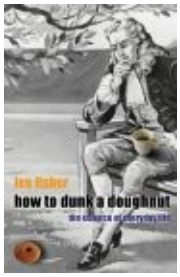
January 2003
Reviews

'How to dunk a doughnut'

reviewed by Phil Wilson



How to dunk a doughnut: The science of everyday life

Paul Erdös is reported to have said "A mathematician is a machine for turning coffee into theorems". We may never know if he appreciated the mathematics behind the perfect dunk of a biscuit into said coffee, but we can all begin to understand the ubiquity of maths in our lives, thanks to Len Fisher's delightful book. The subtitle is "The science of everyday life", though pretty much all the content is maths with the equations (mostly) taken out. Perhaps Professor Fisher was advised that sales would suffer if they weren't, but anyone interested in the applications of mathematics to the real world will find plenty to amuse and educate.

The opening line begins a common theme of the text: "Scientists, like hangmen, are socially disadvantaged by their trade." Fisher clearly loves science − and particularly the process of science − and this enthusiasm comes across very strongly. But there is a subtle frustration expressed in his writing that scientists aren't doing more to tell the public honestly about process − the depression and euphoria, the guesswork, the occasional egotism, and the times when, he reports, you just have to remove your clothes and do handstands for your colleagues.

By skipping the introduction, you'd barely notice the above "theme" because you'd be having too good a time. The book is that rare delight: a riveting read from diverse areas of science and mathematics that not only informs and entertains, but does so without condescension. We learn how to boil an egg, and in so doing discuss heat, energy, and their interchange − some of the most fundamental concepts in science. Fisher has always had difficulty with the way results are presented as facts, and the hidden role of personality and intuition. Take the concept of work, and his 35−year quest to discover that its definition relies almost entirely on intuition. Despite this, he applies the ideas of work and energy to find the most effective way to use hand tools, quoting from work by Archimedes and bringing to life a surprising amount of A−Level mathematics.

The tips on estimating supermarket bills are interesting and useful too, and this chapter perhaps most illuminates the process of science because it is a personal story. We get a feel for the pleasure one can take in chasing the solution to a problem, no matter how mundane it may seem. We see the meritocracy of science − as it should and mostly does work − in microcosm, as Fisher battles to explain why his wife's intuitive approach outperforms his reasoned approach, before bettering both estimates. The fact that the reader learns Archimedes's method for estimating pi by inscribed and circumscribed polygons before encountering Fisher rummaging through supermarket bins for discarded till receipts, is typical of this book, which reads like a conversation with that science teacher we all wish we had had.

Of all the chapters, I enjoyed the one on "How to throw a boomerang" the most, because I didn't know that boomerangs were used far more in sport than for hunting. I didn't know that the world record for flight time is held by a Leeds physicist who caught a boomerang 24 hours and 11 seconds after he threw it, though you may be surprised at how he managed it. I didn't know that there are left−handed boomerangs, and was surprised at the factors missing from the equation governing the radius of the flight circle. Despite knowing the aerodynamics discussed, I found Fisher's presentation fresh and informed. As throughout, I enjoyed the sometimes surprising links with other important concepts.

The other chapters − including advice on catching balls, and how pain influences taste − are just as enjoyable, and all feature lovely diagrams. I particularly liked the ducks with hydrophilic heads and hydrophobic tails standing in for detergent molecules in "Bath foam, beer foam, and the meaning of life". The index was excellent, featuring, for example, "frogs, levitating" and "popcorn, gravy uptake". And frankly the chapter on "The physics of sex" has to be read to be believed...!

I cannot recommend this book highly enough − not only because it is a witty, informative read and the best popular science book I've read in a long time, but because it tells the important story of what science is really like. As for the perfect approach to dunking: you didn't think I'd spoil it by telling you that, did you?

Book details:

How to dunk a doughnut: The science of everyday life
Len Fisher
hardback − 251 pages (2002)
Weidenfeld &Nicholson
ISBN: 0297607561

About the reviewer

Phil Wilson gained the MSci in Mathematics from University College London in 2000. His interest in all areas of maths blossomed there, and he took courses in most disciplines, culminating in a thesis on the proof of Fermat's Last Theorem. He is currently nearing the end of his PhD at UCL, where he is studying the high−speed flow of air through convoluted ducts. He hopes to pursue a career in research and teaching.

Plus is part of the family of activities in the Millennium Mathematics Project, which also includes the NRICH and MOTIVATE sites.