

# Two Books on Einstein and the World He Made

Einstein had a particular genius for choosing among the radical scientific ideas of his day.

By *Marcia Bartusiak*

Jan. 12, 2024 12:48 pm ET



Albert Einstein at the Bern Patent Office, ca. 1905. PHOTO: ETH-BIBLIOTHEK ZURICH/BILDARCHIV

Albert Einstein is one of the most written-about figures of the 20th century, and for good reason. His theories upended the system that physicists had used to describe the world since Newton. Along the way, he became a figure of public fascination—a true celebrity. Now two books further scrutinize different aspects of the man.

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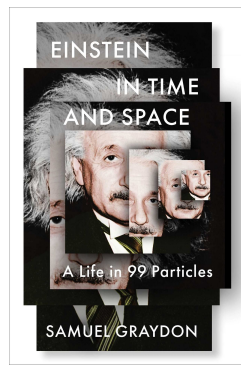
**Einstein in Time and Space: A Life in 99 Particles**

Samuel Graydon's "Einstein in Time and Space" is not an exhaustive biography. Instead it presents 99 vignettes, most of them one to three pages long, that highlight key qualities of this complex person: the

By Samuel Graydon

Scribner

368 pages



curious child, the rebellious student, the serial adulterer, the witty prankster, the loyal friend, the civil-rights defender, the intellect unsurpassed in his time. Mr. Graydon, the science editor at the Times Literary Supplement, has chosen his number of chapters in a

playful homage to the atomic number of the element einsteinium.

Even if readers are familiar with these stories, Mr. Graydon's approach often delivers a fresh take on episodes not strongly emphasized in other biographies. Here is Einstein the engineer patenting a unique refrigerator design and a hearing aid. There he is building a miniature cable car out of matchboxes for his young son Hans. "That was one of the nicest toys I had," Hans later recalled.

As a correspondent, Einstein could be quite impish: "So, what are you up to, you frozen whale, you smoked, dried, canned piece of soul, or whatever else I would like to hurl at your head?" he once wrote to a friend. While starting his career in Bern, Switzerland, the young physicist formed a little club called the Olympia Academy with two friends to discuss science and philosophy. "Einstein, despite being the youngest," writes Mr. Graydon, "was elected president, earning him the title 'Albert Ritter von Steissbein' (roughly, 'Sir Albert, Knight of Backside')." A certificate was made up, featuring a drawing of a bust of Einstein beneath a string of sausages."

Mr. Graydon's stated goal is to point out "the inconsistencies inherent in a life, the inexplicable, incompatible, insane motivations that punctuate days and years." The author notes how Einstein, a devoted pacifist, maintained a close friendship with the German chemist Fritz Haber, who pioneered the use of both chlorine and mustard gas during World War I. He observes that the deep thinker didn't pass up the chance to party with the movie stars Charlie Chaplin, Mary Pickford and Douglas Fairbanks when out in California.

The book also includes moments of quiet dignity, such as the story of the black contralto Marian Anderson, who had been invited in 1937 to give a concert at Princeton University but was denied a room at the local hotel due to her race.

Einstein simply prepared a room for her at his home, an invitation that was extended from that day forward whenever she visited the town.

Mr. Graydon has woven from these separate strands a compelling and beautifully written narrative, though I have one caveat. In his acknowledgments, the author admits that he “lightly fictionalized” a few chapters about representative days at Einstein’s office. Given the wealth of material on hand, a summary of Einstein’s life hardly needs any false embellishments.

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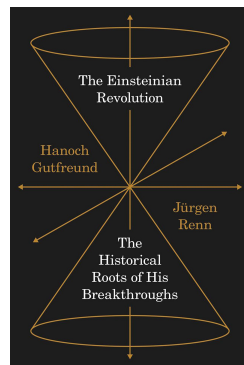
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### The Einsteinian Revolution: The Historical Roots of His Breakthroughs

By Jürgen Renn and  
Hanoeh Gutfreund

Princeton University  
Press

272 pages



While “Einstein in Time and Space” primarily concentrates on Einstein’s personal experiences, Hanoeh Gutfreund and Jürgen Renn’s “The Einsteinian Revolution” delves deeply into his science. Mr. Gutfreund, the academic director of the Albert Einstein Archives at the Hebrew University of Jerusalem, and Mr. Renn, the director of the Max Planck Institute for the History of Science in Berlin, have written extensively on Einstein and with this

book take on a particular challenge: “to dispel the popular myth that Albert Einstein, the unconventional scientific genius, instigated an overwhelming scientific revolution through pure thought alone.” They succeed in that goal, along the way providing an excellent overview of Einstein’s major discoveries, from his early work on quantum theory to general relativity, the new law of gravity that overturned Newton. It is a welcome addition to any collection of books on modern physics.

A true understanding of Einstein’s accomplishments, they write, demands a revision of the legendary concept of the “paradigm shift.” The notion was introduced in 1962 by the historian of science Thomas Kuhn, who argued that a scientific revolution suddenly replaces a previous system of knowledge with a new one unconnected to the past. But Messrs. Gutfreund and Renn prefer to view Einstein’s work as an evolutionary process, where the new system is built upon the scientific scaffolding already in place.

In the late 19th century, that scaffolding was constructed around three dominant areas of physics: mechanics, thermodynamics and electromagnetism. Troubling puzzles were beginning to arise at the intersections between these fields, and many scientists attempted to find solutions within their own isolated specialties. But Einstein—with his deep reading of the scientific literature and the philosophy of science, his constant dialogues with scientific friends, and his careful attention to new experimental discoveries—stood above those boundaries, enabling him to perceive an entirely new vista.

The authors provide a detailed examination of Einstein's *annus mirabilis* in 1905, when he recognized that light can act like a particle as well as a wave; proved that atoms exist; linked matter with energy in that celebrated equation  $E=mc^2$ ; and, with the special theory of relativity, swept away the idea that we live in a fixed space governed by a universal clock.

Before these discoveries, the authors note, the Dutch physicist Hendrik Lorentz had developed a mathematical scheme to explain the behavior of charged particles moving through the ether—the medium that supposedly permeates physical space to allow light to travel. Lorentz's equations foresaw many of the phenomena later explained by special relativity. But his physical interpretation, complicated and full of assumptions, was still rooted in classical physics. Einstein jettisoned this kludge by doing away with the ether, recognizing that space and time are not absolute and declaring that the speed of light is a constant whether a body is stationary or in motion.

Einstein didn't arrive at this solution in a single eureka moment. It was the result of deep reflection over the years, influenced by such philosophers as David Hume, who questioned the causal relations between events; Ernst Mach, who objected to Newton's idea of absolute space; and Henri Poincaré, who early on noted the possible relativity of time. Einstein stood upon the shoulders of giants to gain his new perspective.

While "The Einsteinian Revolution" is written for a general audience, a background in physics helps make certain sections more accessible. Yet the authors' overall thesis is clear and convincing. "The substance of Einstein's work was not new," they stress, "but rather was the result of an accumulation of knowledge over centuries; it was his conceptual organization that was new."

Their book, along with Mr. Graydon's "Einstein in Time and Space," enhances our understanding of both a great scientist and an exemplary humanist.

*—Ms. Bartusiak is a professor emeritus at MIT and the author of "Einstein's Unfinished Symphony."*