

Book and Media Recommendations: Kitchen as Lab, Science in Writing, Who Are Your Students, and How to Help

Cheryl Baldwin Frech*

Department of Chemistry, University of Central Oklahoma, Edmond, Oklahoma 73034-5209 United States

S Supporting Information

ABSTRACT: Book reviews for five titles are presented. *The Food Lab: Better Home Cooking through Science*; *The Story of Western Science: From the Writings of Aristotle to the Big Bang Theory*; *The Next America: Boomers, Millennials, and the Looming Generational Showdown*; *What Every Science Student Needs to Know: A Survival Guide for Undergrads*; and *Mindset: The New Psychology of Success—How We Can Learn to Fulfill Our Potential*.

KEYWORDS: General Public, Elementary/Middle School Science, High School/Introductory Chemistry, First-Year Undergraduate/General, Continuing Education, History/Philosophy, Student/Career Counseling, Minorities in Chemistry

Every summer, selected contributors to this *Journal* scour the shelves and beyond to bring you recommendations for summer book and media diversions. You may find titles to help you in the classroom, laboratory, or kitchen. Enjoy!

■ THE FOOD LAB: BETTER HOME COOKING THROUGH SCIENCE

Your kitchen and a wet-chemistry laboratory have much in common. In both there are sources of heat and cold, measuring and mixing devices, sharps, and timers. To work in each, you don various types of protective gear, stay alert to hazards, and react to whiffs of smell that indicate that chemical reactions have occurred. My cookbook collection includes an entire shelf of science-themed cookbooks, several of which I have reviewed in this *Journal*.^{1–3} J. Kenji López-Alt's tome, *The Food Lab: Better Home Cooking through Science*⁴ represents the epitome of this genre to-date (Figure 1).

The author gained a following with his Serious Eats blog.⁵ There is much to recommend the blog: eating guides to various cities and countries, recipes for seasonal and trendy foods, and

step-by-step directions for tricky techniques (how to peel and cut a mango). Blogs are not necessarily the best format for a scientific and comprehensive look at a class of recipes (or chemical reactions). And some people all too easily slip down the rabbit hole of a blog, wasting an hour clicking one link after another until finding themselves reading about BYOB restaurants in Philadelphia or the use of food imagery in video games.

The book is remarkably similar to a general chemistry textbook, even down to its size and shape and number of pages (958). The inside front and back covers contain common ingredients and tables of conversions. The preliminaries include keys to good kitchen science and a compendium of essential kitchen gear. While the coverage is extensive, it is not comprehensive, and the author states clearly that desserts "aren't his thing".

Nine chapters cover "the science of" a major class of food or heat transfer, from Chapter 1, "Eggs, Dairy, and the Science of Breakfast" through Chapter 9, "Batter, Breadings, and the Science of Frying". Nine experiments you can try at home (temperature vs energy, double-acting baking powder) are included. Numerous one- and two-page step-by-step recipe photo spreads are presented (spaghetti with meat sauce, how to cut a beef tenderloin). Modern techniques such as sous-vide cooking (akin to thermostating a reaction with a water bath) are explored and made accessible to you, the home cook. López-Alt also provides fresh makeovers for some old favorites, such as broccoli-rice and green bean casseroles. And when he gets into a procedure, expect an extensive theme-and-variations approach with multiple recipes (hamburgers, macaroni and cheese, fried chicken). The chapters, while specific to a process, include the necessary accouterments and sides in handy juxtaposition (garlic bread, tartar sauce).

López-Alt's writing is fun and easy to read. Color photographs, tables, and graphs adorn every page. He mentions

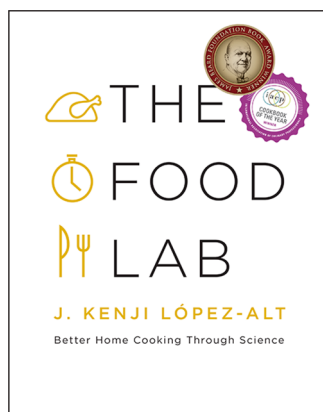


Figure 1. *The Food Lab: Better Home Cooking through Science*⁴ cover image provided by W. W. Norton & Company and reproduced with permission.

Received: May 11, 2016

Revised: June 5, 2016

his love of science repeatedly, and uses experiments and a scientific approach to explain and improve recipes. His final acknowledgment is to Don Herbert, of Mr. Wizard fame, who undoubtedly inspired quite a few chemists, as well.

■ THE STORY OF WESTERN SCIENCE: FROM THE WRITINGS OF ARISTOTLE TO THE BIG BANG THEORY

When I teach general chemistry, I share some of the stories of the people who are behind the big ideas and of the controversies that once existed. Otherwise, students may not ponder the process of science or consider the ways that science develops. *The Story of Western Science*⁶ is a compelling book (Figure 2) that is in a class of its own and which will serve as an excellent resource for educators.

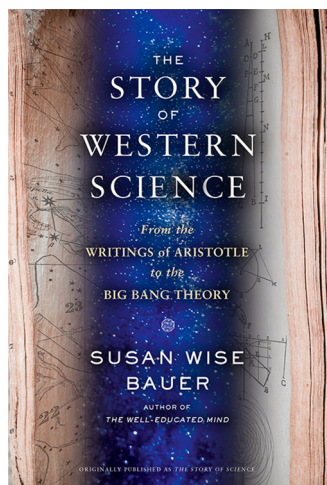


Figure 2. *The Story of Western Science: From the Writings of Aristotle to the Big Bang Theory*⁶ cover image provided by W. W. Norton & Company and reproduced with permission.

Susan Wise Bauer's first words in the preface are "This is not a history of science". Rather, the book is a collection of 28 short chapters that illustrate the development of science writing as a key to advancing our understanding of the world. Science has progressed from the time of the Greeks to the present because someone considered the nature of reality and *wrote down* their thoughts and later, the results of their experiments. Bauer has carefully chosen writings to illustrate the major developments of science: atoms, evolution, continental drift, quantum theory, the origin of the universe.

The book is divided into five parts, each containing multiple chapters: "The Beginnings", "The Birth of the Method", "Reading the Earth", "Reading Life (With Special Reference to Us)", and "Reading the Cosmos (Reality)". Each chapter presents one or two books or papers and a summary of the major ideas contained therein, with a focus on the developments that changed the direction of science. Lucretius (60 BCE) wonders about the ceaseless motion of atoms in Chapter 5, "The Void". Chemistry emerges as a science in Chapter 11, "Instruments and Helps" in 17th-century writings by Robert Boyle, and his student assistant, Robert Hooke. Boyle's scrupulous experiments stand in stark contrast to earlier unsubstantiated explanations of the nature of matter and its transformations.

You might expect *The Story of Western Science* to be a huge compendium of a book as it covers more than two millennia. However, the book clocks in at just over 300 pages, with 60 of those devoted to extensive notes and an index. Each chapter ends with print and online references to the source material, with suitable comments about accessibility and readability of the original writing or translation. Bauer is a writer and historian who is a prominent advocate of classical education through homeschooling. She has a rare ability to distill down ancient volumes and scientific papers to expose the milestones of western scientific progress into a concise and readable book.

■ THE NEXT AMERICA: BOOMERS, MILLENNIALS, AND THE LOOMING GENERATIONAL SHOWDOWN

If you have been an educator in the United States for more than a few years, you know that the makeup of your classes has been changing. In my classrooms, I see more students who are women, Hispanic, mixed-race, single parents, and openly gay; there are fewer students who just graduated from high school and far fewer married students. Paul Taylor, along with the Pew Research Center, tackles current demographics and trends in *The Next America: Boomers, Millennials, and the Looming Generational Showdown*.⁷ The main themes in the book are grouped according to generations, race, class, gender, and culture.

The book (Figure 3) opens with a chapter on hyperpartisanship—the idea that we no longer just disagree—we disengage

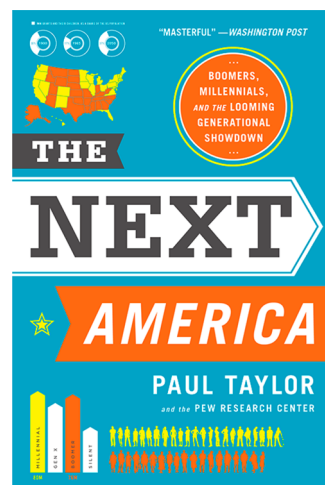


Figure 3. *The Next America: Boomers, Millennials, and the Looming Generational Showdown*⁷ cover image provided by PublicAffairs Books and reproduced with permission.

and distance ourselves from facts. Information and news sources have splintered into thousands of possible outlets, channels, blogs, and Web sites so that it is possible to only consume information with which one is already aligned. A chapter on "Demographic Destinies" describes the slow-motion transition that is occurring as we take in new immigrants and more nonwhite babies are born each year, while an older, whiter generation is dying off. The four large cohorts of generations (Silent, Boomer, Gen X, and Millennial) are considered extensively, and their attitudes toward voting, national security, religion, technology, marriage, and education are explored.

This book was reissued as a paperback in late 2015 and the data updated from the original 2014 hardback edition with an additional chapter added. The discussion makes up about two-thirds of the book, and there are two lengthy appendices that describe the data collection process, clarify terminology, and present some additional data tables. Pick up a copy of the paperback to read and prepare for some good conversations or simply educate yourself about who the United States is as a nation and whom to expect in U.S. classes.

■ WHAT EVERY SCIENCE STUDENT SHOULD KNOW: A SURVIVAL GUIDE FOR UNDERGRADS

Four successful recent science graduates who attended Dartmouth University have put together a how-to book for science majors, *What Every Science Student Should Know: A Survival Guide for Undergrads*.⁸ The book (Figure 4) contains “the advice that we, your authors, wish we had heard when we came to college.”



Figure 4. *What Every Science Student Should Know*⁸ cover image provided by University of Chicago Press and reproduced with permission.

Justin Bauer and coauthors present chapters that cover “How to Manage College Life”, “Choosing a STEM Major”, research, and options and careers beyond a bachelor’s degree. Perhaps Chapter 3, “How to Excel in Your STEM Courses” is the most valuable. As an instructor, I see students fail because they do not know how to “do college”. This chapter is explicit in instructions for students: “The first rule about lectures is to go to lectures. The second rule of lectures is to go to lectures.” I have made the same recommendation to my own students, but the message is meaningful coming from recent graduates. The chapter covers attending class (what to do before, during, and after), studying, homework, and preparing for and taking exams, and what to do after exams and quizzes. There is a section on laboratory courses, and even a troubleshooting section: what should a student do about seemingly boring material, procrastination, a lack of focus, or if they face other struggles. Each chapter contains Students Say sections with quotes by real students about pertinent topics. An appendix presents advice for underrepresented students in STEM, including women, minorities, and first-generation students.

This is a book to have in your office to loan to struggling first-year students. Or buy a copy to give to a high school graduate who hopes to major in a STEM field.

■ MINDSET: THE NEW PSYCHOLOGY OF SUCCESS—HOW WE CAN LEARN TO FULFILL OUR POTENTIAL

The premise of *Mindset*⁹ is simple. Most people have one of two approaches to life (mindsets). People with a fixed mindset believe that intelligence (or any other kind of ability) is static: either you have it or you do not. People with a growth mindset believe that intelligence (and ability) can be developed through application and experience.

Mindsets do not just impact academic performance, they are apparent in many, if not all, aspects of our lives. Author Carol Dweck’s anecdotes vary widely. There’s “CEO Disease”—the contrast between CEOs who surround themselves with sycophants who make the CEO look good but who ultimately are fired for driving the company into the ground. There are female college undergraduates who aspire to “effortless perfection” and who develop anxiety and depression.

The message is repeated throughout the book: examine something that you may have allowed to measure you: a test score, an action, or a rejection. Explore all the emotions that accompany it and then ask what you can learn, rather than let something define you. You can fail at something and not be a failure.

Quite a bit of this book is about academic achievement in students ranging from grade school to college. In two early chapters Dweck uses a study of performance in a chemistry course by college students who aspire to be doctors to illustrate the impact of mindsets on academic success. There are also chapters that consider mindsets in business and leadership, relationships, and the interactions between parents, teachers, children, and coaches. The final chapter, “Changing Mindsets”, provides valuable tools to use yourself, or to try with those students who come to your office for help in a course.

This book was published in 2006 and some of the anecdotes are about people or events that occurred quite some time ago, yet the message is clear and helpful. The book has gained a following on our campus because the mindset concepts are helpful in dealing with our students. Consider reading *Mindset* and decide for yourself.

■ ASSOCIATED CONTENT

📄 Supporting Information

The Supporting Information is available on the ACS Publications website at DOI: [10.1021/acs.jchemed.6b00345](https://doi.org/10.1021/acs.jchemed.6b00345).

Cover art (ZIP)

■ AUTHOR INFORMATION

Corresponding Author

*E-mail: cfrech@uco.edu.

Notes

The authors declare no competing financial interest.

■ REFERENCES

- Frech, C. The Science of Cooking (Barham, Peter). *J. Chem. Educ.* **2004**, *81* (4), 488.

(2) Frech, C. B.; Coppola, B.; Harris, H.; Woodbridge, C. Summer 2013 Book and Media Recommendations. *J. Chem. Educ.* **2013**, *90* (7), 823–831.

(3) Frech, C.; Pagni, R.; Kovac, J.; Coppola, B.; Harris, H. Summer Reading. *J. Chem. Educ.* **2007**, *84* (6), 916–922.

(4) López-Alt, J. K. *The Food Lab: Better Home Cooking through Science*; W. W. Norton & Company: New York, 2015.

(5) Serious Eats. <http://www.serious-eats.com/> (accessed May 2016).

(6) Bauer, S. W. *The Story of Western Science: From the Writings of Aristotle to the Big Bang Theory*; W. W. Norton & Company: New York, 2015.

(7) Taylor, P. *The Next America: Boomers, Millennials, and the Looming Generational Showdown*; PublicAffairs Books: New York, 2015.

(8) Bauer, J.; Kim, Y.; Zureick, A.; Lee, D. *What Every Science Student Should Know: A Survival Guide for Undergrads*; University of Chicago Press: Chicago, 2016.

(9) Dweck, C. S. *Mindset: The New Psychology of Success—How We Can Learn to Fulfill Our Potential*; Ballantine Books: New York, 2006.