

a severe roadblock to the technology.

Toward the end of the book is a relatively short chapter, about 10 pages, on transportation of used fuel to Yucca Mountain in Nevada and on the work of the National Academies Committee on Transportation of Radioactive Waste, of which I was a member, that examined the issue. A lot of substance exists in the committee report, but the discussion in the chapter tends to focus on the impact of terrorism on used-fuel shipments.

The final chapter summarizes approaches to high-level waste disposal in other countries. I found the chapter to be interesting from the standpoint of what other countries—those, such as France, Sweden, and the UK, not completely hamstrung by the political maneuvering so prevalent in the US—were doing about those issues. Although the overall discussion is mostly accurate, glaring technical errors are apparent to anyone with experience in the nuclear-waste area.

Nevertheless, I found *Nuclear Waste Stalemate* an interesting read because of all the gory details of the political and legal maneuverings associated with the disposal of nuclear waste in the US. There is an old saying that government policy is like bologna: It is a lot better if you don't see how it is made. Even though a recounting of all the laws, acts, resolutions, vetoes, and such may seem uninteresting to a scientist, I found it to be extremely intriguing. A review of the political shenanigans by elected officials at all levels, and of those by a large number of advocacy groups, makes it clear why no satisfactory technical or political resolution of the issue has happened in the US.

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A Passion for Discovery

Peter Freund

World Scientific, Hackensack, NJ,
2007. \$42.00, \$29.00 paper
(240 pp.). ISBN 978-981-270-646-1,
ISBN 978-981-277-214-5 paper

Peter Freund's *A Passion for Discovery* is a collection of anecdotes involving approximately 300 20th-century physicists and mathematicians. Freund, a professor emeritus of physics at the University of Chicago, fled as a graduate student from Nicolae Ceaușescu's Romania to Austria and then came to the US via Geneva, Switzerland. His

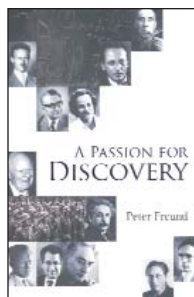
European and Soviet bloc roots allow him to vividly sketch the historical and political background for his stories. The book is largely based on his own experiences and information told to him by colleagues; thus it is quite different from an impersonal collection such as Walter Gratzer's *Eurekas and Euphorias: The Oxford Book of Scientific Anecdotes* (Oxford University Press, 2002).

Freund is a good narrator; in fact, he is a gifted writer. Here are his thoughts about the defection of the great algebraist Victor Kac from the Soviet Union (page 74):

There was no question that living in the States was much, much better than living in the Soviet Union. On the other hand, one's scientific creativity depends on many intangibles: on the relations with one's colleagues, on the meaning of the smile on a colleague's face just after he has been told of a new idea, on one's familiarity with the work environment, on one's knowledge of the location of a certain book in the library, on one's knowledge of the exact path to the library so that while on the way, one can let one's thoughts continue undisturbed on their own path. Going to another place, admittedly a better, much more pleasant place, does not mean that it will all work out for the best. It is a very big risk, and yet Kac, a man who in the rugged Soviet terrain had produced superb work—he had already started whole branches of algebra—was taking this risk. Why?

The following anecdote of Albert Einstein as a Socratic, political scientist has not been reported before, as far as I know. Freund learned of it in the 1950s from Laci Steiner, a family friend who witnessed the event (page 199):

One of the first stories about a physicist that I have ever heard has Einstein as the students' guest of honor at a University of Berlin evening discussion in the economically painful and politically ominous Twenties. First a student gave an impassioned speech about how economics determines history, to the exclusion of any meaningful role of the individual. When he was done, the speaker



turned to the great man for his expected approval, but Einstein completely disagreed with what the young student had just said and to make his point, he addressed a young student sitting in the middle of the hall. The student rose. He was a rather gaunt lad, obviously undernourished, wearing a threadbare coat, and not cleanly shaven, in fact rather slovenly. The large straight scar across his right cheek marked him as a member of one of those right-wing dueling fraternities. Einstein asked him whether he had enough money to support himself. Not surprisingly, the young man answered that he could barely subsist.

"Wouldn't a monthly stipend of," here Einstein named a sum, "go a long way towards solving your problems?"

"Sure, it would, but where in this day and age am I to get such a stipend?"

"As it happens, I have been asked by the Socialist Students' Association to nominate someone for precisely such a stipend. Give me your name and I will nominate you."

"Never! I would rather starve than accept money from the socialists," said the irate student, and he sat down.

"So much for history being determined by economics," Einstein concluded with a smile.

Freund's collection also includes a number of absurd stories, like the statement about Wolfgang Pauli: "He was a child prodigy given leave from attending high school classes so he could go to the University of Vienna to . . . teach a course" (page 20). In the endnotes to the chapter on Pauli, Freund admits that the story of the high-school kid as professor at the University of Vienna might have been apocryphal.

In another story, Finnish physicist Gunnar Nordström visits Einstein in Zurich, Switzerland, before World War I. Freund writes that "by contrast Nordström admired Einstein and made the long journey from his homeland to the shore of the Limmat to discuss matters with the master of relativity. In what may have been an intentional slight, Einstein refused to receive his Finnish visitor, who left understand-

ably dejected and probably quite angry" (page 167). Freund learned about that uncharitable story from his friend, the late Subrahmanyan Chandrasekhar. Anybody familiar with the amiable young Einstein would doubt this version. There is also clear evidence that the snub never happened, and Freund admits that in a commentary at the end of his book. But why include such nonsense in the first place?

The text does contain some minor errors, such as misspellings of Chandrasekhar (page 206), Nordström (page 208), and Ehrenfest (page 209). There are more doubtful stories—and many funny ones—in Freund's book, mostly well told. Freund wrote *A Passion for Discovery* not just for physicists but also for a larger audience.

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The Living Cosmos

Our Search for Life in the Universe

Chris Impey
Random House, New York, 2007.
\$27.95 (393 pp.).
ISBN 978-1-4000-6506-6

Astrobiology is often said to be a subject for which there are no data. Some call it a subject without a subject. No unambiguous evidence exists for life anywhere beyond Earth, but the interdisciplinary field does inform us how

environmental conditions likely gave rise to life on Earth billions of years ago and how evolutionary events have changed and diversified life ever since. Reflecting on our own origins, researchers can reasonably speculate

about life in other cosmic settings. Most of all, astrobiology helps us build a modern *weltanschauung* (worldview) that people of all cultures can adopt—a Big-Bang-to-humankind story that traces generative and developmental changes from quark to quasar, from microbe to mind.

Biology in an astronomical setting was not invented by NASA a decade ago, though that agency has helped bolster the field by handsomely funding it, at least until recently. Astrobiology has been around for much longer under such aliases as exobiology, bioastronomy, cosmic evolution, and "big his-

tory." Indeed, all those subjects foster the interaction of a wide spectrum of natural scientists who are interested in addressing sweeping, integrated ideas about life in the universe writ large.

Chris Impey, a distinguished professor of astronomy at the University of Arizona in Tucson, is a widely respected galaxy researcher renowned for his teaching expertise. With William K. Hartmann he coauthored *Astronomy: The Cosmic Journey* (Brooks/Cole, 6th edition, 2002), an appealing introductory astronomy textbook. In *The Living Cosmos: Our*

Search for Life in the Universe, Impey makes his first attempt at producing a popular book for a general audience; the effort is only partly successful.

The book covers all the usual topics expected in such an exposition. Chapters on the history of our place in the universe and the origin of life on Earth are well written. However, for a book that claims that the discovery of life on other worlds would culminate the Copernican revolution, it oddly leaves out the work of Harlow Shapley, who relegated our Sun to the cosmic suburbs

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