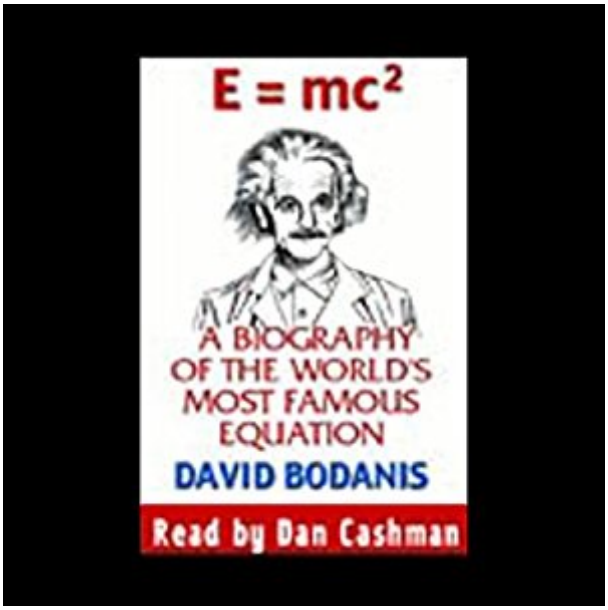
E=mc2: A Biography Of The World's Most Famous Equation



Synopsis

To celebrate the 100th anniversary of Einstein’s miracle year of discoveries, a new edition of the bestselling "biography" of his famous equationGenerations have grown up knowing that the equation E=mc2 changed the shape of our world, but never understanding what it actually means, why it was so significant, and how it informs our daily lives today--governing, as it does, everything from the atomic bomb to a television’s cathode ray tube to the carbon dating of prehistoric paintings. In this book, David Bodanis writes the "biography" of one of the greatest scientific discoveries in history--that the realms of energy and matter are inescapably linked--and, through his skill as a writer and teacher, he turns a seemingly impenetrable theory into a dramatic human achievement and an uncommonly good story. --This text refers to an out of print or unavailable edition of this title.

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Customer Reviews

Most of the content of this book is history, history of the developments of various physical concepts (mass, energy, etc) and history of the results of recognition of the energy-producing potential of manipulating radioactive substances (atomic bombs, nuclear power plants, etc). The history as presented is fairly reasonable. The other major content of this book is technical development of the ideas leading to the equation E = mc2 and then its consequences. It’s in the area of technical development that content disappoints.A very large number of books providing simplified discussions of the theory of relativity - the origin of the equation - appeared in the 1950’s. The idea was to explain the theory to non-geniuses without the necessary physics or mathematics background. Virtually all of those books disappointed; after inspired and enthusiastic beginnings, authors could

not get out of the first few chapters without either making atrocious mistakes or skipping needed explanations to get from one concept to the other. The authors of most of these books were not professionally familiar enough with the ideas to simplify them. You can only really simplify well that which you understand well. The book I'm reviewing here brings back memories of the 1950's.I want to make a suggestion to those of you who have had a little calculus and enough liking of mathematics and physics to put some work (not a whole lot) into understanding the early Einstein results. Buy or borrow English (if that's your best language) translation's of Einstein's original papers. They are very much easier to read and comprehend then all of this simplified gibberish, at least the first few pages are. Doesn't it stand to reason that a world-class genius might be able to write a compelling, well organized presentation of ideas that they are intimately familiar with?I now want to justify my bad opinion of the technical aspects of this book. Around the turn of the last century Michelson and Morley did an experiment that had a quite unexpected result. They measured the (relative) speed of light in various directions expecting to see differences caused by the earth's motion through space much as you might see a swimmer's speed vary depending on whether the were swimming with the current, against the current, or across the current. The result of their experiment was quite disconcerting: the speed of light was the same in all directions. A scientist named H. A. Lorentz develop a set of equations, now called the Lorentz transformation, that explained that the measurements as observed would result if objects shrunk in their direction of movement as a balloon would if you pushed it through the air (bad analogy but it will do).Einstein had another explanation for the Michelson Morley result. That explanation assumed that the speed of light was a universal constant, i.e., that anyone who measured the speed of light (in a vacuum) would get the same result. This assumption combined with others and logic lead to the theory of special relativity. The Lorentz transformations made up the substance of special relativity mathematics but note well the equations were derived from quite different assumptions. One result derived from the theory was that the sped of light was the limiting velocity in the ordinary universe. Another result was the equation E=mc2.So what does this have to do with the book I'm reviewing? Well the author suggests the initial key insight is that the sped of light is the maximum possible. It wasn't. The explanation of why it was is borderline silly. Another problem is that the author nowhere mentions the crucial Michelson Morley experiment that spurred many of the key scientific developments of the 20th century including the subject of this book.Now let's do a little grade school arithmetic. Let's assume a body with mass m is traveling at speed v and define its "kinetic" energy as mv2 (this formula is off by a factor of 2 but it will do). So we have E=mv2 which means we multiply the mass by the velocity and multiply by the velocity again to get energy. We haven't said

anything about the units of these terms but that turns out to be important. First, let m be measured in grams and velocity in centimeters per second. Call the energy computed this way KE(g,c,s). Now assume that m is measured in kilograms and v is measured in meters per second; call KE(k,m,s) the energy with this second set of units. Now it is easy to see that E(g,c,s)=10,000,000E(k,m,s). But please note that both E's represent the same amount of energy but in different units. Numbers are just numbers without units.Our author now goes completely off the rails when describing E=mc2 (where c is the speed of light). He gives c in units of miles per hour, a very large number. Then it is noted that c2 (c squared or c times c) is really really huge and that makes it possible for us to see how that little mass, m, is equivalent to a whole lot of energy. The paragraph above should convince you this argument is rubbish. Gee you want to see an even bigger number? Try c in units centimeters per century. Another point to note is that squaring a number doesn't necessarily produce a larger number - a grade school result. Consider multiplying 0.5 by itself; the result is 0.25 and that is surely less than the original 0.5. In the theoretical physical world there is no very small or very large anything. Size is relative. A things can be bigger of smaller than something else. In order to interpret a number whether a measurement or a calculation, one must specify units.This book is replete with simple errors like mentioned herein. If you want to read history, fine. If you want to learn a little science this is not the place. We are all used to hearing and repeating non-vetted information gathered from the Internet while assuming it's true. This book should be considered a fine source of such information. As I implied in beginning of this review, I don't know if the author is knowledgeable and got caught up in trying to dumb the subject down or whether he doesn't have a clue. There are constant references to his web site for more information. I wasted my time finishing this book and wasn't about to invest any more reading more of the same.

The book is good and the enthusiasm of the author is palpable. However, i think it would have benefitted from more in-depth science, less time spent on the cast of characters that developed the atomic bomb in favor of discussions about the science involved, and a more sophisticated use of italics. I don't know if it's just the Kindle edition that's like this, but many times the italics seem either pointless or improperly used. It actually gets in the way of reading the sentence. Easy read on the whole, and if you knew nothing about the equation before, you'll have learned something by the end.

Some of the history is interesting (measuring the speed of light, for example). but in general the book is an elementary view of its subject. Sometimes the writing is on the level of a child's

explanation, for example, talking about energy and mass running back and forth across the equals sign. The far more interesting aspects of special relativity, length contraction, time dilation, etc., are not even mentioned. These would have been more difficult to explain but would have made a much more interesting book. Instead the book deals just with a formula that was not an integral part of special relativity. Read instead Einstein's book written for high schoolers.

I strongly recommend this book to anyone who is interested in just about anything. The research and discovery leading up to Einstein's theory during the preceding centuries will be amazed at how what they learn about earlier "thinkers" in science. What is energy? What is mass? all things we have learned, but not always seen as unified. And why is the "speed" of light represented with "C"? Read it and find out. and remember C isn't speed, it is distance light travels a year.David Bodanis is a gifted writer and scientist.

Excellent. My teenage niece was reading this, so I deceded to as well. Most of the important ideas and people are here, and in human form, not as statues. It was great for her and me, too.Only flaw is some fuzzy history on a few political scenes, but few of these flaws. The narrative of the Mahattan project is the root of most of this. A full treatment would be far beyond the scope of this book. Rather than choose sides in old fights, it might have been better to avoid the temptation.

I can't begin to describe how interesting this book is. I started out mainly wanting to know what the speed of light has to do with anything, and Bodanis takes us back to the beginning, describing not only the relevance of the speed of light, but also the earliest discoveries involving energy, the equals sign, and mass. Bodanis's writing style is very easy and engaging. If I have one complaint, it's that I would have preferred a chronological treatment of energy, mass, and the speed of light, not a treatment in that order. Still, the book is completely understandable and is chockfull of fascinating history, such as the importance of Emilie du Chatelet, Voltaire, and Lise Meitner. It's probably also the best brief history of the Manhattan Project. At a little over 200 pages, this book is a quick read, but the reader comes away with lots of historical and scientific knowledge. I'm definitely going to have to read more David Bodanis publications!

I enjoyed another of his books on the history of electricity which was well written and understandable even if a person didn't have an extensive science background. I found this book written in a similar fashion, although I was familiar with most of the content; hence the four stars. Mr.

Bodanis does have a gift for writing and storytelling about somewhat complicated subjects in a manner that makes them highly readable. I hope he keeps writing books on scientific subjects because of the passion brings to his storytelling.

Bodanis delves in to the background stories of the scientists that discovered the path to Einstein's famous equation and all the varied uses of E = mc2 .

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