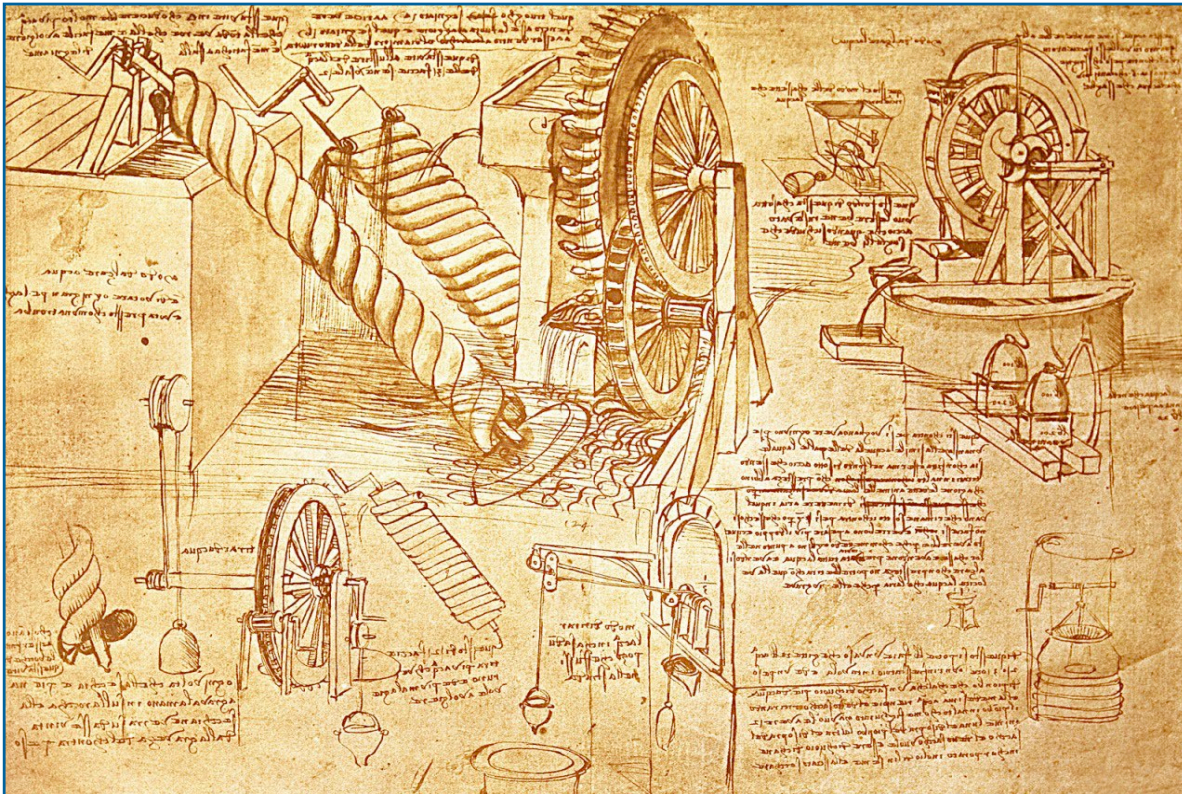


# IEEE History Center

ISSUE 107, July 2018

**SPECIAL ISSUE ON HOW HISTORY SERVES INNOVATION**



*Innovative people are often the ones who draw on, or are influenced by, history (Leonardo da Vinci, Codex Atlanticus)*

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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.

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By Michael Geselowitz, Ph.D.

As I mentioned in my last column, this year we are undertaking a strategic review in partnership with the volunteers of the IEEE History Committee. This is in full swing, but one idea that has already emerged is enhancement of this newsletter to include not just news of the History Center, but also more historical content of interest to you, our readers and loyal supporters. To that end, Research Coordinator Robert Colburn has written a lively opinion piece on “Why History Matters” (page 3).

We invite and encourage submissions

from readers (see box below).

In the meanwhile, longer term planning or no, our programs to encourage preservation and dissemination of information about engineering history continue to thrive. On the preservation side, the History Center played a key role in having the Crosby Building named a California Historic Place, with further eligibility for National status down the road (page 9). On the dissemination side, our REACH Program – designed for pre-university educators – continues to grow.

I hope you will continue to join us to support these important endeavors.

### WAYS YOU CAN HELP HISTORY

As you read this newsletter, you will see the many success stories of the IEEE History Center and the ways it nurtures the heritage of the profession. As successful as the Center is, it relies on the support and contributions—financial, intellectual, and time and effort—of many people. We ask you to help further our work by:

**Proposing an IEEE Milestone**—Milestones recognize significant achievements in technology  
[ieeemilestones.org](http://ieeemilestones.org)

**Contributing a First-Hand History**—Written

and oral histories help us chronicle important innovators and innovations [http://ethw.org/Oral-History:List\\_of\\_all\\_Oral\\_Histories](http://ethw.org/Oral-History:List_of_all_Oral_Histories)

**Authoring an article for the ETHW**—The Engineering and Technology History Wiki (ETHW) is an authoritative collection of historical information about technology’s contributions to society  
[ethw.org/create](http://ethw.org/create)

**Supporting the History Center’s mission with a donation.**

However you can help,  
it is always deeply appreciated.

### 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 did. 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 [ieee-history@ieee.org](mailto:ieee-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 57,000. The newsletter reaches engineers, retired engineers, researchers, historians, archivists, and curators interested in the history of electrical, electronics, and computing engineering, and the history of related technologies.

#### Cost Per Issue

Quarter Page	\$150
Half Page	\$200
Full Page	\$250

Please submit **camera-ready** copy via mail or email attachment to [ieee-history@ieee.org](mailto:ieee-history@ieee.org).

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

For more information, contact Robert Colburn at [r.colburn@ieee.org](mailto:r.colburn@ieee.org).



## HISTORY COMMITTEE CHAIR'S COLUMN

By Robert Dent



The IEEE History Committee met face-to-face in early March at a Newark Airport hotel. The meeting was very productive. One proposed milestone was approved and forwarded to the IEEE Board of Directors for their approval. The Life Members' History Fellowship was awarded to a deserving graduate student studying the history of technology. Discussion occurred concerning the need for an increase in the amount funded for the Fellowship by the Life Members Committee. The process of selecting the winner of the 2018 Middleton Book Award began and will be completed this October. A strategic planning process started and will be continued throughout the year. The "History of the IEEE from

1984" project was reviewed and a process to move forward was agreed upon. Finally, the committee reviewed the activities of the IEEE History Center, specifically, REACH (Raising Engineering Awareness through the Conduit of History), the oral histories program, and ETHW (Engineering and Technology History Wiki). The ETHW is an excellent site to learn about the activities of the IEEE in its history effort, especially, the status of the milestone proposals.

Our second and last face-to-face meeting will occur in mid-October in St. Louis, MO in conjunction with the Annual Meeting of the Society for the History of Technology. Additional meetings, if needed, will occur by conference calls.

Enjoy the Summer (Northern Hemisphere) or the Winter (Southern Hemisphere).

As this issue went to press, the IEEE History Center was saddened to learn of the death of James Brittain, who led the effort to found the History Center. James Brittain was a widely-published historian of technology. A full appreciation of his life and work will be featured in the November newsletter.

## HISTORY CENTER IN ACTION: SHAPING THE FUTURE BY PRESERVING THE PAST

### WHY HISTORY IS THE CRUCIAL FOUNDATION FOR THE PRESENT

Robert Colburn, IEEE History Center Research Coordinator

*"We historians have a duty to stand up for facts, to resist the so-called 'post-truth' world."*

about how much she admired Marie Curie. Paul Baran [inventor of packet switching technologies crucial to the internet, as well as of the airport metal detector] considered history essential.

**HCN:** How do you see technological history contributing to IEEE's mission of fostering an innovative future?

**Colburn:** Many innovative people are often the ones who draw on, or are influenced by, history. Even if they don't think of it in terms of a formal history class. Ruzena Bajcsy [pioneer in machine perception, robotics, and artificial intelligence] talked

People who put themselves in the frame of mind of past innovators are likely to be creative and innovative themselves.

I dislike the divisions between "old" technology and "new". Technologies, even after they are seemingly obsolete, become the basis for new technologies. It's a continuum. Historians wince when you use the C word, because everything is, actually, but in this case it's very true.

**HCN:** You've been heard to say you think you have one of the most fascinating jobs at IEEE. What makes it that?

**Colburn:** The work is intellectually stimulating. New and unexpected things come up each day. In the course of work, I meet extraordinary people. Charles Townes, Nobel Prize laureate and inventor

*Continued on Page 4*

### 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 [ieee-history@ieee.org](mailto:ieee-history@ieee.org)

Current and past issues of the newsletter can be accessed at [www.ieee.org/about/history\\_center/newsletters.html](http://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 Engineering & Technology History Wiki, Milestones, and Oral History Collection, please click on [www.ieeefoundation.org/donate\\_history](http://www.ieeefoundation.org/donate_history)

of the Laser, was on the History Center's board of trustees for many years. I got to conduct an oral history with Sir Tim Berners-Lee, inventor of the World Wide Web, in the course of which we learned we had a common background in the sport of rowing. My friends were so envious. "Whaaat? You got to meet the *Wizard?!?*"

I also conducted an oral history with Charles Kao, later a Nobel Prize laureate. He was the visionary who convinced people that glass could be made pure enough to carry voice and data over great distances, thus he gave us the fiber-optic telecommunications that the world now depends on. That oral history turned out to be the last major one he gave before he died. He was a wonderful, warm person.

The work we do is serious and important. We historians have a duty to stand up for facts, to resist the so-called "post-truth" world. To be one of the guardians of truth, well, that's a huge responsibility. My colleagues and I work hard to get it right.

**HCN:** What are some of the most interesting tasks?

**Colburn:** I like assisting documentary film companies when they call for help making films. By helping them, we are extending our impact to reach a wide audience, and raising the visibility of engineering to the public. The Center has worked with some top ones: Lion Films, National Geographic, BBC4, PBS. I also got to consult on technical accuracy in a scene in an episode of the television show "CSI," as well as for the film "Cinderella Man." They were preparing the scene where Russell Crowe's character is moonlighting as an electrician, and they wanted to know what tools an electrical worker of that time would have had in his work kit. Fortunately, the Center preserves a super collection of old manuals and textbooks, and we had one from almost exactly that time with illustrations in it.

**HCN:** Did you get to meet Russell Crowe?

**Colburn:** No, this was strictly over the phone and via email with the assistant writers and set dressers. We also help book writers, both academic and non-academic. One day, one of Ken Follett's [*Eye of the Needle, Pillars of the Earth*] assistants phoned. Follett was working on a novel about the French resistance, and he wanted to be accurate about how long it would have taken to repair a telephone exchange after sabotage. It turned out, we knew a historian who not only specialized in the history of the French telephone system, but who had actually done exactly

that during the war. Follett was thrilled, and flew to Switzerland to interview him. What began as a technical detail turned into a major chapter in the book that became *Jackdaws*.

**HCN:** If you could go back in time, what historical moment would you like to have been present for?

**Colburn:** Ah, there are so many. I think being on the deck of the *Great Eastern* when they connected the transatlantic telegraph cable in 1866 and found that it worked just fine across that incredible distance. Also being at Bletchley Park during World War II as they were breaking the Enigma and Lorenz Ciphers. The intellectual atmosphere, and the sense of high purpose, must have been intensely stimulating.

**HCN:** In what ways do you think the History Center contributes to tech history and IEEE's heritage?

**Colburn:** My colleagues and I often uncover stories of people who made important contributions, but whose achievements might have been lost to a wider audience. For example, Fowle's equations for transposition of circuits. Without them, it would be impractical to transmit power or telephone signals very far. Everyone thinks of Tesla, and of course they should, but there were many others who made long-distance transmission possible. <https://insight.ieeeusa.org/articles/the-tesla-almost-nobodys-heard-of-frank-fowle-and-alternating-current-transposition/> General Frank Stoner, who set up the United Nations' first communications network, is another pioneer. He ran it on a shoestring, improvising it almost out of nothing. It was tremendously important. He was also a daring, adventurous person helping the U.N. in the the Middle East, in and out of Cyprus, getting evacuated by destroyer...someone should make a movie. <https://insight.ieeeusa.org/articles/engineering-hall-of-fame-general-stoner-and-the-24-hour-circuits/>

The Center maintains one of the world's top oral history collections in the field of tech, and we also preserve the history of IEEE, its organizational units, and its officers.

**HCN:** Do you ever get strange looks when you tell people what you do?

**Colburn:** Oh, all the time. It's great! I have several government friends who think it's a cover story and I'm really doing secret work.

## WHAT'S YOUR HEATHKIT STORY?

By Lisa Nocks, IEEE History Center

When the Heath Company advertised its first oscilloscope kit in *Radio News* in September 1947, the 5" scope didn't even sport a model number. Heathkit aficionados are quick to point out that it acquired its O-1 classification only after the company added more kits to its catalog. Over time, the offerings expanded from electronic test equipment to amateur radio,

television, and eventually computer kits.

Heathkit began as the the Heath Aerial Vehicle Company, founded in 1913 by self-taught engineer and aviator Edward Bayard Heath, to develop affordable airplane kits for hobbyists and aspiring pilots. He renamed it the Heath Aeroplane Company after World War I, and worked on several iterations with Clare Lindstedt. Their aeronautic competition winnings financed the Parasol, a motorcycle-engine powered monoplane

introduced in 1926. After Heath's death in a 1931 test flight crash, the firm reorganized as Heath Aircraft Corporation in Niles, Michigan. In 1935, Howard Anthony purchased the company, renaming it Heath Aviation. After World War II, Anthony took the company in a new direction: selling surplus tech parts, and introducing build-it-yourself electronics kits. By the 1950s, the Heathkit sales catalog included kits for everything from voltmeters to color bar generators and oscilloscopes.

Heathkits were popular among radio enthusiasts, electrical engineering students, and technicians. My dad was one of the post-WW II electronics technicians who made the transition from tube to solid-state electronics, and worked on early consumer color TVs. He was also a Heathkit DIY-er. His workbench held the requisite Triplet multi-meter, EICO picture tube rejuvenator and tube checker, and an EICO oscilloscope. When that EICO scope died, he sent away for a Heathkit/Daystrom IO-10 kit, and then replaced the Triplet with a Heathkit multimeter. My brothers remember helping him build those instruments, though I recall only that I was mesmerized by the changing patterns on the green oscilloscope screen and the jumping needle of the voltmeter, and my dad viewing the TV picture through a mirror as he ran tests from the back of the set.

For hobbyists as well as professionals, Heathkit was a part of mid-20th century culture. Heathkit was how girls could get involved in electronics, how parents and children bonded, and where ham radio operators got their power. Long before we could broadcast to the world over the internet, more than a few pirate radio broadcasters found their strength via Heathkit linear amplifiers.

Heathkit was a strong presence for decades. When Ralph Baer and his Sanders Associates, Inc. colleagues, Bill Rusch and Bill Harrison developed the first interactive TV-based video game unit, the "Brown Box" in the late 1960s, they used the Heathkit tube-based IG-62 color bar/dot generator to create images for the games on a TV screen. An ad in the April 1973 issue of *Popular Science* boasted a catalog of more than 350 Heathkits that included color TVs, guitar amplifiers, garbage compactors, and garage door openers.



*The advertisement which launched an electronics do-it-yourself age*

*"For hobbyists as well as professionals, Heathkit was a part of mid-20th century culture. Heathkit was how girls could get involved in electronics, how parents and children bonded, and where ham radio operators got their power"*

ny introduced four models of the Heathkit Educational Robot (HERO) self-contained mobile robot kit in the early 1980s. Today, Heath® Zenith products such as lighting and security sensors, are manufactured and distributed under the HeathCo brand.

Heathkit kept its well-advertised promise, "We won't let you fail" through its phone and retail store service departments, but its foray into personal computing and amateur robotics did not save the kit business. According to former Heath Company president William E. Johnson, a Heathkit was traditionally about 30% less expensive than an assembled unit, but as pre-built electronics manufactured with cheaper components became available, Heathkit sales slowed. In July, 2012, the American Radio Relay League (ARRL) reported that Heathkit Educational Services, a division providing training programs, manuals, and kits for schools, had declared bankruptcy.

Original Heathkits are a common offering in the EBay/ Etsy universe, and tech sites carry discussions of the impact of Heathkit on independent businesses and hobbyists in the pre-internet environment. Several IEEE member First-Hand Histories and Oral Histories on the Engineering and Technology History Wiki ([www.ethw.org](http://www.ethw.org)) comment on the importance of Heathkits to beginning engineering students. I'm figuring there are many members with stories to tell about them.

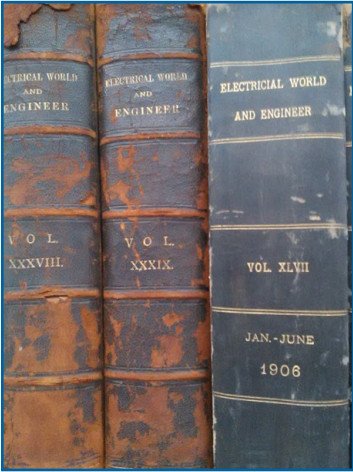
What's your Heathkit story? We invite you to tell them on the [www.ethw.org](http://www.ethw.org) under the "Create content" link.

The first Heathkit "computers"—simple tube-based calculators—went on sale in 1956. In 1977, the company introduced its H8 personal computer kit, followed by the H89, an all-in-one desktop model with optional add-ons such as floppy disk drives. The H11, which included the same CPU as the DEC Corporation PDP-11, was advertised in 1977 for \$1295. (\$5,485.37 in 2018 U.S. dollars. (Suddenly the original A/V Macintosh I paid more than \$1200 for a decade later doesn't seem so pricy!) Zenith Electrics Corporation acquired the Heath Company in 1979, mainly to take advantage of the popularity of Heathkit's computer line, though it continued to sell the complete Heathkit catalog for a while.

Banking on the growing enthusiasm for robots among hobbyists and students, the compa-



## QUIETLY AND STEADILY, THE HISTORY CENTER BUILDS A WIDELY-CONSULTED REFERENCE SERVICE



*“Answering questions about the history of technology—especially from people whose work in turn reaches a wide audience—has a multiplicative impact. Book authors, journalists, government policy-makers, documentary filmmakers, and researchers all raise the visibility of IEEE’s professions”*

raise the interest of students to go into STEM subjects. On occasion, staff have seen their assistance blossom into dazzling results. In 2016, two middle school students who had consulted the History Center went on to win their respective categories at their state championships, and go on to the national championships. One of those placed fourth at nationals, and received one of two California medals given for Outstanding Project (a documentary on Nikola Tesla).

Over the years, the History Center has built up an eclectic and international clientele, and been consulted on matters as diverse as: the Experiments in Art and Technology (E.A.T.) collective in the 1967 IEEE Convention, RCA president David Sarnoff’s desks, old maps, choosing books for a library on the history of broadcasting, and identifying the personnel in a 1920s

“If you’re a public history center, it’s [a public reference service] something you have to do,” a former Smithsonian curator and Chair of the IEEE History Committee once advised, and the History Center has provided that service from its beginning. Although reference questions are not a large segment of staff’s time, it is a useful—and often fascinating—part of the day. We like mysteries, and the tantalizing trail of facts that may, or may not, lead to an unexpected answer.

Answering questions about the history of technology—especially from people whose work in turn reaches a wide audience—has a multiplicative impact. Book authors, journalists, government policy-makers, documentary filmmakers, website builders, and researchers all raise the visibility of IEEE’s professions, and contribute to a technologically-literate society. It begins young. Staff have often assisted schoolchildren with term papers and history fair projects. By doing so, the Center helps

photograph of KDKA’s broadcasting studio. One interesting question involved the Eiffel Tower in Paris. The questioner had heard that the Parisian authorities had intended to demolish the tower but that it had been saved by radio. Was this true? It was. The original permit issued to Gustave Eiffel was for twenty years. The tower was to have been demolished in 1909, but its usefulness for wireless and other science experiments (cosmic rays were discovered there) saved it.

Most of the Center’s reference patrons are IEEE clients, and have to do with institutional history. This is fitting, because the Center’s job is to serve the IEEE membership. Region and Section historians, Standards, Conferences, Eta Kappa Nu, and Corporate Communications are internal patrons. Our external patrons have included Bloomberg News, the Congressional Inventors Caucus, the electronics firm of Bang & Olufsen, and documentary filmmakers working for PBS, National Geographic, Lion Television, and others. These extend the Center’s reach and heighten the public’s understanding of the contributions of technology to our world.

Reference requests often have a two-way benefit. In the course of assisting patrons and delving into the details, staff learn nuances about people and achievements they might not have known before, often from people who were involved with the events, or connected to people who were.

Some of the inquiries are genealogical. Children and grandchildren of technical pioneers are interested in what their relatives accomplished. An article in the History Center newsletter triggered an inquiry from a member whose uncle had crewed the Alexanderson ultra-long frequency submarine communications station on Oahu, Hawaii. Especially popular are reference questions about the crews of the ships involved in the laying of the transatlantic telegraph cables in the 1860s. We routinely hear from people whose ancestors who were crewmembers aboard those ships, and who are trying to find out more about the accomplishments of their forebears. In the course of researching one of those requests, a History Center staff member was surprised and delighted to learn that one of his own ancestors had been a passenger on the maiden voyage of the *Great Eastern* (one of the ships which later laid the successful transatlantic cable).

In a happy occasion, the Center was able to reconnect two former colleagues who had worked together at Hewlett-Packard. One of them saw the other’s name in the donor list of the History Center newsletter and asked the Center for help in getting back in touch.

The History Center: We’re here to help. [ieee-history@ieee.org](mailto:ieee-history@ieee.org)

## TECHNOLOGIES OF *FRANKENSTEIN* EXHIBIT AND ROUNDTABLE

As part of the History Center's ongoing collaboration with its host, Stevens Institute of Technology, the Center co-sponsored an international conference, "Technologies of Frankenstein" in celebration of the 200th anniversary of the publication of Mary Shelley's debut novel. History Center staff members Mike Geselowitz, Robert Colburn, and Lisa Nocks provided significant assistance with conference materials and organization, and made further contributions to two related attractions.



"Frankenstein in Context," an exhibit written and curated by Center historian Lisa Nocks, was on display in the central exhibit space in the Stevens S.C. Williams Library until 14 May. The exhibit provided historical background for the two themes of the conference: the idea of the monstrous as it was understood during Mary Shelley's lifetime, and the technological developments that are hinted at in the novel. Nocks, who has lectured and published on *Frankenstein* in the past, noted that—although Shelley used the word "monster" almost two dozen times to refer to Victor Frankenstein's creature—people living at the time she was writing her novel were continually reminded of the monstrous in their own lives. Epidemic diseases like smallpox – referred to as the "speckled monster" – and environmental and economic devastation resulting from cold growing seasons and then the fallout from the 1815 eruptions of the Indonesian volcano, Mt. Tambora, were "monstrous," as was the then state of medical care that made maternal mortality from sepsis a common

enough occurrence that a thanksgiving ritual for mothers who survived the birthing process was still included in the Anglican Book of Common Prayer. The exhibit also explored the contemporary research and beliefs about life and laws relating to the use of corpses, and the technologies Victor Frankenstein used to reanimate his creature. Nocks covered such topics as the development of the voltaic pile, the popularity of Humphry

Davy as a science lecturer and his use of electro-chemical experimentation to identify elements, the changing laws affecting the use of corpses for medical experiments, and the contemporary debate about the source of life.

A second "Technologies of Frankenstein"-inspired event, "Ethical Considerations 200 Years after Frankenstein," a round-table discussion, organized by Mark Vasquez of IEEE Tech Ethics, was broadcast live on IEEE.TV on 1 May. The speakers, philosopher of technology Peter Asaro (New School), IEEE member Dominik Boesl (KUKA Robotics), and historian of science and technology Lisa Nocks (IEEE History Center) responded to questions from moderator Jean Kumagai (*IEEE Spectrum*) about the similar concerns about technology in Mary Shelley's milieu and ours. Later, Vasquez delivered questions from the online audience, all making for an interesting discussion. The virtual round table is available to the IEEE community and to the public on the Tech Ethics tab of IEEE.TV. <http://ieeetv.ieee.org/channels/techethics>

## HISTORY CENTER IS PART OF IEEE'S HUMANITARIAN AND PHILANTHROPIC CONSORTIUM

The History Center is a member of IEEE's Humanitarian and Philanthropic consortium. The Consortium was established both as a way to save its member programs money (by sharing traveling expenses and the costs of exhibits and shipping at conferences and meeting series), and also to build communications across IEEE's organizational units and to various external audiences. The H&P consortium creates a unified reporting format and maximizes the visibility of their efforts by placing IEEE's twelve humanitarian and philanthropic programs – the IEEE Foundation, IEEE Life Members, Humanitarian Activities Committee, Smart Village, MOVE Community Outreach Initiative, SIGHT, IEEE Empower, the PES Scholarship Initiative, Eta Kappa Nu, EPICS, the IEEE Internet Initiative, and the History Center—under a single mantle.



## NEW PARTNERSHIP WITH ASEE

IEEE initially launched the Engineering and Technology Wiki (ETHW) as a partnership between IEEE, AICHe, AIME, ASCE, ASME, SPE and SWE. As a pan-engineering history site meant to encompass the histories of all technological disciplines, the ETHW's scope expands beyond the technical fields of interest of these seven societies. The ETHW partner societies have been working with the American Society for Engineering Education (ASEE) to have ASEE officially join the website's consortium.

The first project the ASEE is undertaking on the website is compiling a collection of First-Hand Histories of ASEE Fellows. Spanning all technical disciplines of engineering through the education sector, the ETHW as of 1 June 2018 collected eighteen histories, and anticipates receiving several more.

To read these histories, visit:

[http://ethw.org/First-Hand:ASEE\\_Fellows](http://ethw.org/First-Hand:ASEE_Fellows)

## “CREATIVITY, DISCOVERY, INVENTION,” STEVENS INSTITUTE COURSE SPRING 2018

Part of the arrangement between IEEE and the Stevens Institute of Technology is that the IEEE History Center historians teach courses in the Stevens College of Arts & Letters (CAL). Until now, the staff have been teaching upper level history of technology courses. However, CAL also teaches a two-semester “Freshman Experience.” The first semester, CAL 103, is the “Writing and Communications Colloquium,” where the students, largely in engineering, learn some of the skills necessary to becoming a successful engineering student and, ultimately, engineer.

In the second semester, CAL 105, or “Knowledge, Nature and Culture,” students take a thematic, interdisciplinary seminar that introduces the students to the various disciplinary approaches of the humanities and social sciences. It does so through the lens of investigating an aspect of science and technology that intersects those approaches, and that draws on the interest and expertise of the specific section instructor. For spring 2018, CAL Dean Kelland Thomas asked IEEE His-

tory Center Senior Director Michael Geselowitz to teach one of these sections. Mike chose for his theme “Creativity, Discovery, Invention” and explored how the humanities can shed light on the parallels and differences among artistic creativity, scientific discovery, and technological invention. Of particular focus was the question of whether in any or all of these human endeavors real progress was made by ordinary individuals, or only by extraordinary individuals that society has deemed to be “geniuses.” Picasso was a genius! Einstein was a genius! Tesla was a genius! Mike was happy to point out to the budding young engineers that while “artistic geniuses” and “scientific geniuses” get most of the press, the word “genius” and the word “engineer” share the same linguistic root.

Eighteen students were enrolled in the section, and the course ran from mid-January to mid-May. Look forward to exciting reports on other courses given by other History Center staff members in future issues of the newsletter.

## VINTAGE COMPUTING AT VCF EAST XIII

Under the leadership of tech journalist and enthusiast Evan Koblentz and his board, groups across the United States and Italy have connected and coordinated their branding and marketing under the Vintage Computer Federation or VCF label, where the F also stands for Festival. Historians Mary Ann Hellrigel and Alex Magoun represented the IEEE History Center at the latest VCF East at InfoAge in Wall Township, New Jersey, USA, at Evan's invitation, and they were impressed by the attendance and activities. More than four hundred people of all ages attended exhibits over three days in May, during which Mary Ann and Alex handed out the Center's promotional literature and chatted with IEEE members and many other folks. The exhibits were remarkable: the first consumer digital video camera (featured on the cover of *Popular Electronics* right after the Altair); a complete run of Macintosh IIs with various boards and addons; three generations of programmable electronic music systems; an excellent slide rule/calculator collection; early French home computers; various emulators

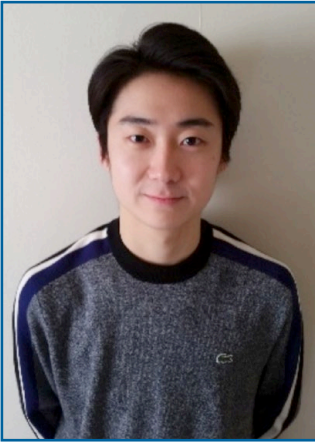
and originals for games and other programs; and much of the Joe Weisbecker collection of RCA home computers.

Exhibitors came from not only the mid-Atlantic but also the southern and midwestern US, and Canada. Besides the people above and their peers, curious local families also appeared, looking for interactives and encouragement for their children. A young girl, about eight years old, stopped by with her father to talk about women engineers and inventors. Evan proudly showed off their museum's recently expanded exhibit space, which features a working military Univac mainframe, a late 1950s Bendix G15 minicomputer on loan, a wide array of 1970s computers, etc. It was impressive and heartening to see so many people restoring historic electronics—and software—of ever greater complexity.

Vintage Computer Festival West takes place 4-5 August at the Computer History Museum in Mountain View, CA, USA. For more information, visit <http://vcfed.org/wp/>.



## PHILIP LEE IS RUTGERS INTERN IN PUBLIC HISTORY



The History Center is pleased to announce that Philip Lee is joining us this summer as part of the Rutgers Internship in Public History. Philip is a rising senior Economics major at Rutgers University, New Brunswick campus, from Fort Lee, New Jersey. He attended Fort Lee High School from 2011 to 2015. During this time, Philip was involved with Boy Scouts of America, ultimately becoming an Eagle Scout in 2014. At Rutgers, Philip

is part of Quantitative Finance Club and Rutgers Economic Society (RECONS). In addition, he was involved with two competitions at Rutgers: RECONS Forecasting Competition and Deloitte's Case Consulting Competition. Always having had a passion for history, Philip is excited to be interning for the IEEE and is grateful for this opportunity.

The Rutgers Public History Internship provides practical and meaningful hands-on experience at history-related non-profit or other historical agencies or institutions in New Jersey, where they receive instruction from experienced public historians, and learn about how the daily work of public history is done. The IEEE History Center is delighted to be one of the institutions partnered with Rutgers.

## ELIZABETH BADGER IS 2018 IEEE LIFE MEMBER INTERN IN HISTORY OF ELECTRICAL TECHNOLOGIES

Elizabeth Badger is a fifth year graduate student from the University of Minnesota who, when not working for the IEEE, lives in St. Paul. She is a culture and technology historian who is primarily focusing on video games, both on the industrial and the consumer side. At present, her research is exploring the importance of electrical engineering to the birth of the video game industry, and how cultural norms from within that field affected the cultural landscape of the game industry. She has conducted research in a variety of places including the Strong Museum, the University of Texas Austin, Stanford, and the Hagley museum. She hopes in working with the IEEE to solidify her understanding of engineering culture of the late 1960s and early 1970s, and find out how that culture continues to affect the industry today.

Other previous experiences have included docent and in-

ternship work for the Spark Museum in Bellingham, Washington and the Bakken Museum in Minneapolis, Minnesota. She has also worked as research guide and library aide for Minnesota's History Day program, as well as teaching and assisting in numerous different courses in the University of Minnesota's History department. She is, perhaps unsurprisingly, an avid gamer with a passion for learning about older, more obscure titles, companies, and consoles.

The Life Members' Internship in the History of Electrical Technologies

<https://www.ieee.org/about/history-center/internship.html>

is supported by generous donations to the IEEE Life Members' Fund of the IEEE Foundation

[https://www.ieeefoundation.org/donate\\_history](https://www.ieeefoundation.org/donate_history)

## BRICK AND MORTAR HISTORY— IEEE HISTORY VOLUNTEERS IN THE FIELD

### STATE OF CALIFORNIA GRANTS LANDMARK STATUS TO CROSBY BUILDING

By Robert Phillips

The State of California Historical Commission has granted landmark status to the Crosby Building at 9028 W. Sunset Boulevard. This building was the primary office of Bing Crosby, and the location where the first video tape recorder was developed. In 1953 Bing Crosby was being asked to do television shows instead of radio, but there was no easy way to record a television program as he was doing with his radio show. In 1950, Bing asked Jack Mullin if he could record television on tape the way the radio show was recorded, and Jack told Bing that he

did not see why it could not be done. Encouraged by Jack, Bing put money into the Electronic Division of Bing Crosby Enterprises so that Jack could build him a recorder and also encouraged Ampex to build a video recorder. The major development by BCE was the design of a broadband magnetic head.

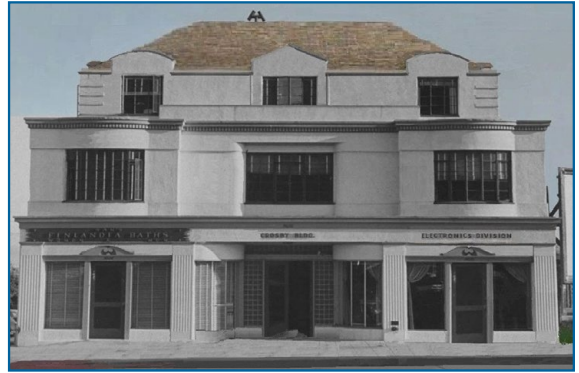
The commission voted unanimously for granting the national listing. The State has sent the nomination to the National Park Service, which grants national landmark status. Because the owner objected, the building will be listed as "eligible for National Status." However, the State of California will list it as

a State Historic Place without any restrictions.

The journey to landmark status is a long one, and it began more than three years ago with the First-Hand History Robert Phillips wrote for John Vardalas, who at that time was the Senior Historian (now retired) at the IEEE History Center. The first hand history is on the Engineering & Technology History Wiki at [http://ethw.org/First-Hand:Bing\\_Crosby\\_and\\_the\\_Recording\\_Revolution](http://ethw.org/First-Hand:Bing_Crosby_and_the_Recording_Revolution) Phillips' two First Hand History entries on the EWHW were the major references for the landmark nomination.

The Ampex videorecorder is an IEEE Milestone

[http://ethw.org/Milestones:Ampex\\_Videotape\\_Recorder\\_-\\_1956](http://ethw.org/Milestones:Ampex_Videotape_Recorder_-_1956)



The Crosby Building in West Hollywood, California, U.S.A. where videotape recording was invented. Photo Credit: Robert Phillips

## IEEE LIFE MEMBERS' FELLOWSHIP IN HISTORY

### THEODORA DRYER IS 2018-2019 IEEE LIFE MEMBERS' FELLOW IN THE HISTORY OF ELECTRICAL AND COMPUTING TECHNOLOGY

Theodora Dryer is a PhD candidate in the History of Science Department at University of California, San Diego. Her thesis, *Designing Certainty: The Rise of Algorithmic Computing in an Age of Anxiety, 1920-1960* investigates the rise and spread of algorithmic decision-making before 1945 when people such as Herbert Simon began to use electronic computing programs predicated on 'yes' or 'no' decision-making. Earlier 1920s and 1930s iterations of the same algorithms—the null hypothesis model and the Input-Output model—represented a drastically different approach to decision-making. In these earlier contexts, the objective was not to ascertain certainty, but to embrace the

limits of human uncertainty. Prior to 1945, algorithmic planners rejected the certainty hypothesis altogether. They instead embraced *uncertainty* and *unknowability* as central mechanisms in their computational planning work. Interwar human computers believed that mathematical mechanisms were intrinsically limited in their capacity to manage human welfare. *Designing Certainty* begins at the end of WWI when a growing transnational planning movement sought to reorganize a failing social and political world with algorithms designed to translate uncertainty into probabilistic language.

## THINGS TO SEE AND DO

### Artefacts Consortium

The Adler Planetarium is proud to host the 28th meeting of the Artefacts Consortium, on the theme of Relevance of Collections, October 14-16, 2018, Adler Planetarium, Chicago, USA. The meeting will explore how museums and related institutions have defined and maintained the relevance of their collections. The Artefacts Consortium is an international association of historians in museums and academic institutions who promote the use of objects in serious historical studies. Registration and paper submission are now open.

<https://www.adlerplanetarium.org/artefacts>

### “Sound of the Times – The Michael Molnar Radio Collection”

A fascinating and visually impressive exhibit, “Sound of the Times – The Michael Molnar Radio Collection,” is on display



now through March, 2019 at the Red Mill Museum Village, just off I-78 in Clinton, New Jersey, U.S.A. The exhibit, co-curated by the museum's collections curator, Elizabeth Cole and Michael Molnar, a Stevens Institute alumnus and radio history enthusi-



ast, includes dozens of radios, speakers, and related equipment Molnar collected over more than three decades, and offers images and stories of the history of radio and its cultural impact. Among the artifacts are a c1934 RCA Model 281 radio and a c1923 Freed-Eisemann NR-5 neotrodyne receiver that visitors

can attempt to tune. An added attraction is a sound recording booth that allows visitors to experience recording as it was in the hayday of radio broadcasting by entering the booth and to trying to create sound effects during a narrated story.

## TECH HISTORY ON THE WEB: STAFF FAVORITES

### FAIRCHILD PATENT NOTEBOOKS

What's present at the creation of a technology besides the inventor(s)? Usually there's a notebook on the bench for research and—until recently—patent purposes. It's difficult to get any closer to an engineer's thinking during a project, and it's exciting to follow the inventive process as recorded in nearly real time, when those notebooks are preserved. The Computer History Museum has scanned 207 of the most significant Fairchild Semiconductor notebooks donated by Texas Instruments. Included are five, beginning 3 April 1957 and ending 1 March 1968, when Gordon Moore joined other former Fairchild staff at Intel. You can explore his thoughts as he helped build the company and developed the "law" that bears his name at <http://www.computerhistory.org/collections/fairchild/?s=Gordon+Moore>.

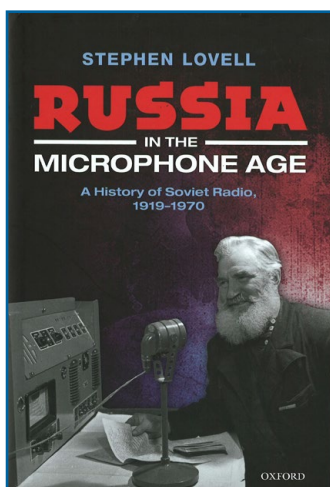
### HISTOIRE DE LA TÉLÉVISION (ET DE QUELQUES AUTRES MEDIAS)

Between 1999 and 2004 André Lange created and edited the original version of this enormous site on the early history of television and related technologies, and last December he launched a new and expanded version: <https://www.histv.net/>. Its special appeal lies in the trans-national documentation of and essays on the television experiments and promotions before World War I. Although largely in French, Prof. Lange has translated substantial sections and online translation makes much of the rest comprehensible. Explore the world of video electronics, often before researchers knew there were electrons!

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 <https://www.ieee.org/about/history-center> and more about the Engineering & Technology Wiki ([ethw.org](http://ethw.org))

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*Russia in the Microphone Age: A History of Soviet Radio, 1919-1970*, New York, Oxford University Press, 2015

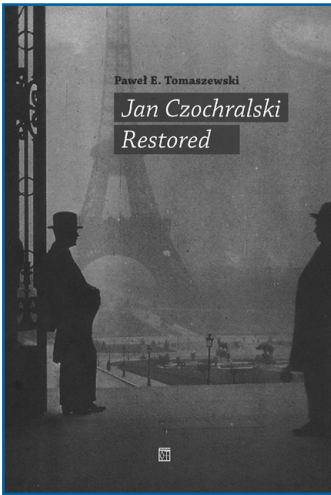


Nations around the world began regulating the new medium of radio broadcasting in the early 1920s, including the newly formed Union of Soviet Socialist Republics. Professor Lovell synthesizes a fascinating variety of sources, from government archives to regional university dissertations to oral histories preserved in Great Britain and the United States, to explain the evolution of Soviet broadcasting. While changes in programming and presentation

were largely related to the politics of successive leaders, the author usefully and smoothly includes responses from urban and rural audiences, who complained about the emphasis on high-culture programming, and changes in technology, as in the post-1945 transition from live to pre-recorded material, and the gradual transition to wireless receiving systems. If the differences with government-sponsored radio in democracies are obvious, the similarities are sometimes surprising.

Available from Oxford University Press at <https://global.oup.com/academic/product/russia-in-the-microphone-age-9780198725268?cc=us&lang=en&>, \$59.95, hardback, ISBN 978-0-19- 872526-8, xi + 298 pages, black and white illustrations.

TOMASZEWSKI, PAWEŁ E.,  
*Jan Czochralski Restored*, Wrocław, Oficyna  
 Wydawnicza ATUT, 2013



Researchers in material science, and particularly solid-state physics and engineering, will be familiar with the Czochralski Method, but what do they know of the man who invented it? Prof. Tomaszewski has spent more than thirty years exploring and documenting the accomplishments and mysteries of a fellow Pole who navigated the complex currents of Polish and German politics over the first half of the 20th century, and who suffered exile in 1945 from the academic life where he was

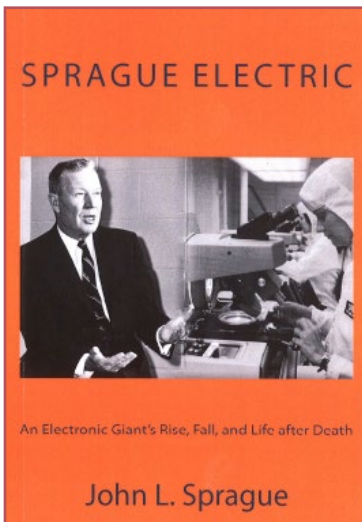
most productive. The author cannot answer all of the questions he raises from available evidence, but his wide-ranging research has resulted in the rehabilitation of Czochralski's reputation in his homeland. The evidence indicates, when it does not show, that this remarkable man refined metallurgical techniques and science on behalf of the Polish state during his German employment in the 1920s and his Polish employment in the 1930s, and protected his staff and Jewish business partners during World War II.

Available from Oficyna Wydawnicza ATUT at [www.atut.ig.pl/?916,jan-czochralski](http://www.atut.ig.pl/?916,jan-czochralski), 55 zł, hardback, ISBN 978-83-7432-945-3, 298 pages, black and white illustrations.

#### 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.

[http://www.amazon.com/Sprague-Electric-Electronics-Giants-after/dp/150338781X/ref=sr\\_1\\_2?ie=UTF8&qid=1429202871&sr=8-2&keywords=sprague+electric](http://www.amazon.com/Sprague-Electric-Electronics-Giants-after/dp/150338781X/ref=sr_1_2?ie=UTF8&qid=1429202871&sr=8-2&keywords=sprague+electric)





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