

## **The Atom and the Apple, Princeton University Press, Reviews:**

"The Atom and the Apple is a delightful ramble through many areas of science as well as through the experiences, opinions, passions and frustrations of a leading research physicist. Unlike most books describing scientific ideas to the wider public, Sebastien Balibar does not attempt to present a systematic discourse on a single area of physics, but tries instead to convey a wide range of scientific concepts together with the excitement of research and a description of the environment in which the physicist works. It is a very refreshing read that will do much to bring an understanding of scientific culture to the reader. This book is certainly provocative and stimulating, and it frequently challenges political correctness. . . . The Atom and the Apple provides an accessible introduction to a wide range of physics topics: the Big Bang, superfluidity, chaos and turbulence, quantum computing and cryptography, the matter-antimatter asymmetry of the Universe and many more. At least as importantly, however, Balibar explains the framework that underpins scientific knowledge and research. Since attempts to solve the major challenges in this enjoyable book help to make an informed debate possible."--Chris Sachrajda, Times Higher Education Supplement

"Casting himself as more a dreamer than a detail-obsessed scientist, French physics professor Balibar credits his own childlike sense of wonder as the inspiration for this engaging collection of essays on the physics of everyday objects. . . . Balibar's breezy bicycle ride through the French countryside is the starting point for an engaging digression on chaos theory and the so-called butterfly effect. . . . [B]alibar is careful to keep his readers enthralled with colorful analogies and a flair for dressing up scientific concepts in elegant, entertaining prose."--Carl Hays, Booklist

"When it comes to ideas, the French have the knack. You see it in their science documentaries and, as Sebastien Balibar's little book proves, you see it in their science writing. The assumption is that readers are curious folk who may not know the, uh, domain of discourse, but they're interested. No need to talk down, no need to talk up to show off. Just chat. And that's exactly what Balibar, a physicist, does. He draws us into 12 problems of physics--from chaos theory to cosmology--by recounting events of his childhood and career. It's wonderful."--Leigh Dayton, The Australian

"Parisian physics professor Balibar (of the École Normale Supérieure) has a fervor for life and his work that makes this look at everyday physics, its history and his own life experiences contagiously readable. Whether explaining the crystal chime of a wine glass or the "sweet spot" in bicycle touring, his text is eloquent, charming and rigorous, translated beautifully by Stein. Each chapter is an independent essay, examining a problem in contemporary or historical physics and showing its direct relevance to things ordinary and otherwise--the quantum properties of the kitchen table, the strange behavior of films and gels, the problems of nuclear waste, the relative predictive success of meteorologists and economists; perhaps most clever is his defense of Eve's fateful curiosity. Balibar's explanation of his own work in low temperature physics is just as interesting, as is his discussion of the Balibar clan in pre- and post-WWII. Full of ways to rethink daily activities and draw out readers' curiosity, this is an excellent, personable scientific tour." --Publishers Weekly (Starred Review)

## Science Teacher Association recommends :

The Atom and the Apple: Twelve Tales from Contemporary Physics 05/08/09

<http://www.nsta.org/recommends/>

Reviewed by **Susan Behrens** Professor

*The Atom and the Apple*, I thought at first, was about physics. But by the sixth tale, I decided that the book is really about translation and communication. The author invites us to ask those “dumb” questions that our students seem simultaneously shy and brave about asking, and to run with them. Why is it dark at night? Where did the Moon come from?

The author uncovers terms and unpacks mysteries; he identifies his ideal reader as someone who has a “sense of wonder and curiosity regarding his or her surroundings” and wants to “look a little more deeply at the mundane.” To me, that’s what translation is all about. On a literal level, the book was translated (by Nathanael Stein) from its original French. While we are reading English, we are also aware of the author’s nationality: spending boyhood summers in the French countryside, walking through the Paris campus of his institute. In a chapter called “The Power of Words,” he supplies a list of terms and definitions that are related to his work. While this list was compiled at the request of two artists who were profiling the Latin Quarter in Paris, the reader is also treated to a personalized, annotated dictionary. For example, we have the term “coffee” and an accompanying short vignette about the “coffee club” brainstorming sessions at the Kapitza Institute in Moscow. Later in the chapter, we learn about Kapitza the man and his place in history. Part of that story (which involves a kidnapping ordered by Stalin and a scientist unjustly ignored by the Nobel Prize committee) wrestles with giving credit to a scientist who discovers (translates into words, if you will) a phenomenon as opposed to the person who coined the term for the phenomenon. And to really drive the idea of translation home, credit was withheld from someone because of an assumption that he wouldn’t have been able to read a scientific publication in its original French.

At its heart, this book translates everyday questions into engaging stories. Each chapter has a fanciful title like “My Cousin the Leek” or “I Am Radioactive” that makes sense as you read. The trajectory of each chapter, however, is not straightforward. Like a television drama, there are several threads that ultimately come together. I appreciated the author making this meandering style explicit: “By way of all these digressions, I’ve gone from radioactivity to the history of the Moon. While we’re here, I may as well add two more things: one on dinosaurs and one on extraterrestrials.” And we stick with our author, assured that it will all make sense and that the digressions will be pleasurable and informative.

This book’s intended audience seems to be the educated, scientifically aware (if not trained) reader. Many teachers will already know much of the material he covers; for example, that DNA is a double helix. But there is usually a new twist to a fact: the DNA helix is right handed! There are left-handed helices out there as well. And then we are onto a story about matter and antimatter. I knew about the Big Bang but not the Big Crunch. While I don’t think I would do especially well on a pop quiz at the end of each chapter, I am at a higher level of awareness about the world around me after having read this book. I am also a better translator of words, mysteries, and natural phenomena.

Words are “the basis of thought.” We all benefit from putting words into terms that make sense to us and fit in with our experiences. In fact, essay 12, “I Speak English,” muses on foreign language instruction in the French school system and the importance of translation to the sciences: “What’s the point of all that sweat and hard work to move knowledge forward if no one will find out?” A boy in the French countryside; a physics professor in Paris: this author models exploration for us and we are invited to follow suit.

He ends by saying “I wish all scientists would try to be understood by the greatest possible

number of people when they leave their specialized niches and communities.” In other words, let’s understand one another. This book will not only spark reflection among teachers but also will provide many anecdotes to share with students.

*Review posted on 6/4/2009*

## **The Public Square :**

**December 10, 2008**

[\*The Atom and the Apple: Twelve Tales from Contemporary Physics\*](#) by Sébastien Balibar

In 1999, a French official with the Ministry of Education asked physicist Sébastien Balibar to contribute to a “single manual” of “the whole of knowledge in a form accessible to students in middle and high schools.” The manual, the official said, was to be 200 pages long, and, of course, it had to “make sense.”

Unsurprisingly, the manual never came together. But Balibar packs quite a broad swath of fairly comprehensible contemporary physics in his 178-page *The Atom and the Apple*, taking on everything from extraterrestrials to chaos theory to the Fibonacci sequence. Breezy histories of major discoveries (Balibar even apologizes for his brevity) end in cliffhanger conclusions, in the unresolved questions driving study today. Mingled between are helpful analogies for the non-scientist (and interesting digressions on the problem of scientific analogies) and asides on the drama of scientific discovery, the competition for citations and Swedish prizes, set in the most traumatic and revolutionary of centuries for physics.

Balibar’s 12 chapters are arranged to answer the sort of questions that seem elementary — why the night is dark, why crystals have facets, whether a table is quantum, whether a cat can be dead and alive at the same time (that last question was answered, thankfully, by thought experiment). Answering the simple questions requires an understanding of big concepts, for which Balibar draws on his analogies: space curved by matter becomes a mattress sinking under a sleeping body; atoms are pearls on a necklace; the earth’s core and surface are a pot of water beginning to boil. Throughout, he maintains both a sense of wonder and a sense of mastery. He tells with relish of looking through his first telescope as a child, and how [superfluid helium](#), which can climb up and out of a container, “continues to surprise” him though he has seen it nearly every day for 20 years. He cheekily praises Eve for her curiosity. But he also mentions that he discovered the phenomenon of “quantum evaporation,” though his teacher named it so years later. He mocks the pseudo-scientific vocabulary of Jacques Lacan and Michel Houellebecq (especially Houellebecq). And he lectures alongside Steven Hawking, noting that “holding a conversation with him in person leaves one with the unforgettable impression that one is speaking directly with Hawking’s brain.”

And for those passages that are still somewhat confounding, he helpfully mentions, albeit in a footnote, that Richard Feynman once said, “no one really understands quantum physics.”

**Excerpt:** “There’s a good chance that physicists will discover other particles, the behavior of which will make the ‘standard model,’ which describes the currently known particles, evolve even further. And then perhaps we will have a better idea of the origins of the asymmetry that allowed us — and stars, black holes, and of course, our dear cousins, the leeks, all made of matter as we are — to exist, such that we can ponder the mystery at all.”