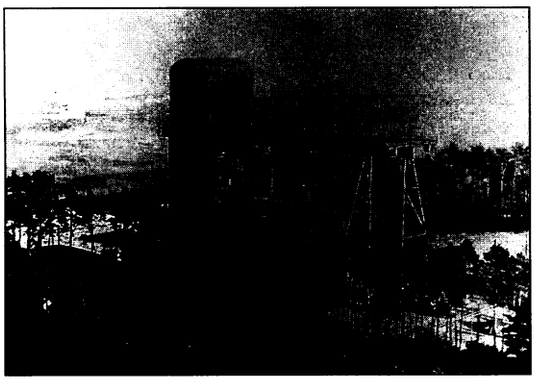
Vignette: V-2 Episode

Lacking any way to get quick answers about the appropriateness of his design [Hermann] Kurzweg resorted to homemade improvisations. One weekend he carved a rocket body out of a Peenemünde pine branch, inserted weights into holes to get the proper balance, and made hard rubber fins in the proposed shape, but in three different sizes. To obtain low-speed stability information he tried throwing the model off the roof of his house. When that proved unsatisfactory, the model was mounted on a wire through its center of gravity, and Kurzweg drove down the Berlin-Anklam highway at a speed of 100 km/h.

—From *The Rocket and the Reich*



"Test Stand I at Peenemünde, designed to accommodate engines or missiles with up to 100 metric tons of thrust, was finished in spring 1939. The Army had made a massive investment in ballistic-missile technology since the mid-1930s." [From *The Rocket and the Reich*; Smithsonian Institution]

sources between the mid-1930s and 1945, the rocket program never had a clear strategic concept behind it. Early planners thought of rockets as artillery without the inconvenience of massive (but nevertheless quite sensitive) heavy gun barrels. They also stressed their surprise value. But they never answered the question of how missiles (compared to any alternative weapons system) were to achieve a militarily significant effect. Lack of clear strategic conceptions in combination with enormous and unforeseen technical problems and, later, Allied bombing delayed deployment of the missiles until autumn 1944. When they were used, it was in small numbers, and they were woefully inaccurate. Thus, in the final analysis, the V-2 represented "a unique weapon: More people died producing it than died from being hit by it" (p. 264).

The large number of deaths that resulted directly from missile production (largely through mistreatment and undernourishment of slave laborers in building and operating underground production facilities) is a large part of the reason why the program's history expands our understanding of the nature of National Socialism. Too often, the systematic degradation of human beings that most would agree was central to Nazism and the undeniably impressive technological feats achieved under the regime (among them missiles, jet aircraft, and synthetic oil and rubber) are dealt with in isolation from one another. To his credit, Neufeld tackles the difficult issue of the connections between the two. Missile technology, he argues, had intellectual and social roots independent of Nazism. But the rocket program flourished under National Socialism because of the movement's fundamental commitment to war-making. What is more, in order to realize their dreams, the program's technical personnel compromised themselves severely by accepting (at least implicitly, often explicitly, and sometimes with gusto) Nazi racism and systematic exploitation of human beings.

"After the first A-4 success, Armaments Minister Albert Speer (right, with arm-band) moved to take over missile production. Here he watches a launch with Propaganda Minister Josef Goebbels (center), who dubbed the missile 'Vengeance Weapon 2' (V-2) in 1944." [From *The Rocket and the Reich*; Bundesarchiv Koblenz]

Making such nuanced judgments is a difficult business, but Neufeld's basic method provides a solid basis for doing so. He carefully examines postwar accounts of the program, many written by participants, in light of archival evidence with the aim of demolishing the numerous myths surrounding rocket development in National Socialist Germany. So, for instance, he establishes conclusively that Arthur Rudolph (later project director of the Saturn V rocket program) and others involved in postwar American rocket projects, despite their postwar attempts to foist full responsibility onto the SS, not only were aware of but actively participated in establishing and administering slave labor programs.

Valuable as it is, the method has its drawbacks. Sometimes it is impossible, in spite of extensive documentation, to ascertain the most simple facts, as for instance in dating precisely the arrest of Wernher von Braun by the SS in early 1944 or in explaining fully the motivations for this bizarre action. Furthermore, closely following archival sources also at times entails adopting the heavily bureaucratic language of the documents themselves. Still, whatever its limitations, Neufeld's fundamental method is a vital basis for his interpretations, which in turn require him to transcend the documents. His book succeeds ultimately because he combines empirical reliability with normative judgments and so provides a history of Nazi rocket technology in its full political, social, and moral dimensions.

Raymond G. Stokes
Science and Technology Studies Department, Rensselaer Polytechnic Institute, Troy, NY 12180–3590, USA

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Studying the Defeated

Suffering Made Real. American Science and the Survivors at Hiroshima. M. SUSAN LINDEE. University of Chicago Press, Chicago, 1995. xii, 287 pp. + plates. $29.95 or £23.95.

The recent controversy over the Smithsonian Institution's planned display of the Enola Gay, the B-29 that dropped the atomic bomb on Hiroshima 50 years ago, reveals how divided opinion remains over the role of the United States in the Pacific war and its aftermath. The book under review can be viewed as providing a chapter in the saga of the international race to determine the biological effects of radia-

A piece of a cyclotron from the Physical and Chemical Research Institute (Rikagaku Kenkyujo, or Riken) being dumped into the Bay of Tokyo, November 1945. [North Carolina State University Archives]

tion, which led to human experimentation in the United States and the former Soviet Union in the 1940s and '50s. The author examines how the Japanese, too, were objects of study immediately after Japan's defeat. Those who survived the bombs dropped on Hiroshima and Nagasaki became valuable scientific resources for the U.S. Atomic Bomb Casualty Commission (ABCC) that was established in both places a couple of years later.

Lindee has drawn on archival records and personal papers of those who worked at the ABCC to tell the story of its first 10 years, how it began, how it was managed, and its sociopolitical context. Earlier versions of chapters have appeared elsewhere, and along with the recent historical studies by John Beatty and the memoir *Song among the Ruins* by the geneticist William J. Schull (Harvard University Press, 1990), we have been able to piece together a nuanced picture of the ABCC from a variety of viewpoints. All these accounts fail, however, to adequately access the Japanese-language literature on this topic. Despite this, Lindee has produced a sophisticated study of the ABCC that is rich in insights and understanding of the Japanese position. It is perhaps here where the controversy surrounding the subject lies.

"Weighing an infant at the nine-months examination program of the [Atomic Bomb Casualty Commission] genetics project"; 1953 or earlier. [From *Suffering Made Real*; William J. Schull Collection, Houston Academy of Medicine Archives, Texas Medical Center]

One cannot avoid concluding that the survivors of the atomic bombs were exploited. Neglected by the Japanese government until 1957 when a law was passed to help meet their medical and social needs, they were in the meantime studied by the ABCC, which was eager to learn of the long-term effects of radiation but was prevented officially from treating them lest its actions be perceived as U.S. atonement for the rise of atomic weapons. Human sympathy saw to it, however, that such policies were thwarted by actual practice.

Lindee's work should be read in conjunction with the literature on American censorship of the atomic bomb during the Allied Occupation, most notably Monica Braw's *The Atomic Bomb Suppressed* (Sharpe, 1991). Both Braw and Japanese writers discuss how it was ironical that Japanese physicists had their cyclotrons destroyed and were prohibited from conducting research related to atomic energy during the Occupation while other Japanese scientists and physicians were encouraged to research the effects of the bomb on Hiroshima and Nagasaki. An early ABCC survey team in 1947 consisted of only two Americans. By late 1951, however, the ABCC was employing 1063 people, 920 of whom were Japanese. Many were involved in a genetics project that was the largest of the ABCC's programs and an early example of big science in biology. It entailed contacting pregnant women, establishing their history of exposure to radiation, and examining their new-born children. Lindee suggests that the whole enterprise was not unlike colonial science, where local research workers collected data to be repatriated back to the occupying country. She later interprets the medical studies of the survivors that resulted as constituting a hybrid body of work in which American-Japanese interaction produced studies drawing on both cultures.

Atomic Bomb Casualty Commission Jeeps, Hiroshima, early 1950s. "Genetics project home visit teams usually consisted of a Japanese pediatrician, driver, and nurse." [From *Suffering Made Real*; Houston Academy of Medicine Archives, Texas Medical Center]

Atomic bomb histories usually focus on physicists and politicians. This book looks at biologists, and what a different world it shows! Rather than heroicize the bomb and emphasize lives saved, all geneticists could do was to put limits on the damage attributable to the bomb's radiation. While Lindee's account is focused on the scientific work, the emphasis is on how data were socially constructed by the administrative, intellectual, and personal processes that were intrinsic to the ABCC's activities. The author argues that the cultural setting affected the way in which data were collected and abstracted, what she calls scientific distancing. Researchers used mutation not only to measure genetic change but also to assess the potential social and evolutionary costs of exposure to radiation. Though not all readers may agree with the conclusions Lindee draws from her historical narrative, this is a powerful book that raises important issues for our understanding of how dealing with the atomic bomb shaped postwar science.

Morris F. Low
Research School of Pacific and Asian Studies, Australian National University, Canberra ACT 0200, Australia