



The Birthplace of Electrochemistry

The 17th International Meeting on Lithium Batteries (IMLB)* was held this past June in the beautiful and historic setting at Villa Erba along the shores of Lake Como,

Italy. This international meeting has become an exceptional gathering where the world's top battery research scientists present their work on electrochemical conversion and storage. The application of their research now powers our essential wireless devices so that they run longer, cleaner, and more efficiently. But the splendor of the location was not the only reason that IMLB was so exceptional this year; the meeting venue reconnected attendees to their roots. Lake Como is the birthplace of Alessandro Volta, the inventor of the first battery, which he called the electric pile, and the place where the science of electrochemistry began.

Modern electrochemistry can be traced back over 200 years to the 18th century and the work of Alessandro Volta and his experiments with the electric pile. While Volta hailed from Lake Como and was a trained physicist, many consider him to be the first great electrochemist. As a result of his vast scientific influence, the ECS Europe Section named an award after him and every two years they recognize a scientist with the prestigious Volta Medal (see photo). The medal depicts his electric pile, the first notable electrochemical storage device.

Around 1791, Volta began to study "animal electricity," which was noted by his colleague Luigi Galvani to describe the force that activated the muscles of his frog specimens. He regarded their activation as being generated by an electrical fluid that is carried to the muscles by the nerves. Volta realized that the frog's leg served as both a conductor of electricity and as a detector of electricity. He replaced the

frog's leg with brine-soaked paper, and detected the flow of electricity by other means familiar to him from his previous studies. He discovered the electrochemical series, and the law that the electromotive force of a galvanic cell is the difference between their two electrode potentials.

As witnessed by the exceptional program at the 17th IMLB, electrochemistry has blossomed into a very influential science that covers not only chemistry and physics but also biology, materials science, and chemical and electrical engineering. It's interesting to note that Volta's collaborator in the study of animal electricity was Luigi Galvani, a physicist working in bioelectrochemistry. Volta essentially objected

to Galvani's conclusions about animal electric fluid but the two scientists disagreed respectfully; and owing to this disagreement between the two, Volta built the first battery in order to specifically disprove his associate's theory.

It is evident from Volta's historical discovery that from its beginnings, electrochemistry has been a transdisciplinary area of science with the precision

of physics and the depth of materials science. Had he not been challenged by Galvani and examined his colleague's research in bioelectrochemistry, Volta may not have been led to his discovery of the electric pile. Today, 214 years after Volta's work, it would have been difficult for Volta to imagine the progress and potential of his electrochemical storage device, which he would have been able to observe at IMLB near his home on the shores of Lake Como where it all began.

Volta Medal



Alessandro Volta



Electric Pile

Roque J. Calvo
ECS Executive Director



*The 17th International Meeting on Lithium Batteries was chaired by Bruno Scrosati, the founder of IMLB and a Past President of ECS (2003-04). Professor Scrosati has been responsible for championing the development of IMLB since the first meeting held in 1982, and leading it to become the most important meeting in this influential field. It is appropriate that the event founder brought this science back home to its birthplace again this year. (See the IMLB 2014 meeting summary on page 11 in this issue.)