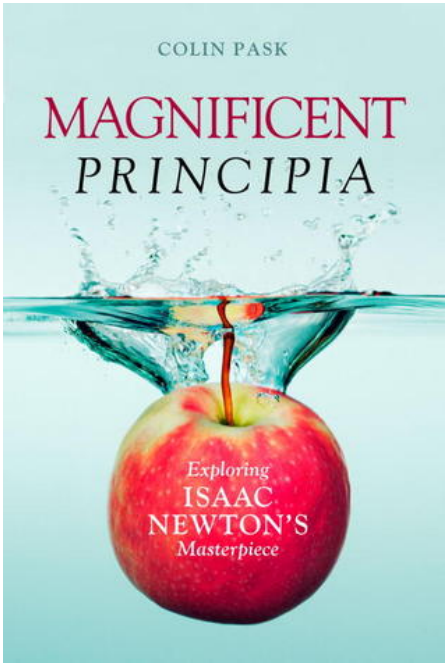

Magnificent Principia: Exploring Isaac Newton's Masterpiece

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Nobel laureate Steven Weinberg has written that "all that has happened since 1687 is a gloss on the *Principia*." Now you too can appreciate the significance of this stellar work, regarded by many as the greatest scientific contribution of all time. Despite its dazzling reputation, Isaac Newton's *Philosophiae Naturalis Principia Mathematica*, or simply the *Principia*, remains a mystery for many people. Few of even the most intellectually curious readers, including professional scientists and mathematicians, have actually looked in the *Principia* or appreciate its contents. Mathematician Pask seeks to remedy this deficit in this accessible guided tour through Newton's masterpiece.

Using the final edition of the *Principia*, Pask clearly demonstrates how it sets out Newton's (and now our) approach to science; how the framework of classical mechanics is established; how terrestrial phenomena like the tides and projectile motion are explained; and how we can understand the dynamics of the solar system and the paths of comets. He also includes scene-setting chapters about Newton himself and scientific developments in his time, as well as chapters about the reception and influence of the *Principia* up to the present day.

Magnificent Principia: Exploring Isaac Newton's Masterpiece Details

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From Reader Review Magnificent Principia: Exploring Isaac Newton's Masterpiece for online ebook

Gary Beauregard Bottomley says

By no means is this book an easy read. My most favorite book that I have never read is “The Principia’. No doubt about it. This book gives enough of what’s inside “The Principia’ such that a reader can appreciate why it is the most important book ever written, but this book does have a lot of modern mathematics, physics and complexity making this book as a whole inaccessible to most readers, but almost certainly less complex than the 'Principia'.

Newton probably was the greatest mind that ever lived. This book highlights why by putting the 'Principia' into modern science. I love Newton’s Method. I always have. It’s a way to approximate a solution to an intractable problem not solvable analytically or geometrically by taking the function's first or second order derivatives (usually that’s all that is needed) and approximating a solution through iteration. Newton has it with in the 'Principia' but most readers would not be able to spot it unless it was pointed out to them. Perturbation theory is another of my favorite tools. I use it all the time even in everyday live, ‘Ceteris Paribas’, everything else being equal, is how I understand my world. The precession of the equinoxes has always fascinated me. All of these kinds of things were explained with in this book because Newton’s ‘Principia’ has them, but Newton presents them abstrusely while this book does its best to present them in modern notation.

It is possible to argue that the 'Principia' was the most important book ever written. It's not always obvious why. This book helps the modern reader better understand why, but not always in easy language.

Elizabeth Brown says

Reviewed for Library Journal, July 2013

Lars Crielaard says

A most interesting subject. Newton has set a huge standard for science.
Unfortunately I missed some background knowledge to fully understand several chapters in the book. The writer didn't explain everything thoroughly but instead gave much suggestions for further reading.

Carlos G. Flores says

Th book itself its O.K., it brings readers of the everyday closer to science masterpiece. The thing is that the science masterpiece is very difficult to handle as it is said at the beginning of the book. I particularly like the part of the influence the book had at that time and how the new generations of scientist build upon their principles.

I have to handle it to the author it explain a few concepts of the book which I was not familiar. Which he did it with out needing any kind of mathematical help, that would have been welcome as well. The comprehensive and explanatory references to the additional information available to those wishing even more are greatly welcomed.

Need less to say as a few other reviews, that brought me up to read it, mention that the book is made in tiny little parts that help me through out the whole book. I really enjoyed the authors commentary on the avenues of physics first opened by Newton, as well as some of the subsequent developments. Pask's wonder at the genius of Newtonian physics can't help but share his obvious enjoyment in words.

Brett says

Couldn’t really finish it. I think I got 30% of the way through and found it dry and piecemeal. I wanted to understand the man and principles behind principia, so perhaps this was the wrong book to read. If you want a blow by blow explanation of the third edition, almost verbatim, and need to understand it for a test of some sort, then this is the book for you. If you’ve got a general interest, then I’d skip this and read a more autobiographical style book.

Alex Nelson says

A decent book, but it selectively focuses on various parts of the Principia. It's probably great for people curious about the history of the book, but are afraid to read Newton's Principia for the Common Reader.

Roy Lotz says

> *Newton calculates that the force of the Sun to move the sea on the Earth’s surface is ‘to the force of gravity as 1 is to 38604600.’ According to Cartwright, this is a good result when compared with the modern value of 1 to 39231000.*

When I opened Newton’s *Principia*, I knew that I was biting off more than I could proverbially chew; but I did not know I was nibbling on a continent. Almost immediately I was thrashing about ineffectually in obscure mathematics. First I turned to the guide written I. Bernard Cohen and Anne Whitman, published as a part of their new translation of the *Principia*; but this is geared toward historians of science, and is of greater use to those with a scholarly interest in the text. But for somebody like me, merely trying to understand the basic elements of the book, I had to look elsewhere.

Colin Pask’s popular introduction answered marvelously. Though he provides some basic historical and biographical background, this book largely consists of a summary, in plain prose, of Newton’s tome. And this is precious enough, considering how impenetrable the text so often appears. Of most interest to me, Pask also takes care to explain how Newton’s propositions, theorems, lemmas, and scholiums contributed to modern mathematics and physics. At several points Pask juxtaposes Newton’s approach with the modern formalism—which is fascinating even if, like me, you often struggle to understand either. What is more,

Pask provides ample reading lists at the end of each chapter, for students who wish to learn more about any particular topic. And I must say that it was heartening to see that even Pask, a trained historian of mathematics, had to rely on a bevy of secondary sources in order to come to terms with the *Principia*.

In sum, Pask's book is an excellent starting point for anyone who wishes to confront this most famous, and famously unreadable, of books.

Devon Flaherty says

Magnificent Principia (2013), by Colin Pask, as a way to read–without actually reading–Isaac Newton's The Principia, or more correctly, Philosophiæ Naturalis Principia Mathematica or Mathematical Principles of Natural Philosophy, 1687 (last edition, 1726). Magnificent contains important chunks of Principia, although what percentage I am not at all clear on, and it digests those chunks for the "general" reader.

Despite my attainment of a passing grade on the cusp of calculus in high school and my general smarts, I thought that a centuries-old math and dynamics tome would be a bit over my head (at least for leisure reading). I must have been right, because even the primer that I chose was over my head, or at least at times confusing and at others snorable. I mean, even the basic language and references that Pask uses to explain Newton to the "general" public is hardly the language of the everyman. Inertial mass? Point mechanics? Linearly superposed? (Actually, most of my confusion sprang from words that I know the definition of, like velocity or mass, but which were used with much more nuanced and specific scientific meaning.) For whole paragraphs of technical reference I would *zone out* until it was over and I could catch Pask on the next paragraph. Oh, Newton is important, hmmm? You don't say. Uh-huh. Mm-hmm. I get that.

Which means, honestly, I don't have much to say about the book itself (either one). Let's be honest: in fact, I didn't even completely absolutely finish it. What I can offer you instead is a warning. Yeah, go ahead and make that list of best and most influential books in the world, but consider leaving off the technical bits. I think Newton for Dummies might have enriched my life a little bit more than going cross-eyed over the level-Z math hiding behind a meltingly beautiful cover. Or perhaps one of those science-in-ten-minutes series or coffee table classics. Or a board book, like they make for Poe and Austen. You know, where you can gum the edge without ruining it.

Now let's run through a little history before I give my brief review.

The Principia is considered by many to be the single most important work of scientific (history) writing, or one of the two most important books on natural science with The Evolution of Species. Some consider Newton's work to be the beginning of science, or at the very least a synthesis and rationing of everything that came before him. The Principia was originally three books and includes such groundbreaking material as the laws of motion, a foundation of classical mechanics, the law of universal gravitation, and a derivation of Kepler's laws of planetary motion. Many of Newton's assertions and formulas are still used today, and his theories paved the way for such future work as Einstein's Theory of Relativity, etc. etc.

Isaac Newton was very involved in the scientific and philosophical discourse of his day. He had his friendly, his respectful, and his antagonistic relationships with other (some still famous) scientists and philosophers. He became a fellow of the Royal Society, and a maths professor at Trinity College in Cambridge. His work was in physics, mathematics, optics, astronomy, mechanics, dynamics/motion, geometry, color theory, acoustics, alchemy, Biblical chronology, and even science theory (as in laying out the ground rules for

rigorous hypothesis testing). He is a key figure in the scientific revolution and basically invented calculus. My kids know him as the guy who discovered Newtonian fluids, aka Oobleck.

He was born at the turn of the year in 1643, in England. Newton was destined to become a farmer, but some providential changes in his continuing education led him to a love of math and the study of several influential scientists and mathematicians (Des Cartes, Galileo, etc.) under the tutelage of an attentive professor. He was hard-working and unsociable, and his mother's abandonment of him (for another family) left him a very insecure man with odd quirks of behavior, including rage at criticism, paranoia, and mental breakdowns. He never had his own family. He loved studying for its own sake, and was not concerned with disseminating the information or with fame or fortune (all of which he received). His genius was known and celebrated during his own lifetime. He eventually moved into politics and religion.

As for Colin Pask and his Magnificent Principia, it was published in 2013 and I was actually waiting in line for a copy. It's not a huge seller, but it seems to be admired in its field. Pask is enthusiastic–even if the writing is dry because how else would you write about the Principia?--and knowledgeable. And darned if he doesn't sincerely try to reach out to the "general" public. Yes, I keep putting that in quotes. Because it is a quote. And it is laughable. I would definitely recommend this book only if you were some sort of student studying Newton, the Principia, or modern dynamics, mathematics, or a related branch of science. As for the Principia itself, I would recommend felling your gaze onto an original copy somewhere at a library or university near you (look it up), marveling at the changes this document and the man behind it has wrought on modern society, and then go about your day.

To get a slightly more enjoyable idea of where Newton fits into the scheme of things, you might want to try The Clockwork Universe by Edward Dolnick. If you have some sort of sick wish to understand physics without being forced to, you could start with Basic Physics by Karl F. Kuhn. Or Newton for Dummies.

***REVIEW WRITTEN FOR THE STARVING ARTIST BLOG.
