opportunities for physical chemists grew significantly for the first time.

The fullest current historical treatment of Nernst is Diana Barkan’s *Walther Nernst and the Transition to Modern Physical Science* (Cambridge, 1999), which situates Nernst’s early researches in the disciplinary context of the late nineteenth century and the turn of the twentieth century. Barkan’s study emphasizes Nernst’s researches that fostered his heat theorem (which became the third law of thermodynamics) and the initiation of the first Solvay conference in physics in 1911 but lacks a complete account of his later career. In this new biography, Hans-Georg Bartel and Rudolf P. Huebener seek both to correct and to supplement Barkan’s account, in particular with a comprehensive treatment of Nernst’s researches following World War I.

*Walther Nernst: Pioneer of Physics and of Chemistry* succeeds largely as an internalist study of Nernst’s work and the scientific connections and collaborations that influenced his discoveries. Presented here are Nernst’s early life, his years as a student in Zurich, Berlin, and Wurzburg and as Ostwald’s assistant at Leipzig, his marriage to wife Emma and family life, the founding of the Institute of Physical Chemistry at Göttingen, his transfer to Berlin in 1905 and the establishment of the Institute of Physical Chemistry there, his participation in World War I, and his final researches on strong electrolytes and cosmology. Bartel and Huebener deliver well on their promise to flesh out Nernst’s later career, with the sections on his Berlin period making up nearly half the book’s contents. They draw extensively on the scientific papers of Nernst and his contemporaries, as well as on Nernst’s personal correspondence, which informs the motives for his professional decisions.

Particularly illuminating is the authors’ treatment of Nernst’s professional relationships, which effectively illustrate his influential position in the German physical chemistry and physics communities. Notable examples include his supervision of his first doctoral student, Wolfgang Pauli; his dialogue with Ostwald and the organic chemist Emil Fischer regarding his appointment at Göttingen; the founding of the Kaiser Wilhelm Society for the Advancement of Science; his work as chair of a scientific research committee during World War I, alongside Fischer and Fritz Haber; and his rivalry with the latter over the discovery of the third law. The reader looking to establish the scope of Nernst’s place in the historical record will find here such valuable gems from the material and social periphery of his scientific life as floor plans of his laboratories and lists of names of his predecessors and successors in the many professional positions he occupied.

Readers searching for a robust historical interpretation of Nernst’s work will find weaknesses in the form and construction of the narrative. Few attempts are made to engage with current historical studies, beyond prefacing mentions of previous work on Nernst, and the volume as a whole lacks a clear historiographical frame. Many sections seem unstructured and read as inventories of discoveries, events, and relationships. The situating of Nernst alongside Ostwald and the ionists in the framework of antiatomism is particularly weak and responds only to issues that affect the trajectory of modern scientific concepts. An early chapter on the background of physical chemistry is simply a catalogue of scientific discoveries, with no treatment of themes that would later inform Nernst’s work. These restrictions mean that it is left to the reader to interpret broad historical themes and find insights into Nernst’s character within an essentially homogenized narrative.

Bartel and Huebener’s biography would not be suitable as an introduction to broad themes in the history of physical chemistry; it will be of greatest benefit as a reference for historians already familiar with Nernst’s work or those who wish to gain special insight into his process of discovery in developing the Nernst equation and the third law. The primary historical data presented here makes up a valuable picture of the German scientific community, portraying Nernst as an active, respected, prolific, and highly motivated researcher who came to define the scope of electrochemistry in its incipience.

*Martha Harris*


The career of the great Danish natural philosopher Hans Christian Ørsted has long posed major interpretative puzzles for historians, as it did for contemporaries. His celebrated 1820 announcement of the disturbing effect of a current-carrying wire on a nearby compass needle has been understood as a towering achievement of Romantic nature philosophy and a direct consequence of Ørsted’s debt to the idealist world philosophy of Friedrich Schelling and the charismatic trials of the visionary Jena pharmacist Johann Ritter, whom Ørsted
judged “the creator of modern Chemistry” (p. 359). Alternatively, it has been seen as a rare moment when the Danish physicist liberated himself from the misty reveries of German metaphysics in the name of experimental discipline; or as the result, rather, of sober Kantian methods innovatively applied to the dynamics of galvanism and electrochemistry. Convinced that the course of the sciences, and of the intellectual life of the genial individual, followed the same path as that of developmental nature, Ørsted would doubtless be sympathetic to scholars who seek to tease out the principles of his natural philosophy through the intellectual trajectory he followed in the decades between the catastrophes of revolution, war, economic collapse, and constitutional struggle that marked his epoch.

Several recent publications have helped transform anglophone scholarship on this career: following the important selected collection of his scientific works (from Princeton in 1998) and, for example, the beautifully illustrated Intersections: Art and Science in the Golden Age, edited by Mogens Bencard (Gyldendal, 2000), Springer has released this group of papers presented five years ago at a Harvard conference. While its price is characteristically extortionate and the copy-editing is uneven, the collection represents a valuable advance in studies both of Ørsted’s projects and of their place in the various milieux where he plied his trade. The collection includes essays, such as a characteristically witty contribution by David Knight, that signal the tough task English-speaking readers faced in interpreting the Danish natural philosopher’s idiosyncratic version of the “scientific sublime” (Charles Darwin found Ørsted’s notoriously fragmented collection Soul in Nature “dreadful” [p. 417]). The aim here, so Robert Brain explains in his lucid introduction, is to use key aspects of Ørsted’s enterprise, notably his manifold linkages with scientific communities across northern Europe and his wide-ranging critical interventions in the philosophical and natural scientific literatures of the period between Enlightenment and Romanticism, as a kind of probe with which to investigate the condition of the sciences at this key juncture in the emergence of European modernity.

Contributors signally differ, for example, on the relative weight of Kantian metaphysics and of the cosmologies of Schelling and of Ritter in these scientific programs. Michael Friedman, authoritative interpreter of Immanuel Kant’s late natural philosophy and methodological projects, representatively urges that the Danish chemist’s initial engagement with the critical philosophy was part of an attempt to use Kantian resources to challenge Kant’s public denial of scientific status to chemistry and that the encounter with Schelling’s thought in the first decade of the nineteenth century, during Ørsted’s European tour, was decisive for his natural philosophy of unified dynamics and electromagnetism. Similar views are sustained by Frederick Gregory, who urges the importance of the then-fluid disciplinary boundaries of natural philosophy and natural history, and by Roberto de Andrade Martins, who claims in a lengthy analysis of the work of Ørsted and Ritter on the elusive phenomena of magnetochemistry that since “Kant is a more honorable ancestor than Schelling,” historians have mistakenly denied the latter’s importance in Ørsted’s intellectual worldview (p. 362). Several more impressive essays in this collection shift the conversation from doxography to better-contextualized histories. Karen Jelved and Andrew Wilson point out that Ørsted was “brought up in a laboratory, not a library” (p. 98), that his initial uses of Kantian metaphysics from 1798 were immediately designed to establish his own chemical credentials in debates with the eminent court administrator and scholar Adam Hauch, and that close readings of these texts show Ørsted to have been “a determined and very ambitious chemist” but an entirely “unsophisticated” philosopher (p. 112).

This more pragmatic reading of Ørsted’s project is supported by Arne Hessenbruch’s ambitious essay. The stress is on the status of the Lutheran pastor as a possible role model for the young lecturer and Ørsted’s need to learn how to win and hold his various audiences in Denmark. Hessenbruch brings out the natural philosopher’s close relation with his brother, a celebrated lawyer and politician later skewered by Karl Marx, who loathed this kind of moderate liberal regime, as “an enormous political haemorrhoid” (p. 43). In particular, Hessenbruch brings out the relationship between the Ørsted brothers’ emergent commitment to the values of educational formation and controlled public welfare under the aegis of forms of enlightened absolutism. Other contributors agree that the best way to make sense of their subject’s often apparently self-contradictory writings and rather fluid prises-de-position is to place them in their immediately polemical context.

Anja Skaar Jacobsen reminds us that “a Schellingian storm raged in intellectual life in Copenhagen” (p. 63) at the very period of Danish military, economic, and political crisis and that this struggle had consequences for debates on phrenology and poetry, utility and chemistry, in all of which Ørsted was a protagonist. In a very long essay, Kenneth Caneva convincingly demonstrates that Ørsted adopted scientific positions that he reck-
ensed would best capture the interests of his many audiences. The Budapest chemist and prudent atomist Jakob Winterl was turned by his Danish spokesman into an apostle of newfangled dynamist physics, while accounts of Ritter’s remarkable trials on ultraviolet light, galvanic chemistry, and his own body were artfully managed by Ørsted, depending on whether he was addressing Parisian disciples of Laplace or the Jena circle of Friedrich Schlegel.

Other contributors confirm the virtue of these focused readings of specific aspects of Ørsted’s enterprise. Brain nicely uses Schlegel’s aesthetic reflections on the value of the fragmentary artwork to make sense of several aspects of the electrochemical experimental program. There is an intriguing resonance here with Michael Dettelbach’s reading of Alexander von Humboldt’s troubles in Parisian scientific circles: Dettelbach rightly emphasizes that the relation between detailed scrutiny and global ambition was, at least temporarily, seen as a Germanic virtue in the French capital. Dan Charly Christensen explains how Ørsted’s crucial early debate with Hauch was at least partly stimulated by the young chemist’s choice of lectures in the Copenhagen medical faculty and how successive experiments in the relation between acoustics and electricity were used to advance Ørsted’s career both in scientific and in literary institutions in Copenhagen.

Dominated by critical transformations in the society of orders and the emergence of modern disciplinarity, this was an epoch especially concerned with finding ways of reading character in nature and society. Phrenology offered one path: Jacobsen reports that when Ørsted saw a wax model of Kant in Berlin early in 1802 he was at once impressed by the development of the philosopher’s organs of perspicacity. For Ørsted himself, no doubt, electrical acoustics was a more perspicuous way of reading the signs. Fascination with such resonant hieroglyphs prompted Kierkegaard to remark that the great scientist’s face resembled “an acoustic figure well bowed by nature” (p. 124). The significance of scientific aesthetics in the public culture of the period is also evident in essays that juxtapose Ørsted’s dynamics, careerist and philosophical, with the projects of his closest contemporaries, especially the contributions by Ernst Hamm on the planetary dynamics of Henrik Steffens and by Olaf Breidbach on the Jena circle of the period. Hessenbruch notes here that “serious is a common term used to describe Hans Christian” (p. 115). It has been hard, perhaps, for students outwith the immediate settings of Ørsted’s career fully to make sense of this seriousness. By illuminating the ferocity, satire, and energy devoted to the polemics of cultural life in Ørsted’s world, Hans Christian Ørsted and the Romantic Legacy in Science: Ideas, Disciplines, Practices will make this task rather easier.

SIMON SCHÄFFER


When reading The Role of Women in the History of Geology, I was reminded of Virginia Woolf’s remark in A Room of One’s Own: “Indeed, I would venture to guess that Anon, who wrote so many poems without signing them, was often a woman” ([Harcourt Brace Jovanovich, 1989], p. 49). This collection of twenty-two papers reveals the heretofore unacknowledged but substantial role that women have played in the history of geology since the late eighteenth century. With the publication of famous treatises by Hutton, Lyell, and Darwin and stratigraphic sleuthing that led to the development of geologic maps and the concept of deep time during the nineteenth century, it should come as no surprise that women too were drawn to the developing science of geology. The real surprise is that their contributions were unearthed only in the twenty-first century.

Scholars captivated by the history of geology are very familiar with the names James Hutton, William Smith, Charles Lyell, Georges Cuvier, Louis Agassiz, Roderick Impey Murchison, Rev. Adam Sedgwick, Sir Archibald Geikie, Charles Darwin, William Buckland, and Henry De la Beche—a fossil assemblage, à la the Pulitzer Prize–winning writer John McPhee, that fastens one firmly in nineteenth-century Great Britain. Thanks to the work of editors C. V. Burek and B. Higgs and the authors of the essays in this remarkable collection, we can now appreciate the roles in this history not only of Mary Anning but also of Elizabeth Cary Agassiz, Margaret Benson, Eliza Maria Gordon Cumming, Sophie Duvaucel, Catherine Raisin, Mary Rosse, Gertrude Elles, Ethel Woods, Margaret Crosfield, Marie Stopes, Ethelred Bennett, Grace Anne Milne, Anne Phillips, Agnes Arber, Marie Anning but also of Elizabeth Cary Agassiz, Margaret Benson, Eliza Maria Gordon Cumming, Sophie Duvaucel, Catherine Raisin, Mary Rosse, Gertrude Elles, Ethel Woods, Margaret Crosfield, Marie Stopes, Ethelred Bennett, Grace Anne Milne, Anne Phillips, Agnes Arber, Marie Anning but also of Elizabeth Cary Agassiz, Margaret Benson, Eliza Maria Gordon Cumming, Sophie Duvaucel, Catherine Raisin, Mary Rosse, Gertrude Elles, Ethel Woods, Margaret Crosfield, Marie Stopes, Ethelred Bennett, Grace Anne Milne, Anne Phillips, Agnes Arber, Dorothea Bate, Maria Matilda Ogilvie Gordon, and Annie Greenly. The result is a compelling anthology that will at long last allow interested scholars to examine the contributions of women to the development of geology as a science.

Emerging from a 2005 conference that dealt solely with the role that women played in the history and development of geology, the essays in