TORONTO meeting highlights

The fair city of Toronto welcomed attendees of the Society's 197th meeting. Over 1,600 registrants were able to choose from 1,310 papers in 34 symposia. Visitors could take in a Blue Jays baseball game or any number of exhibits in the city's impressive museums, as well as enjoy the abundant restaurants and tourist attractions. The favored occupation in the free hours of the meeting was comparing notes on how many moose had been spotted. The city of Toronto has recently undertaken a public art project of installing moose sculptures throughout the city, each one painted by a different artist. There was the moose in a pinstripe suit, the one with flowers painted on it, and the one with the Toronto cityscape on its side; but the hands-down favorite was the moose perched on a diving board high above the fountain in a nearby park.

The Society's Board of Directors meeting on Thursday resulted in some interesting news for all members. The Directors voted to approve the recognized use of an acronym for the Society (namely, "ECS") and to use a logo to represent the organization. Although ECS will remain The Electrochemical Society formally, and will continue to maintain its familiar corporate seal, the use of "ECS", the tagline, and a logo will make publicizing the Society an easier task. It will help further promote the Society as a vibrant organization in both electrochemical and solid-sate areas. Look for the new logo in the next issue of *Interface*.

The Board also voted to approve the following nominations. Larry R. Faulkner was named the recipient of the 2000 Edward Acheson Award; and the following were elected as Fellows of The Electrochemical Society: Cammy R. Abernathy, K. M. Abraham, John C. Angus, William R. Fawcett, David S. Ginley, Yasuhiko Ito, Howard R. Huff, Robert F. Savinell, Daniel A. Scherson, Roger W. Staehle, Charles W. Struck, and Sergio Trasatti. The biographies of these award winners, and winners of Divisional awards, will appear in the program section of the next issue of *Interface*.

Dennis R. Turner *(above) presented the 2000 Vittorio de Nora Award Address.*

Plenary Lecturer *Stevan Harnad (at left in top right photo) with ECS President Dale Hall.*

Glenn Stoner *(at left in lower photo) received the 2000 Henry B. Linford Award from President Hall.*

All photos by Henry Koro, Toronto.

Plenary Lecture

Professor Stevan Harnad set the tone for the week with his provocative talk on the future of scientific refereed journals. He spoke of the current system's "access blocks." In the paper journal model, these blocks occur, in part, because many scientific journals are so highly priced and thus not affordable to a broad readership. In the electronic arena currently, the access is based on the paper model, and thus many of the blocks are still present.

Harnad would like to see the content of scientific journals getting through to more "minds and eyes" than the current system accomplishes. In his "Post-Gutenberg Galaxy of Scholarly Skywriting," the ideal online

resource would contain all papers in all fields, be systematically interconnected, be effortlessly (and freely) accessible, and rationally navigable. In the Gutenberg era, there was a trade-off: scholars would give their content to journal publishers in return for the costly and valued processes of physical production, marketing, and distribution. But today, Harnad argues, these "value-added" processes are no longer necessary. He advocates that authors continue to submit to the traditional journals, but to also publicly self-archive all un-refereed preprints, and all refereed reprints, for free, in all global and local online archives.

E-print servers, such as Paul Ginsparg's Los Alamos archives (for physics) have been operating successfully for many years. New initiatives, such as PubMed Central from the National Institutes of Health (for life sciences), and the Scholar's Forum at Caltech, are gathering support. The latest work in the area of e-print servers is the recent Santa Fe Convention, which presents a simple technical and organizational framework to support basic interoperability among e-print archives. Harnad noted that electronic scholarly journals must be perpetually archived and that a greater mass of material would force the issue to be addressed.

In response to concerns about quality, raised by members of the audience, Harnad said that the refereed aspect of scholarly journals was still very important, and that journals should raise their level of quality even higher. Another member of the audience drew the lecturer's attention to patent considerations, a very important concern in publishing in the electrochemical and solid-state fields. Harnad spoke about "rational navigation," (discerning quality material), which is much needed in this era of information overload.

If we want to free the literature, Harnad advocates that universities take following steps: mandate free e-publication, and reward it (by recognizing online archives in tenure and salary reviews); establish online archives; and provide the funds and personnel to help its authors to publish in the archives. The talk generated much discussion in the hallways and during committee meetings. Stay tuned to the pages of *Interface* for more on this exciting topic.

The Toronto Host Committee *took a rare break from their duties. From left to right are Benoit Marsan, Gessie Brisard, Sharon Roscoe, Wojtek Haliop, and Olga Kargina.*

The non-technical registrants *had a full program, including this light-hearted and colorful lecture on Toronto's history from Toronto historian Mike Filey.*

Meeting attendees learned about the latest in instrumentation, materials, systems, software, and more, at the ***Toronto Technical Exhibition.***

Vittorio deNora Address "Electrochemical Engineering and Technology for Electronics"

Vittorio de Nora Award winner Dennis Turner has had a long career in electrochemical engineering and technology for electronics. In 1942, just after college, Turner went to work for Westinghouse Research Laboratories near Pittsburgh. He joined a department developing and making components for radar systems. An electroplating facility was needed to make certain radar components, and he was given the job of setting up and operating a facility to process a variety of objects. Some of the smallest objects were 1/4-inch brass parts that were the base for germanium chip tungsten whisker detectors of reflected radar signals. The brass needed silver plating, but there were no good brightener additives for silver cyanide plating solutions then, so the silver was a matte white. He discovered that silver could be electropolished in the plating solution with an alternating current; this resulted in his first patent.

After the war, Turner went to the University of Michigan and completed work for his PhD in 1950. He returned to Westinghouse and helped develop periodic reverse current plating for commercial applications. It was especially good at filling in micro scratches on metals to minimize mechanical polishing prior to bright nickel and chromium plating.

He joined Bell Telephone Laboratories in 1952, and began to study the electrochemistry of germanium and silicon. One of the projects involved devising a way to

These meeting highlights were written by Krishnan Rajeshwar and Mary Yess, Interface's *Editor and Managing Editor, respectively.*

Enjoying a "meeting moment," *were (top photo, left to right): Robin Susko, ECS secretary; Walt van Schalkwijk, chairman of the New Technology Subcommittee; Carl Osburn, ECS vice-president (and incoming president for 2000-2001); and Jim Amick, an ECS past president.*

The coffee breaks *provided an opportunity to renew acquaintances (middle photo), as did Jeff Cole (left), one of the initiators of the de Nora Award, with Norman Hackerman, a former editor of the Journal.*

Past President Paul Milner *(bottom photo) introduced Dennis R. Turner, the de Nora Award recipient.*

remove the damaged surface layer on silicon wafers when cut from single crystal boules. He succeeded in developing a process to electropolish silicon, using a dilute solution of hydrofluoric acid. At low current densities, a dark reddish porous film formed on the silicon. This was the first evidence that the film was porous, and porous silicon has remained an interesting material to study.

When silicon solar cells became a reliable method of recharging batteries, Bell Laboratories began developing new communication equipment for remote locations. The first practical communication satellite, called TELSTAR, was one such project. It used a hermetically sealed nickel-cadmium battery. Dr. Turner became head of a group to do research and development on how to improve nickel-cadmium battery performance under a wide range of conditions for man applications.

Dr. Turner also worked on lead acid batteries. He noted that they are the primary back-up power source in telephone central offices in the event of a utility power failure. Turner carried out accelerated tests on the anodic growth of pure lead rods and lead rods alloyed with small amounts of metals normally used to strengthen lead for battery grid use.

In the early 1960s, the Bell System started replacing telephone central office switches, which used electromechanical relays, with electronic switches using transistors, integrated circuits, miniaturized capacitors and resistors, and other modern components. Interconnections became an important part of the new system. Printed circuit boards and connectors with high reliability and tighter design rules became essential to achieving the new electronic switching systems. Turner's group was now assigned to work with Western Electric to help achieve the quality and production requirements of printed circuit boards and connectors for the new electronic switching systems. There were nine Western Electric plants making printed circuit boards.

Electroless copper plating is an important process used to deposit some or all the copper on printed circuit boards. To achieve fast electroless plating without the risk of spontaneous deposition, the solution chemistry must be controlled within a narrow range. Dr. Turner's group undertook the development of an automatic electroless copper solution chemistry analyzer and controller to replace the manual analysis, which was being done infrequently and unreliably at one of the plants. His group succeeded in designing and building a machine that automatically took a sample of the solution, analyzed all the important chemicals—copper, formaldehyde, cyanide, and hydroxide—and controlled the chemical additions to maintain about twice the copper deposition rate. It reduced the processing time from 30 to 15 hours.

Construction of the new electronic switching systems in the Bell System required a large number of electrical connectors as well as printed circuit boards. After their experience working to improve printed circuit board manufacturing quality and production rates, Dr. Turner's group began to help several Western Electric plants upgrade their production of electrical connectors. At one Westinghouse plant, when his group entered the picture, gold plating of connector contacts was being done by a slow manual batch process. It was clear that a faster method was needed to meet production needs. Turner had overall responsibility for the design and construction of an automatic reel-to-reel machine that would electropolish, nickel plate, and selectively gold plate the connector terminals.

The facility increased production by 600%, reduced exhaust gas and ventilation by 97%, and reduced chemical waste by 90%. It also required 75% less labor and 63% less floor space. The gold thickness distribution was improved to the extent that gold consumption was reduced by 55%. The ecological objectives were met by using small volumes of solution in enclosed processing cells that in effect carried out the entire process in an exhaust chamber.

Dr. Turner's concluding message was that electrochemical engineering and technology has played and will continue to play an important role in the great strides made by modern electronics. ■