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Commentary

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Book and Media Recommendations: Proven Facts and Speculative Fiction

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ABSTRACT: This selection of recommendations starts with a set of speculative questions and answers them from the world of proven facts. Turning that on its head, the other selections start with some known facts, and pose intriguing questions about the way things might be, or might have been, in a speculative world.

KEYWORDS: *General Audience, Public Understanding/Outreach, Interdisciplinary/Multidisciplinary, Textbooks/Reference Books, Ethics*

Proven facts and speculative fiction have a great deal in common. This selection of recommendations puts these two ideas side by side. Chemistry sometimes seems like Arthur C. Clarke's notion that a sufficiently advanced technology will be indistinguishable from magic; in fact, some people like to perpetuate this. In the first selection, a graduate student and a recent graduate team up to demystify the molecular world by answering a set of speculative questions. In the remaining selections, the authors start with reality and take big and small steps to wax nostalgically, to speculate, and to extrapolate from their foundational ideas and reconstruct what life might have been like in the far past, the near past, and in the all-too-Orwellian world of today.

HANDY ANSWERS

The Handy Chemistry Answer Book[1] is a new entry in a well-established series of answer books written for the general audience (Figure 1). This series is not instructional, per se, in that it is not aimed at teaching either "smarties" or "dummies" about the ins and outs of the subject in an accumulated prose. Its approach is close to the sorts of questions I got from my dad: give me the 30,000-foot view on cancer, and keep it to about a minute. Believe me, you learn how to cut to the chase when your listener is willing to trust you without having to cite all that bothersome evidence.

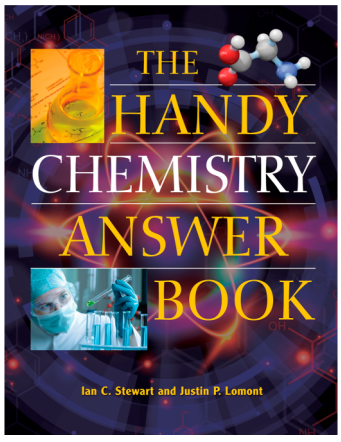

Figure 1. *The Handy Chemistry Answer Book*[1] cover image provided by Visible Ink Press and reproduced with permission.

This book contains upward of 900 short answers to questions that are grouped in traditional sections: History of Chemistry; Atoms and Molecules; Chemical Reactions; Organic Chemistry; Inorganic Chemistry; Analytical Chemistry; Biochemistry; Physical and Theoretical Chemistry; Nuclear Chemistry; Polymer Chemistry; Energy; The Modern Chemistry Lab; The World Around Us; Sustainable "Green" Chemistry; Astrochemistry; Chemistry in the Kitchen; and Chemistry Experiments You Can Do At Home. The tone is conversational, and the authors succeed in giving answers that would satisfy my dad, for example (ref 1, p 9):

> *How was the theory of phlogiston disproved? Antoine Lavoisier, an 18th-century French chemist, disproved the theory of phlogiston by showing that combustion required a gas (oxygen) and that that gas had weight. ... So Becher (Johann Joachim Becher, 1635−1682) had it backward: oxygen was being used up by the candle instead of phlogiston being given off by the flame.*

While the information is not that different from what one might find among the links in an Internet search, these passages are more like having asked your chemistry buddy to do the search and get back to you with the bottom line. Throughout the book, the authors are fearless in their willingness to take on quite contemporary topics and to make them accessible. University students were asked to provide questions, and many of the topics in The World Around Us chapter come from this solicitation, which brings forward an unsurprising but tastefully managed collection of questions about bodily fluids and functions, for example (ref 1, p 219):

> *What is inside of a zit? Gross. You really want to know? Okay... the major component of most pimples is a mixture of keratin and sebum. We just talked about what keratin is, earlier in this chapter. Sebum is an oily mixture that your skin naturally secretes. Earwax is also made up of mostly of sebum.*

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This book would be a particularly useful starting point for teachers in upper elementary to high school settings, for high school and general studies university students, and perhaps for parents with inquisitive children. There is a nice selection of step-by-step at-home activities in that last chapter that all three of these populations might find quite interesting.

NOSTALGIA

Jack Finney was a mid-to-late 20th century novelist whose popular science fiction stories were *de rigueur* reading for a generation or two of high school students. He died having completed only two of what was speculated to be a longer series of time travel novels, *Time and Again*[2] and *From Time to Time*.[3] Decades earlier, mainly in the 1950s, he wrote a set of imaginative short stories, and 12 of these with time and time travel themes were collected in 1986 as *About Time*.[4] I only recently learned about this latter collection, so forgive me for being late to the party. Fortunately, all of these books are still in print.

The protagonists in Finney's time travel stories are all cut from the same cloth: looking at the mid-20th century from the perspective of the newly industrialized late-19th century, modern life (ca. 1960) is filled with 60 years of global conflict, dangerous urban areas, and tremendous societal class distinctions...and the 1960s have not even started yet. Finney's characters yearn for a simpler time. They want happy endings.

Finney cannot be bothered with technobabble and worm-holes; time travel is a natural state that is blocked by the "invisible chains" that bind us to the present—skyscrapers and telephones, coins that bear dates and the artifacts that surround us and remind us of modernity. Lose these, and you lose the chains.

Short stories are fun because you can usually take them in with one gulp. In the 1700-words of "The Third Level", Finney paints his scene, and pulls you into the middle of a mystery as Charley finds a portal to 1894 on the third level (there are only two) of Grand Central Station, New York City (ref 4, p 11):

> *I talked to a psychiatrist friend of mine, among others. I told him about the third level at Grand Central Station, and he said it was a waking-dream wish fulfillment. He said I was unhappy. That made my wife kind of mad, but he explained that he meant the modern world is full of insecurity, fear, war, worry and all the rest of it, and that I just want to escape. Well, hell, who doesn't? Everybody I know wants to escape, but they don't wander down into any third level at Grand Central Station.*

His stories often end with a twist, and usually provide the reader with a sense of identification (*I would have done that, too*) that gives you a memorable emotional impression. Originally written between 1950−1962, reading these stories also carries a time-traveling glimpse into the world of the 1950s that is different from the idyllic one to which Marty McFly traveled in Dr. Emmett Brown's modified DeLorean, 30 years later.[5] I imagine that Finney's nostalgia about the 1890s is similarly rose-colored.

ICE AGE MEDICINE

About 30,000−32,000 years ago, the last maximum in the Weichselian glaciation was beginning, sending its ice sheets over present-day Britain, Germany, and Russia. At the same time, in the area we would one day call southeast France, humans left some magnificent cave paintings that were sealed off, only about 1000 years later, by a rockslide. They were only revealed again 20 years ago, in 1994. It is worth becoming familiar with the Chauvet Cave and its paintings, because it is the real starting point that Kim Robinson used to construct his novel, *Shaman*.[6] The story is a speculative fiction account of Loon, a teenage boy, whose orphan-to-shaman-coming-of-age story is set against the world of the Weichselian glaciation.

I have recommended Robinson before.[7] He generally extrapolates science into the future and creates scenes of rich detail that derive from his exhaustive study of his subject. He does the same here, only working it backward. I think of Robinson as creating educative fiction, because you do learn along the way.

To nomadic tribes during this period, we can easily imagine winter as a predator. And unless you have figured out how to plan ahead, your survival bumps up against a wall pretty quickly. In true Darwinian (perhaps it is Dawkinsian) fashion, the more effectively the critical cultural information is passed down, the better chance you have at passing it on. Elevating the critical stories to myth and superstition, perhaps even religion, the line of tribal shamans, Robinson speculates, was consecrated to receive, hold, and transfer this wisdom. Oral tradition is a desperate way to learn. If you fail to pass something on, or you fail to pass it on well, it can be lost forever or left to its rediscovery. This is Loon's story in becoming a link in the chain of tribal culture and memory. When telling stories is all you have, you better be able to learn them, tell them, and understand them, well.

Whether it is on Mars, the outer fringes of the solar system, or in prehistoric France, Robinson explores one theme that keeps you riveted: except for the technology, the emergence of modern humans, even when extrapolated into the far future, is not that long a period of time, and so we should expect to find the same drives, more or less, embedded in both the past and in the future. A few tens of thousands of years is just not enough time to expect big differences. They (humans, forward and back) eat, sleep, love, hate, covet, lust, survive, negotiate... in ways we would immediately recognize; the glaciers and the space ships only create different backdrops.

Robinson writes meticulously, and it is not everyone's cup of tea. The first part of the book is Loon's long and solitary journey across the tundra to prove his worth as a future shaman. When he returns, we begin our more detailed encounter with the tribe. I tend to read Robinson over long stretches of time and only when I am in the mood for whatever is the opposite of a "page-turner". By the last third or so of this book, however, things pick up, and the adventure and movement of the tribe, and their own excitement, are carried off the page.

YOU ARE BEING WATCHED

"You are being watched", intones Michael Emerson's character, Mr. Finch, at the start of each episode of *Person of Interest*.[8−10] You see, in the post-9/11 world, the government wanted a machine that could synthesize the bazillions of bits of information gathered by everything, everywhere, and to predict where the next big bad thing was going to happen. To do this, it needed an artificial intelligence, and so they got it. Mr. Finch built the machine.

The series starts with this premise and runs with it along two parallel lines of unexpected consequences. First, the machine works, but it cannot sort out the difference between a terror attack and a mugging. The government deemed these minor

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acts of violence irrelevant. Mr. Finch, a mysterious figure with near limitless resources, does not. And so the series started as a fairly traditional procedural, where each week Mr. Finch and his associate, Mr. Reese, take on the bad guys who are threatening to do harm to the ordinary people. The cast grew, as did the procedural plot lines, leading to a compelling drama about crooked cops, administrative corruption, nasty Russians, some of the best written characters in all of television history, deep and intersecting character histories, a terrific dog, and a hugely emotional story about camaraderie, trust, and redemption.

At the same time, the second consequence appears. And while we have yet to know for sure, good money would bet that the AI has emerged as an independent intelligence, and it is gearing up for... something we have been led to believe is pretty nasty, world-shattering, or both. I will keep this spoiler-free. Just stay tuned.

Now through its third season, I am breaking my own rule of waiting until a series is over before I recommend it. I am completely convinced that the *Person of Interest* show-runners have a great plan, and so I am going to go out on a limb and predict that this series will continue to be worth your time if you climb on board.

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Notes

The authors declare no competing financial interest.

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