

INTRODUCTION

It seemed to many a literary discovery . . . when I pulled him out of a century of oblivion.

—Emil du Bois-Reymond, “Goethe und kein Ende,” 1882

Emil du Bois-Reymond is the most important forgotten intellectual of the nineteenth century. Born in 1818 (the same year as Ivan Turgenev, Karl Marx, Jacob Burckhardt, Emily Brontë, James Froude, Ignaz Semmelweis, and Frederick Douglass), du Bois-Reymond achieved international celebrity for his research in neuroscience and his addresses on science and culture; in fact, his picture could be seen hanging for sale in German shop windows alongside those of the Prussian royal family. Contemporaries called him “the foremost naturalist of Europe,” “the last of the encyclopedists,” and “one of the greatest scientists Germany ever produced.” “Gentlemen,” he would tell his students in Berlin only half in jest, “there are two outstanding physiologists in the world; the other one is at Leipzig.”¹

People generally recall du Bois-Reymond as an advocate of mechanistic biology, but during his lifetime he earned recognition for a host of other achievements. He pioneered the use of instruments in neuroscience, discovered the electrical transmission of nerve signals, linked structure to function in neural tissue, and posited the improvement of neural connections with use. He also served as a professor, as dean, and as rector at the University of Berlin, directed the first institute of physiology in Prussia, was secretary of the Prussian Academy of Sciences, established the first society of physics in Germany, helped found the Berlin Society of Anthropology, oversaw the Berlin Physiological Society, edited the leading German journal of physiology, supervised dozens of researchers, and trained an army of physicians. He owed the largest share of his fame, however, to public lectures of remarkable scope and originality. In matters of science, they emphasized the unifying principles of energy conservation and natural selection, introduced Darwin’s theory to German students, rejected the inheritance of acquired characters,

and fought the specter of vitalism. In matters of philosophy, they recovered the teachings of Lucretius, surveyed the borders of science, and provoked Nietzsche, Mach, James, Hilbert, and Wittgenstein. In matters of history, they accelerated the growth of historicism, formulated the tenets of history of science, popularized the Enlightenment, and promoted the study of nationalism. In matters of letters, they championed realism in literature, formulated the earliest account of cinema, and criticized the Americanization of modern culture.

Today it is hard to comprehend the furor incited by du Bois-Reymond's addresses. One, delivered on the eve of the Prussian War, asked whether the French had forfeited their right to exist; another, reviewing the career of Darwin, triggered a two-day debate in the Prussian parliament; another, surveying the course of civilization, argued for science as the essential history of humanity; and the most famous, responding to the dispute between science and religion, delimited the frontiers of knowledge. Epistemology rarely inflames the public imagination anymore. In the second half of the nineteenth century, however, epistemology was one of the sciences of the soul, and the soul was the most politicized object around. When du Bois-Reymond proclaimed the mystery of consciousness, he crushed the last ambition of reason. Everyone who longed for a secular providence was devastated by the loss. Owen Chadwick put it this way: "The forties was the time of doubts, in the plural and with a small d. . . . In the sixties Britain and France and Germany entered the age of Doubt, in the singular and with a capital D."²

Envious rivals identified du Bois-Reymond as a member of the "Berlinocracy" of the new German Empire.³ This was not quite fair. As a descendant of immigrants, du Bois-Reymond always felt a bit at odds with his surroundings. He had grown up speaking French, his wife was from England, and he counted Jews and foreigners among his closest friends. Even his connections to the crown prince and the crown princess disaffected him from the regime. Du Bois-Reymond supported women, defended minorities, and attacked superstition; he warned against the dangers of power, wealth, and religion; and he stood up to Bismarck in matters of principle. His example reminds us that patriots in Imperial Germany could be cosmopolitan critics as well as chauvinist reactionaries, a point often lost on his peers. He once joked to his wife on a lecture tour that officers in the army assumed that anyone of his eminence was an intimate of the government who regularly conversed with the Kaiser.⁴ He might have told them that he had introduced the engineer Werner Siemens to the mechanic Johann Georg Halske, or that he had launched the career of the physicist John Tyndall, or that he had championed the photography of Julia Margaret Cameron, or that he could recite poetry by Goethe and Hugo that he had seen in manuscript, but he was too polite to do more

than excuse himself.⁵ His enthusiasts would have been pleased to learn that he did indeed present himself to his king, a considerable honor for someone who once signed a guestbook as “Emil du Bois-Reymond, frog faddist, Berlin.”⁶

Du Bois-Reymond’s distinction was a long time coming. For most of his life he worked in obscurity, although every so often a keen observer would perceive the significance of his methods. Ivan Turgenev, for one, based the character of Bazarov in *Fathers and Sons* on his example. Another famous student at the University of Berlin, Søren Kierkegaard, wrote:

Of all sciences physical science is decidedly the most insipid, and I find it amusing to reflect how, with the passing of time, that becomes trite which once called forth amazement, for such is the invariable lot of the discoveries inherent in “the bad Infinity.” Just remember what a stir it made when the stethoscope was introduced. Soon we shall have reached the point where every barber will use it and, when shaving you, will ask: Would you like to be stethoscoped, Sir? Then someone else will invent an instrument for listening to the beats of the brain. That will make a tremendous stir, until, in fifty years, every barber can do it. Then in a barbershop, when one has had a haircut and a shave and has been stethoscoped (for by then it will be very common) the barber will ask: Perhaps you would also like me to listen to your brain-beats?⁷

Measuring brain-beats is not yet common practice in barbering, but it is in medicine. In this respect Kierkegaard was right: the march of technology has been steady to the point of routine. Every refinement of du Bois-Reymond’s electrophysiological apparatus, from the vacuum-tube amplifier to the microelectrode to the patch clamp, can be thought of as a footnote to his original technique.⁸ Such achievement in instrumentation is in no sense small: two years after Kierkegaard’s taunt, du Bois-Reymond contended that physiology would become a science when it could translate life processes into mathematical pictures. The imaging devices that we associate with medical progress—the EKG, the EEG, the EMG, and the CT, MRI, and PET scanners—seem to vindicate his prediction. But success is not a category of analysis any more than failure. To make sense of why du Bois-Reymond devoted the whole of his scientific career to one problem, we need to understand his deepest motivations.

Paul Cranefield once asked a simple question: “What kind of scientist, in 1848, would promise to produce a general theory, relating the electrical activity of the nerves and muscles to the remaining phenomena of their living activity?”⁹ Cranefield’s answer was someone who believed that electricity was the secret of life. Perhaps du Bois-Reymond really did think of himself as a visionary—after all, he was born in the year in which *Frankenstein* was published. On the other hand, a scientist obsessed with electrophysiology could just as easily be considered a practical philosopher, a misguided fool, or a complex figure.¹⁰

The study of animal electricity has a long history. When du Bois-Reymond came to the topic, it was still musty with doctrines of vitalism and mechanism, forces and fluids, irritability and sensibility, and other arcana of biology. Underlying all this confusion were the elementary workings of nerves and muscles, the problem that sustained him throughout his career. The reason is plain: nerves and muscles are the basis of thought and action. Du Bois-Reymond never gave up trying to understand animal electricity because he never gave up trying to understand himself.

Du Bois-Reymond's life followed the course of his science and his society, a Romantic theme of parallel development common in the first half of nineteenth century. Less apparent is the more classical theme of the second half of his life: the lesson of restraint implied by authority. This is the deeper significance of his biography—how his discipline failed to capture experience, how his praise of the past hid his disapproval of the present, and how his letters and lectures only hinted at the passion of his ideals. “The result of a year's work depends more on what is struck out than on what is left in,” Henry Adams wrote in 1907.¹¹ Du Bois-Reymond shared Adams's Attic sensibility. The sad fact is that most of his countrymen did not. Du Bois-Reymond was not the first intellectual to counsel renunciation over transcendence, but he was one of the last in a nation bent on asserting itself.

The central question posed by this biography is how someone so famous and so important could end up so forgotten. I have thought of many reasons, among them that du Bois-Reymond is hard to pigeonhole, that he clashes with our image of Imperial Germany, and that he resists our condescension. But to my mind du Bois-Reymond arrived at the best answer himself. Reflecting on how few of his generation remembered Voltaire, he suggested that “the real reason might be that we are all more or less Voltairians: Voltairians without even knowing it.”¹² The same holds true for my subject. Du Bois-Reymond is hidden in plain sight.