



Geons, Black Holes and Quantum Foam: A Life in Physics

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He studied with Niels Bohr, taught Richard Feynman, and boned up on relativity with his friend and colleague Albert Einstein. John Archibald Wheeler's fascinating life brings us face to face with the central characters and discoveries of modern physics. He was the first American to learn of the discovery of nuclear fission, later coined the term "black hole," led a renaissance in gravitation physics, and helped to build Princeton University into a mecca for physicists.

From nuclear physics, to quantum theory, to relativity and gravitation, Wheeler's work has set the trajectory of research for half a century. His career has brought him into contact with the most brilliant minds of his field; Fermi, Bethe, Rabi, Teller, Oppenheimer, and Wigner are among those he called colleagues and friends. In this rich autobiography, Wheeler reveals in fascinating detail the excitement of each discovery, the character of each colleague, and the underlying passion for knowledge that drives him still.

Geons, Black Holes and Quantum Foam: A Life in Physics Details

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From Reader Review Geons, Black Holes and Quantum Foam: A Life in Physics for online ebook

dejah_thoris says

Overall, Wheeler's memoir isn't bad, but you will need a solid background in the history of physics to really appreciate it. His perspective is limited, so there's not much depth to some of the big name physicists he describes in brief encounters. He's also very biased towards himself. Although he acknowledges that his reticence to enter WW2 was great, he doesn't dwell on the fact that he didn't believe the Nazi atrocities until he saw the concentration camps in person. He tries to overcome his past by throwing himself fully into war work once he sees its importance, but he doesn't spend much time defending his decision to support Germany for as long as he did. Later in the book, one of his colleagues that he helped hire at Princeton is being investigated by the House of Un-American Activities Committee and he does nothing to support him. He justifies this by noting that his colleague had changed from what he appeared to be in the interview to who he actually was. He also notes that his colleague's defense rested not on whether he was a Communist but whether HUAC should be investigating anyone. Wheeler seems to regret this decision a bit, but definitely not to the extent you'd expect. On a positive note, Wheeler coined the term black hole, it from bit, and thought up some interesting examples of applied quantum theory. So, his memoir has lots of merit, but he is human, so you may discover some parts of his personality you do not like too.

Ushan says

I knew John Wheeler as most senior coauthor of the 1200-page book *Gravitation*, and this is his autobiography. Yes, Wheeler has done research on General Relativity, coining the terms "black hole" and "wormhole". The geons of the title are electromagnetic waves so massive they are held together by their own gravity; by Wheeler's calculations, a torus the size of the Sun and a million times more massive is the smallest one for which quantum effects could be ignored; he also explored geons composed of gravitational waves. However, Wheeler has done much more than that. He worked on the Manhattan Project, living next to the world's first large-scale nuclear reactor, the B Reactor at the Hanford Nuclear Reservation. When the reactor suddenly stopped working, Wheeler thought that some fission product must be absorbing a lot of neutrons; by looking at the way the reactor was restarted, he realized that the half-life of the fission product must be less than 11 hours, but not much less; looking at the chart of isotopes, he guessed that it was xenon-135; indeed, it was. They added more fuel elements, since the designer of the reactor anticipated this possibility. Wheeler wonders whether, had the atomic bomb project started a year sooner and ended a year sooner, World War II would have lasted a year less; I very much doubt it. Before the war, Wheeler worked with Niels Bohr on nuclear physics, predicting correctly that isotope 239 of element 94 would be fissionable by slow neutrons. In his later years he tried to start a program to reorganize physics around the concept of information: each pencil lead is unique, but each carbon-12 atom is identical; the thing that makes an individual pencil lead from individuality-less atoms is information. I couldn't find any other physicist who took up this program. Much of the rest of the book is reminiscences about other physicists Wheeler has interacted with, from Albert Einstein to David Deutsch.

Chris Meger says

I can't believe I didn't add this one earlier. John Wheeler is one of my favorite physicists of the "old guard". He's the "it from bit" guy! I love that!

Natalie says

I read this in college. There aren't that many books I still remember. This one was good!

Mitch Allen says

Autobiography of a great American physicist. All the facts and polished thoughts, but nearly enough intimacy or exploration of his vulnerabilities that one might hope for.

Drew says

An interesting romp through the physics of the 20th Century. John Wheeler was involved with many of the ideas and, it seems, almost all of the major figures who turned our traditional view of the world upside down. If one looked solely at the physics parts of his memoir, you'd walk away happy with a lay understanding of some very exciting work. The book is worth the read just for this tour de force through non-classical physics.

I felt that the book could have undergone another round of editing. The narrative jumps back and forth through time. That could be okay if he focused on one topic and went through all the times it cropped up, then set the clock back to discuss another topic. He's in and out, more like one would get if you were at a cocktail party and kept picking up the conversation with him as you rotated throughout the various guests. Exciting conversation, yes, but hard to keep up at times.

While this isn't a comment on the book, but more the man, I found myself repeatedly "yelling" at the book about his politics. It seems he was an adherent of the "my country, right or wrong, my country" philosophy. I didn't see any introspection about his nuclear weapons work both during World War II and his work on the much more devastating hydrogen bomb during peacetime. I saw much more reflection from Oppenheimer, Einstein and Bethe. I think he missed President Eisenhower's speech on the rise of the military-industrial complex.

Wheeler never explores the impact of his weapons work on others. He ignores the rest of the world, focusing solely on Europe, when he sees vindication of his weapon's work by the fact that Europe had peace for the longest period ever after the end of World War II. He neglects to mention the proxy wars fought between the East and the West in Africa (e.g. Congo, Angola), Latin America (e.g. Guatemala, Chile, El Salvador, Nicaragua), the Middle East (e.g. Lebanon, Iran), and Asia (Vietnam, Laos, Cambodia, Korea).

Intersecting both the man and the memoir, I felt there was a huge lack of humility on his part. He doesn't need to beat himself up or constantly downplay his achievements, which are plenty. But I felt as if physics in the 20th century would never have happened if Mr. Wheeler hadn't been around. I guffawed (a word I've always wanted to use!) when he called out several scientists (including Oppenheimer) for being less than humble.

Having ranted for several paragraphs, I want to conclude by saying that this is a book worth reading for many people. To see how science was done is crucial for today and tomorrow. Scientists worked together, and PhD's taught their students, instead of passing such duties on to their graduate assistants. Also, it stirred so much up in me, part excitement, part questioning, part disagreement, that it must be a good book since it got a conversation going in my head and with the person who gave me the book.

Shivkumar Somasundaram says

A very interesting and engaging autobiography by one of the smartest theoretical physicists of the twentieth-century. Highly recommended!

Thomas says

This book is like a nice tall glass of water. Cold but refreshing. A bit dull, but useful for a vigorous lifestyle. A lot of the book is rather hard to appreciate without at least oh a year of physics but there are also plenty of interesting anecdotes about the Manhattan project, the creation of the H-bomb and various academic brouhahas from someone on the inside. But it's also pretty repetitive and not engaging most of the time. If you're already interested in Physics though, you'd probably enjoy working through it for a while.

Mark says

John Wheeler was my great uncle.

The book mixes auto-biography and a layman's guide to modern (late 20th century) astrophysics

Pandu says

John Wheeler is a genius, not only in physics, but also in writing. He manages to make esoteric concepts bearable--the only guy I know who not only excited uranium and plutonium, but also made the topic exciting on paper.

Ed says

B Wheeler - Autobiography of physicist John Archibald Wheeler from 1911-1995. Career at Princeton, UNC Chapel Hill and UT Austin. Relationship with Niels Bohr and quantum physics, and Albert Einstein and general relativity.

Gordon says

If you're looking for a great biography of a physicist central to many of the major discussions and discoveries of the twentieth century, this is perfect. John Archibald Wheeler came up with the name "black hole," fitting pioneering work on relativistic astronomy into a busy schedule of shaping the then-emerging field of quantum mechanics from both scientific and philosophical angles.

Gigio says

Wheeler nasceu em 1911 e morreu em 2008. Acompanhou toda a física do século XX. Começou no estudo do núcleo, participou do Projeto Manhattan e do desenvolvimento da bomba de hidrogênio, pulou para a área de gravidade, (quase) inventou o termo "buraco negro", inventou o termo "buraco de minhoca", pulou para teoria quântica e fez mais contribuições. Orientou Feynman, Kip Thorne, Hugh Everett III e outros físicos famosos. Esbarrou em uns cinco prêmios Nobel (não levou nada no final). Provavelmente o físico mais azarado do século.

Não tem como uma autobiografia assim não ser no mínimo muito interessante (para quem gosta de ciências).

Hugh Chatfield says

This impressive book tells readers about the fascinating life of physicist John Archibald Wheeler. Great introduction to the notion that "empty space" is really a seething "quantum foam" where particles spring into existence from nowhere.

Kari says

Favorite quotes:

"The universe is a grand synthesis, putting itself together all the time as a whole....It is not one thing happening after another....It is a totality in which what happens 'now' gives reality to what happened 'then,' perhaps even determines what happened then....Measuring, the act of turning potentiality into actuality, is an act of choice." (p. 338, 339) I'm still pondering that one.

"The electron pays for its freedom to move forward and backward in time by remembering neither future nor past. We remember the past and are trapped in one-way motion through time." (p. 348)

"Entropy is nothing more than the grand totality of lost information." (p. 341)
