



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

by John Archibald Wheeler with  
Kenneth Ford

Published by W.W. Norton and  
Company

416 pages, 1999

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# Making Physics Sing

Reviewed by Jonathan Shipley

I looked these words up in the dictionary: geon, black hole, quantum foam. My dictionary only listed the black hole (An ultimate state of gravitational collapse. Stars with a mass greater than two solar masses can expect to evolve into this condition, a concentration of matter so dense that even photons [light particles] cannot escape when the pressure of thermonuclear reactions is unable to counteract the force of self-gravitation. Black holes are believed to be associated with certain X-ray-emitting binary star systems, such as Cygnus X-1). Make sense? Of course. One doesn't expect ecstatic enthusiasm and delightful thoughts on the subject of physics. I was one of those people. But I was pleasantly surprised by John Archibald Wheeler's autobiography, *Geons, Black Holes, and Quantum Foam*.

Wheeler is one smart cookie, this much is clear. He earned his Ph.D. at Johns Hopkins University at the age of 21. His faculty appointments have included the University of North Carolina and the University of Texas at Austin though he spent most of his career at Princeton. He's written about the end of time, the mutability of physical law, and the role of observation in shaping the history of the universe. That's no small potatoes, my friend. He's coined the terms *geon*, *black hole*, and *quantum foam*. He's worked with the sharpest minds in the field. Have you

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heard of the physicist named Albert Einstein? Wheeler knew him quite well. Wheeler has pioneered many realms of physics.

It's fairly difficult to be a pioneer. You have to have a certain drive. And it helps if you're smart. Really smart. Being so smart, one would think Wheeler would have difficulty writing a memoir that could reach the masses without being, well, boring. One would be wrong on that count however, because not only is our man brilliant, he knows how to write a sharp and charming memoir.

Wheeler tells us how, at the ripe old age of 27, he worked with the great Danish physicist Niels Bohr (who's not at all a bore) to develop the theory of nuclear fission and who went on to become a key figure in the Manhattan Project.

*In my postdoctoral years, I was blessed with two wonderfully strong mentors, Gregory Breit and Niels Bohr... I will speak of these two remarkable scientists, so different from each other in so many ways, yet both brilliant, both possessed of a burning commitment to understanding the basic laws of nature.*

He tells us of Einstein's general theory of relativity in the 1950s and how Wheeler brought his class from Princeton for tea with arguably the smartest man in the known universe. "That is how I first met Einstein. It was my impression, based on listening to him that day, that he was no longer on the frontier. He seemed to be pursuing his own idiosyncratic track in a direction veering away from the main stream of physics." He tells us how he postulated geons. He tells us how he and his students predicted features of black holes. He tells us his efforts in understanding the union of quantum theory and relativity.

This guy, if I haven't already said it, is smart. One probably wouldn't see him sitting on a couch Wednesday evening munching on Doritos and watching *Wheel of Fortune*. He is a teacher and with his exciting new book, he teaches the reader about his life, science, and our unending thirst for knowledge. | *July 1999*

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