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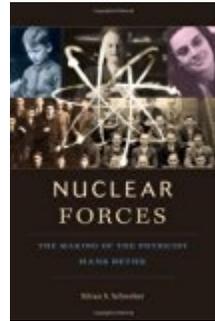
in the Humanities & Social Sciences

S. S. Schweber. *Nuclear Forces: The Making of the Physicist Hans Bethe*. Cambridge: Harvard University Press, 2012. 608 pp. \$35.00 (cloth), ISBN 978-0-674-06587-1.

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Becoming Hans Bethe

This book is not a direct study of war or military history. It has something to say about what science and war were doing to each other as they became closely associated at the beginning of the twentieth century; nevertheless, readers seeking new tales of the Manhattan Project will not find them here. To be sure, physics Nobel laureate Hans Bethe became the public character he did because he was director of the Theoretical Division at the Los Alamos laboratory that built the first atomic bombs. However, this book is not about that part of Bethe's life; in fact, it mentions it only tangentially.

Silvan Schweber makes his academic homes in departments of physics and programs in the history of science and ideas. He has written elsewhere about the "military" side of Bethe's career, tracing the almost, but not quite completely parallel path he traveled alongside his friend and colleague, J. Robert Oppenheimer.[1] *Nuclear Forces* is a formidable work that reaches its conclusion just before that part of Bethe's life began.

This book is an intellectual history, alongside a history of the social and cultural life of Europe's academic middle class between the last years of Otto von Bismarck's regime and the first of Adolf Hitler's. Schweber's focus is, indeed, the making of the physicist Hans Bethe, as the first page full of mathematical reasoning and equations will make clear. The reader who cannot follow the physics and mathematics will lose much of this book. The reader who can will see a concise, mathematical history of twentieth-century theoretical physics that

outlines the intellectual, scientific issues that people in the field sought to resolve before so many of them were caught up in the atomic bomb business. (For good measure, Schweber publishes Hans Bethe's doctoral dissertation as an appendix.)

That is not all there is to say, however. Your reviewer is among those who cannot follow the math; but Schweber is clear enough about what he is doing with it, and the other very well-documented aspects of Bethe's life and career. Bethe, he writes, is "representative of the role played by physicists during the twentieth century," and the biography "an attempt to understand, interpret, and communicate the meaning of and the reasons for Bethe's involvement ... in the shaping of the history of the twentieth century" (p. 5).

These are not small objectives. Before the century had even begun the physical science disciplines had helped remake the Euro-Atlantic world in myriad material, economic, and political ways. They were part of intellectual life in that same community, and their new discoveries came with philosophical implications that were uncomfortable in that new century. Moreover, Schweber insists that he must "situate Bethe in the institutions and networks that made his career possible" (p. 5). The most important of these are the German middle class and its families and the German university system.

Bethe was thoroughly wrapped up in both from birth; his father Albrecht was a physiologist who held posts at Strassburg and Kiel before becoming rector at the Uni-

versity of Frankfurt; his mother, a one-time artist from whom Albrecht Bethe became estranged and to whom young Hans remained constantly devoted.

Schweber's long, closely reasoned narrative, based very thoroughly on files of personal correspondence, argues that Bethe's life was shaped on the one hand by the idea of *bildung*—the German concept of “self-cultivation and self-formation” (p. 81) descended from the Enlightenment and the discomfiting arrival of the industrial and the French revolutions—and on the other by the high-powered and competitive world of the German university system. According to Schweber, *bildung* was an important aspect of the German middle class, especially the educated middle classes of the Jewish community as they increasingly sought to assimilate to mainstream German society. At the same time, in the universities, self-cultivation was to take place under the close auspices of a cadre of autocratic *Herr Professors*.

Bethe worked, successfully, under Arnold Sommerfeld, one of the most autocratic of them all; and he learned the rules of the game at the same time he was developing his own scientific insights. As he worked, he learned to attack questions he knew he could answer. He also traveled throughout the transnational scientific world of Europe, Britain, and the United States before he moved to Cornell University in upstate New York in 1935. (Bethe never considered himself Jewish and he was never religious, but Bethe's mother was Jewish and he was cast

out of German universities under Nazi racial laws.) Even readers seeking something other than Bethe's personal story or professional accomplishments may find this aspect of the story useful in an unexpected way. Eventually, Bethe came to enjoy the freer, more open, and more cooperative atmospheres of universities in Italy, Britain, and the United States more than he did the seigniorial rule of his German mentors; and he came to believe that openness and cooperation among physicists produced more insight. This angle may help resolve the vexing question of why Germany, of all countries, is the only nation that began work on nuclear weapons and failed to produce them.

Hans Bethe was a most significant physicist in theoretical research and in the design of the first atomic and hydrogen bombs—even if his life had much less of the drama that engulfed friends and contemporaries like Robert Oppenheimer and Edward Teller. Schweber's dry but friendly, thorough, and rigorous biography will interest historians of science more than historians of war and nuclear weapons, but it will illuminate the work of either group.

Note

[1]. Silvan S. Schweber, *In the Shadow of the Bomb: Oppenheimer, Bethe, and the Moral Responsibility of the Scientist*, Princeton Series in Physics (Princeton: Princeton University Press, 2006).

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