

# IEEE History Center

ISSUE 97, March 2015



*Thomas Lohe (President of Karlsruhe Institute of Technology) and Roberto de Marca (2014 IEEE President) unveil Milestone plaque for Hertz's discovery and experimental proof of electromagnetic waves (IEEE's 150th milestone)*

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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.

Welcome to another action-packed issue of the IEEE History Center newsletter, the first issue in what is poised to be a very exciting year. As discussed by the IEEE History Committee Chair in his column (pg 3) and also described in the article on page 4, the new Engineering & Technology Wiki site has been launched. As mentioned last issue, a Phase 2 grant from the United Engineering Foundation will have us continuing to fine-tune the site and finding additional partners. Our main focus in 2015, however, will be on raising the visibility of this new exciting resource. I hope

that you, our staunch supporters, will visit the site ([www.ethw.org](http://www.ethw.org)), use its content, and, most importantly, participate in our efforts to preserve and make known engineering history by writing topic articles or first-hand histories.

Our other major focus this year will be REACH (Raising Engineering Awareness/Appreciation through the Conduit of History) our pre-university educational program that was previewed last issue by our IEEE Development Office colleague, Natalie Krauser-McCarthy. To remind you, REACH will be our effort to give pre-university teachers the tools they need to teach and engage their students in the history and role of engineering and

### 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 Global History Network, Milestones, and Oral History Collection, please click the "Donate Online" tab at [www.ieee.org/donate](http://www.ieee.org/donate) or [www.ieeefoundation.org/](http://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 [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 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.

	Cost Per Issue
Quarter Page	\$150
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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, 2 October.

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

technology in their society. While not every student who learns about the history of engineering and technology will enter a technical field (though we hope some do!), everyone will gain a better understanding of the technology they use daily, and of how the engineering discipline helped create the world many take for granted. We are not the only ones who believe that the role of technology in history is important—the “Common Core” social studies standards that are being promoted in the United States call for students to engage in the subject—but for structural and historical reasons history teachers currently lack the tools to do so effectively and in an exciting way. The IEEE History Center is well positioned to fill that gap!

2015 will be the year that we organize our staff team to take on this important initiative, identify our external content partners, develop production and communication plans, and convene stakeholder meetings. We will also be working closely with Natalie and our other IEEE Development Office and IEEE Foundation partners to identify and engage potential major donors.

I would like to point out that despite these two major initiatives, ETHW and REACH, we have not let up in our other ac-

tivities to preserve and make known the proud heritage of IEEE, its members, our professions and industries, and, most importantly, the related technologies. The ever accelerating Milestones program has reached a Milestone of its own (see pg. 7). Our successful move to the Stevens Institute of Technology was capped off by some exciting university teaching (pg. 5). Our social media presence is exploding (pg. 5). We completed an important institutional history project for the IEEE Life Members Committee (pg. 4).

We hope that all of these programs continue to draw your support for our important mission. This is the newsletter issue when annually we recognize you, our generous donors, with our Honor Role (pp 9-13). As you can see—despite uncertain economic times and despite an ever-increasing number of calls for your philanthropic dollars—you and your fellow fans of the IEEE History Center have come through again. I want to personally express my extreme gratitude and also my hope that you will continue to give generously, whether for REACH (our fundraising focus this year), for general operating support, or for any program or project that resonates with you personally. Thanks again.

## HISTORY COMMITTEE ACTIVITIES

### HISTORY COMMITTEE CHAIR’S MESSAGE

Taking this opportunity to thank you all for the support in 2014, needs to be extended especially to those of you who recognise the History Centre operations as a worthwhile means to 'leave your mark' in history! To the donors and volunteers, your contributions may seem to disappear into the noise of today's social communications, and I want to assure you that your contributions are highly valued. Our History Center operation is measured financially as 0.3% of the IEEE machine, our impact however in one of the most visible of IEEE outside academia and far greater than a 0.3% influence.

Witness the degree of change during the past 12 months with the History Centre. Sure there were back-end office changes for the staff, with still some challenges to resolve, but the game changer is the new "Engineering and Technology History Wiki". The level of investigative journalism and word of mouth around this initiative are all pointing to the near guaranteed success and support this initiative even before it goes

live. The attention is elevating the IEEE brand and shows we are adaptive to the modern day social and behavioural changes. The anticipated changes in 2015 are expected to be equally significant as our initiatives expand and gather momentum, suffice to say, it will be hard to predict how high we will land from a reputation and global historical impact perspective.

One thing history teaches us that most of the challenges we are facing today have all occurred in the past. Technology facilitates social change, where unwanted events in the world can be presented in an unsettling way onto your smart phone within minutes. The recent events here in Sydney and then in Paris both came across like we were there, indeed I was just 300m from the Sydney events, and shared that same emotion of what occurred in Paris just 14 days later. Communications 100 years ago was far less immediate, and now looking forward, the social changes in the future will be driven by what we do in the technology space, for better or for worse.

## CENTER ACTIVITIES

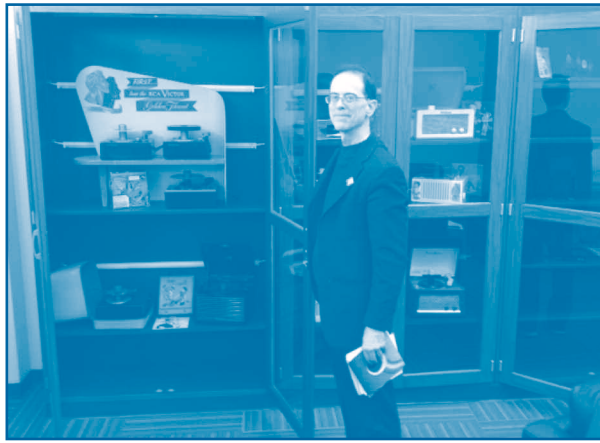
### NEW 45-RPM PHONOGRAPH EXHIBIT AT THE HISTORY CENTER

Long before music streaming and MP3 files, and portable cassette decks pioneered by Sony’s Walkman, corporations sought ways to make the music you want available when you want it. In the late 1930s, RCA Victor had a problem. Sales of 78rpm records were rising, and so were sales of record changers on

which people stacked their own playlists, just like AM radio’s first disc jockeys. But 78s, made largely of slate powder, weighed heavily on a record player’s spindle and motor; the variety of shaped edges made it difficult to separate one disc from

the stack. Benjamin Carson led a team to redesign the record and its changer in a patented system that RCA released only after Columbia records introduced its longplaying 33 1/3-rpm records in 1948. Both systems found their niches among record buyers, the cheap 7-inch diameter singles proving popular with teenagers and performers with only a song to release. RCA Victor made its large-spindle changers for nearly ten years, before multi-speed players with spindle adapters made them less necessary. The single record format is a rare novelty now that plays at the LP speed with an LP spindle, but the format's durability over 50 years testifies to its cultural appeal.

The History Center's first exhibit at its offices in Stevens Institute's Samuel C. Williams documents this pop culture icon,



thanks to the generosity of Phil Vourtsis, the world's leading collector of 45rpm record changers and phonographs. Outreach historian Alex Magoun had worked with him before in assisting with Phil's book, *The Fabulous Victrola 45* (Schiffer, 2002), and creating a smaller exhibit at the David Sarnoff Library. At the History Center Vourtsis loaned a larger sample of RCA Victor record players and related artifacts that Magoun complemented with more recent 45rpm records and other discs of similar or even smaller size. The result is three cabinets showcasing RCA's initial products and succeeding changers, along with 45s in their original colors and sleeves. Should you be in the New York or Hoboken, NJ area and feel a nostalgic pull, please stop by!

## LIFE MEMBERS COMMITTEE HISTORY PROJECT UPDATE, MARCH 2015

By Sheldon Hochheiser, Archivist and Institutional Historian

As I reported in the last two issues of the newsletter, at the request of—and with funding from—the IEEE Life Members Committee, the IEEE History Center engaged veteran public historian of technology and IEEE Member Andrew Butrica to research and write a history of the Life Members Committee. In January, as planned, Butrica completed a 162-page draft history and submitted it to the History Center and through the Center to the Life Members Committee for review. The draft documents the entire history of the IEEE Life Members Committee; its predecessor the Life Members Fund Committee; the history of life membership at IEEE predecessors AIEE and IRE; and the many programs that the Life Members Fund has supported over the years. These include many decades of support for historical

activities, both at the IEEE History Center and elsewhere, as well as decades of support for students, education, and the interests of older IEEE members. Butrica's work stands as a model of what can be done by a historian to document an important piece of IEEE history.

Butrica, as part of his research, became no doubt the first person to read all of the minutes of the committee, going back to AIEE days, and all of the issues of the Life Members Newsletters. He also conducted Oral Histories with staff member Dan Toland, who long supported the committee, and key volunteers Art Winston and Jacob Baal-Schem.

After reviews are completed, the LMC history will be posted on the the Engineering and Technology History Wiki for all to read and use. The three oral histories will be posted there as well.

## UEF PROJECT UPDATE

As was reported in the last issue of this newsletter, the IEEE History Center championed the creation of a consortium of engineering associations with the goal of designing, launching, and running a new history of engineering website. With support for the United Engineering Foundation (UEF), this consortium launched the Engineering and Technology History Wiki Network ([www.ethw.org](http://www.ethw.org)) in January 2015. Currently the consortium has seven members: AICHE, AIME, ASCE, ASME, IEEE, SPE, and SWE. The UEF is funding a second year to expand and improve the site and seek additional partners, and all partners contribute an annual fee to run the website. The IEEE History

Center manages the site on behalf of the consortium. Please go to the ETHW and explore it.

From the outset, the IEEE History Center has believed that ETHW would best serve the world by increasing the diversity of the participating engineering disciplines. The current consortium members all have the same belief. As mentioned, seeing the wisdom of embracing more engineering societies, the United Engineering Foundation has given us a second grant to help in this recruitment. This grant is also intended to help us promote the site within the memberships and the wider general public. To paraphrase a cliché, building it does not ensure that they will come. An active awareness campaign is needed.

## IEEE HISTORY CENTER AT THE AMERICAN HISTORICAL ASSOCIATION

From Friday 2 January to Monday 5 January, the American Historical Association (AHA)—the main society for practicing historians in North America—held its annual conference in New York City. The theme of the meeting was “History and other Disciplines” and the AHA encouraged nontraditional session formats in order to foment discussion on this important issue of interdisciplinarity. Dr. Andrew Russell, a Stevens Institute of Technology colleague, therefore organized a roundtable session held on the Sunday entitled “The History of Engineering and the Engineering of History,” which was chaired by IEEE History

Committee member Dr. Paul Israel. History center Senior Director Dr. Michael Geselowitz contributed opening remarks entitled “Professional Courtesy: Historians Encounter Engineers” and participated in the subsequent discussion. The session was well attended by a range of historians interested in issues surround engineering and technology (and even one practicing engineer!), and the discussion was lively. While at the conference, Dr. Geselowitz also attended several sessions on public history and participated in the AHA’s annual business meeting.

## IEEE HISTORY CENTER 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 123,000 followers as of January 2015 and more than 130,000 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 10,400. To follow the blog or to view the images, go to <http://engineeringhistory.tumblr.com/>.

## BRINGING THE HISTORY OF ENGINEERING ALIVE

The History Center’s innovative course, given in the Fall of 2014, on the history of engineering was a success. As reported in the last issue of this Newsletter, this course, which looked at the role of engineering in human development from prehistoric times to the 18th century, integrated hands-on labs with classroom lectures strongly grounded in history and archaeology. Introducing labs is an exciting and effective way to make a traditional humanities course come alive, particularly for engineering and science undergraduates. Traditionally, history courses require students to write term papers. The capstone for this course was an ambitious project in which students, grouped in teams, explored the connection between the design and performance in ancient naval vessels.

The trireme was a formidable, high performance naval vessel in the ancient Mediterranean. In their superior use of the trireme, the Athenians defeated Xerxes’s much larger Persian fleet at the battle of Salamis, in 480 B.C. Many historians argue that it was this victory that saved Athens and allowed the concept of democracy to take root in the history of the West. The students were asked to examine the role of the cutwater (bow) in the performance of these ancient vessels. Other than serving as a way to mount a bronze ram, did this long protrusion of the bow play any role in the vessels performance? To frame the project, Dr. John Vardalas, Senior Historian at the IEEE History Center, consulted a team of 2 naval architects, an archaeologist, and a historian of ancient navies: Drs. Larrie Ferreiro, Raju Datla, Jeffrey Royal, and William Murray respectively. They suspected that the cutwater played a role. This group produced a

rough sketch that captured the general shape of the cutwaters found in ancient iconography.

With the help of a graduate student, our undergraduates worked in two teams to convert this rough sketch into 3-D CAD drawings for the hull. The CAD files were then sent to a CNC machine to produce a 5 ft. scale version of the hull, with two different bow attachments: the ancient cutwater and the traditional bow we normally associate with ships. The two configurations were then tested in Stevens’s world-class tank testing facility, at the Davidson Laboratory. The tank uses an array of sensors to measure the model’s dynamic behavior. The model was run through the water at different speeds. The students then scaled up the data to produce drag coefficient numbers for the full sized vessel, which, based on archaeological evidence, was more than 120 ft. long. From the data, the students discovered that the cutwater conferred clear hydrodynamic advantages to the vessel.

Instead of writing a conventional report, the course challenged the students to give a presentation in a specific historical context. They were to go back in time to Ancient Greece and pretend to be naval architects giving a presentation to the Athenian Trieropoioi on the eve of the Peloponnesian War. The Trieropoioi, a board of ten men, was charged by the Athenian assembly to let contracts for trireme construction. Each team had to convince this board that if Athens were to prevail over its Spartan foe, more money had to be invested to support the team’s R&D. The students got into their role-playing and did a wonderful job. The board was played by Stevens faculty and staff, which included the Provost.

## ROBOTICS HISTORY: NARRATIVES AND NETWORKS. A MAJOR COLLECTION OF ORAL HISTORIES COMES TO THE IEEE HISTORY CENTER

In 1961, George Devol and Joe Engelberger put the world's first industrial robot on the factory floor of General Motors, and in the half-century that followed, robots have found their way into surgery rooms, scientific laboratories, battlefields, search and rescue situations, Mars, and even our homes as vacuum cleaners, toys, and security guards. To commemorate this anniversary, the IEEE Robotics and Automation Society decided in 2010 to undertake a major project to document, and preserve, and disseminate this history. The society formed a partnership with the School of Information and Computing at Indiana University, and in particular, with Assistant Professor Selma Šabanović, a social scientist who is an expert on the influence of social and cultural factors on the design of robots in the U.S. and Japan, as well as on how theories of social cognition can be developed and evaluated through human-robot interaction. Professor Šabanović put together a team to undertake the extensive initial stage of this project, collecting the recollections of major par-

ticipants in robotics through oral history. The team collected more than ninety of these between 2010 and 2013. In 2014, Šabanović approached the IEEE History Center to see if the Center would be interested in hosting and preserving the transcripts of these oral histories on the IEEE Global History Network. The History Center of course, was happy to do so, and she started to send the transcripts to the History Center as they were ready. To date, she has sent 22 transcripts, all of which have been posted. Among the interviews available are those with IEEE Life Fellows Peter Kokotovic, Ray Jarvis, and George Bekey.

With the transition from the Global History Network to the new Engineering and Technology History Wiki, these oral histories can be found there. You can find the list of available oral histories, with brief descriptions, and links to the full transcripts at: [http://ethw.org/Oral-History:Robotics\\_History:\\_Narratives\\_and\\_Networks](http://ethw.org/Oral-History:Robotics_History:_Narratives_and_Networks)

## FROM WATT TO JOBS: LIVES OF THE ENGINEERS AND THE RISE OF THE GREAT POWERS

It's not hard to imagine that for engineering majors fulfilling a requirement in history—even when it's about one's profession—a course on the history of modern engineering threatens to glaze over the eyes and ears. After all, what can one learn from the development of now-outmoded techniques and technologies? History Center outreach historian Alex Magoun thought he would try to overcome that potential obstacle in two ways. One is to take a biographical approach, and focus on the lives of individual engineers and their relation to the era and countries in which they lived or worked. The second approach is to put those individuals in the context of their countries' rise to the status of great powers. "I want to make it personal," Magoun says. "Engineers enjoy and struggle with the fortunes of life, and they have to adapt to or resist the political, economic, and technological trends of their time and space, just as the rest of us do."

Such a course has its challenges, to be sure. Magoun has learned a great deal about civil and mechanical engineering in the 18th and 19th centuries, and is still assimilating what biographies he can assemble about engineers in European and Asian countries in the 19th and 20th centuries. "My high school French helps a bit, but not with German, Japanese, or Russian, alas. The sooner online translation software improves, the better."

## THANK YOU TO OUR HISTORY CENTER DONORS!

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

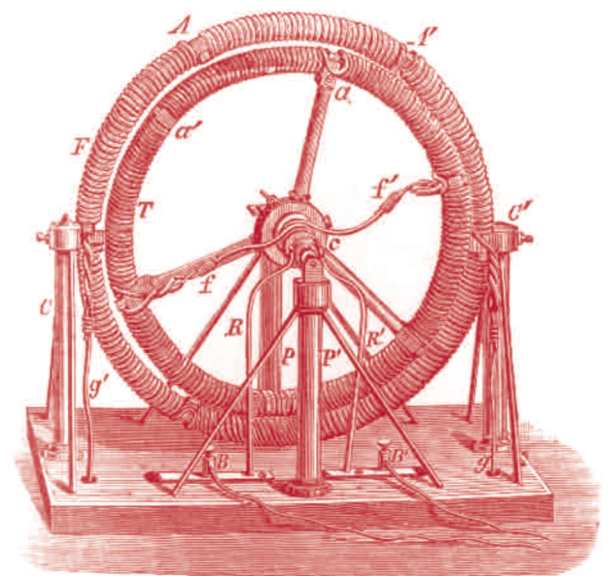


Image courtesy of Smithsonian Institution

## 150<sup>TH</sup> MILESTONE IN ELECTRICAL ENGINEERING AND COMPUTING DEDICATED

IEEE's Milestone program dedicated its 150th milestone on 5 December 2014. Commemorating Heinrich Hertz's discovery and proof of electromagnetic waves in 1888, the plaque was unveiled in front of the building where Hertz made his discovery at the Karlsruhe Institute of Technology, Karlsruhe, Germany by 2014 President Roberto de Marca and Karlsruhe Institute of Technology President Detlef Lohe. The Milestone Program has grown in recent years, and is one of the most publicly-visible ways that IEEE recognizes and celebrates achievements within its fields of interest. 2014 was a very active year, with fifteen milestone dedication ceremonies held in Japan, Germany, Canada, and the United States. Because some of the milestones

had multiple plaques, almost half a ton of bronze bearing IEEE's name was installed in various parts of the globe.

Nonetheless, many achievements remain to be recognized, and IEEE encourages its members to propose these achievements. Details of the Milestone Program can be found at: <http://www.ieeeahn.org/wiki/index.php/Special:Milestones> and there is even a list of suggested achievements (which is not intended to be a comprehensive list, merely examples) which can be proposed [http://www.ieeeahn.org/wiki/index.php?title=Milestones:List\\_of\\_Achievements\\_Suitable\\_for\\_Milestones](http://www.ieeeahn.org/wiki/index.php?title=Milestones:List_of_Achievements_Suitable_for_Milestones)

## THINGS TO SEE AND DO

### VINTAGE COMPUTER FESTIVAL

**Vintage Computer Festival East** will celebrate its tenth anniversary on April 17-19 at the InfoAge Science Center, in Wall, New Jersey. "VCF East" offers sixteen technical classes, two hands-on demonstration halls of systems from the 1960s-1980s, and historic lectures. This year's keynote speakers are computer designer Wes Clark and VisiCalc co-creator Bob Frankston. There

will be a special ceremony honoring the 50th anniversary of the DEC PDP-8 minicomputer. Visitors to the family-friendly event will also find museum tours, consignment, vendors, food, prizes, and more. Please visit [www.vintage.org/2015/east/](http://www.vintage.org/2015/east/) for details or find us on Facebook and Twitter @vcfeast. Contact: [evank@midatlanticretro.org](mailto:evank@midatlanticretro.org).

### THE COMPUTER WORE HEELS APP

Guest review by Gabriela Geselowitz, *Tablet Magazine*

In 2011, readers of this newsletter were informed about a documentary film, "Top Secret Rosies," which had been partially funded by the IEEE Foundation. The IEEE History Center had played an advisory role in the production, and served as one of the premier sites. Now the director of the film, LeAnn Erickson (also a professor of film at Temple University in Philadelphia) has turned the film into an App for the iPad.

Like the film, "The Computer Wore Heels" tells the inspirational story of the group of young women in their teens and twenties who used their math skills and early computing technology on behalf of the allies during World War II. It's a story well recorded but under-reported, and this app explains the work of these women in a way accessible to young adults.

LeAnn Erickson's App reads like a novel (and is even designed to resemble a book, complete with turning pages), with multimedia extras, from newsreel clips, to old photographs, to now-digitized handwritten notes. It tells the story from the perspective of the young women from a diverse group of back-

grounds who were united by their love of math and desire to help the war effort. The story is one of the history of computing to be sure, but it's also several composite biographies.

The app explores the hardships of the young women, including the several Jewish participants in the program fearing the Holocaust overseas, and the discrimination faced by an African American woman on the team. Of course, it outlines how difficult it was to have a career in mathematics as a woman at the time, how they didn't receive the recognition they deserved for their work, and yet what a rare opportunity all the girls had.

This story draws the clear connection between math skills and computing, as the women go from solving problems on their own to working on ENIAC.

The app concludes with a message to young women encouraging them to follow in the footsteps of these women seventy years ago – and it's a message sorely needed. Hopefully this app will gain popularity and can inspire someone else to not give up on her love of math or computing.

Available for the iPad at the Apple App Store for \$2.99.

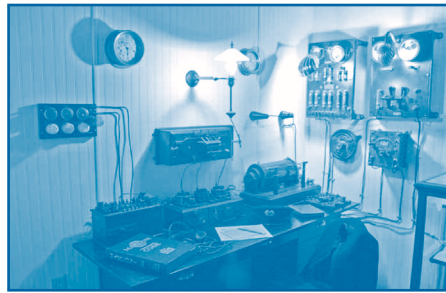
## ANTIQUÉ WIRELESS MUSEUM, BLOOMFIELD, NEW YORK

Life without telegraph, telephone, radio, television, cell phone, or wireless text messaging would be very quiet and certainly not what we expect in today's world of instant communications. The Antique Wireless Museum, now in its 62nd year, preserves and shares the history of technologies used to communicate and entertain, from telegraph to text messaging.

The Antique Wireless Association (AWA) is based in Bloomfield, New York southeast of Rochester New York. The AWA houses a world-class collection, including nearly 90,000 cubic feet of artifacts and ephemera at the Thomas Peterson, Jr. Antique Wireless Museum and Research Campus.

In autumn of 2014, the AWA announced plans to double the size of its exhibit space by August 2015. "Phase II" of AWA's development of the museum will provide much needed additional exhibit and program space. In the last year there have been two major additions to the collection which will be incorporated into Phase II.

Major components of the Delano, California, *Voice of America* Station have been recovered and shipped to AWA. The AWA, in cooperation with the Collins Collectors Association, rescued the station's control room and one of the Collins 250,000 watt short wave transmitters and shipped the components to Bloomfield, New York. The Delano station was built in



*Titanic Wireless Room Display*



*Western Union Office Display*

1944 and operated until October 2007 as a Voice of America station during World War II, the Korean War, the Cuban Missile Crisis, and the Cold War. One of VOA's most powerful stations, it sent its signals to Central America, South America, and the Pacific Rim. This display will tell the historically significant story of VOA and its role in worldwide short-wave broadcast communications, and its major impact on preserving and promoting free speech.

The AWA was also selected as the new home for the National Telegraph Museum and significant pieces from the historic Western Union Museum. Displays of these historic artifacts and ephemera will be included as part of the Phase II development. Telegraph was the beginning of electric/electronic communications, and Western Union, founded in Rochester, New York, played a central role in the development

and commercialization of the telegraph industry.

The Antique Wireless Museum is open Tuesdays from 10 am to 3 pm and weekends from 2 pm to 5 pm. The research library is available for historical research by appointment and holds more than 500,000 books, documents, photographs, and recordings.

For further information, visit the AWA web site at [www.antiquewireless.org](http://www.antiquewireless.org).

## IN MEMORIAM

### IN MEMORIAM: CHARLES TOWNES, A DEDICATED SUPPORTER OF HISTORY



The IEEE History Center lost a friend and longtime supporter recently. Charles Townes, IEEE Fellow, Nobel Laureate, and inventor of the laser, died at the age of ninety-nine on 27 January 2015. Townes's many contributions to technology made him a towering figure; imagine a world without CD and DVD players, laser surgical devices, industrial lasers, or fiber-optic communications. While much has, and will, be written about his technical achievements, the IEEE History Center staff would particularly like to remember his service to IEEE's historical activities. We also recall with personal fondness what a delightful and engaging person he was to work with. Charles Townes

served on the Trustees of the History Center from 1999 through 2001, and continued to lend his wisdom and advice as a trustee emeritus for many years after that. He was also a stalwart supporter of the IEEE History Center Fund.

An oral history—including an audio clip—with Charles Townes conducted by IEEE History Center Senior Historian Fredrik Nebeker can be found on the Engineering & Technology History Wiki (ETHW) at [http://ethw.org/Oral-History:Charles\\_H.\\_Townes\\_%281992%29](http://ethw.org/Oral-History:Charles_H._Townes_%281992%29) and we are pleased that we can help preserve Charles Townes' words and voice. An obituary in The Institute can be found at: <http://theinstitute.ieee.org/ieee-roundup/opinions/ieee-roundup/remembering-laser-theory-pioneer-charles-townes->



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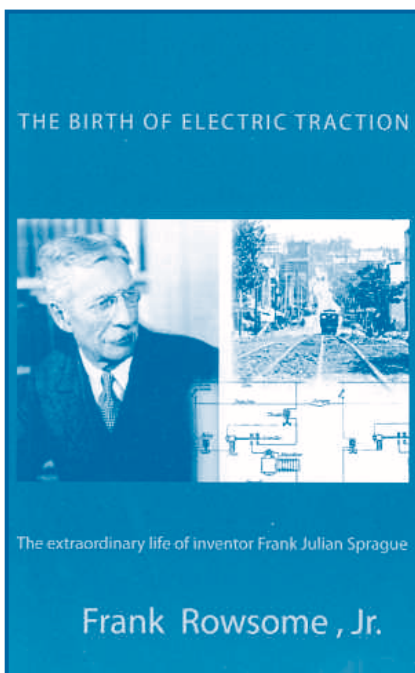
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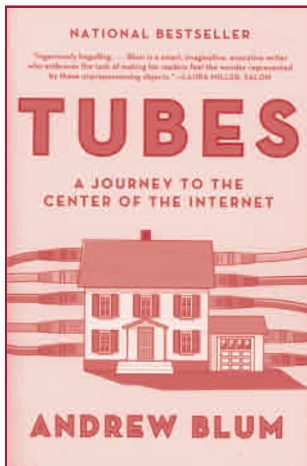
Frank Rowsome Jr. is probably now most famous for *The Verse by the Side of the Road* (1966), but he was also managing editor of *Popular Science Monthly* and later became NASA's chief of technical publications.

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BLUM, ANDREW,  
*Tubes: A Journey to the Center of the Internet*,  
Ecco Books: 2012



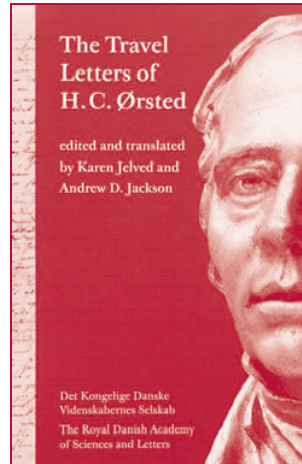
By Sheldon Hochheiser

While not—except incidentally—a book of history, many readers of this newsletter will likely find this book an interesting and engaging read. While the internet is most often thought about in abstract conceptual terms, Blum undertook the task of exploring and describing the internet in physical terms—as actual pipes of fiber optic strands carrying messages across cities and around the world on pulses of light, as physical buildings where the messages are handed off from one carrier’s fiber to another’s

on their way to their destination, and as data centers where the information is stored. He constructed his book as a physical journey, a geek’s travelogue, to locations around the world where the physical internet is located, from hubs in places including New York, Vienna Virginia, Amsterdam, and London, to cables running under city streets to places where submarine cables emerge from the ocean. He explains how all these things come together to provide the physical infrastructure upon which modern communications is grounded.

Ecco Press, an imprint of HarperCollins Publishers, New York. Paperback, \$15.99. ISBN 978-0061994951. 271 pages, Index.

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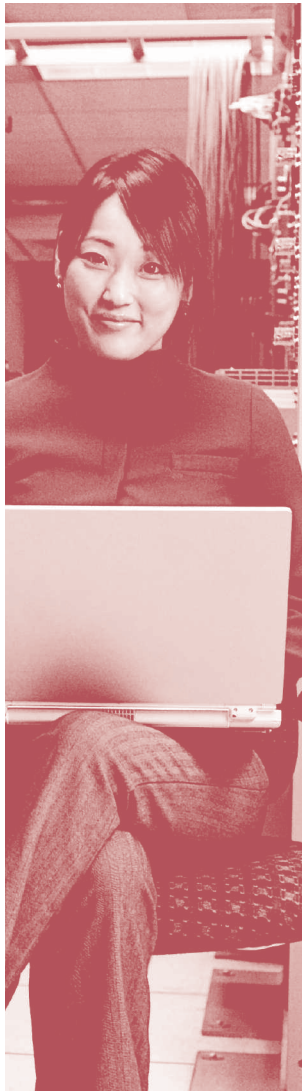
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