This Month's Stiff: Michael Faraday

Entered Mortal Coil: 22 September 1791

Assumed Room Temperature: 25 August 1867

"I've got two. How many do you have, laddie?"

Michael Faraday should be rightly remembered as one of the greatest experimental scientists of the 19th Century. As mentioned in a previous essay, in my opinion, one is truly great when a unit of measure, for instance, is given your name at some point after you slip the bonds of this mortal existence. Dearly departed Mike had not one, but **two** scientific units named in his honor! The Brits are rightly proud of this man.

Unlike his contemporaries, Mike had extreme trouble with mathematics. In fact, it is said he knew very little. His mind was geared towards the "hands on" approach. A sheet of formulas and arcane calculations did not presage any of his discoveries. No, Mike just went out and found out first hand whether his ideas had any merit. However, given the broad scope of his contributions, he is often listed amongst the other greats who understood the "new math", and showed their work on paper before the final answer. Unfortunately, I am afraid a modern professor would have given Faraday an "F" in lab for that very reason! So, what did the gentle scientist discover? Here is the grocery list of the high points:

1. *Transformers:* Discovered mutual-inductance, which is the basis for modern transformers.

2. *Self-Inductance*: Discovered this characteristic of coils at approximately the same time as Joseph Henry. However, the unit of self-inductance is named for his American contemporary (see DED No. 11).

3. *The Dielectric Constant*: Faraday described the fundamental characteristic of capacitors, and he also invented a variable capacitor. The unit of capacitance, the **Farad,** designated by the letter **F**, is named for Mike as a result of this discovery.

4. *Electric motor and dynamo*: Every piece of modern electrical machinery owes its existence to these two inventions of Faraday.

5. *Faraday Rotation*: Polarized light will change its rotation when influenced by an electromagnet. This phenomenon is also known as the *Faraday Effect*.

6. *Faraday's Constant*: Mike discovered that a specific amount of electric charge is required to deposit one mole of a substance on an electrode via electrolysis. This unit of charge is referred to as a **Faraday,** and is denoted by the symbol **Fd**. A Faraday is equal to 96.4853 kilocoulombs. A coulomb is defined as the number of electrons stored when a potential difference of 1 volt is applied across a capacitor of 1 Farad. We'll talk about Mr. Coulomb later, if someone will kindly remind me to do so. Whew! Okay, that's enough difficult electronic theory for now!

7. *Terminology*: Mike made up some cute electrical terms for us. These include anode, cathode, electrode, and ion.

8. *Other stuff*: Faraday discovered Benzene.

Ever mindful of his obligations to his fellow man, Faraday always gave a lecture on Christmas day for children. These lectures are classics of the scientific method, and described various concepts in a way that the common person could understand. The tradition of these lectures continues to this very day. Faraday's work in electricity and magnetism helped pave the way for his fellow countryman, James Clerk Maxwell. Mike was truly a hard act to follow.

References:
Internet: http://chem.ch.huji.ac.il/~eugeniik/history/faraday.htm

Internet: A Ridiculously Short History of Electricity and Magnetism, http://maxwell.byu.edu/~spencerr/phys442/node4.html

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