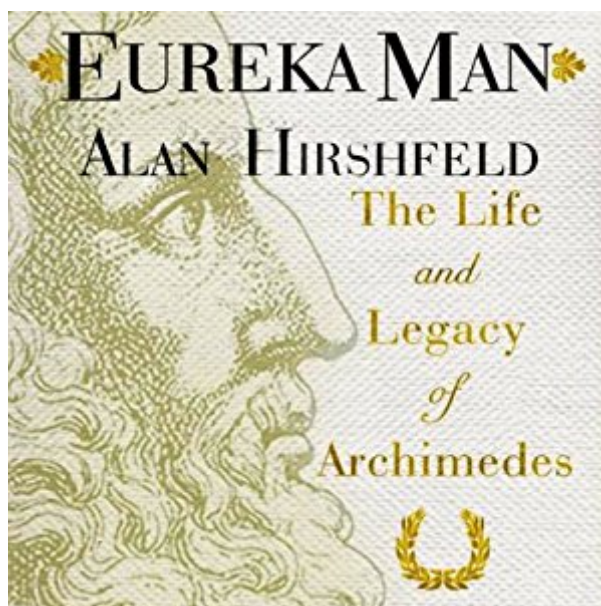


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# Eureka Man: The Life And Legacy Of Archimedes



## Synopsis

Many of us know little about Archimedes other than his "Eureka" exclamation upon discovering that he could immerse an object in a full tub of water and measure the spillage to determine the object's weight. That seemingly simple observation not only proved to King Hieron II of Syracuse that a certain amount of silver had been used in what was supposed to be his solid-gold crown, it established the key principles of buoyancy that govern the flotation of hot-air balloons, ships, and denizens of the sea. Archimedes had a profound impact on the development of mathematics and science: from square roots to irrigation devices; planetariums to the stability of ships; polyhedra to pulleys; number systems to levers; the value of pi to the size of the universe. Yet this same cerebral man developed machines of war so fearsome, they might have sprung from a devil's darkest imagination - indeed, weapons that held at bay the greatest army of antiquity. Ironically, Archimedes' reputation swelled to mythic proportions in the ancient world for his feats of engineering: the hand-cranked irrigation device, commonly known as "Archimedes' screw," and his ingenious use of levers, pulleys, and ropes to pull, single-handedly, a fully laden ship! His treatises, rediscovered after 1,000 of collective amnesia in Europe, guided nascent thinkers out of the Dark Ages and into the Renaissance. Indeed, Archimedes' cumulative record of achievement - both in breadth and sophistication - places him among the exalted ranks of Aristotle, Leonardo da Vinci, Isaac Newton, and Albert Einstein. Eureka Man brings to life, for general readers, the genius of Archimedes, offering succinct and understandable explanations of some of his more important discoveries and innovations.

## Book Information

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## Customer Reviews

I thought, having been fairly familiar with both Dijksterhuis' and Netz' and Noel's book on respectively the mathematics of Archimedes and the discovery and analysis of the palimpsest that I was well versed in it's lore. Professor Hirshfeld's book proved me wrong. He does a masterful job of threading the two stories together, especially filling in a number of the blanks in the still murky history of the palimpsest. I have some minor mathematical quibbles with the work (namely that he does not discuss the double reductio ad absurdum method of proof that Archimedes wielded so skillfully) but that does not detract from the overall force of the book. I strongly recommend this to anyone interested in the history of mathematics.

The short version: Eureka Man is, very broadly, three stories: The man and his milieu (mostly his milieu - see closing paragraph), his contributions and influence, and the utterly amazing & fortuitous chain of events over the last 2200 years whereby we today know of the first two. For those in a hurry, I can whole-heartedly recommend Eureka Man on all three counts: This is the best concise summary of Archimedes' world and work that I know of - all the detail you need; nothing that you don't. The longer third story - about 1/2 of the book - was for me a complete delight. The amazing twists & turns of fate by which we know even a little of this brilliant man - a story that is still unfolding with the recent re-discovery & recovery of the Archimedes Palimpsest (or Codex). And if that weren't enough, Hirshfeld has a genuine ear for language. The writing is lively and fun, a pleasure to read.=====For those who want a more detailed synopsis, read on . . . Hirshfeld devotes the first half of the book to the first two stories: The Greco-Roman world of the 3rd Century BC, when the Greek city-states of the Greek peninsula & Italy (including Sicily), and the post-Alexandrian Hellenistic kingdoms of Egypt & modern Turkey were steadily losing their autonomy to Rome. Archimedes' life & work were intimately bound up in this tumultuous transitional period - he studied in Alexandria & corresponded regularly with its leading intellectuals, such as Eratosthenes the mathematician & geographer, and Heron the inventor (of the world's first steam engine, to name but one). These correspondences comprise almost the whole of what has come down to us from Archimedes' own hand (so to speak - they have been copied & re-copied dozens of times). The mother - necessity - of Archimedes' most famous inventions was the Roman siege of Syracuse during the 2nd Punic War. His booms, winches (including the famous "claw of Archimedes"), catapults, and perhaps even a focusing mirror "ray-gun", held the Romans at bay for two years. Even his death, by the sword of a Roman soldier, was milieuistic. Legend has it that the soldier had ordered Archimedes to "move along" or some

such, and Archimedes, deep in some abstruse bit of math, told the soldier to buzz off, with predictable results. Legend also has it that Marcellus, the Roman general leading the siege, was mortified by his soldier's summary execution of the World's Greatest Mathematician & Engineer, and made handsome reparations to Archimedes' family (legend doesn't record if the reparations were taken out the anonymous soldier's hide). Hirshfeld also covers in some detail the most well-known Archimedean mathematical achievements - the Cattle Problem, the Sand Reckoner, levers & planes, Squaring the Circle, and of course, the flashing Eureka! moment. But he goes a step further by considering these in the context of the mathematical means & methods of the day - how the Greeks were seemingly hamstrung by their inefficient verbal & mathematical symbolism, and Archimedes' clever "work-arounds." Especially, Hirshfeld discusses the tantalising but spotty evidence that Archimedes, in his efforts to compute the area under curves, came very close to the "infinitesimals" that both Newton and Leibniz used in their independent development of The Calculus. In so doing, he also discusses the Greek abhorrence for zero, with its embodiment of the Yin-Yang concepts of nothingness and infinity. That a man of this culture could come so close to calculus is even more astonishing than Newton's great leaps, given that by Newton's age the time was ripe. All of the above are well known to Archimedean fans, but for those new to the subject, I can recommend Hirshfeld's concise summary without hesitation. He sweats the details as required to illuminate the historical context, but never gets bogged down; and he omits them entirely where they would serve no purpose (such as the difficult "On Floating Bodies" treatise).

Part II, "A Palimpsest's Tale" is exactly what it says it is - the story of the Archimedes Palimpsest and the improbable chain of circumstance & narrow escapes by which Archimedes' story & work have come down to us. Historical context is essential to understanding of course, and Hirshfeld doesn't skimp. He gives a good overview of ancient IT - the media, the repositories, the copying, etc, and how it all evolved thru the centuries. Much of Part II duplicates the Palimpsest history as related in The Archimedes Codex by Reviel Netz & William Noel, but I found Hirshfeld's version to be both more thorough & more concise - he doesn't get side-tracked, for example, by tales of research trips to the Mediterranean. Finally, a few small complaints. I have spent many frustrating, futile years looking for information on Archimedes the man so my excitement was high when I found Eureka Man. The title says "The life & Legacy of Archimedes". Well, one out of two ain't bad, I guess. Eureka Man offers a thorough & enjoyable account of Archimedes' legacy - his astonishing feats of logic & invention, how they managed to get transmitted to us, and his influence on later scientists. But as far as Archimedes himself . . . well, there just isn't that much to go on, so Hirshfeld, like everyone else, makes do by recreating Archimedes' milieu. He does a good job of it, but I had naively hoped that

maybe he'd turned up some new documents or had deduced some new insights from the specialist literature (I'm not a scholar, just a devoted fan). So: the title is a bit misleading. My other complaint is that Hirshfeld seems way too uncritical and polite regarding certain theories - if that is the word - of Reviel Netz, co-author of the Archimedes Codex (I mean to post a review of that as well, if I can ever think of a way to keep it under a thousand words). But those are minor cavils with a book that is both edifying & entertaining. What more could anyone ask? Eureka Man will be a permanent addition to my library, and I'm betting it will be the same for most people who buy it.

I am a big fan of Hirshfeld's book on Michael Faraday, *The Electric Life of Michael Faraday*. I hoped for an equally excellent experience with this biography of Archimedes. Perhaps my expectations were a little high. Though a solid, interesting book, it doesn't quite reach as high a level. The main thing that threw me off was the fact that only about half of this short book is really a biography of Archimedes, which is what I was looking for. This is not a surprise, perhaps, given how little is known of his life. And Hirshfeld does give some nice descriptions of Archimedes' work. His explanations of Archimedes' method of calculating pi and the story of *The Sand-Reckoner* are particularly good. I also liked the explanation of the law of levers (especially as exposition of Archimedes' method), though this is tough going for someone who doesn't already understand something of the physics. Still, I felt a little misled by the title and I thought I was getting something other than what I got. In fact, the last half of this book is the story of the Archimedes Palimpsest. The Palimpsest (for those who missed the story in the news a few years back or have never visited the website) is an ancient manuscript of Archimedes' works hidden beneath the pages of a liturgical book. Discovered for the first time in the opening years of the twentieth century, in its pages were found not only works already known but also the only known versions of some of Archimedes' writings. It was and remains an awesome discovery and a revealing view into Archimedes' work. Hirshfeld does a nice job of taking us through what is known of the document and its various appearances through the twentieth century up to the present day. Certainly, it is a story worth telling and a fascinating one to someone, like myself, who is interested in books as objects in and of themselves. Somehow, however, I got the feeling that this was two very separate books brought together by the name Archimedes. I think I would rather have seen both parts expanded and published as two separate books. Still, as it is, there is a lot of valuable information here.

This is really like two different books in one. The first part, that covers the math of Archimedes and his other accomplishments, is rather dry and the author almost seems bored by it. The second part,

which focuses on the Archimedes Palimpsest (also covered in a recent book titled the Archimedes Codex), feels as if it were written by a different author, someone who was genuinely excited about his subject and is expressing that in his writing style. So if you find yourself getting bogged down in part I, at least give part II a try before giving up entirely.

This book is very interesting and the writer have a lot knowledge about some very specific details that I am pretty sure that was hard to find it. However, because he does not make the calculus ... he arrived in some mistakes... but it was fun to discover these!!

Arrived in time as described. Good product.

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