

BOOKS

A Life Bridging Generations, Disciplines, Time and Space

A Tale of Two Continents: A Physicist's Life in a Turbulent World

Abraham Pais
Princeton U. P., Princeton, N.J.,
1997. 509 pp. \$35.00 hc
ISBN 0-691-01243-1

[Writers] work to disambiguate the tragedy of disambiguity, to make sense of the cost of making sense.

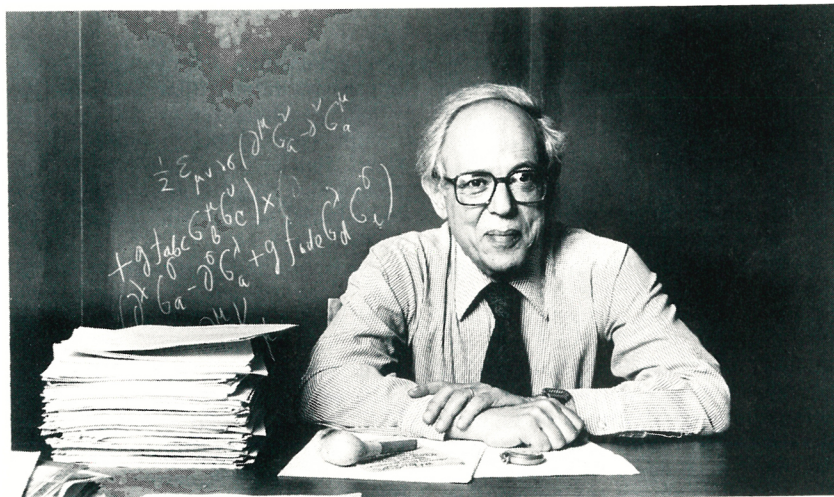
—Louis Menand

Reviewed by Silvan S. Schweber

Abraham "Bram" Pais is a distinguished theoretical physicist—he has been called the father of particle physics—and is, perhaps, an even more eminent historian and biographer. When writing his biographies of Albert Einstein and of Niels Bohr, Pais eschewed making sense of the cost of making sense and avoided psychologizing. But in coming to the autumn of his own life, he has felt the need to assess the cost to himself of making sense and to disambiguate the tragedy of the disambiguities of his life. To do so, he has written his autobiography.

Written in a straightforward, unpretentious, literate manner, *A Tale of Two Continents* is an engrossing and gripping document. However, this autobiography also exhibits some of the limitations of the genre. Pais's sense of honor and decency has imposed constraints on what he is willing to say about some of his colleagues. We thus get a very moving and candid account of his youth, a forthright and frank account of his personal life—even though self-dissection is always painful—an insightful report of his rewarding activities as a historian, a sensitive and buoyant depiction of the joy of his third and present marriage to Ida Nicolaisen—the happiest years of his life—but a somewhat less revealing narrative of his professional career.

Pais is very much taken with the



"BRAM" PAIS, November 1981. (Courtesy AIP/Emilio Segrè Visual Archive.)

great men he has interacted with. The ones he writes about are for the most part members of an earlier generation, and the list is indeed impressive; in it are Paul Dirac, Wolfgang Pauli, Erwin Panofsky, Isidor Rabi, J. Robert Oppenheimer, John von Neumann and Oswald Veblen, to name but a few. Among the "truly great" he encountered, he names Bohr, Einstein, Pablo Casals and Chaim Weizmann. Each of the latter is an off-scale individual who reached the pinnacle of human achievement in an area that means the most to Pais: Bohr with his humanity, Einstein with his science, Casals with his music, Weizmann as a Jew.

Among the four, Bohr holds a special place in Pais's heart. Bohr was a father figure whom he came to love. Weizmann represents the successful amalgamation of science, Judaism and Zionism. The meanings of the Jewish tradition and of Zionism have been ever present concerns of Pais's.

Pais was born in 1918 in Amsterdam into a comfortable but not well-to-do orthodox Jewish household. His father was a diamond cutter, but his life centered about the Sephardic community in Amsterdam. Bram gave up his religious faith at an early age, thereby distancing himself from his parents' culture and creating a chasm between himself and them. During his teens, Zionism became his bond to his

Jewish tradition, but his love for science eventually won out, and thereafter he could no longer conceive of emigrating to Israel.

The young Bram was, by his own account, "a smart, rather arrogant kid," a quick learner, especially in mathematics. Always the outstanding student in his class, he realized quite early that he had special scholastic abilities. After a rigorous high school education, he entered the University of Amsterdam in the fall of 1935. A year later, two lectures by George Uhlenbeck convinced him that physics was his destiny. Pais did a master's degree thesis under Uhlenbeck's supervision. When Uhlenbeck returned to the US in the summer of 1939, Pais turned to Hans Kramers and Leon Rosenfeld for guidance in his PhD dissertation.

World War II broke out in September 1939, and Holland was invaded and fell in May 1940. A German decree that November barred Jews from obtaining doctorates after 14 July 1941. To meet this deadline, Pais worked frantically, and he got his degree on 9 July 1941.

Life for Jews in Holland became ever more difficult and precarious as the German occupation wore on. Pais's parents survived the occupation in hiding, but his sister and her husband did not. Pais's account of his own harrowing experiences—hiding, eventually being arrested and interrogated by the

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SS, being thrown into prison and having to come to terms with the execution of his best friend, who was imprisoned with him—is surely one of the most moving statements of survival during the *Shoah*. It is also a testimony to the courage and heroism of the non-Jews who were responsible for saving his life, among them Kramers, who nurtured Pais's passion for physics and music during those years. Kramers wrote a letter to Werner Heisenberg asking him to intervene on Pais's behalf in order not to have him deported to a concentration camp. Heisenberg wrote back to Kramers that he "understood, was very sorry, but could do nothing."

Pais's girlfriend, Tineke Buchter, stands out among those who helped him survive. Not only did she, who was not Jewish, secure hiding places for him and others, but at great personal risk obtained Pais's release from the SS prison by seeking out a high Nazi official in Amsterdam and showing him the Kramers letter to Heisenberg. Fittingly, Pais got her name inscribed as one of "the righteous among the nations," in the Yad Vashem, the Holocaust memorial in Jerusalem. Being thus inscribed is the singular honor that Israel bestows, as its expression of gratitude, upon those whose exceptional courage and moral nobility helped save Jewish lives during the Holocaust.

Coming to terms with the war years has been a lifelong struggle for Pais. He poignantly describes his initial anhedonia—the inability to experience emotions of any kind—and the steps, including psychoanalysis with Theodor Reik and several visits to Yad Vashem, that enabled him again to accept the normal emotions of ordinary living.

Undoubtedly, physics and the physics community were the principal salve that helped heal the wounds. Right after the war, Pais spent a year in Copenhagen as Bohr's assistant and amanuensis. Pais lovingly describes his close collaboration with Bohr and what it meant to him to be so warmly received by the Bohr family. In the fall of 1946, he went to the Institute for Advanced Study in Princeton to work with Pauli, only to find that Pauli had returned to Switzerland and that the institute had become a fairly sterile place. But the intellectual life at the institute changed dramatically with the arrival of Oppenheimer as director in the fall of 1947. Oppenheimer asked Pais to stay on and help him to build a school of theoretical physics at the institute. Pais did, for 16 years, first as a member and then as a professor. He helped fashion that eminent institution into the finishing school for the best and brightest young theorists from all over the world and played a major

role in making it a hospitable environment both intellectually and socially.

In his autobiography, Pais tells of his own impressive contributions to particle physics and to other areas of physics, and in the process he gives a vivid account of the atmospherics within the physics community during the heady days when particle physics was the flagship of physics. Pais also gives insightful portraits of some older physicists, in particular Oppenheimer, whom he characterizes as the most complex personality he ever encountered. Pais believes that Oppenheimer harbored a latent homosexuality that contributed to the tribulations of his personal life.

Although he is forthright about Dirac, Bohr, Einstein, Oppenheimer, Pauli and others of that generation, Pais finds it more difficult to write about members of his own generation. Thus we do not hear very much about Max Dresden, who was his closest friend while growing up in Amsterdam, nor about Res Jost, who was perhaps his closest friend and collaborator during the Princeton years and for whom Pais wrote one of the tersest yet most moving eulogies that I have ever come across. Pais is always ready to say good things about friends and collaborators, as in the case of Sam Treiman and Howard Georgi, but when he cannot do so, he is silent.

The character trait that stands out most clearly in reading *A Tale of Two Continents* is Pais's courage, not only the courage to confront the demons within him, but the courage to test his intellectual, physical and emotional limits. Thus in 1960 he had to climb Mount Blanc and two years later the Matterhorn, no small feat. Nor could it have been easy for him to encounter the *Wunderkinder* of the post-World War II generation of physicists—Freeman Dyson, Murray Gell-Mann, Frank Yang, T. D. Lee—yet he came to terms and found his niche. He had the courage to leave the institute in 1963, when he saw himself "in great danger" of becoming complacent about his work. At Rockefeller University, he built a physics department and found himself reinvigorated and able to strive again.

In the late 1970s, Pais turned to writing history and met brilliant success in that enterprise. He also found great happiness in his present marriage. It is good to see this warm, witty, urbane, cosmopolitan man, who throughout his life has cultivated broad interests outside of physics, reap the rewards of his constantly striving to be the best at everything he undertakes. It corroborates what Eugene Wigner used to say: "There is some justice in the world." Pais has striven

to be an outstanding physicist, an outstanding teacher, an outstanding father, an outstanding historian and, above all, an outstanding human being. May he continue to strive and thrive for many years to come!

American Astronomy: Community, Careers, and Power, 1859–1940

▶ John Lankford
U. of Chicago P., Chicago, 1997.
447 pp. \$65.00 hc
ISBN 0-226-46886-0

History of Astronomy: An Encyclopedia

▶ Edited by John Lankford
Garland, New York, 1997.
594 pp. \$95.00 hc
ISBN 0-8153-0322-X

John Lankford is a social historian, a fact that goes far to explain the otherwise puzzling emphases of these two books: *His American Astronomy* looks not at scientific knowledge (there is no mention of Edwin Hubble and his achievements, for example), but at the social organization of astronomy, its population and institutions and at the exercise of power in the community. *His History of Astronomy: An Encyclopedia* provides historical overviews of such subjects as time-keeping instruments, calendars and telescopes; it examines astronomy in various national contexts; it discusses the history of observatories; it takes up topics in social history, such as the participation of women in astronomy; and it provides biographical sketches. Notably missing, with but a few exceptions, are separate entries on discoveries and theories.

The encyclopedia is aimed at high school students and above. The biographical entries are far less detailed than those in the multivolume *Dictionary of Scientific Biography* (Charles Coulston Gillispie, ed. Charles Scribner's Sons, 1970–1980; supplement, 1990, Frederic L. Holmes, ed.), but many are written by world-class scholars and are worth checking for their more up-to-date, if far from complete, bibliographies.

One does not have to agree completely with the premise that there is never an undisputed explanation of past events to welcome the emphasis on historiography—on how historical explanations have changed over time. The wide range of topics covered in the *Encyclopedia* also expands our understanding of the history of science be-