

Book Reviews May 2020: 'Einstein on the Run', 'Falling Felines', 'Something Deeply Hidden', and 'How to'

Abstract

All movement is relative: Rick Marshall reviews 'Einstein on the Run' by Andrew Robinson.

Avoiding a cat-astrophe: David Sang reviews 'Falling felines and fundamental physics' by Gregory J Gbur.

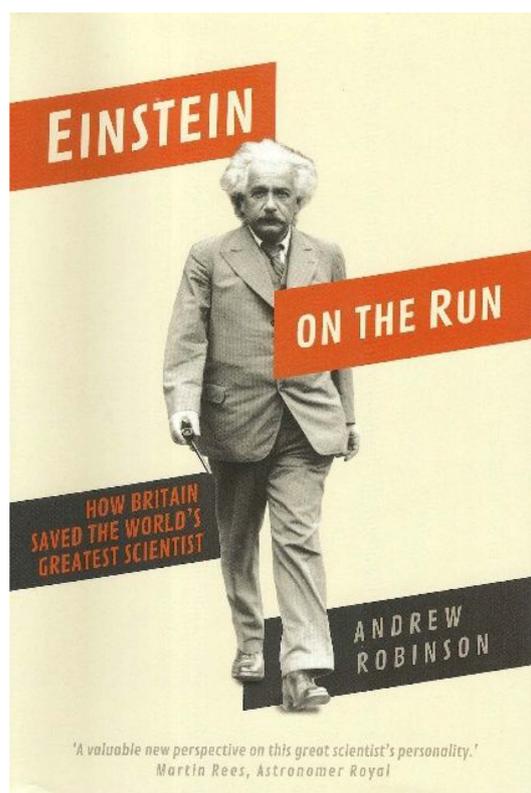
A dizzying tour through many worlds: Ruth Wiltsher reviews 'Something Deeply Hidden' by Sean Carroll.

The art of over-engineering, ad absurdum: Rick Marshall reviews 'how to' by Randall Munroe.



BOOK: EINSTEIN ON THE RUN

All movement is relative



There have been so many books about Einstein so surely there cannot be anything more to be said? Not so.

The focus of this book is Einstein's connections with England—not only its scientists, but several other interesting characters too. Some of the latter are well known, others less so. There are also two chapters that deal with Einstein's scientific achievements and serve as a backdrop against which his wider interests are set. A great deal of meticulous research has gone into this book. Less well-known historical facts, fascinating anecdotes from contemporaneous documents (letters, newspaper, magazine articles, etc) are woven together to make a compelling and entertaining story.

Einstein made several visits to England and, for a short period, it was his refuge after leaving Nazi Germany. Robinson fills out the straightforward facts, laid out for example in the compendious 'An Einstein Encyclopaedia' reviewed in *Physics Education* [1]. Einstein lived in Berlin from 1914 until he left Germany for good in December 1932. Einstein had attracted the attention of the Nazis because of his Jewish heritage, his pacifism, and his internationalism. After he had left Germany, what we would now call 'fake news' was circulated widely by the Nazis and posters of him appeared with the caption 'not yet dead'. His first haven was Belgium, but it was soon obvious that he was still in danger, so he came to England for a short while and stayed in Norfolk before emigrating to the USA. Einstein had first visited England in 1921 and subsequently came several times to give lectures and consult with colleagues. By all accounts Einstein was something of an anglophile, and had WW2 not intervened, he might well have made England his new permanent home.

The book skilfully melds together Einstein's scientific and public life. No biographer no matter how diligent (and lucky?) is going to unearth all the possible sources about their subject. Missing from this book are details of Einstein's long standing friendship with his doctor Janos Plesch. This began in Berlin and continued when both families left Germany to finally end up in the USA. Dr Plesch had Einstein's secret telephone number at Princeton, and was one of the last people to see him before he died. After Einstein's death, Dr Plesch set out his thoughts about his friend in a letter to his son Peter¹. This was subsequently published [2] along with some comments by Peter. As Einstein was a family friend, Peter knew Einstein from his teenage years and

¹ Peter became a Professor of Chemistry and the University of Keele in the UK ([rsc.org/Membership/AboutRscMembership/Obituaries/obituary-peter-plesch.asp](https://www.rsc.org/Membership/AboutRscMembership/Obituaries/obituary-peter-plesch.asp)).

continued an occasional correspondence with him after both families fled Germany. Both Dr Plesch's and Peter's observations sometimes complement those of Robinson, but at others they provide a definite contrast.

I must take issue with one statement in the book that Einstein was 'Not by nature a great teacher because he had too many original ideas' (p 73). On the contrary, the way he dealt with enquiries from children suggests quite the contrary [3].

The book's title has several interpretations: trying to find a personal safe haven; trying to deal with painful family commitments; trying to find the solitude he needed to carry out his scientific work, which by all accounts was perhaps the main driver in his life. Being able to work obviously required a safe haven and periods of solitude. However, the book overlooks that fact that during his working life Einstein had 33 collaborators, many of whom shared the joint authorship of the resulting scientific papers.

Einstein was a complex character, with an imposing personality and a good understanding of human nature, I am sure that he will continue to fascinate long after his scientific contemporaries have faded from public attention. This is not a book to learn about Einstein's theories. There are some interesting parts that will catch the attention

of historians of science. Its strength lies in adding to our biographical knowledge of Einstein, while also helping to illuminate a recent period in English history.

References

- [1] 2016 *Phys. Educ.* **51** 3–5
- [2] Plesch J and Plesch P H 1995 Some reminiscences of Albert Einstein *Notes Rec. R. Soc. Lond.* **49** 303–28
- [3] Marshall R 2005 'With friendly greetings'—your A Einstein *Sch. Sci. Rev.* **86** 57–60

Rick Marshall

WORTH A LOOK

Einstein on the run. How Britain saved the world's greatest scientist

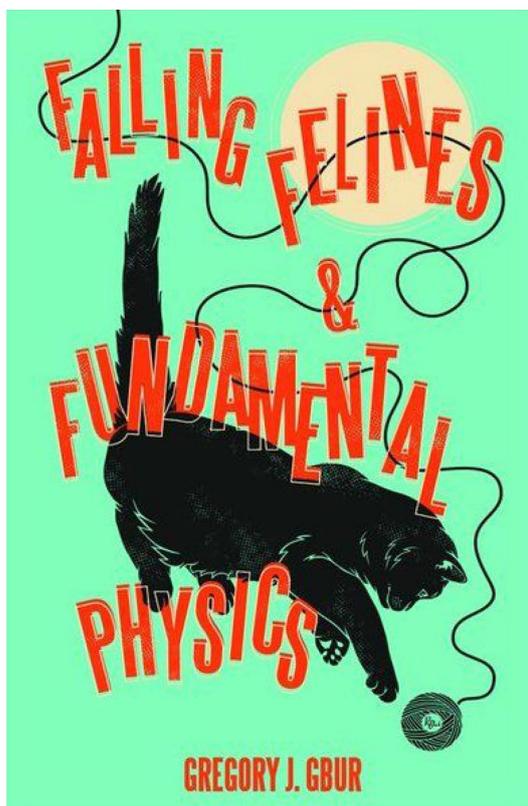
Andrew Robinson

Rating: ★★★

Price: £16.99

Details: Published 2019 by Yale University Press, 304pp, ISBN: 978-0-300-23476-3

Avoiding a cat-astrophe



Here's a book about moments of inertia and the conservation of angular momentum. This may sound dry, but Gregory J Gbur's book certainly is not dry. He is a cat parent (as cat owners are now known, apparently) and has been looking into the intriguing question of the ability of cats to land feet-first, even when they are initially upside down. How do they manage to reorient themselves to make a safe landing simply by twisting their bodies in mid-air? Do not worry—no laws of physics are broken in this book.

The question of how cats fall safely has been tackled by scientists for over three centuries, and Gbur provides an account of their various theories. Early efforts were hampered by the difficulty in seeing quite what a cat does as it falls. That did not stop a good number of experimenters from

dropping an ever larger number of cats from a range of heights.

In the mid-nineteenth century, James Clerk Maxwell suggested that a cat must be rotating as it starts to fall. Then it could pull in its limbs to speed up its rotation. However, experiments with real cats showed that, even when dropped with no initial rotation, they could land on their feet and walk away unharmed.

It was not until the advent of photography that it became easier to see what was going on. Even then, as one commentator pointed out, you can look at sequences of images of a cat falling (there are plenty on the internet) and it is still unclear what is going on. This leaves room for multiple theories, all involving the cat in manoeuvring different parts of its body. Does it spin its tail in one direction so that its body can turn the other way? Does it bend at its waist and then counter-rotate the two halves of its body? Or does it move first one set of paws and then the other?

As Gbur suggests, physicists tended to look for a single mechanism to explain how cats turn as they fall; evolution has probably made use of all these different mechanisms. Cats are individuals, so one cat may make greater use of one mechanism while another relies more on another.

There is an additional problem which cats have to solve. They have to know which way is down. It seems that a significant number of cats have been subjected to whirling on turntables and flights in zero-g aircraft. The conclusion is that they rely on two senses to determine the vertical direction; vision and the sense of balance obtained from organs in the ear.

Gbur is a physicist and a blogger. His explanations are generally very clear. However, I felt that too often he spent too long introducing experimental techniques. For example, there is a lot about the early history of photography and the development of neurophysiology—I found myself wishing he would cut to the chase and discuss the results relevant to falling cats. He includes five pages on the Mpemba effect; another inscrutable

phenomenon which has led to long and rather inconclusive debates. I would have preferred to know more about how humans twist and turn on trampolines and when diving. I could have done without the final chapter on ‘scientists and their cats’, an anecdotal ragbag of stories of cats and their scientist owners (sorry, parents) and some of the more unusual tests that have been performed on cats.

David Sang

WORTH A LOOK

Falling felines and fundamental physics

Gregory J Gbur

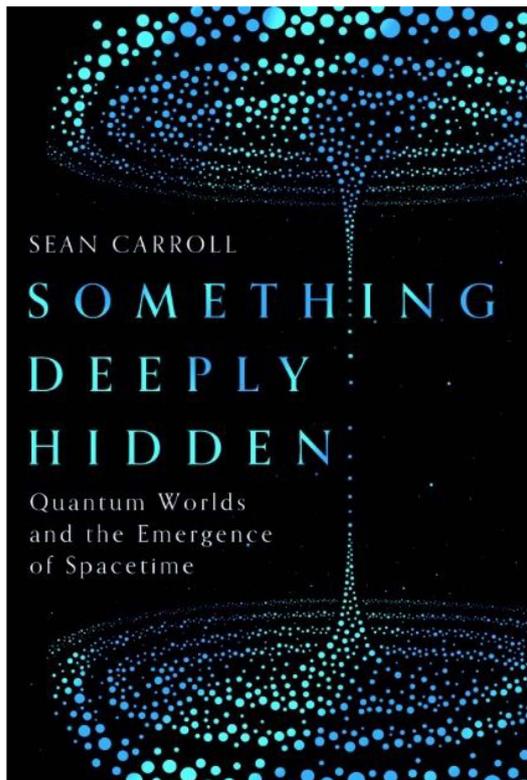
Rating: ★★★

Price: £18.99 (hardback) also available as an e-book

Details: Published in 2019 by Yale University Press, 360pp, ISBN: 9780300231298

BOOK: SOMETHING DEEPLY HIDDEN

A dizzying tour through many worlds



In *Something Deeply Hidden*, Sean Carroll sets out to make quantum mechanics understandable. The book is split into three main sections: ‘Spooky’, ‘Splitting’ and ‘Spacetime’, which explore different aspects of quantum mechanics. ‘Something deeply hidden’ is a quotation from Einstein and in various places Carroll explores the history of quantum ideas and the competing theories which have emerged. He is an avid proponent of the Many-Worlds interpretation of quantum mechanics first proposed by Hugh Everett in 1957, and explanations and defence of this interpretation are the main focus of much of the book.

In chapter one, Carroll deliberately does not take a historical approach. He maintains that every version of quantum mechanics has two parts: a wave function and the Schrödinger equation—and Many-Worlds, according to Everett, has nothing else. Chapter three addresses the connection between fields and particles and takes a more historical approach. Entanglement and ‘spooky action at a distance’ are introduced in chapter five and the splitting of the universe and decoherence follow in chapter six.

NEWS AND REVIEWS

There is a Socratic discussion in chapter eight between a father and daughter, where many of the ideas of quantum mechanics are addressed in a clear manner. The author concludes that classical physics is an approximation, which is useful in appropriate circumstance and can be derived from the Many-World wave function.

The book, despite its cover's claim to be 'a magisterial tour', is not easy reading—this reviewer found some chapters difficult. Nevertheless, for teachers or curious students trying to come to terms with quantum mechanics, it is worth a look.

Ruth Wiltsher

WORTH A LOOK

Something deeply hidden

Sean Carroll

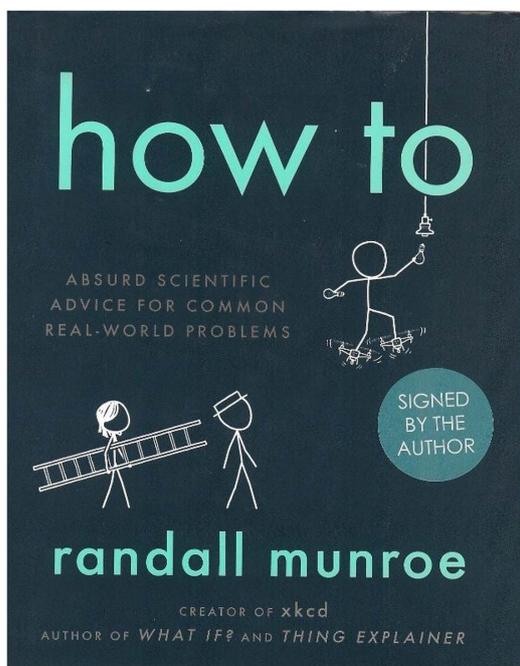
Rating: ★★★

Price: £20.00 hardback also available as an ebook

Details: Published in 2019 by Oneworld, 352pp including an index, appendix and suggestions for further reading, ISBN: 9781786076335

BOOK: HOW TO

The art of over-engineering, ad absurdum



Having previously reviewed and thoroughly enjoyed Randall Munroe's 'what if?' (*Physics Education*, November 2015), I came to this book with high hopes. It is good, but overall I was a little disappointed compared to 'what if?'. Maybe this was because the format has already had a good run for its money? But if this the first Randall Munroe book you fancy reading, it should make a good impression. Randall Munroe is the creator of the webcomic 'xkcd' and a physics graduate.

Like 'what if?', 'how to' is full of lateral and creative thinking and is therefore a fun way to explore scientific topics. This volume concentrates upon "absurd scientific advice for common real-world problems. At times, it is a very odd real-world that is being explored. It is full of theoretical model building and suitable approximations to make a conclusion possible. Equations are used to develop arguments, but most of them have an irritating mixture of imperial and SI units, e.g. a single equation includes quantities

specified in mph, inches, ft, mm, MPa and gallons. Yet a foot note (p 132) does in fact refer to SI units and another (p 176) on how units might be confusing.

Get your students to check out the improbable facts, or fill in the details of the outlined calculations (but do give them a list of imperial to metric conversions!). Several topics are well worth reading for ways to enliven your lesson plans when presenting dynamics, sound, optics, energy and introductory Relativity Theory. There are references for each chapter if you want to follow up some of the ideas, and a detailed index to locate items that often turn up in unusual contexts. In fact, the index itself is an interesting read, not least to jog your memory about the multitude of ideas and topics covered.

The book is illustrated in Munroe's unique style. His characters are, in their way, as distinctive as L S Lowry's characters. Apparently so simple and yet so expressive. There are some relatively minor drawbacks: you will find a few errors of fact and the odd questionable bit of physics, but at least they make you pause for thought. The footnotes are printed in an annoyingly small font, as are some of the equations and reference

numbers, and beware indices confused with superscripted reference numbers at times.

This book will make you laugh at times and pause for thought at others. Sometimes the topics are cross referenced, but it is a book you can dip into and out of at random, as the chapter titles attract your interest. Well worth a look.

Rick Marshall

WORTH A LOOK

How to: absurd scientific advice for common real-world problems

Randall Munroe

Rating: ★★★

Price: £16.99 hardback, also available as an ebook

Details: Published 2019 by John Murray, 320pp, ISBN: 978-1-473-68032-6