



The Current Source

Newsletter of the Schenectady Section of the IEEE

Chairman's Message

Greetings! This year, the Schenectady Section of the IEEE will be celebrating its centennial, a year-long opportunity to highlight activities spanning a hundred years. For sure, it is a daunting task. We may not have the collective memory to recall all the significant events. But with your help, we can try.

What was it like being an electrical engineer at the start of the 20th century? What were the technical issues and challenges? Who

were the gurus and leading thinkers? Which were the leading schools and companies? What was the outlook for the future? Which of today's electrical devices and equipment were predicted by the IEEE members of 100 years ago?

Then there are the stalwarts whose careers defined the course of the industry. Who were they, what did they do, and how do we remember them today? What would the IEEE be today, or where

would it be, without their contributions?

Just a few questions to trigger memories and research. If you feel like writing something, contributing some pictures or clippings, or making a presentation, along these lines, let us know, through the chapter officers listed in this newsletter. If you haven't been active in the IEEE recently, this may be a chance to participate.

Just remember that technical writing guidelines don't all apply here. Hopefully, by the end of the year we will have collected and collated enough real history to get a good handle on just what it took to last a century and still be ready for another century ahead.

—Ricardo Austria

Industrial and Commercial Power Systems Conference Coming to Capital District in 2005

The Schenectady Section of IEEE has invited the Industrial & Commercial Power Systems Department of the Industry Application Society to hold its May 8–11, 2005 Technical Conference in the Capital District. Plans are under way to host this meeting at the Sheraton Hotel, soon to be renamed the Prime Hotel and Conference Center, in Saratoga Springs.

I&CPS has two significant roles in IEEE. Its main focus and activity is developing and sustaining the Color Book series of application standards. The first two days of the technical conference will be devoted to an intense schedule of working group

and committee meetings centered around these standards. Supporting the standards activity is the I&CPS' second role in fostering technology, and the latter half of the conference will be a traditional technical program with up to 32 application-oriented papers on various subjects related electrotechnology in industrial and commercial facilities.

The I&CPS Technical Conference traditionally draws about 125 engineers (accompanied by 20–30 "guests") from all over the United States—as well as a few other countries. In addition to the technical committee sessions and the formal

program, the agenda will include a welcoming reception (probably on Sunday evening), an off-site social function on either Monday or Tuesday evening, an awards luncheon on Wednesday, and a program of guest activities.

To execute this conference, we will need a number of volunteers to address some of the critical conference functions. Louie Powell has offered to serve as General Chair of the Conference; Louie has been chair of the I&CPS Department for 2001–2002, and is familiar with how the conference is organized from the national perspective. We will also need a Vice-

Chair, Treasurer, Registration Chair, Facilities & Programs Chair, Guest Program Chair, and Webmaster. If you would like to volunteer, contact Louie at 385-2999 or louie.powell@ieee.org.

In recent years, I&CPS has held its technical conferences in New Orleans (2001) and Savannah (2002), and will be going to St. Louis (2003) and Clearwater (2004) before they arrive in Saratoga Springs. This will be a great opportunity for us to show off upstate New York while hosting this small but very active IEEE group.

—Louie Powell

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IEEE SCHENectady Section February Membership Meeting "Increasing Power Transfer Capability of Existing Transmission Lines"

Presented by:

Jose Daconti
Executive Consultant
Power Technologies, Inc.

Friday, February 21, 2003

12:00 noon

Ramada Inn, 450 Nott St. (near Erie Boulevard), Schenectady

Lunch: Free for IEEE members, \$5 for non-members. For reservations, contact

Lou Tomaino, l.tomaino@ieee.org, or leave a message at 385-0967

by February 19.

Sponsored by the Power Engineering Society

Nominations Sought for IEEE Awards

The IEEE Awards Board is inviting nominations from IEEE Sections, Societies, and individual members for medals, recognition, and prize papers to be presented in 2004.

Usually the December issue of "The Institute" will have a section that details various awards given by IEEE. In addition to these, awards are presented by the Regional Activities Board, Technical Activities Board, GOLD, etc. The awards are too numerous to be listed in this brief article. You may visit the IEEE web site at www.ieee.org/about/awards to know more about the awards and how to nominate deserving candidates electronically or to download a nomination form.

There is deadline for receipt of nominations at IEEE headquarters, so do not delay nominating a deserving candidate.

Many IEEE members in the Schenectady Section qualify for many of these awards. Unless we take the time to identify them and send in nominations, their achievements will go unrecognized by IEEE and their peers. Please actively look for candidates for awards and nominate them before the deadline. For any assistance with the nomination process, contact the Section Awards Chair, Kutty Nair, by e-mail at kuttynair@ieee.org or by phone at (518) 399-1774.

—Kutty Nair

IEMC 2003: Managing Technologically Driven Organizations: The Human Side of Innovation and Change

The IEEE Schenectady Section is co-sponsoring the IEEE International Engineering Management Conference (IEMC 2003), to be held at the Desmond Hotel in Albany Nov. 1–3. The conference provides a key opportunity to study and assess new directions in technology management and the strategic use of human resources to shape and enhance innovation. It will address all aspects of the human side of managing technology-driven organizations, focusing especially on how to unleash creativity and motivate employees.

The deadline for submitting paper abstracts and proposed panel sessions is May 15. For more information, contact Sam Salem at s.salem@ieee.org or check the conference website at: www.ieee-iemc-2003.org. You may also check the IEEE Schenectady Section website for updates on conference activities.

On the web at: <http://www.ewh.ieee.org/r1/schenectady/>

The History of Electrical Engineering in Our Area

We all have some concept of the importance of GE in the history of electrical engineering, of the contributions of Edison and Steinmetz and their early colleagues. But did you know of all that local inventors, scientists, and engineers have contributed to our field from the earliest days of this nation to the present? This column, to run in every newsletter, will attempt to give a brief synopsis of the amazing inventions and contributions made right here in our backyard. If you have any people or ideas you would like to see profiled, please contact the author at creis@igc.com.

Joseph Henry, inventor of the electric motor

What do an elementary school in Galway, N.Y., a cape in the extreme northern Arctic, and a mountain range in Utah have in common with a unit of emf? They were all named after Joseph Henry, a native of the Capital district and one of the most famous scientists during the early years of America's existence.

In August 1893, an International Congress of Electricians met in Chicago during the World's Columbian Exposition. Scientists and engineers at the Congress adopted names and agreed on definitions for eight units of electrical measure: the Ohm, the Ampere, the Volt, the Coulomb, the Farad, the Joule, the Watt, and the Henry. The Henry (the only unit named after an American) was defined as "the induction in a circuit when the electromotive force induced in this circuit is one international volt, while the inducing current varies at the

rate of one ampère per second. Who was this famous Henry?

In 1827, only 40 years after the ratifying of our Constitution, a young Joseph Henry was Professor of Mathematics and Natural Philosophy at Albany Academy (still around today as the Albany Academy for Boys). The common measure of magnetic force was the amount of weight that an electromagnet could suspend. Electromagnets in those days relied on lots of current in very few turns to generate a magnetic field. Driven by a need to simplify classroom demonstration of the new ideas of electromagnetism, Henry was looking for a way to replace the large batteries in his laboratory with something smaller and more reliable. Building on the work done by English experimenter William Sturgeon, Henry wound an electromagnet of 400 turns of silk wrapped wire around a soft iron core. This is perhaps the earliest known use of insulated wire in the production of electromagnets. Previous published versions had relied on space between bare wires to prevent shorting.

Although this familiar-looking laboratory magnet was nothing more than a combination of previously existing ideas, Henry used it as a springboard for a new area of study: the investigation of the principles behind the design and construction of powerful, efficient electromagnets. As with all magnet designers today, Henry tried different methods of winding,

varying the number of turns, their density, and the size of the iron core. From these experiments, Henry discovered that if a cell of a single pair of electrodes is to be used with a given magnet, the magnet should be wound with several coils of wire in parallel; on the other hand, if a battery of many cells is to be used, the magnet winding should form a single long wire. Henry was the first person to understand this difference between applying voltage and applying current to a magnet.

Henry and his colleague Philip Ten Eyck built a 21 lb magnet that could support 750 lb, arguably the most powerful electromagnet of its time. A description on the magnet and the principles of magnet winding discovered to date was published in the *American Journal of Science* in January 1831.

In the summer of 1831, Henry published another paper in the *American Journal of Science* entitled "On a Reciprocating Motion Produced by Magnetic Attraction and Repulsion." It was a simple device whose moving part

NEW IEEE FELLOWS

Congratulations to the following three Schenectady Section members who were elected to the grade of Fellow as of Jan. 1, 2003.

Dr. Timothy L. Johnson

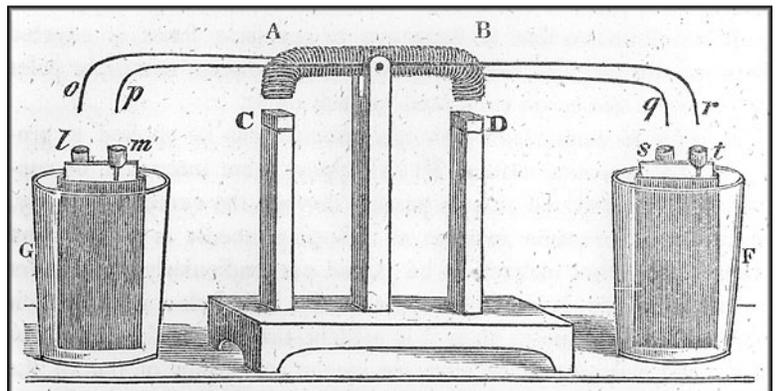
GE Global Research,
Niskayuna
"For contributions to the application of hybrid systems."

Prof. George Nagy

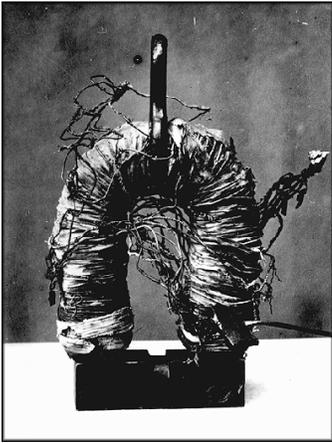
Rensselaer Polytechnic
Institute, Troy
"For pioneering and sustained contributions to pattern recognition."

Dr. Manoj R. Shah

General Electric,
Schenectady
"For contributions to electromagnetic design and analysis of electric machines."



Henry's oscillating electromagnet motor. From Silliman's *American Journal of Science* 20 (July 1831): 342. Smithsonian neg. no. 46,797-E.



Henry's Albany magnet. Image copied from old photograph, N.M.A.H. Cat. No. 181,451c. Smithsonian neg. no. 39,040.

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was a straight electromagnet rocking on a horizontal axis. Its polarity was reversed automatically by its motion as two pairs of wires projecting from its ends made connections alternately with two electrochemical cells. Two vertical permanent magnets alternately attracted and repelled the ends of the electromagnet, making it rock back and forth at 75 vibrations per minute. Henry at this time considered his little machine merely a "philosophical toy," but nevertheless believed it was important as the first demonstration of continuous motion produced by magnetic attraction and repulsion.

This early motor contained all the elements we are

used to seeing today: a wound armature, a permanent magnet rotor, and a commutator to apply the mechanical forces at the right time. Although this type of reciprocating or rocking motion motor is not as popular today as rotary motors, Henry was the first to show how polarity could be automatically reversed.

Henry left the Capital District in November of 1832 for a career at Princeton, where he further refined his concepts of electrical motors. Henry eventually culminated his career as the first Secretary of the Smithsonian Institution. As that position gave him control over funding sources for further scientific research, we can all under-

stand how he came to be so widely honored by explorers and inventors who were much in his debt. Henry, from the beginning of his career at the Albany Academy, insisted that our country had a major destiny in professional science and pursued that goal relentlessly in every possible way. He was the first great torch-bearer for professional science in the United States.

Much more information on Henry's career, his pioneering work, and many of the accolades given him can be found at <http://www.si.edu/archives/ihd/jhp/index.htm>.

—Chandra Reis



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