

entific argumentation, but his necessary dependence on figurative modes of expression hampered his effort at reuniting the community of physicists, one of whom characterized his theory as “awful Bohr incantation terminology. Impossible for anybody else to summarize” (p. 66). Canaday follows with his most ambitious effort in the book, a literary analysis of a play written by leading physicists in 1933 as a “stunt” at an annual meeting held in Copenhagen to discuss the latest developments in the field. The work, known as the “Blegdamsvej Faust,” parodied and thus was intended to diffuse the controversy. The success of Canaday’s meticulous analysis of the parody and its inside jokes about the incompatibility of classical and quantum mechanics depends on the reader’s ready acquaintance with Goethe’s *Faust*, contemporaneous theoretical physics, and the dramatis personae involved in the controversy.

The chief problems with *The Nuclear Muse* are the flexibility of Canaday’s definition of what constitutes a literary work and the chronological approach he uses to organize his analysis. As Canaday turns to the Manhattan Project for further case studies, his definition of a literary work is expansive enough to include a “primer” on the state of nuclear physics for new arrivals at Los Alamos, fragments of speeches, and written accounts of exchanges between the scientists in Los Alamos and native residents who lived near the site. The analysis of the last yields an unsurprising reading of the “modern” unintentionally patronizing and displacing the authentic “traditional.” Occasionally Canaday finds a spot-on example that would seem to anchor his analysis and bring it to satisfying closure. One such example is the John Donne sonnet “Batter My Heart, Three-Personed God.” The poem inspired J. Robert Oppenheimer to select “Trinity” as the name of the first test of the atomic bomb. Canaday points out that Donne’s plea to God to be harsh with him because he has no self-control served as Oppenheimer’s rationale for investing the work of the scientists with religious significance. This investment presumably distanced the human inventors from any moral culpability in the terrible real-world effects of the bomb. Unexplored, however, is an equally plausible interpretation: Oppenheimer sensed that his work and that of other theoretical physicists was probing the very matrix of existence and thus entrusted his fate to the hoped-for beneficence of God’s order.

Though the chronological approach establishes a useful historical context, it weakens the analysis because the themes change over time

and therefore Canaday cannot develop any interpretive momentum. The concluding chapter could have been used to summarize the claims thematically, but Canaday chooses instead to introduce another example, an analysis of the use of physics in fiction. This brings the work full circle, as he begins with a reference to H. G. Wells’s work that inspired Leo Szilard to convince the United States to develop an atomic weapon. Canaday tackles an intriguing but tricky thesis—the compatibility of literature and physics—but is brought up short by ranging too widely for the subjects of his analysis.

ANDREW ROJECKI

Manuel Valera Candel; Carlos López Fernández. *La física en España a través de los Anales de la Sociedad Española de Física y Química, 1903–1965.* 449 pp., bibl. Murcia: Universidad de Murcia, 2001.

This book stems from two Ph.D. dissertations written at the Universidad de Murcia under the supervision of Pedro Marsset. The aim was a bibliometric analysis of the physics articles in the *Anales de Física y Química*, the journal of the Spanish Society for Physics and Chemistry (Sociedad Española de Física y Química; SEFQ), from its founding in 1903 through 1965. Manuel Valera Candel led the way in 1982, with a study of the years up to the Spanish Civil War (1936–1939), and Carlos López Fernández picked up the thread in 1986, with a study that began with the postwar period and continued well into the Franco years (the dictator died in 1975). Their work is now made widely available in a joint publication that builds on the methodological and thematic unity of the two dissertations.

Publication of the *Anales* was the main task of the SEFQ. One in four papers in the journal was devoted to physics from the first number through 1965. The authors convincingly argue that throughout this period the journal remained the most significant outlet for Spanish physicists, who were reluctant to publish abroad. Extrapolating data from the chemistry literature, they estimate that articles in foreign journals made up at most 16 percent of the production of Spanish physicists—though substantial qualitative corrections might apply here. The trend reversed in the last quarter of the century. Publication abroad mounted from 1965, and by the early 1980s it surpassed 75 percent.

The book’s structure plainly reflects its dual origin. For each of the periods 1903–1937 and 1940–1965, a study of the society’s endeavors precedes the analysis of the physics literature

proper. This provides new, firmer evidence on key issues of the historiography of Spanish physics in the twentieth century, such as the preeminence of the Board for the Promotion of Studies (Junta de Ampliación de Estudios). Established in 1907, the board galvanized research in the physical sciences by means of new laboratories and a sizeable fellowship program. After the Civil War it was seized by the insurgents, who made it into the Consejo Superior de Investigaciones Científicas (Spanish Scientific Research Council). Under both guises, this was the key institution in Spanish science right into the 1970s, when universities began taking a share: in the 1970s scholars affiliated with Spanish universities provided more than half the papers in the *Anales*, up from a mere 10 percent in the 1950s.

The analysis throws much new light on the relative significance of areas within physics, on the community of physicists, and, above all, on the impact of the Civil War. Previous studies have all too often been concerned either with the prewar period or (less frequently) with the Franco years. Taken together, the authors' data suggest that the Civil War made little difference with regard to the quantity of physics papers published in the *Anales*. However, only 10 percent of authors were active both before and after the war, a clear sign of disruption. In this regard, López Fernández's chapter on the SEFQ's accommodation to Franco's regime immediately after the war could not be more telling.

The book is quite informative. The bibliography lists all of the physics articles in the *Anales*, arranged alphabetically by author, for the periods 1903–1937 and 1938–1965. While this is very useful as a reference tool, one wonders why the authors packed their footnotes with complete references to the very same articles. Also, an index of names would have enhanced the book's usefulness.

The book makes it clear that we need to know more about the education of physicists. Given the sorry state of teaching at Spanish universities after the Civil War, one wonders how the authors who published in the *Anales* managed to learn their trade in the first place. The fact that questions remain in no way diminishes the value of Valera Candel and López Fernández's book, a most welcome contribution to the history of Spanish physics in the twentieth century that will doubtless inform the debate about the impact of the Civil War on the Spanish scientific community.

XAVIER ROQUÉ

Joseph Cotter. *Troubled Harvest: Agronomy and Revolution in Mexico, 1880–2002.* (Contributions in Latin American Studies, 22.) xxvi + 393 pp., bibl., index. Westport, Conn./London: Praeger, 2003. \$89.95 (cloth).

How do political and agricultural revolutions co-exist? Joseph Cotter considers the Mexican revolution's legacy (1910–1920 and onward) and the green revolution (arguably, the 1960s and 1970s) from the point of view of the local experts charged with carrying on the work of both. Cotter's focus is on the professionalization challenges faced by Mexican *agrónomos* (agricultural scientists), which he traces from before revolution engulfed the country to the end of the century. He documents the *agrónomos*' enduring bias against the agricultural practices of the peasant farmers and even of the wealthy landholders. He describes the persistent tension between the subtle, although not universal, disdain for the type of agriculture they claimed to want to help and transform and their efforts to convince government leaders that their profession was indispensable to modern Mexico.

The promise of land reform was a prominent outcome of the Mexican revolution, and during the 1920s and 1930s Mexican *agrónomos* were deeply involved in the logistics of redistributing large landholdings to peasant communities. During the 1930s they were also active in the government's cultural campaign designed to create a countryside populated by modern, scientific peasant farmers. By the late 1930s their profession's reputation had sunk along with the failure of that campaign. They were frequently criticized as trafficking only in politics and lacking any scientific expertise. As the enthusiastic land reform of the Cárdenas presidential administration (1934–1940) died down and the capitalist Avila Camacho administration (1940–1946) took its place, professional *agrónomos* were searching for ways to appear to be—and also just to be—more “scientific.” The creation of the Rockefeller Foundation's Mexican Agricultural Program in 1943 supported both the foundation's concern to bolster Mexico's food supply and encourage scientific, modern agriculture and the *agrónomos*' desire to appear more scientific. Cotter challenges the notion that the year 1940 represented a solid break in agricultural programs between an earlier Mexican revolutionary project and a later foreign-run capitalist project; instead, he emphasizes the continuity within the agronomic profession and its unbroken utilization of whatever governmental or philanthropic resources were at its disposal. Cotter explores the