



REVIEW: Sam Kean. *The Disappearing Spoon, And Other True Tales of Madness, Love, and the History of the World from the Periodic Table of the Elements.*

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REVIEWS

A Spoonful of Stories from Chemistry's Past and Present*

Sam Kean. *The Disappearing Spoon, And Other True Tales of Madness, Love, and the History of the World from the Periodic Table of the Elements*. 400 pp. New York, NY: Little, Brown and Company, 2010.

Julia R. Bursten[†]

Sometimes the right book finds you at the right time, and it shifts your perception of a familiar subject just a little, just enough to make a difference. It reminds you of something important you haven't thought of in a while, or it shows you a new way of looking at and interacting with the world. Last winter, for me, that book was *The Disappearing Spoon*, by Sam Kean. I heard a very fuzzy description of the book at a holiday party, something about the periodic table and political history. As someone eternally interested in chemistry and its impact on society at large, I was intrigued.

The book accompanied me through a hectic holiday travel season, and as I read little kernels of story about each of the elements in the periodic table, I found myself unable to stop bringing them up in conversation. As my family pulled foil over Christmas leftovers and discussed my current hometown of Pittsburgh: "Did you know that aluminum used to be more expensive than gold, and that Pittsburgh is where the guy who figured out how to isolate it cheaply set up shop?" Or as news of the flood in Brisbane hit American televisions: "Did you hear that Australian astronomers used chromium to provide evidence that the fine structure constant may change over time?"

The book follows an unusual format, which may explain why the first description I heard of it was so fuzzy. Each chapter is a thematically-related series

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of stories, and each story centers on one element in the periodic table. Over the course of the book and in no particular periodic order, each element gets a story of its own. Some of the stories are fairly well-known: copper is oligodynamic, which explains why it is used in public places where germs would otherwise spread; the mixture of niobium and tantalum known as “coltan,” which provides fuel for cell phone batteries, has played a role in fueling tribal conflict in Sudan; Wilhelm Röntgen discovered x-rays by observing barium lit up by active Crookes tubes.

Other stories are less common and more jolting: supporters of Gandhi were more prone to goiters because they preferred homemade sea salt to the iodized salt imported from imperialist Britain; the devil in Mark Twain’s “Sold to Satan” is an anthropomorphized critical mass of radium, held back by a thin film of polonium; King Midas’s “golden touch” was probably a reference to the abundance of zinc relative to tin in ores around Phrygia, so that Phrygian refineries produced golden brass where nearby towns had only bronze to show. The book’s eponymous tale refers to a milder form of elemental trickery, in which practical-joker chemists craft spoons from gallium. The spoons appear normal on sight but melt away into nothing when dipped in cups of hot tea—a disappearing act made possible by gallium’s 84°F melting point.

The stories are absorbing, conversational, and bite-sized, making the book a perfect read for travel or bedtime. Moreover, when taken together, they compose a detailed and sometimes shocking portrait of the role that chemistry and chemicals have played in human social and political history. Above all, the stories are thought-provoking and anchored in everyday activities, which means they tend to return to mind more frequently and more unexpectedly than standard *Science* or *Nature* articles.

Kean’s aim in *The Disappearing Spoon* is primarily to relay fascinating anecdotes, but along the way he provides insightful commentary on various relationships between science and society, warning of the dangers of incautious research on newly-discovered elements and revealing historical vignettes that offer partial explanations of how modern chemistry has become so thoroughly entangled with modern industry. Chemistry, the most industrially-fraught of the modern natural sciences, is sometimes vilified for the hand it has played in allowing eager entrepreneurs to expose innocent laborers and consumers to unforeseen and occasionally lethal dangers. For instance, contemporary organic and natural consumer markets often tout the purity and wholesomeness of their products by deeming them “chemical-free,” an embarrassingly false admission that underscores the bad rap chemistry has received from its more torrid affairs with industry.

Many of Kean’s stories, such as the one of aluminum related above, offer portraits of industry’s courtship of chemistry over the past two centuries, without taking a strong stance on whether or not the current marriage merits a divorce. As such, excerpts of the book make excellent pedagogical tools for sparking classroom

debates about historical and contemporary relations between science and society, as well as providing countless springboards for more rigorous academic inquiry into the history of chemistry.

The book offers pedagogical tools for the philosophy classroom, as well. In the chapter entitled “Chemistry Way, Way Below Zero,” Kean touches on the tenuous relationship between chemistry and physics during a story about Bose-Einstein condensates. The discussion is far from a robust academic debate on the matter, and indeed it often feels philosophically naïve. But by taking the reader on a whirlwind romp through the basics of crystal structure, the discovery of noble-gas compounds, the usefulness of superconductivity, and interpretational difficulties surrounding Heisenberg’s uncertainty principle, Kean manages to weave a surprisingly un-technical tale of convoluted feedback dynamics between advances in physics and advances in chemistry in the twentieth century. The ten-minute story easily inspires classroom discussions of reduction in the sciences, as well as of the proper interpretation of the uncertainty principle and, with Kean’s breezy description of the so-called miscalculation that led Bose to predict his condensates, of the relationship between mathematics and scientific theories.

Kean’s book is a rich deposit of beautiful, heartwarming, distressing, true stories from the history of chemistry. Sifting through the deposit in search of a particular fact or moral is a bit like panning for gold—often frustrating, rarely rewarding. On the other hand, carrying around a sample of the deposit and showing off bits of it to family and friends, or to colleagues and students, can produce fun and insightful conversations about the relationship between chemistry and everyday activities like cleaning up holiday dinners. Whether they are read for pedagogical or personal reasons, the stories in *The Disappearing Spoon* are likely to follow their readers around, provoking thought and sparking discussion long after the book is returned to the shelf.

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