Recently, the Andrew W. Mellon Foundation made a major contribution to expand the project, insuring that it will be truly international in scope and allowing us to add an archival component to the project. (See the related story on the archival work in sidebar.) With this funding in place, we can now proceed at full speed on the many tasks ahead of us to make Power and Control a success and of value to IEEE.

We have also been very fortunate to have received generous contributions from several sectors to our endowment fund. IBM has made a leadership gift at our highest (F o u n d i n g Partner) category of giving. And three of the IEEE Technical Societies (Antennas and Propagation, Electron Devices, and Microwave Theory and Techniques) have also contributed—setting what we hope will be a precedent for other IEEE Societies and outside professional organizations that serve the electrical, electronics, and computing professions.

We anticipate that the income from the endowment will be a critical part of our funding over the coming decade; without it we will have to scale back many of our research and public outreach programs. Building an endowment will enable the Center to continue and increase its activities. Project grants and support from our parent organizations will continue to provide a significant part of our operating budget; but endowment interest will provide an increasing share of our operating budget over the coming years. This endowment is achievable if we are blessed with continuation of the good-will and support we have received over past years from individuals, companies, foundations, and other organizations.

The Center has long had the practice, when conducting oral-history interviews, to ask about personal and company papers and about plans for their preservation, and the Center sometimes assists in arranging appropriate placement of records. The Mellon Foundation support will allow the Center to do much more than this. The Center will prepare two documents: “Guidelines for Companies for the Preservation of Records” and “Guidelines for Individuals for the Preservation of Records”. These guidelines and survey forms will be sent to several hundred leading companies and several hundred of the most eminent engineers from around the world. The survey form for companies will ask not only about company records, but also about the existence of company histories, which exist in many cases in in-house publications.

The results of the surveys would be used in selecting the most promising sites for research on Power and Control and in preparing, for the benefit of other researchers, a guide to company records and to company histories. The Center believes that this kind of archival research is especially important now when so many historically valuable records are in danger of being lost forever.
Oral History Results

The IEEE Oral History Project, in which members of the History Center staff conduct in-depth, career-spanning interviews with distinguished engineers (see NEWSLETTER No. 17, 1994), has resulted in the recent publication of two detailed biographical articles. From 1943-1953, as a young electrical engineer at the Westinghouse Corporation, Edwin Harder (1912-1994) developed a portable display celebrating the achievements of Harold Alden Wheeler at a celebration given by the Westinghouse Corporation in honor of Wheeler’s 50th birthday. The exhibit, contained on a broadband with a super heterodyne circuit built by Wheeler in 1925, highlighted Wheeler’s contribution of automatic volume control for radio loudspeakers. After the birthday banquet, the exhibit was moved to Hazel Dell’s Long Island, NY headquarters where it remained on display for several weeks. The Center’s curator Andrew Goldstein interviewed Edwin Harder in July 1991, has published an article in the current issue of the IEEE Annals of the History of Computing (volume 15, number 2). The article, entitled “Edwin L. Harder and the Anacom: Analog Computing at Westinghouse,” identifies the growing complexity of power networks and the increasing role of microelectronics in control systems as a backdrop for Westinghouse’s involvement in analog computer computation. Aspray describes how the mathematically sophisticated Harder replaced a variety of special purpose calculators with the general purpose Anacom, an analog computer kept in service between 1946 and 1991.

A different article, the product of an oral history interview of Edwin Werth conducted by Frederik Nebeker in April, appeared in the April 1993 issue of Proceedings of the IEEE. Nebeker’s article, entitled “Ernst Werth: Bridge of Cultures” focuses on the former IEEE president’s tenacity during his remarkable career to bring together different traditions harmoniously. Nebeker’s article is illustrated with details of Werth’s involvement in European and American electrical engineering, Western and Chinese industry and academia, and with both the AIEE and the IEEE.

Competitiveness Vision

The IEEE Press has just published William Aspray, ed. Technological Competitiveness: Contemporary and Historical Perspectives on the Electrical, Electronics, and Computer Industries. This book, the result of the Center’s Technology Competitiveness Project, is a compendium of the technological competitiveness held in October, 1991, with keynote speakers including IEEE electronic, U.S. electronics, computer, telecommunications, electrical technology for the home market, industry, and commerce, and electric power in France. Along with expanded versions of the papers presented at the conference, the book offers analytic introductions to each section as well as a general introduction. The price for IEEE members is $40. To order a copy, contact IEEE Customer Service, 445 Hoes Lane, Piscataway, NJ 08854-1313, tel. (800) 981-0004.

Radio History Resource

A useful resource for those interested in the history of radio and radio engineers is Antique Radio, in Austin, Texas. Antique Radio is principally an electronics supplier, selling vintage radio parts by mail order, but it also offers an extensive collection of literature, both original material with operational details about specific radio sets and secondary work on the history of broadcasting. Along with familiar titles such as Tom Lewis’ Empire of the Air and the three-volume guide Radio Manufacturers of the 1920s by Alan Douglas, Antique Radio also offers exclusive items such as Roper Radio, which tells the story of super-power million-watt output “X” stations along the US-Mexico border during the 1930s to 1950s, and the colorful characters who broadcast on them. For more information, contact Darel Roth, Antique Radio, 5005 N. Lamar, Blvd. H-105, Austin TX 78751, tel. (512) 467-0004.

Talks...

History of EE Education

Frederik Nebeker organized and chaired a session on the history of EE education for the 50th anniversary of the Illinois Institute of Technology’s centennial conference, held 26-27 June 1993, at the University of Illinois in Champaign-Urbana.

Robert Rosenberg (Thomas A. Edison Papers) discussed the origin of the discipline of electrical engineering. The electrical industry emerged suddenly as a major industry in the 1880s, and the resulting need for trained workers was in large part met by the rapid establishment, at many colleges and universities, of courses in electrical engineering. These courses were usually taught within physics departments, and the definition of electricity and the influx of students, and the applicability of physics to the new engineering field did much to encourage the scientific standing of physics; in many institutions, physics grew from a class in 1860 to a large department in 1890.

Susann Hensel (Friedrich Schiller University, Jena, Germany) talked about the pedagogical ups and downs of Oliver Heaviside’s operational calculus. After falling out of favor in the early years of this century, operational calculus again came to be taught at engineering schools in the period between the two world wars. The operational symbol most prominent in engineering schools were John R. Carson, Louis Cohen, Valentine Bush, and Ernst J. Berg.

Ronald Kline (Cornell University) analyzed the effect of World War II on EE education in the United States, with a focus on Cornell University. He argued that the changes popularly attributed to the war, such as expansion of the curriculum to include electronics, in fact began earlier. The war did, however, have a great influence, as in bringing about a higher degree of specialization, an increase in the scientific content of the curriculum, and a greater involvement of EE in research on engineering fundamentals.

The Golden Age of Radio

Frederik Nebeker presented a talk on “25 Years of Engineering in the Rochester Section of the IEEE Radio” at the annual awards banquet of the Rochester IEEE Section, held 8 June 1993. Nebeker described the Section’s radio broadcasting and the development of

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donated to the Center in the latest Newsletter. The Didi International is a microfilm edition of the papers of Karl Taylor Compton and James Killian. It was the result of a project first published by the National Academy of Sciences, International (NASI). We were recently informed that RPI has canceled the project and that no microfilm editions is forthcoming. These important papers are still on deposit at the MIT archives, however. For more information, contact Helen Samuels, MIT Institute Archives and Special Collections, Room 145B/118, Cambridge, MA 02139, tel. (617) 253-5681.
BIBLIOGRAPHY

The Newsletters' "Bibliography" section was prepared with the assistance of Prof. Thomas F. Hargrove of the University of Wisconsin-Madison.


The electrification of Russia took place during a broader context that spanned the twilight years of Imperial Russia, the dawn of the Soviet regime, and the revolutionary years in between. Coopermiss's book, based on study of cistart and archival material, analyzes Russia's entwined technical, political, and economic trajectories through her second industrial revolution. Foreign commercial and technical influence, electrification's political constituencies within Russia, and Russia's peculiar institutional and organizational environment are important themes Coopermiss traces as he constructs the story of the development of central and regional power stations throughout Russia.

Coopermiss also seeks to explore how electrification in Russia differed from that of Western countries. Russia lagged the West generally in electrification and related developments, and rural areas within Russia lagged further. These gaps persisted well into the Soviet period, despite the government's increasing interest in electrification and its role in promoting agricultural and social, and economic factors—some of which spanned both czarist and Soviet regimes. While the government and the electrical engineering community shared a general goal of electrification, their interests in reality required struggle and conflict over technical and political issues alike.

Italy

A museum of the History of Electricity will be opened by the Ente Nazionale Energia Elettrica, the Italian National Energy Board. Exhibitions will show the evolution of electrical energy from the first electric lighting to the present. A section of the museum will display the story of electricity back to 640 BC, giving detailed attention to the contributions of major Italian figures. The museum will also include a fine collection of Italian ceramics, sculpture, and paintings, and will feature a large collection of rari.

United States

Near Minneapolis, The Pavek Wireless Museum is a non-profit museum for the exhibition and preservation of the social and technical history of wireless and electronic communications of the period 1900.

The museum, located in the Minneapolis suburb of St. Louis Park, contains and exhibits thousands of radio and electronic components, vacuum tubes, transmitters, and receivers, broadcasting equipment, "ham" radio equipment, and wireless communication apparatus for the news and entertainment business, industries, for business, and for communications functions of all types. The collection chronicles the development of electronic communications from the first mineral-based radio receiver through the development of television. Displays representing more than 150 brands of home radio receiving sets— as well as telegraph equipment, microphones, speakers, antennas, television, and public address— are on exhibit, some such as crystal sets, World War I aircraft and ship-to-shore communication systems, battlefield equipment, and spark transmitters are also represented.

For the researcher, the museum maintains a library of hundreds of technical books relating to electricity and the development of the wireless spectrum. In addition to these, the holdings include catalogs, schematics, patents, and lists of inventors. For more information contact The Pavek Wireless Museum, 3515 Raleigh Avenue, St. Louis Park, MN 55446, USA, tel. (612) 926-8189.


Leslie's book analyzes the development of science and technology in post-WWII America through the lens of the technological programs sponsored by MIT and Stanford in instrumentation, aerodynamics, nuclear energy, and the military. Leslie argues that military, and to a lesser degree industrial, funding changed for the worse the fundamental character of scholarly research, intellectual freedom, and science and engineering discipline definition as it was practiced in the academic sector.

The title is somewhat a misnomer in that it considers technology as much as, if not more than, military and MTT, he considers, among other organizations, the Gas Turbine Lab, Naval Supersonics Lab, Aeroscience and Structures Lab, Instrumentation Lab, Lab for Nuclear Science and Engineering, Center for Materials Science and Engineering, and the National Magnet Lab. At Stanford, he considers, among other organizations, the Applied Electronics Labs, Ames Research Center, SLAC, Microwave Lab, the Center for Materials Research, and the Stanford research park.

Even readers who dispute Leslie's claims about the negative impacts of the military on academic science will find much of interest in the book. As with his other historical writings, Leslie has done a thorough job of locating and analyzing archival sources, and his writing is clear and witty.

Other Books


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Historical Exhibit at Microwave Show

By David Morton

Visitors to the 1993 Microwave Theory and Techniques Society convention, held in Atlanta, Georgia June 15-17, were treated to an exhibition of artifacts related to the history of radar and microwave communications. Begun in 1980 by IEEE History Committee member Theodore Saad, this exhibit has been a regular feature at the annual convention. This year, however, the historical exhibit, located in the midst of the commercial exhibition area, rather than at the convention hotel as in previous years, had its highest profile ever. The location gave the exhibit constant exposure and ensured a high volume of visitors.

The focus of the exhibit was a collection of artifacts borrowed from the Historical Electronics Museum in Baltimore, MD. Museum volunteer (and Westinghouse engineer) Steven Stitzer arranged for display an assortment of microwave tubes, technical literature, test equipment, historical books, and videos. Tubes bearing such unlikely names as the “acorn”, the “door knob”, and the "bathtub", as well as the more familiar magnetron and klystron, documented the technical development of radar, especially during World War II. A video from the MIT Museum illustrated the production process for a Raytheon subminiature tube.

Stitzer planned to demonstrate the measurement of standing wave ratios with a "slotted line" analyzer and a microwave spectrum analyzer, but was stymied by technical troubles.

Additional items on display, obtained from the Air Force and from the Naval Research Laboratory, included several phased antennas and a chronology of the development of super-miniaturized monolithic microwave integrated circuits.*

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IEEE Life Members Offer Fellowship

Applications will be accepted beginning in October for the 1994-95 Fellowship in Electrical History. The Fellowship, which is funded by a grant from the IEEE Life Members Fund, is for either one year of full-time graduate work in the history of electrical science and technology at a college or university of recognized standing, or for up to one year of independent research for a recent Ph.D. graduate in the same field. The stipend is $14,000.

The Fellowship Committee evaluates applicants on the basis of a complete description of the proposed research, college transcripts, letters of recommendation, and additional information supplied on the application form. Students with undergraduate degrees in engineering as well as those having degrees in the sciences or the humanities are invited to apply. The deadline for receipt of applications is 1 February 1994, and three copies of entire application package must accompany the original. Application forms may be obtained from the Center.*

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Partnership Program

We are grateful to the organizations and individuals listed below who provide generous support to the Center in the form of operating, endowment, and project funding. If you or your organization are interested in joining our Partnership Program, please contact the Director, Dr. William Aspray.

Founding Partners:

- IEEE
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- Antennas and Propagation Society
- Electro-Mechanics Company
- Environmental Research Institute of Michigan
- KBR Foundation
- Sematech
- Takashi Sugiyama

We are also grateful to the thousands of individuals and institutions who make annual contributions to our Friends Fund.

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