FROM THE EDITOR

# From a Frog's Electrified Leap

Perhaps most of us interested in electrochemistry know of the experiment of 1791 when Luigi Galvani, his scalpel touching a frog's internal crural nerves, observed the movement of the frog's leg while sparks were generated from an electric machine. This discovery of Galvani was one of the first demonstrations of the importance of electrochemical phenomena in biology. Some years ago this relationship between electrochemistry and biology was directly demonstrated on me during a physical therapy session in which electrodes were connected to my quadriceps and a potential was applied to cause those muscles to contract. The first impulse seemed to cause my whole body to rise off the table, but once the appropriate voltage was determined, this nerve stimulation was used to "teach" me to contract those muscles so that I could walk again after the trauma of a ligament rupture from playing soccer. A colleague later informed me that I had violated a lesser-known rule of academia: professors should not play a sport with undergraduate students unless there is a net between them, and hence the injury. And I had only thought that the warranty on my knee had expired.

I recently read an interesting tidbit in the book "Introduction to Electrochemistry" by D. B. Hibbert (MacMillan Physical Science Series, 1993). Following the observation of Galvani, experiments on electrifying dead animals and people became almost common practice in the early nineteenth century. Being up to date on the science of the day, Mary Shelley wrote her popular novel Frankenstein, in which a monstrous being is brought to life by a bolt of lightning. Not only did this illustrate early on the relationship between electrochemistry and biological systems, but also unfortunately provided a model of the mad scientist.

Unfortunately for me, my knowledge of bioelectrochemistry is nearly limited to this demonstration of Galvani's experiment, and the examples of electric eels and electroencephalograms (EEGs). Although these practical applications of organic and bioelectrochemistry are fascinating, the links to the fundamentals of these areas are often perplexing. Even with all the modern tools for probing organic and molecular biochemical systems, these systems seemed overly complex to me, with more exceptions than rules, as compared to the science and engineering of solid-state and other electrochemical areas. This issue of ***Interface*** highlights the Organic and Biological Electrochemistry Division with feature articles which discuss the developments and advances in the electrochemistry of proteins, enzymes and cellular components, which help clarify the role of electrochemistry in biology. These articles have convinced me that electrochemistry may offer approaches to discovering the truth that nature has artfully hidden in living things.

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INTERFACE

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