, Peter, played by Joshua Jackson. “I cheated fate to be with you. We shouldn’t have had that time together, but we did.” He regrets nothing and he regrets everything. He wants forgiveness and wants to bestow it. Parallel universes, alternate timelines, and changes both irreversible and reversible are all trumped, time and again, by terrifically written characters whose stories we care about.

■ HAL HARRIS

***The Half-Life of Facts: Why Everything We Know Has an Expiration Date* by Samuel Arbesman**

The intriguing title of this book is what made me buy it. The author's thesis is that essentially all of human knowledge, and especially scientific conclusions, are subject to change at any time. Among scientists and science educators this is not big news, but for the general public, which is the intended audience for *The Half-Life of Facts*,¹⁸ this is one of the lesser-appreciated key steps in the scientific process. There really is no final answer in science. Every "conclusion" is subject to refutation, or at least refinement, and every good scientist is looking for opportunities to show that the nature of the world is not as had been assumed before. The general public is more likely to become irritated when they are told in the media that red wine will make you live longer, only to be told months or weeks or hours later that it is not true.

Arbesman's argument is that science marches inevitably onward, replacing or improving prior knowledge. He uses the "half-life" analogy for this process and illustrates it with examples, such as the discovery that the number of human chromosomes had been miscounted as 48 in 1912 and reported in textbook after textbook until finally corrected in 1956. When I think of a "half-life" I have in mind a particular physical model, the one that we use when discussing first-order chemical reactions as exemplified, for example, in unimolecular thermal decompositions at moderate pressure or any nuclear decay. When I think of "facts", I think of conclusions that have been established as a truth that has been established as a result of repeatable experiments. While the erroneous count stood up for nearly 50 years and was eventually corrected, the author is not clear about what he considers to constitute a "fact". Does he believe that the corrected number will eventually be replaced by another? Arbesman adopts flexible definitions of both of the nouns in his title. By doing so, he can build a fairly interesting book for the lay reader that emphasizes over and over the nature of science. Some of the "facts" that he chooses to discuss are not real facts, at all.

He uses as one example the idea that children can become strong by eating their spinach (as once did Popeye, a bygone cartoon character), which is not true at all, and never was, except in the mind of its creator. Even more interesting is another myth about how spinach got that reputation. According to the myth, which Arbesman ironically perpetuates on pages 83 and 84, it was a consequence of a decimal-point error made by a German analytical chemist in 1870. It turns out that there is no truth whatsoever to this story, and the author points this out in his official errata. This is one example of a "fact" that had a lifetime of less than a century. Arbesman uses a number of examples like this one from popular culture to show how "facts" change over time. Physical scientists may also find fault with his use of "phase transitions" to describe how scientific findings in a particular area may accumulate until they eventually reach widespread acceptance. Research on smoking and human health is used as an example of how the once "healthful" practice of inhaling smoke from tobacco eventually changed in public perception. In my opinion, the story of how these findings were suppressed for additional decades is a more interesting one than the "phase transition" model.

***The Signal and the Noise: Why So Many Predictions Fail—But Some Don't* by Nate Silver**

I would argue that Nate Silver was the most influential political pundit of 2012. I had begun reading his *FiveThirtyEight* blog¹⁹ in the *New York Times* very early in the election cycle because it was much more fact- and data-driven than any of the other political polls available. He is not a "pollster", in that he does not ask citizens questions about their political opinions or voting plans. Instead, he does a meta-analysis of the polling that has been done by others, weighting them according to the quality and size of the sample, and taking into account the differences between their predictions and previous results. Silver always does an excellent job of explaining his choice of data to analyze, and his predictions are based on the application of Bayesian statistics. The fact that his work proved to be even more accurate in November than his error limits would require made it even more delicious when the science deniers of the right-wing (Karl Rove and *Fox News*) were still claiming that he must be wrong nearly until the Electoral College was convened. It is much easier to make accurate projections when there are lots of data and an open process. His methods are not so applicable for Academy Awards and Popes (although he did pretty well on the Academy Awards), but he has also recently written about Chief Justice John Robert's questionable use of statistics and public opinion on same-sex marriage.

*The Signal and the Noise*²⁰ describes how statistical methods can be applied to the prediction of economic collapses, earthquakes, weather, climate change, terrorism, poker, and sports, among other topics. Silver has personal experience with several of these. Besides his political polling blog, he has earned a living in poker and developed and sold a system for the evaluation of baseball players (it is called PECOTA—Player Empirical Comparison and Optimization Test Algorithm—and is still for sale, although no longer owned by Silver). The best parts of the book are those about polling, poker, and baseball, but I enjoyed all of it because he applies a consistent scientific approach. He discusses several different methods of extracting a meaningful signal from noise and illustrates them with real-life examples. I have recommended the book to many of my students because it is written in a lively and humorous manner and it consistently emphasizes the importance of a skeptical attitude in doing science. This is not a book about how to do statistical research; there are almost no equations, but lots of illustrations. For those who would like to go somewhat deeper, there are more than 50 pages of references at the end.

***The Case of the Poisonous Socks: Tales from Chemistry* by William H. Brock**

The Royal Society of Chemistry consistently publishes some of the best popular literature about chemistry; *The Case of the Poisonous Socks*²¹ is another resource that can enlarge your appreciation for the history of chemistry and enrich your teaching. (See Figure 4.) Historian of science William Brock presents 42 essays about personalities and enterprises in 19th and 20th century chemistry. Some of the essays are republished from *Chemistry in Britain*, *Chemistry and Industry*, *The Bulletin for the History of Chemistry*, *Education in Chemistry*, or *Ambix*, but most of them have not been previously published. It is an eclectic selection, from organic and industrial chemistry to mathematical and physical chemistry. Part 4 includes four chapters specifically on the role of women in chemistry: "Women in Alchemy and Chemistry"; "Teaching Chemistry to Women"; "Musical Affinities"; and "Edith Hulda Usherwood

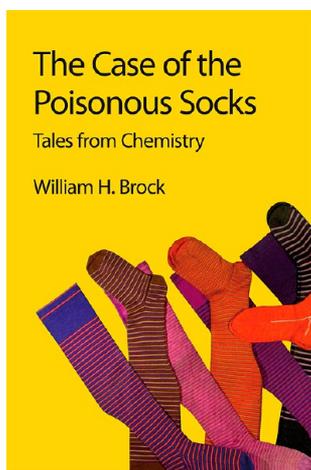


Figure 4. *The Case of the Poisonous Socks: Tales from Chemistry*²¹ cover image provided by Royal Society of Chemistry Publishing and reproduced with permission.

and the Ingold Partnership". Most of the chapters, though, seem simply to be stories that Brock found interesting. Some are about chemical giants such as Avogadro, Haber, Kekulé, von Liebig, Olah, and Crookes, and I discovered connections in those chapters that I had not realized previously.

Brock writes in a lively and convincing manner about some of the most colorful characters in science—the famous ones, of course, but also some of those often neglected. Henry Armstrong was one of those. Armstrong was an inveterate writer of letters to *Chemistry and Industry*, most often complaining about some newfangled idea—such as electron arrows, ion dissociation, atom bombardment, or quantum mechanics. Armstrong also famously claimed that Ramsay had mistaken an allotrope of nitrogen for his noble gas, argon. Some other characters are presented in a new light. For example, I had known of J. R. Partington because of his *Short History of Chemistry*²² (which is still in print 76 years after its first edition), but was ignorant of most of his contributions to thermodynamics, and electrochemistry, and of the fact that he had a chemistry textbook published when he was still a graduate student. The first chapter, for which the book is titled, is about a puzzling case of an allergic skin reaction to an azo dye, possibly Field's orange, which affected only persons whose perspiration was basic. It is a coincidence that, after I bought this book at the ACS National Meeting in Philadelphia, where we visited the marvelous Barnes Institute art museum, the first essay I read was about Albert C. Barnes and how he made his fortune from selling a bactericide named Argyrol. Barnes' enterprise later merged with Henry Crookes' company to become Crookes–Barnes Laboratories. Barnes' wealth multiplied fabulously, allowing him to become a world-renowned art collector and philanthropist. Chemists with any interest at all in history will find real nuggets throughout *Poisonous Socks*.²¹

***Life's Ratchet: How Molecule Machines Extract Order from Chaos* by Peter M. Hoffmann**

I found this ferociously mechanical view of the processes of life as described by Peter Hoffmann, a professor of biophysics at Wayne State University, to be unique. The "ratchet" in *Life's Ratchet*²³ is a reference to several related gedanken experiments similar to Maxwell's famous demon. (See Figure 5.) Maxwell's imp was capable of sorting molecules by their speeds as they diffuse through a pinhole, creating a temperature difference

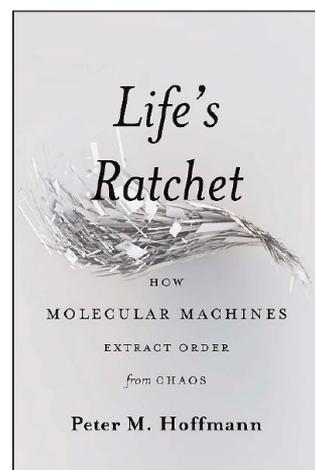


Figure 5. *Life's Ratchet: How Molecule Machines Extract Order from Chaos*²³ cover image provided by Basic Books, an imprint of the Perseus Books Group, and reproduced with permission.

without apparent expenditure of energy. The "Brownian ratchet", first proposed by Gabriel Lippman in 1900^{24,25} (not Marian Smoluchowski as Hoffmann says), was a similar idea, except that it did not require an intelligent demon. Instead, a ratchet of molecular dimensions was prevented from rotating in one direction by a delicate pawl. The pawl allowed collisions with a single energetic molecule to turn the ratchet in one direction, but prevented similar collisions from the other direction from making it turn backward. Smoluchowski was the first to point out the flaw in this perpetual motion machine, but most people had never heard about any of this until Richard Feynman included his brilliant explanation of why it does not work in his *Lectures on Physics*.²⁶

Hoffmann clearly understands the biochemistry of life, but in *Life's Ratchet*, he maintains the viewpoint of a physicist, focusing on the ways in which life uses thermal and chemical energy to convert the chaotic motion of molecules on the nanoscale into structure and purpose. Especially informative to me is his description of how the many, various forms of myosin are involved in the conversion of ATP into muscular activity. I was fascinated by his calculation that molecular machines based on ATP have incredibly large power densities, about 100 W/cm⁻³. Furthermore, these nanoscale machines operate in a maelstrom of water molecules, undergoing potentially disruptive collisions every 10⁻¹³ s, and the thermal energy of these random collisions is about a hundred million times larger than the energy output of the molecular machine. No wonder I have so much trouble getting anything accomplished.

■ **C. M. WOODBRIDGE**

***Learn Me Good* by J. Pearson**

*Learn Me Good*²⁷ (Figure 6) is the story of how a laid-off engineer became a teacher. Sort of. After being laid off from a thermal design engineering firm, he reinvented himself as a third-grade math teacher. Our protagonist does not write about taking the classes, passing the tests, and being certified as a teacher. Instead, he writes about what he experienced in his first year. But he does not write about lesson plans or his teaching philosophy. The book is written as a collection of e-mail messages to a former colleague, who is still at the design firm. We never directly see the text from the former colleague, but we get an idea of the type of exchange that is occurring.

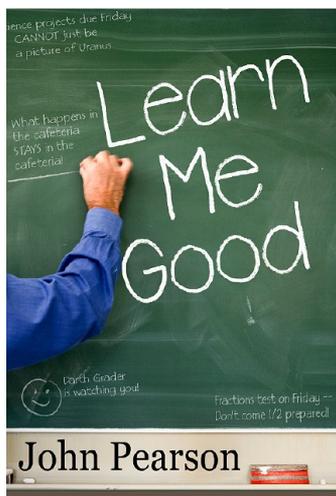


Figure 6. *Learn Me Good*²⁷ cover image provided by CreateSpace Independent Publishing Platform and reproduced with permission.

The e-mails are filled with humor, and we see how Jack Woodson grows and evolves in his first year. The e-mails are light-hearted and funny, but they also deal with the less-than-funny aspect of teaching: the facilities, the importance of passing the standardized tests, and the endless changes in enrollment. We see how he reacts to and adapts to all the challenges and, in the process, grows into a better teacher. He shares his journey with humor and self-deprecation, and it is an enjoyable journey. Even the darker parts are shared in a positive manner—instead of writing the horror stories about helicopter parents (for example), he turns the horror into something funny and, almost, a morality tale.

There is, in my opinion, a dark undertone to this book. Along the journey, we see some of the challenges faced by public school teachers, children, and parents. They are appalling. But Jack does not dwell on this dark underbelly—he points out the good being done in spite of all the challenges. The reader is left to decide what they are going to do about the challenges in our public school systems.

***The Cookbook Collector* by Allegra Goodman**

*The Cookbook Collector*²⁸ was purported to be about cooking, relationships, and book collecting. As an avid book hoarder who has a small cookbook collection of her own, I thought this sounded like a great book. I was further excited to find that there was a mystery associated with the cookbooks. A mystery with books and cooking? Sign me up, I was hooked. I was looking at this text as a possible source for a seminar for nonscience students; I thought the cookbook theme could be used to tie into molecular gastronomy, cooking, and the chemistry behind cooking. I thought that this would be a good way to teach nonscientists a little science and show them they know more about science than they think.

Unfortunately for me, the book was more about the relationship between two sisters: Emily, a Silicon Valley mogul, and Jess, a graduate student in philosophy. I felt the cooking theme was more of a side note than a main theme and this strongly colored my feelings about the book. The mystery was indeed there, but it developed too late in the book to change my disappointment into interest and enjoyment. This would have been a perfectly good “beach book” to read this summer—it is well written and the characters are interesting. Because it did not focus on what I wanted it to be about, I was

disappointed overall. I will save this book and go back and reread it in a few years and see if I like it better then.

***Doing Science and Culture* by R. Reid and S. Traweek. *Cyborgs and Citadels: Anthropological Interventions in Emerging Sciences and Technologies* by G. L. Downey and J. Dumit**

This pair of texts—*Doing Science and Culture*²⁹ (Figure 7) and *Cyborgs and Citadels*³⁰—contains a series of essays on the

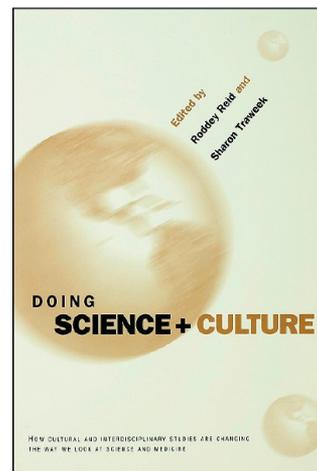


Figure 7. *Doing Science and Culture*²⁹ cover image provided by Routledge and reproduced with permission.

cultural study of science and technology. Both grew out of collaborations that germinated in conferences. Both are about anthropologists “looking in” to the world of science and technology. As with many anthologies, some essays drew me in and others did not. Both texts are fascinating reading; they give a glimpse into what those on the “outside” see when they look into our world. These observers, however, are not the same as those from the general public or mass media. Instead, these observers put science and scientists under their own microscope and report their findings.

These texts introduced me to a new field: the anthropology of science and technology. Having read *Beamtimes and Lifetimes*³¹ years ago while I was working at Brookhaven National Lab, I had an idea that there were anthropologists studying scientists. Gone are the days, however, when anthropologists were only looking at ancient civilizations or tribes in remote areas or primates in remote areas. Now, they have turned to study scientists, science, and technology. A quick Internet search shows that the anthropology of science and technology is a thriving field with programs in numerous departments and portions of journals devoted to the field. These texts give the rest of the world a glimpse of what the anthropologists who study us and our field are seeing. I look forward to reading more texts and articles like this.

***White Elephant and Blue Murder* by Nora Barker**

*White Elephant*³² and *Blue Murder*³³ are two of Nora Barker’s books about Dr. Christmas Eve Connery (Chris to her friends) and the latest murders she has stumbled over. (See Figures 8 and 9.) Chris is an art historian and the chair of the fine arts department at Midwestern State University, located in the town of Camden (located somewhere in the chilly Midwest). This small town is an unusual hotbed of activity: murder, theft, and break-ins occur with a regularity that would put a larger town to

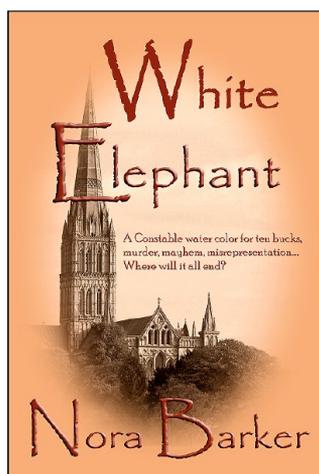


Figure 8. *White Elephant*³² cover image provided by StoneThread Publication and reproduced with permission.

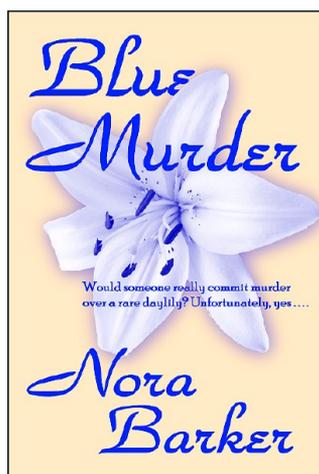


Figure 9. *Blue Murder*³³ cover image provided by StoneThread Publication and reproduced with permission.

shame. And, unlike most department chairs I know, Chris, along with her ability to aid the police (and sometimes the FBI) in solving these crimes, is at the center of all the nefarious activity. The story in *White Elephant* centers around a painting Chris purchases for \$10 from the resale shop, The White Elephant, where her mother works in Florida. The painting may be a far more valuable, albeit stolen, painting. *Blue Murder* begins with the murder of Chris's neighbor and the theft of some rare daylilies he was breeding. How does the latter story tie in to art history or art theft? Read the story and find out.

Although there is an order to this series, reading the books out of order is not a problem. Other books in the series include *Murder in Primary Colors*, *Red Hot and Dead*, and *Green-Eyed Death*. These mysteries are fun, enjoyable books about life in an academic institution. While these adventures might stretch credulity, we can recognize elements typical of life in the ivory tower—angst over tenure and promotion, department meetings, budget cuts, working with students, and student pranks on campus. Nora Barker, who is an art historian and retired college professor, ties crime, a little art history, and academia into good stories. I look forward to her next installment.

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Notes

The authors declare no competing financial interest.

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