



SEEBECK OR VOLTA ?

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We have just celebrated a jubilee of a wonderful scientific discovery, the discovery of thermoelectricity made by Seebeck. 170 years ago, while heating the contour made of inhomogeneous materials Seebeck discovered the deviation of the magnetic needle. Seebeck service to science is evident. Besides the referred Seebeck effect he carried out a research into thermoelectric material properties. His studies have much fundamental information, which is still significant nowadays. He determined, for example, a high thermoelectric activity of the materials based on *Bi-Te*, *Bi-Se*, *Pb-S*, *Zn-Sb*, they are all typical semiconductors. His conclusion on the high thermoelectric figure of merit of the semiconductor materials was confirmed again about 120 years later and laid the foundation for the development of current thermoelectric material studies. But Seebeck did not completely understand of the nature of his discovery. He named his effect as "the phenomenon of magnetism" paying no attention to its electrical nature.

Thus the question is: who was the first to observe a thermoelectric effect and to discover the possibilities of an electric current receiving in the circuit assembled of inhomogeneous materials at the temperature difference ?

The answer to this question is in the book on the history of physics "Storia della Fisica" written by Italian scientist Mario Glozzi.

In the part of the book, where Mario Glozzi describes the history of heat and electric current discoveries, we find the section titled "Thermoelectric Effects". Here the author informs us about the fact that in 1794 Italian Volta discovered an electric current in a circuit in case the iron conductor ends are being heated up or maintained at different temperatures. With a great interest we referred to the original work containing three letters written by A. Volta to Abbot Anton Mario Vassalle, Professor of Physics, The Royal University in Turin, in 1794 - 1796. In his first letter of February 10, 1794 Volta writes, that the prepared frog's organs, its legs to be exact, are very sensitive indicator of electricity. Volta assembled a circuit composed of two vessels with cold water, a frog's leg put into water and an

iron arc. One end of the arc was placed into one vessel and the other end of the arc was placed into the other vessel. When heating one end of the iron arc he discovered the thermoelectric effect. Now I am quoting: " And here having examined lots of arches carefully and having chosen one of them made of iron which had given nothing without warming up... I lowered its one end into the boiling water for about half a minute, then extracted it and, giving it no time to cool, I returned back to my experiment with the two vessels of cold water. And then a frost in water began to contract. And this happened twice, thrice and four times, and I repeated my experiment up to the moment the iron end sunk earlier into the hot water, "became cold".

This is a good proof that Volta was the first who observed the thermoelectric phenomenon! Mario Glozzi draws attention to the fact that this experiment was left unnoticed and Seebeck, very likely, knew nothing about it.

The exceptional correctness of his experiments is striking. In these experiments Volta used only those metals, which did not result in the electric current at the temperature difference absence.

To restore a justice and pay a tribute to the greatest scientist we should draw our attention to that wonderful experiment.

There is an excellent opportunity to realize this idea, the idea of celebrating bicentenary of the thermoelectric effect discovery in 1994. Moreover the History gives us an exact date of this effect description by Volta. It happened on February 10, 1794.

Let us celebrate this historical date, the date of discovery of thermoelectricity made by Volta not belittling indisputable contribution made by Seebeck into thermoelectrics.

Dear colleagues - thermoelectricians! I wish you great success in science, engineering and business while celebrating the year of bicentenary of thermoelectrics discovery.