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May 2002

Reviews

'It must be beautiful'

reviewed by Helen Joyce



It must be beautiful – great equations of modern science

This book is built on an extended metaphor, which casts equations as the poetry of science. According to the editor Graham Farmelo (head of Science Communication at the Science Museum in London), great equations and great poems are alike in a number of ways. Both suffer if anything is added, changed, or taken away, both are a rich stimulus to the prepared imagination, and both draw much of their power from their conciseness. Most importantly for this book, the creators of both claim to have been guided by their sense of beauty. (The imperative "It must be beautiful" of the title is attributed to Einstein and Dirac, both featured here.)

So, to be called a success the book must satisfy two criteria – that it is a good read, and that it convinces the reader of the soundness of this metaphor. On the first it succeeds, but not really on the second. It's certainly not the book I expected when I decided to read it. I expected the great equations to be "unpacked" for me, to be provided with the equivalent of literary criticism, just as poetry criticism focuses on the meanings and significance of the words and phrases, the resonances and connections between them. Well, some of the essays in the book, notably Roger Penrose's article on the Einstein Equation of General Relativity, do just this. But the majority are more like "biographies" of their equation, explaining how they came into being, where they were born, what was their heritage, and what their lives have been like.

Actually, this is pretty interesting, which is why I said it was a good read. Some of the essays cover material frequently found elsewhere – if you read popular science books you will be familiar with Einstein in his Swiss patent office, and the Los Alamos group building the first atom bomb. But some are more original, notably the particularly good essay on Shannon's equations and their crucial role in the information revolution. This is an essay where the equations really do take centre stage.

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A couple of equations were pretty dubious candidates for inclusion, and must have been chosen simply to add variety. If the criteria had been stuck to closely, the book would probably have been almost entirely physics, which would have been boring. But really, is Drake's equation, purporting to estimate the number of extra-terrestrial civilisations, beautiful by any stretch of the imagination? And the sole representative of chemistry is also a wildcard entry – chemical "equations" aren't really equations at all, and so no matter how interesting the process by which CFC's deplete the ozone layer, the essay probably belongs elsewhere.

All in all, this is a good book, and better if you just forget about the poetry stuff.

Book details:

It must be beautiful – great equations of modern science

Ed. Graham Farmelo

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