



Niels Bohr's Times, In Physics, Philosophy, and Polity

By Abraham Pais

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Abraham Pais's life of Albert Einstein was one of the finest scientific biographies ever written. When it first appeared in 1982, *Christian Science Monitor* called it "an extraordinary biography of an extraordinary man," and Timothy Ferris, in *The New York Times Book Review*, said it was "the biography of Einstein he himself would have liked best," adding that "it is a work against which future scientific biographies will be measured." As a respected physicist himself, Pais was the first biographer to give Einstein's thinking its full due, yet despite the occasional high level of science needed to discuss Einstein's ideas, the book was a national bestseller. Indeed, it was one of *The New York Times*'s Best Books of the Year, and the winner of the 1983 American Book Award for Science.

Now Pais turns to Niels Bohr, to illuminate the life and thought of another giant of 20th-century physics. Bohr was the first to understand how atoms were put together, he played a major role in shaping the theory of the atomic nucleus, he decoded the atomic spectrum of hydrogen, an achievement which marks him as the founder of the quantum dynamics of atoms, and his concept of complementarity (which provides the philosophical underpinning for quantum theory) qualifies him as one of the twentieth century's greatest philosophers. Pais covers all of these achievements with sophistication and clarity, but he also reveals the many other facets of the man. Perhaps most important, he shows that Bohr was not only a great scientist, but also a great nurturer of young scientific talent, acting as father figure extraordinaire for several generations of physicists. Bohr's Institute of Theoretical Physics, which he founded in Copenhagen and for which he tirelessly raised funds, was the world's leading center for physics all through the 1920s and 1930s, the birthplace of Heisenberg's papers on the uncertainty relations, Dirac's first paper on quantum electrodynamics, and other pivotal works. And Pais reveals as well the personal side of Bohr, the avid reader and crossword puzzle solver (Bohr loved Icelandic sagas, Goethe and Schiller, Dickens and Mark Twain--while studying in England early in his career, he improved his English by reading *The Pickwick Papers* with a dictionary to one side); his aid to Jews and other refugees in the 1930s and during the war; the tragic loss of his son Christian (who died in a sailing accident right before Bohr's eyes); and his attempts during and after the war to promote openness between East and West, meeting with both Roosevelt and Churchill (the former was quite courteous, the latter lectured Bohr like a schoolboy).

Bohr's research, his teaching, his friendships with the major scientists of our time, his aid to refugees, his role as philosopher, administrator, and fund raiser, his devotion to science and to his family--all these qualities are illuminated by Pais in a marvelous biography that captures the essence of one of the best-loved figures of this century.

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Editorial Review

From Publishers Weekly

When Einstein's revolution opened a window to quantum physics, it was the Dane Niels Bohr (1885-1962) who went through it to decode the first atomic spectrum (and to win a Nobel Prize in 1922). Bohr's career as a physicist spanned the full development of quantum mechanics, which he approached with a kind of *gemutlichkeit* that we do not associate with theoretical genius. Pais, a former physics professor who first met his subject in 1946, is a diligent biographer who captures Bohr and his era with the intensity of a devoted protege. Bohr's broad career, touching many important developments and figures in his field (Heisenberg, Pauli, Rutherford among them), and overflowing into European post-WW II policy requires a biographer with deep resources such as Pais, who here preserves the social and scientific dimensions of a full epoch of physics in his depiction of Bohr's singular life. Illustrations.

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Review

Advance praise for Neils Bohr's Times 'To anyone who worked under Bohr and was influenced by him, the book is fascinating and to any physicist with the slightest interest in the history of his subject it is to be highly recommended. ... the picture of intense argument, and excitement, of great minds seeking the truth and of their strengths and weaknesses comes through vividly, as does the central question - does God play dice? Dr Pais has done a fine job.' Sir Nevill Mott, Nobel Laureate

'Pais gives us an intimate picture of Niels Bohr, the great human being. He also shows in a profound manner how Bohr's ideas on atomic physics and quantum mechanics evolved, often painfully, and guided most of the scientists working in the field.' Hans A Bethe, Nobel Laureate

'What struck me most was Pais' account of the intellectual battles that established the basis of modern physical science. We now take the truth of quantum mechanics as read, but it was a great and exciting struggle, and Bohr's finest hour.' Sir Sam Edwards FRS

'A. Pais' "Niels Bohr's Times" illuminates the probing, deep exertion within Bohr that was midwife to the birth of twentieth century physics. One watches audacious improvisation accompanied by internal doubt of sufficiency and substantiality ... It is a pleasure to catch glimpses of the author's humour abd his personal as well as intellectual impressions; Abraham Pais is very much a part of "Niels Bohr's Times".' Mitchell Feigenbaum

'Niels Bohr could not have asked for a better biographer than Abraham Pais.' The New York Times Book Review

'A close-up portrait of a truly extraordinary, and extraordinarily appealing, personality..... Pais is himself a physicist of great distinction. He writes with authority and, in addition, with unfailing grace and considerable charm.' Science

'Abraham Pais is a physicist who has made fundamental contributions to the quantum picture of reality. But during the last 14 years he has shown himself to be a historian of science who combines deep scientific insight with meticulous scholarship. He is perhaps the unique example in modern times of a world-class physicist turned historian.' London Review of Books

'For many people, a review of this book will not be needed. Anyone familiar with Abraham Pais's previous historical/biographical studies of Einstein (Subtle is the Lord) or particle physics (Inward Bound) will already be certain that this book about Bohr is one which must go to the top of the priority list.' The Observatory

'The book is a delight to read, and Pais gives the layman a glimpse into the make-up of a great man, and also a glimpse into the make-up of the world.' Paul Robertson, Regina Leader Post, 10 October 1992

'Through a detailed and eminently readable account of Bohr's life and work, his importance to the development of twentieth century physics is established without a doubt ... this very rich book, to which it is impossible to do full justice within the confines of this review. My best advice would be to read it yourself!' A J Kox, European Journal of Physics 1992

About the Author

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Abraham Pais is Detlev W. Bronk Professor of Physics Emeritus at Rockefeller University in New York. He is also the author of '*Subtle is the Lord...*' (for which he won an American Book Award) and *Inward Bound*.

Users Review

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