Commonwealth Weapons Tests

A Very Special Relationship. British Atomic Weapon Trials in Australia. LORNA ARNOLD. Her Majesty's Stationery Office, London, 1987 (U.S. distributor, Bernan-Unipub, Lanham, MD). xviii, 323 pp. + plates. Paper, $13.95.

Britain's nuclear weapon tests in Australia in the 1950s produced a nuclear deterrent for the United Kingdom, a plutonium-contaminated proving ground in South Australia, and an Australian Royal Commission to inquire into the trials some 30 years later. The tests have also given rise to a recent spate of books that dissect in fine detail the use of Australian territory for experiments designed to enhance British power, prestige, and (arguably) security in the nuclear age.

A Very Special Relationship is the most measured and technically impressive of these books. Although it is not made entirely clear in the introduction, the book is apparently a semiofficial history. The author had wide-ranging access to classified British government documents, as well as to the mountain of documents tabled before the 1984–85 Royal Commission. The result is a detailed account of how, with considerable skill, efficiency, and economy, the British managed to squeeze their entire program of major trials for developing both atomic and thermonuclear weapons into less than 6 years—compared with 17 (postwar) years for the United States and 14 for the Soviet Union.

Arnold takes the reader through the history of Britain's decision to acquire nuclear weapons, the bureaucratic and scientific preparations for the test program, and each test conducted in Australia. These began with *Hurricane* in the Monte Bello Islands off Western Australia in 1952 — Britain's first atomic bomb test — and ended with the so-called "minor trials" at Maralinga in South Australia in 1963. Particularly impressive is Arnold's discussion of radioactivity, especially her explanation of the varying units of measurement and the controversy over its medical effects. Unfortunately no details of Arnold's scientific or other qualifications in this area are provided.

The main shortcoming of *A Very Special Relationship* is its determinedly British perspective. It almost totally ignores the findings of the Australian Royal Commission. Though Arnold does tackle some controversial aspects of the test program (and gives it an almost entirely clean bill of health), she fails to address the Royal Commission's many criticisms of both British and Australian conduct in relation to the tests. Though it may not be politic in a semiofficial publication to confront the conclusions of another government's inquiry directly, the Commission's findings could have been at least implicitly tackled.

The Royal Commission, for example, concluded that measures taken to ensure the safety of the aboriginal population during the *Buffalo* series demonstrated "ignorance, incompetence and cynicism." Arnold simply notes that the two Native Welfare Officers responsible for keeping aborigines out of a vast prohibited range had "an impossible task." Similarly, the Royal Commission accused the chairman of the Australian Weapons Tests Safety Committee, Ernest Titterton, of having concealed information from the Australian Government to facilitate the conduct of the tests. Arnold merely notes that "as a very new Australian with close United Kingdom ties and a Los Alamos background, his position was bound to be seen by many as an ambiguous one."

Arnold is especially uncritical of the "minor trials," which left a large area of the Maralinga test site littered with plutonium, one of the most toxic substances known and having a half-life of 24,000 years. The Royal Commission concluded that because of this, the *Vixen* series of minor trials should never have been conducted at the South Australian test site. Arnold notes uncritically that British ministers were "adamant" that the experiments could not take place in the United Kingdom because of the possible repercussions on public acceptance of other nuclear activities in Britain, such as the civil nuclear power program. Better to contaminate Australia than Britain.

Though *A Very Special Relationship* is a valuable account of British nuclear tests in Australia from the official British perspective, readers should be aware that there is another side of the story, told in such works as Robert Milliken's *No Conceivable Injury* (Penguin, 1986), Blakeway and Lloyd-Roberts's *Fields of Thunder* (Allen and Unwin, 1985), and Joan Smith's *Clouds of Deceit* (Faber and Faber, 1985).

TREVOR FINDLAY
Peace Research Centre, Australian National University, Canberra, ACT 2601, Australia

Questions of Realism

The Shaky Game. Einstein, Realism, and the Quantum Theory. ARTHUR FINE. University of Chicago Press, Chicago, 1986. xii, 186 pp. $25. Science and Its Conceptual Foundations.

In *The Shaky Game* Arthur Fine collects six of his recent papers in the history and philosophy of science, adding two new papers and an introductory essay. The primary topic is historical—Einstein's attitude toward the quantum theory and toward realism as a philosophy of science—but included also are two essays outlining Fine's new program in the philosophy of science, dubbed the "natural ontological attitude" (NOA).

Fine's essays on Einstein are distinguished from other such literature by his extensive use of the Einstein archive; in this regard, they should be models for philosophers of science looking to the "greats" for answers to philosophical questions. The archival evidence complicates our picture of Einstein's opinions, which is good, since it frustrates the all too common strategy of seeking sanction from Einstein for currently fashionable views.

The greatest dividends of Fine's archival research come from his reading of the Einstein-Schrödinger correspondence. In "Einstein's critique of quantum theory: the roots and significance of EPR" (1981), Fine draws attention to the importance of this correspondence for showing that Einstein was not wholly enthusiastic about the 1935 Einstein-Podolsky-Rosen (EPR) paper, which claimed to demonstrate the incompleteness of quantum mechanics. Einstein confided to Schrödinger that Podolsky wrote the paper and that he did not like the way it turned out because "the essential thing was . . . smothered by the formalism [Gelehrsamkeit]"; Einstein then presented a different incompleteness argument that invokes neither the EPR "criterion of physical reality" nor quantum limitations on the simultaneous definiteness of conjugate observables, this argument being based instead upon what Einstein calls the "separation principle" [Trennungsprinzip]. In a new paper, "Schrödinger's cat and Einstein's: the genesis of a paradox," Fine shows how the continuing discussion between Einstein and Schrödinger led to the famous Schrödinger "cat paradox" and to a similar but never-published Gedankenexperiment of Einstein's in which the incompleteness of quantum mechanics is held to be exhibited by a pile of gunpowder whose having exploded or not remains indefinite (until an observer examines it) because the triggering depends upon the decay of a radioactive atom.