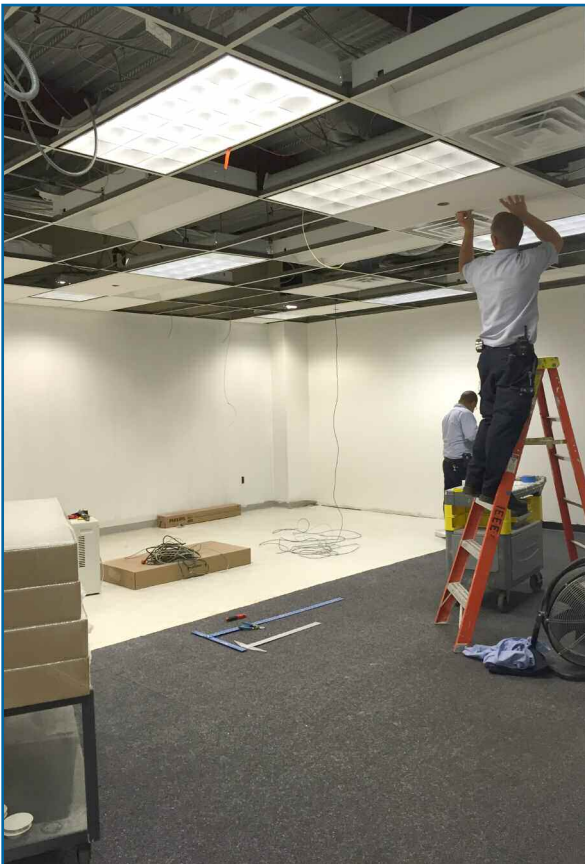


IEEE History Center

ISSUE 98, July 2015



SPECIAL ARCHIVES RENOVATION AND EXPANSION ISSUE

Static from the Director.....	2	History Center on Twitter and Tumblr IEEE Milestones Dedicated
History Committee Activities.....	3	Fellowship
Vice Chair Allison Marsh Honored		9
Center Activities.....	3	Things to See and Do
Renovation & Expansion of the IEEE Archives		9
Using History for the Honors Ceremony		Taylor's World Conference HISTELCON 2015
Lecture on Long Distance Telephone History		Donor Profile.....
Archivist Sheldon Hochheiser Leaves		10
Engaging History Students Through REACH		Bibliography
Vardalas Wins Outstanding Paper Award		11

The newsletter reports on the activities of the IEEE History Center and on new resources and projects in electrical and computer history. It is published three times each year—once in hard copy (March) and twice electronically (July and November) by the IEEE History Center.

IEEE History Center
at Stevens Institute of Technology
Samuel C. Williams Library 3rd Floor
1 Castle Point on Hudson
Hoboken, NJ 07030-5991
Telephone +1 732 562 5450
Fax +1 732 562 6020
E-mail: iee-history@ieee.org
URL: www.ieee.org/history_center

IEEE History Committee 2015

David Burger, Chair
Allison Marsh, Vice Chair
Fiorenza Albert-Howard
Jacob Baal-Schem
Theodore Bickart
Richard Gowen
John Impagliazzo
Paul Israel
David Kemp
Antonio Perez Yuste
Antonio Savini
Mischa Schwartz
Isao Shirakawa
Jorge Soares
John Vig

IEEE History Center Staff

Michael Geselowitz, Senior Director
m.geselowitz@ieee.org

Sheldon Hochheiser, Archivist and
Institutional Historian
s.hochheiser@ieee.org

Alexander Magoun, Outreach
Historian
a.b.magoun@ieee.org

John Vardalas, Senior Historian
j.vardalas@ieee.org

Nathan Brewer, Digital Content
Administrator
n.w.brewer@ieee.org

Robert Colburn, Research Coordinator
r.colburn@ieee.org

IEEE prohibits discrimination,
harassment and bullying.
For more information visit
www.ieee.org/nondiscrimination

© IEEE information contained in this
newsletter may be copied without permission,
provided that copies for direct commercial
advantage are not made or distributed, and
the title of the IEEE publication and its date
appear on each copy.

By Michael Geselowitz, Ph.D.

As those of our readers who are teachers or academics know, as we enter the summer months (here in North America) certain activities slow down. Therefore, now is a good time to point out our successes this past spring in those areas. Coming off the successful Stevens Institute of Technology course on the history of pre-modern engineering and related academic symposium (reported in the March newsletter), IEEE History Center Senior Historian Dr. John Vardalas presented on the pioneering course at the northeast sectional meeting of the American Society for Engi-

neering Education. The result?...the prize for best faculty paper (see page 7)! Also as a result of the course and symposium, Stevens undergraduate engineering students are working with faculty on a paper that will be submitted to a refereed history journal. At the same time, Outreach Historian Dr. Alex Magoun followed with a well-received sequel on the history of modern engineering.

However, the History Center is a broader locus for the public history of technology than just university-level teaching, research and outreach, so there will be no summer doldrums. The IEEE Archive is undergoing a major renovation (page 3). The Center's so-

SUBSCRIPTION INFORMATION

The IEEE History Center newsletter is available free to all persons interested in technological history – whether engineers, scholars, researchers, hobbyists, or interested members of the public. It is published in hard copy in March, and in electronic form in July and November of each year.

To subscribe to the IEEE History Center's free newsletter, please send your name, postal mailing address, e-mail address (optional if you wish to receive the electronic versions), and IEEE member number (if applicable – non-

members are encouraged to subscribe as well) to iee-history@ieee.org

Current and past issues of the newsletter can be accessed at: www.ieee.org/about/history_center/newsletters.html

The IEEE History Center is a non-profit organization which relies on your support to preserve, research, and promote the legacy of electrical engineering and computing. To support the Center's projects – such as the Global History Network, Milestones, and Oral History Collection, please click the "Donate Online" tab at www.ieee.org/donate or www.ieeefoundation.org/

NEWSLETTER SUBMISSION BOX

The IEEE History Center Newsletter welcomes submissions of Letters to the Editor, as well as articles for its **Reminiscences** and **Relic Hunting** departments. "Reminiscences" are accounts of history of a technology from the point of view of someone who worked in the technical area or was closely connected to someone who was. They may be narrated either in the first person or third person. "Relic Hunting" are accounts of finding or tracking down tangible pieces of electrical history in interesting or unsuspected places (in situ and still operating is of particular interest). Length: 500-1200 words. Submit to iee-history@ieee.org. Articles and letters to the editor may be edited for style or length.

THE IEEE HISTORY CENTER NEWSLETTER ADVERTISING RATES

The newsletter of the IEEE History Center is published three times per annum; one issue (March) in paper, the other two (July and November) electronically. The circulation of the paper issue is 4,800; the circulation of the electronic issues is 22,500. The newsletter reaches engineers, retired engineers, researchers, archivists, and curators interested specifically in the history of electrical, electronics, and computing engineering, and the history of related technologies.

	<u>Cost Per Issue</u>
Quarter Page	\$150
Half Page	\$200
Full Page	\$250

Please submit camera-ready copy via mail or email attachment to iee-history@ieee.org.

Deadlines for receipt of ad copy are 2 February, 2 June, 2 October.

For more information, contact Robert Colburn at r.colburn@ieee.org.

cial media program will follow our readers to beach—or the ski slopes south of the equator (see page 7). The Milestones program, managed by Research Coordinator Robert Colburn, is moving ahead at full tilt. Digital Content Administrator Nathan Brewer is working hard on the Engineering & Technology History Wiki. Look for a major outreach effort in the fall, again funded by the United Engineering Foundation (which funded the first two phases of the project).

Most importantly, the new pre-university REACH program will achieve critical momentum this summer with the addition to the History Center staff of a new REACH Program Manager. Our colleague from the IEEE Foundation, Natalie Krauser-McCarthy, has provided a full update on page 6.

Finally, the summer will end with a bang with History Center staff participating in IEEE HISTELCON 2015, the

IEEE Region 8 history conference. The History Center and History Committee are technical cosponsors, and the meeting is being held in conjunction with the annual meeting of the International Committee for the History of Technology. In addition, the IEEE Israel Section, one of the sponsors, is holding an additional day of activities on “Israel High-Tech: 1955-2015 - Historical Perspectives.” Information is available at www.ieee.org/about/history_center/conferences/histelcon2015.html.

Finally, I note the departure of Sheldon Hochheiser (page 5), and would like to extend him my personal best wishes. And of course, as always, I wish you, our loyal supporters, my best wishes for the coming season and my continued thanks for your generous support of these programs.

HISTORY COMMITTEE ACTIVITIES

IEEE HISTORY COMMITTEE VICE-CHAIR ALLISON MARSH HONORED

The IEEE History Committee is pleased to congratulate Dr. Allison Marsh upon her receiving the IEEE-USA 2014 "Award for Distinguished Literary Contributions furthering Public Under-

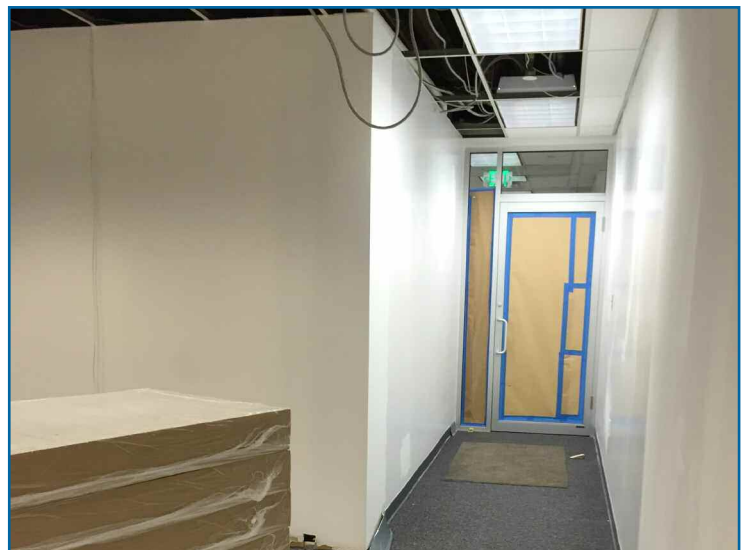
standing and Advancement of the Engineering Profession" for her article on the Smithsonian engineering collections (www.ieeeusa.org/volunteers/awards/2014/index.html)

CENTER ACTIVITIES

RENOVATION AND EXPANSION OF THE IEEE ARCHIVES



One of the hidden treasures at the IEEE Operations Center in Piscataway, New Jersey is the IEEE Archives. It has long been located behind a locked door on the ground floor of building two, near the meeting rooms. The archives houses the official historical records of the IEEE and its predecessors, the AIEE and



the IRE, and is the responsibility of the IEEE History Center. For the last seven years, the archives has been administered by History Center staff member Sheldon Hochheiser, Institutional Historian and Archivist. The archives has had a low profile; if staff or volunteers even knew that IEEE had an archives, they

likely assumed it was located with the History Center offices, formerly at Rutgers, and now at Stevens. But as IEEE intellectual property, it had always been at the main IEEE Office. While functional, the room had some problems: it was completely filled by boxes of material, with a space for only one person – typically Hochheiser– to work. And it was cramped and unattractive, and thus not a good place to bring visitors to show off IEEE’s rich history.

These several problems are being re-addressed as this article is being written. The Archives is almost doubling in size; absorbing the adjacent room formerly occupied by the Safety Office.

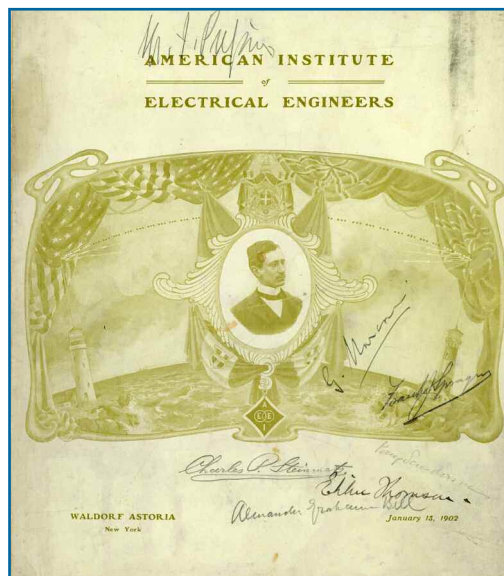


It is being completely renovated. The new enlarged space beginning with the new glass door is inviting, and encourages staff and volunteers to look in and engage. The Archives is getting all new shelving with ample room for additional acquisitions, new carpeted floor, paint, display cases, and work space for three. The new layout is spacious and an expression of the high regard the IEEE has for its 131 years of advancing technology for the advancement of humanity. The renovation is in full spring as this article is being written. It will be complete by the time you receive this issue. A formal ribbon cutting and celebration is planned for the autumn.

ARCHIVES UPDATE: USING HISTORY FOR THE HONORS CEREMONY

On 20 June 2015, IEEE held its annual Honors Ceremony and Banquet at the famous Waldorf-Astoria Hotel in New York. IEEE staff planning for the event began many months earlier. When Leslie Russell, Senior Manager in the Awards group in IEEE Corporate Activities began researching the Waldorf-Astoria, she discovered two long-ago banquets held by IEEE’s predecessors at the original Waldorf-Astoria building. The first held was the AIEE Annual Banquet of 1902, and the second a joint IRE/AIEE banquet in 1922. At both, the guest of honor was Guglielmo Marconi. Leslie contacted Sheldon Hochheiser of the History Center for more information, and to arrange to distribute reproductions of the four-page 1902 banquet program, one of the jewels of the IEEE Archives, a photograph of which she found on the Global History Network (now the ETHW).

Leslie and her team went further and decided to use these two banquets to add a historical dimension to an 2015 awards ceremony thus planning a program that could highlight the this year’s awardees in the context of both the past and the future. Hochheiser readily agreed to work with Leslie, her colleague Lynn Frassetto, and their external production company to provide historical expertise and material from the IEEE Archives. The production company’s concept was to have an actor play someone who would have been at the 1902 dinner, and who



returned after a Rip Van Winkle-like sleep to attend the 2015 dinner, with a robot (representing the future) as his dinner companion. Hochheiser provided a plausible background story for the 1902 attendee—Henry was an AIEE member who worked at the Thomas Edison complex in West Orange, New Jersey. Hochheiser also fact-checked the short scripts for each time Henry would have a short conversation with the robot before the presentation of one of the awards, to make sure the remarks were historically accurate for what Henry might have known in 1902. He also wrote a half-page description of the two historical banquets for the 2015 Honors Ceremony program. This accompanied the reproduction of the entire

1902 banquet program, which was included in the 2015 booklet. And finally, when the production company decided that it would be appropriate to use historical photos as backdrops in the short introductory videos that preceded the announcement of each award, Hochheiser spent a day and a half in the archives with art director Vicky Accardo finding and selecting appropriate photographs.

This use of history to enhance a major IEEE event, the annual Honors Ceremony, thus serves as a sterling example of the added value that the IEEE History Center brings to the table when it works with other parts of IEEE to advance the organization’s programs.

HISTORY CENTER PUBLIC LECTURE ON U.S. LONG DISTANCE TELEPHONE HISTORY

Marking the 100th Anniversary of the First Transcontinental Call



The First Transcontinental Telephone Call and other Tales of Long Distance Telephony

Presented by Dr. Sheldon Hochheiser

AT&T began building the nation's original long distance network in 1885. Starting from New York, the network reached Chicago in 1892. But, because an electrical signal weakens as it travels down a wire, that distance was close to the limit for the line. With the 1899 introduction of loading coils, construction proceeded west. By 1911, the network stretched as far as Denver, but had reached the distance limit for loading coils.

In 1908, AT&T President Theodore Vail had made a transcontinental telephone line a major goal, even though he knew the technology to build one did not exist. The next year, Chief Engineer John J. Carty announced in San Francisco that AT&T would open a transcontinental line in time for the city's 1915 exposition. Learn about the twists and turns in the story as we commemorate the first transcontinental phone call made on January 29, 1915.

Saturday, May 2, 2015 at 2:00 pm



Dr. Sheldon Hochheiser is the Archivist and Institutional Historian at the IEEE History Center at Stevens Institute of Technology. Before joining the Center in 2008, Sheldon spent 16 years as corporate historian for AT&T, acting as both subject matter expert on AT&T history and manager of the corporate archives. While at AT&T, he curated historical exhibits, completed oral histories with company executives, and served as a historical expert on television and radio.

Monmouth County Library - HEADQUARTERS

FREE ADMISSION

125 Symmes Drive, Manalapan, NJ 07726-3249 Telephone: 732-431-7220 www.monmouthcountylib.org

With the IEEE History Center being located in New Jersey, Center staff periodically has opportunities to give public talks on the history of IEEE Technology. Such an opportunity reached IEEE Historian Sheldon Hochheiser this spring. Donna Mansfield, Program Coordinator for the Monmouth County Public Library approached him in early March asking if he would give a talk at the library to commemorate the centennial of the first transcontinental telephone call. Hochheiser had been studying the history of telephony in the United States for many years, and was therefore the best person to speak on the history of long distance telephone service in the U.S. On Saturday 2 May, Hochheiser traveled to the library in Manalapan, New Jersey to give a talk titled "The First Transcontinental Telephone Call and Other Tales of Long Distance Telephony" to a rapt audience of more than twenty-five residents of Monmouth County. Several in the audience were knowledgeable about telecommunications, having worked in the field at Bell Labs among other employers.

While the center of Hochheiser's talk was the work leading up to – and the ceremonies inaugurating – transcontinental telephone service, he placed that achievement in the overall context of the history of long distance from the first experimental line in 1881 to the 1970s, and in the context of the changing patterns in which long distance telephone service was used and perceived.

Note: If you look carefully at the reproduction of the otherwise excellent poster that the library prepared to publicize the talk, you'll notice a small error; the date given there for the original call is four days off—it was on 25 January, not 29 January.

ARCHIVIST SHELDON HOCHHEISER LEAVES THE HISTORY CENTER TO RETURN TO AT&T

It is with mixed feelings that we report that Dr. Sheldon Hochheiser, IEEE Institutional Historian and Archivist, left IEEE in June to become Corporate Historian at AT&T and Manager of the AT&T Archives and History Center facility in Warren, New Jersey. If this sounds familiar to you, it may be because Hochheiser held this position for many years before joining IEEE.

Many of our readers are familiar with Sheldon and his work over the past seven years at the History Center, where he directed the Center's programs in archives, institutional history (i.e., history of IEEE) and oral history while participating in the full range of History Center activities. His work as IEEE Archivist was capped this year by achieving the renovation and expansion of the Archives room at the Piscataway Operation Center (see page 3). Earlier in his tenure, he moved the collection

records to a modern archives database, and supervised its re-cataloging by a project historian. He developed and implemented the archive's first formal collecting policy—namely, that the archives' focus is institutional history and thus it preserved material on the history of the overall IEEE and its predecessors, rather than material on IEEE's technologies. Working with several volunteers, he was instrumental in having the IEEE Board of Directors adopt IEEE's first archives policy, stipulating that certain IEEE records of historical value were to be transferred to the archives for permanent preservation after they were no longer required for current business purposes. He increased the archives size by many acquisitions from around IEEE. As institutional historian he wrote multiple articles about IEEE history for the IEEE Global History Network (now the Engineering &

Technology History Wiki) and other venues, prepared slide shows and gave talks, and answered numerous reference questions.

While Sheldon was head of the oral history program, the number of oral histories available for use and posted on the internet doubled from fewer than three hundred to more than six hundred. He cleared up a backlog of unpublished oral histories, conducted fifty-nine oral histories himself, and coordinated oral histories done by other History Center staff. He also took over the Center's training of volunteers to do oral histories, converting it into a self-paced webinar available on IEEE's website. Major History Center oral history projects that he directed included twenty-three oral histories of IEEE past presidents, a series of over thirty oral histories of engineers from the former Westinghouse Defense Electronics Division (this project was conducted jointly with the National Electronics Museum) and oral history projects with leaders in the fields of electromagnetic compatibility and superconductivity. Major external collections acquired during his tenure include a series of what will ultimately be ninety-two oral histories commissioned by the IEEE Robotics and Automation Society of leaders in those fields, and fifty oral histories of women in computing done by former History Center Postdoc Janet Abbate as part of her research for her book *Recoding Gender*.



As a member of the History Center team, Sheldon wrote three articles for the History Center's now-ended STARS program on telephone transmission, switching, and instruments respectively, and numerous historical articles for IEEE Publications. He team-taught five semesters of history of technology courses at the Rutgers, the Center's former partner, and gave a workshop on telecommunications history at the Rutgers Institute for High School Teachers.

Sheldon earned an M.A. and a Ph.D. in the History of Science from the University of Wisconsin, and an interdisciplinary B.A. from Reed College in Chemistry/History. He taught at Rensselaer Polytechnic Institute and the University of Minnesota, and worked as Corporate Historian at Rohm and Haas, where he wrote a company history, *Rohm and Haas: History of a Chemical Company (University of Pennsylvania Press, 1986.)* As mentioned above, immediately prior to coming to IEEE, Sheldon spent many years at AT&T, most of which as Corporate Historian and Co-Manager and Manager of the AT&T Archives.

While at IEEE, Sheldon maintained his contacts with the AT&T and Alcatel-Lucent archives, to the benefit of all three organizations, and we look forward to continuing that relationship with Sheldon back on the other side. Sheldon Hochheiser will certainly be missed at the Center, but we wish him the best of success in his return to AT&T.

CENTER ACTIVITIES: ENRICHING THE HISTORY CLASSROOM & ENGAGING STUDENTS THROUGH REACH

By Natalie Krauser McCarthy and Michael Geselowitz

In May, the IEEE History Center hosted the inaugural meeting of the Educator Advisory Panel for REACH (Raising Engineering Awareness/Appreciation through the Conduit of History), our new pre-university program described last issue. Teachers, principals, and curriculum developers joined Center Senior Director Mike Geselowitz and IEEE Foundation Development Officer Natalie McCarthy at Manalapan High School in Manalapan, NJ, USA. Everyone was very enthusiastic about REACH and confirmed that the history classroom offers the perfect location to position engineers as important and positive contributors to society, and to expand students' awareness and appreciation of the technology they use daily. Furthermore, teachers and their students will gain a better understanding of the role of engineering in forming the modern world that many take for granted, and those students with appropriate interest and/or talent will be encouraged to pursue careers in engineering.

Ultimately, REACH enrichment resources, in the form of online modules or lessons, will enhance the capabilities of the

teachers, excite their students, and help answer the essential question, "How have scientific and technological developments through history changed the way people live and the way economies and governments function?"

Interestingly, there was a foundation of understanding and appreciation of IEEE among the educators, as several schools are already deeply involved with IEEE sections through other programs such as robotics competitions and RESEED. REACH is of course different, as it targets the social studies classroom and not STEM (Science, Technology, Engineering & Mathematics) fields, but the panelists were enthusiastic about working with us. Geselowitz and McCarthy explained that REACH is a Signature Program of the IEEE Foundation funded by donor dollars and that as a non-profit, there would be no charge to the teachers to access REACH modules. As you can imagine, this was very well-received.

Concurrently, we are recruiting a REACH program manager. This person will be the lead communicator to our teacher and educator advisory panel, manage the content development and production process, and liaise with the IEEE Foundation on

fundraising and stewardship activities, all while serving as an integral member of the IEEE History Center team. The development of each REACH lesson will begin by using materials gathered and preserved by the IEEE History Center including Oral Histories, and Milestones, and produced in a multi-media format to encourage active participation in and beyond the classroom. The projected cost per lesson is \$75,000.

You can get involved today by making a donation online,

by making a referral that will link us deeper into the educational community, or by connecting us to a possible source of funding. Updates on the launch and progress of REACH will continue in future IEEE History Center newsletters. Contact Natalie Krauser McCarthy at n.krauser-mccarthy@ieee.org or 732-562-6065 with any donation questions or Michael Geselowitz at m.geselowitz@ieee.org or 732-562-6022 with content questions or suggestions.

SENIOR HISTORIAN VARDALAS WINS OUTSTANDING PAPER AWARD

IEEE History Center Senior Historian, Dr. John Vardalas, won the "Outstanding Faculty Paper Award" for "The Role of Undergraduate History of Engineering in the Formation of Engineers: a New Interdisciplinary, Experiential Approach" about the pioneering course that Vardalas and Senior Director Dr. Michael Geselowitz taught at Stevens Institute of Technology beginning in the Fall semester of 2014. The course covered the history of engineering from prehistoric times to the 18th century. What made this course innovative was use of "labs" in a humanities course. The labs provided a hands-on opportunity to explore problem solving in different historical contexts. In one lab, using only bricks, the students assembled small-scale Roman arches and explored their load-bearing limits using pressure sensors. In another lab, the students studied how people produced practical and portable measures of time, before the advent of the medieval mechanical clock. Thus, the students were challenged to make connections between engineering solutions and the larger societal context at different times in history.

The paper was delivered at the ASEE, Northeast section, 2015 conference in Boston.

THANK YOU TO OUR HISTORY CENTER DONORS!

Your support helps preserve the heritage of IEEE's technologies.

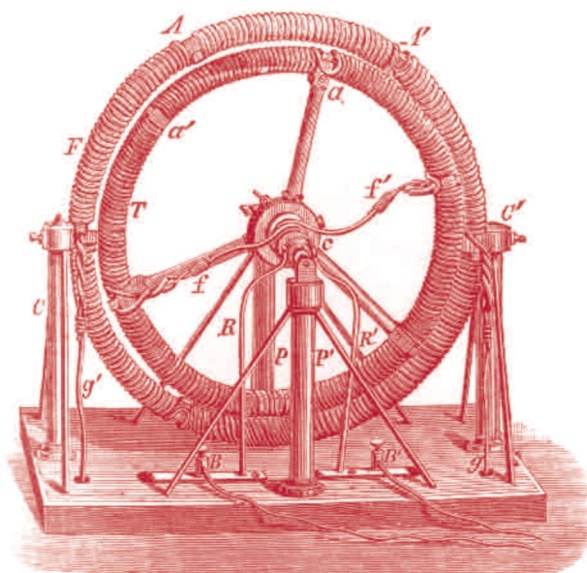


Image courtesy of Smithsonian Institution

IEEE HISTORY CENTER SOCIAL ON TWITTER AND TUMBLR

The IEEE History Center is bringing history to more people via social networking tools such as Twitter and Tumblr. Follow the activities of the IEEE History Center and others involved in the history of engineering on its Twitter feed at <https://twitter.com/ieeehistory>.

The IEEE History Center maintains a blog on Tumblr in which interesting images related to the history of technology are posted. Featured in Tumblr's history and science categories,

the blog has approximately 132,000 followers as of June 2015 and more than 170,000 total social interactions. To date, six of the posted images were featured on Tumblr's radar, a feature that allows the Tumblr staff to broadcast selected images to all logged-in users. These posts receive significantly more social interactions, the highest reaching 12,000. To follow the blog or to view the images, go to <http://engineeringhistory.tumblr.com/>.

STEREO RECORDING, MIDDLE & UPPER ATMOSPHERE RADAR, VAPOR-PHASE AXIAL DEPOSITION, AND THE VIRGINIA SMITH HIGH-VOLTAGE DC CONVERTER DEDICATED AS IEEE MILESTONES

The invention of Stereo Sound Recording (UKRI Section), Middle and Upper Atmosphere Radar (Kansai Section), Vapor-phase Axial Deposition for Optical Fiber (Tokyo Section), and the Virginia Smith High-Voltage DC Converter have been dedicated as IEEE Milestones during the first months of 2015. The Milestone plaque for Stereo Sound Reproduction can be visited at the famous Abbey Road studios in London (of Beatles fame) ethw.org/Milestones:Invention_of_Stereo_Sound_Reproduction,_1931 The Middle and Upper Atmosphere Radar plaque can be visited in the reception area at the floor entrance hall of Shigaraki MU Observatory, Kyoto University, Koyama, Shigaraki-cho, Koka-city, Shiga 529-1812 Japan [ethw.org/Milestones:The_MU_\(Middle_and_Upper_atmosphere\)_radar,_1984](http://ethw.org/Milestones:The_MU_(Middle_and_Upper_atmosphere)_radar,_1984). The Vapor-phase Axial Deposition plaque can be visited at the NTT Atsugi R&D Center, 3-1 Morinosato Wakamiya, Atsugi-shi, Kanagawa, 243-0198 Japan ethw.org/Milestones:Vapor-phase_Axial_Deposition_Method_for_Mass_Production_of_High-quality_Optical_Fiber,_1977-1983

and the Virginia Smith High-Voltage DC plaque can be visited at WAPA Corporate Headquarters Building, 12155 West Alameda Parkway, Lakewood, Colorado, USA ethw.org/Milestones:Virginia_Smith_High-Voltage_Direct-Current_Converter_Station,_1988

The ETHW contains lists of all IEEE Milestones dedicated in chronological order of the technical achievement ethw.org/Milestones:List_of_IEEE_Milestones as well as by year dedicated ethw.org/Milestones:List_of_Milestones_by_Dedication_Year It also contains guidelines for IEEE Milestones Program and information on how any IEEE member may submit a milestone proposal online.



IEEE, the Western Area Power Authority, and Siemens celebrated the IEEE Milestones in Electrical Engineering and Computing commemoration of the Virginia Smith Converter Station on 21 May. The station, located in Sidney, Nebraska, provides an important interconnection between two of the U.S.A.'s three electrical grids. Its electrical current conversion technology represents an important technological achievement in the field of electric power. (Photo courtesy of Western Area Power Authority)

FELLOWSHIP IN THE HISTORY OF ELECTRICAL AND COMPUTING TECHNOLOGY

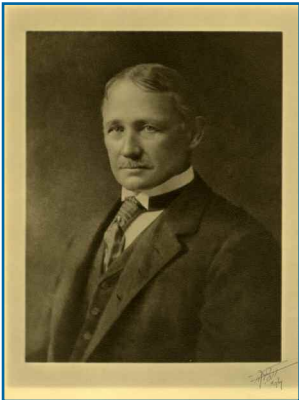


Gerardo Con Diaz is a historian of science and technology with a special interest in intellectual property law. His dissertation is entitled *Intangible Inventions: A History of Software Patenting in the United States, 1945-1985*. It is a contribution to the historiographies of technology, business, and intellectual property.

Gerardo is a Ph.D. candidate at Yale University's Program in the History of Science and Medicine. Before beginning his doctoral work, he received a B.A. in mathematics from Harvard University and an M.Phil. in history, philosophy, and sociology of science and medicine from the University of Cambridge (Trinity College). His most recent work is forthcoming in the *IEEE Annals of the History of Computing*.

THINGS TO SEE AND DO

TAYLOR'S WORLD CONFERENCE



Frederick Winslow Taylor (1856-1915) is widely known as the founder of scientific management. His work remains influential today, more than a century later. He is probably the most illustrious alumnus of Stevens Institute of Technology in Hoboken, New Jersey, which, as readers of this newsletter will know, is where the IEEE History Center has been located since June 2014. On 24-25 September 2015,

Stevens Institute will be hosting on campus an interdisciplinary conference, Taylor's World, on Taylor's life and legacy. The conference marks the centenary of Taylor's death, and is open to the public. Further information, including the conference program and on-line registration can be found at taylorsworld.org. Both the IEEE History Center and the IEEE Technology and Management Society are technical co-sponsors of the conference, and History Center Staff have served as members of the conference committee. Taylor's papers are held at Stevens, and tours of the collection will be among the activities on the conference program.

HISTELCON 2015



HISTELCON (HIStory of ELectrotechnolgy CONFerence) is a flagship Conference of IEEE Region 8, cosponsored by the IEEE History Center. HISTELCON 2015 will explore "High Technologies" in various historical epochs from multiple historical and contemporary perspectives. The conference will allow historians and sociologists of technology and science to interact with practicing engineers, scientists and technical experts. Subjects will include origins and early developments of high technolo-

gies; the cultural/social/economical drivers for the development of high technologies; impact of high technologies on culture/society/economics; and governmental policies to foster high technologies in different cultures/societies.

The Technical program will include more than one hundred papers as well as invited lectures and presentations. The social program will include a Reception, a tour to a high-tech site, a jazz concert, and gala dinner. A special session will be devoted to a homage to Israel high-tech founders in the presence of the Past IEEE President, IEEE Region 8 Director, IEEE History Committee and Center Chairs, and IEEE Israel Chair.

Tel-Aviv University (TAU) will host the conference. Registration fees are as low as 190 Euros for Members and 100 Euros for students and Life Members. Accommodation will be provided at various Tel-Aviv hotels as well as at Tel-Aviv University dormitories. Conference web-site: <http://icohtec-histelcon.tau.ac.il>

ROBERT DENT



Name: Robert A. (Bob) Dent
Member Grade: Life Senior Member
Year Joined IEEE: 1965

Robert (Bob) A. Dent joined the Student Branch of IEEE in 1965 while he was a senior at Stevens Institute of Technology in Hoboken, NJ, USA, the new home of the IEEE History Center. He is particularly interested in the IEEE History Center, a center to preserve, research, and promote the history of information and electrical technologies.

Bob says, "IEEE provided an opportunity to read and hear technical information, to develop professionally, and to network with my peers in the profession and the industry in which I had

chosen to work." After 32 years of volunteering for IEEE, he joined the staff of IEEE as the Executive Director of the Power Engineering Society, now known as the Power & Energy Society (PES). Now he serves as Chair of the PES History Committee.

"I donate online to the IEEE Foundation because it is easy and secure," he said. Bob donates to the IEEE History Center, primarily, and he also donates to the Foundation Fund so the money goes where it is most needed. He says, "I trust the IEEE Foundation to allocate my contribution to the programs that are appropriate and most in need. I know many of the volunteers and staff of the IEEE Foundation and trust they will use the funds that I contribute to be spent effectively and responsibly."

Bob believes in supporting the programs of the IEEE Foundation because, he says, "I want to pay forward to programs that benefit present and future electrical engineers and society, in general."

BE FOREVER GENEROUS: CONSIDER LEAVING A BEQUEST TO THE IEEE FOUNDATION FOR THE IEEE HISTORY CENTER

Has technology and its history inspired you or played an important role in your career? If the answer is yes, a bequest to the IEEE History Center Fund of the IEEE Foundation for benefit of the History Center is an excellent way to pay it forward to the next generation of engineers.

Language to consider when updating your estate plan:

I give the sum of \$___ [or all (or stated percentage) of the rest, residue, and remainder of my estate] to the IEEE Foundation, Incorporated, New York, NY, USA for the benefit of the IEEE History Center Fund."

Notify the IEEE Foundation of your intentions to leave a bequest in your will or trust and you will be invited to join the elite, legacy giving, donor recognition group – the **IEEE**

Goldsmith Legacy League and be *Forever Generous*. Donors may choose to remain anonymous.

For more information visit www.ieeefoundation.org, contact Stan Retif in the IEEE Development Office at +1 732 562 2632 or e-mail donate@ieeef.org.

WILL YOUR COMPANY MATCH YOUR DONATION?



Find out instantly:
ieeefoundation.org/matching-gifts

Your love for IEEE is second nature.



Now, showing your support through IEEE Foundation can be just as automatic.

Recurring gifts are convenient, customizable, efficient, environmentally friendly and ensure a steady source of support for IEEE Programs.

How does it work? Set up your gift once, and it will automatically deduct from your credit card according to your preferences, including:

- Frequency
- Amount deducted per payment
- Duration

You will receive an annual tax receipt summary and you can stop or adjust your gift at any time by calling +1 732 465 5871. As always, you can visit ieeef.org/donate and select "recurring gifts" to set up your gift.

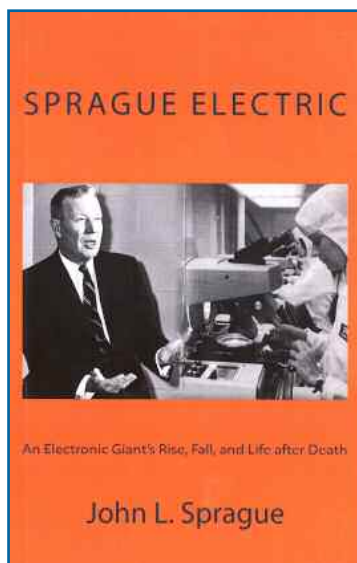
IEEE Foundation



NEW BOOK FROM THE IEEE HISTORY CENTER PRESS

SPRAGUE ELECTRIC: AN ELECTRONIC GIANT'S RISE, FALL, AND LIFE AFTER DEATH

by John L. Sprague



The rise of the Sprague Electric Company from a high-tech kitchen-table startup is representative of much of the U.S. electronics industry. Sprague Electric began in 1926 in the Quincy, Massachusetts kitchen of a young naval officer, Ensign Robert C. Sprague, and became a thriving manufacturer employing thousands of workers. Its broad product line of electronic components achieved international sales and a reputation for the highest quality. There were more than 50,000 Sprague components on every Apollo mission, and more than 25,000 aboard every Space Shuttle. The company later declined, went through a series of acquisitions, and eventually dissolved.

Sprague Electric provides a valuable business and technological history, a story of corporate success, and a cautionary tale of what to avoid. Told by company insider John Sprague, Sprague Electric gives the reader a front-row seat.

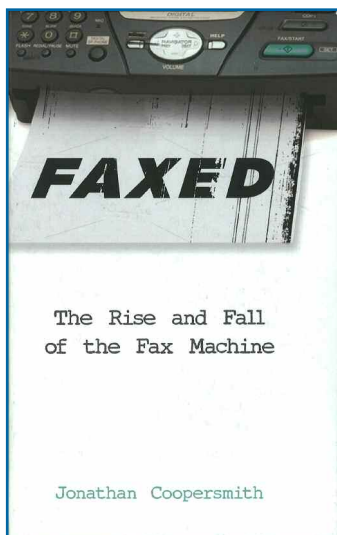
The Sprague Electric story reveals the value of investment in research and development, and also the effects of raw material supply chains on product lines. It is a story of a company's relations with the small New England mill town of North Adams, Massachusetts where its factories were located, and how labor relations—initially cordial—later soured. It is a story of how a vulnerable company weathered the stresses of the Great Depression and triumphed, only to be brought down by the recessions of the 1970s and 1980s.

It is a history of acquisitions, mergers, and spin-offs—some of them botched—and of the strategic and tactical mistakes that eventually caused the company to vanish. Yet Sprague Electric's successor companies continue its legacy in the electronic components industry. Corporations formed from its different business units and operations are now located around the world. The principal manufacturing plant of Sprague Electric is now an acclaimed art museum.

Available from Amazon.com in hard copy and on Kindle.

www.amazon.com/Sprague-Electric-Electronics-Giants-after/dp/150338781X/ref=sr_1_2?ie=UTF8&qid=1429202871&sr=8-2&keywords=sprague+electric

COOPERSMITH, JONATHAN,
Faxed: The Rise and Fall of the Fax Machine,
Johns Hopkins University Press, 2015.



Imagine a technology that was conceived and patented in the 1840s, persisted with at the most limited niche use for a century and a quarter, only to suddenly burst to a short-lived prominence at the same time that it was becoming obsolete. There is at least one such technology—facsimile transmission or more popularly “fax.” With Jonathan Coopersmith’s excellent new book, the story has now been well told. The attraction of being able to electrically transmit and reproduce at a distance an actual document, text, or other

image attracted a series of advocates despite the rise and spread of an alternate, reliable, and more economical technology, telegraphy, that provided fast text transmission, and the realities of a technology that proved time after time inadequate for reliable commercial use.

Independently invented by Alexander Bain and Frederick Blakewell in the 1840s, fax persisted into the twentieth century through a series of inventors, advocates, and short-lived failed commercial trials. In the 1920s, available technical improvements, such as selenium photo cells and vacuum tube amplifiers, and the interest of large corporations such as AT&T led to a successful introduction for a limited protected market, picture telegraphy, almost completely for a single use—the transmission of photographs for publication in distant newspapers. Faxing was slow, and very expensive, but newspaper publishers learned that photographs sold newspapers, and thus attracted more advertisers. Newspaper wire photos became popular in Japan, Europe, and elsewhere as well as the United States. By the late 30s, wire photos had become a standard part of the newspaper industry; the U.S. Associated Press sent 60-70 photos a day to its member newspapers. Even during World

War II, fax's primary use was photo transmission. The use of fax changed little in the post-war era, with the exception of the Western Union "Desk Fax" marketed to corporate customers as an adjunct to the telegraph system, a machine that could transmit or receive locally a small piece of paper with up to 150 words. Longer transmission was handed off to the telegraph network, so to a large degree it replaced messengers.

Things began to change for fax in the 1970s. General purpose machines marketed by large companies such as Xerox provided internal transmission of exact documents among the facilities of large corporations. Technological leadership passed to Japan, both because of increasing Japanese prominence in electronics and to the importance of handwritten communications in that country.

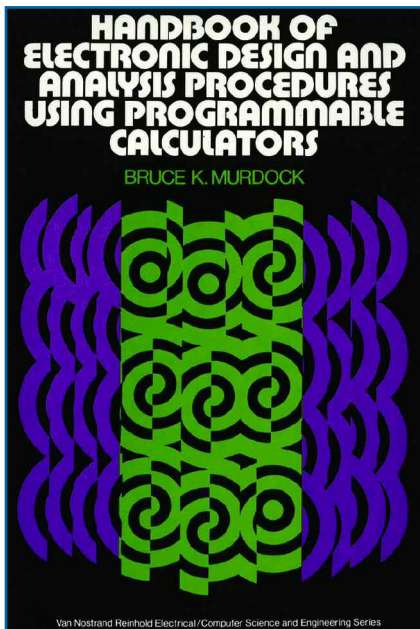
As a result, fax machines became increasingly common in Japanese homes and offices in the 1980s. The Japanese government played an important role in this, by brokering a universal but flexible standard, known as G3, so for the first time any manufacturer's machine could communicate with any other over standard telephone lines. Widespread fax use spread around the globe, using the G3 standard and ever less expensive Japanese machines employing ever more sophisticated electronics. For the first time in the technology's history, market pull finally surpassed techno-

logical push. Fax spread far more widely than its advocates expected, and in doing so new uses developed in areas including newsletters, politics, art, and eventually junk fax. By 1994, 15% of all telephone calls in the U.S. were faxes.

But beginning in the mid-1990s, the very technological advances that had aided the rise of the fax began to lead to its obsolescence as computers, especially personal computers, became more powerful and networked. Increasingly, data was either digital or digitized, and transmitted directly over the internet, decimating fax use. While the decline was far slower in Japan than elsewhere, by the early 2000s, fax clearly had become obsolete. So, for most of its history fax competed unsuccessfully against existing entrenched technologies, especially the telegraph. After a brief heyday as a successful technology, it in turn failed to compete with a newer technology.

Coopersmith tells his story clearly with ample attention both to technical detail and wider context, and notably with an eye to the comparative evolution of fax in different national contexts. It is highly recommended to readers of this newsletter.

Johns Hopkins University Press, Baltimore. Hardcover, \$54.95. ISBN 978-142141591-8. 298 pages, index.



Initially published in 1979 by Bruce K. Murdock, *Handbook of Electronic Design and Analysis Procedures Using Programmable Calculators* is a lengthy book featuring time-saving techniques for using calculators in the HP-67/97 or TI-59 families. It offers programs and programming techniques for solving problems in network analysis, active and passive filter design, high frequency amplifier design, and engineering mathematics. Complete documentation including flowcharts, algorithms, nu-

merous sample problems, tips, and references fully clarify all aspects of problem solution, saving the engineer from relying on intuition, guesstimates, and approximations for a wide variety of complicated problems.

Handbook of Electronic Design and Analysis Procedures Using Programmable Calculators is now available for a free download on the Engineering and Technology History Wiki (ETHW). You can view the book at http://ethw.org/Archives:Handbook_of_Electronic_Design_and_Analysis_Procedures_Using_Programmable_Calculators

The IEEE History Center is actively looking for more books to publish on the ETHW. If you have written a book or monograph that you would like us to digitize and add to the ETHW's book collection, please contact us at ieee-history@ieee.org

The full list of open-access books and articles published on the ETHW can be found here: http://ethw.org/Archives:Books_and_Archival_Publications

AMAZONSMILE SUPPORTS THE IEEE FOUNDATION

AmazonSmile provides a simple and automatic way to support the IEEE Foundation. While you shop at smile.amazon.com, you'll find the same Amazon.com products, and the IEEE Foundation receives 0.5% of the purchase price.

To set up your IEEE Foundation/AmazonSmile account,

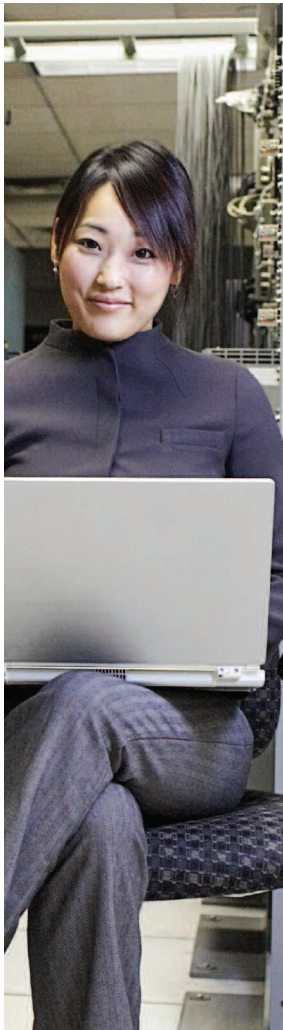
visit: <http://smile.amazon.com> and select "IEEE Foundation, Inc." Then shop for eligible AmazonSmile products. AmazonSmile Foundation donates 0.5% of the purchase price to the IEEE Foundation. Please contact donate@ieee.org with questions. Thank you for your support.

Inspiring the Future

Donate and Enable the Impact of IEEE *through IEEE Foundation*

EDUCATION

Empower the world's brightest young minds.



INNOVATION

Encourage impactful ideas and creative solutions.



PRESERVATION

Share the evolution of groundbreaking ideas.



Your generous donations motivate students and young professionals, enable innovators to make a difference, promulgate technology's influence on the world and inspire the future.

IEEE Foundation

Dedicated to providing philanthropic services to support the core purpose of IEEE—**advancing technology for humanity.**

Visit ieeefoundation.org to learn more.

Be an inspiration. Donate Today. ieeefoundation.org/donate



Your contributions to the IEEE History Center Fund preserve the heritage of the profession and its contributions to humanity. We invite you to find out more about the Center and its programs at http://www.ieee.org/web/about/history_center/index.html and more about the IEEE Global History Network at www.ieeeahn.org

Donations to the IEEE History Center Fund may be designated for general use to support IEEE history activities, to support collection and posting of Oral History interviews of important innovators, and to build the History Center endowment. You may donate online at <https://www.ieeefoundation.org/donate> or by mail.



at Stevens Institute of Technology
Samuel C. Williams Library 3rd Floor
1 Castle Point on Hudson
Hoboken, NJ 07030-5991



Making a *safe and secure*
online gift to the IEEE Foundation –
History Center Fund has never been easier!
You can support IEEE's historical
activities by clicking on
<https://www.ieeefoundation.org/donate>
and choosing "**IEEE History Center Fund**"
at the "**Designation**" box.