IEEE History Center

STATIC FROM THE DIRECTOR

I write this column having just returned from giving a guest lecture to a group of boisterous but attentive ninth graders in a global history class. This activity was part of our pilot project with Hillsborough (NJ) High School to explore how we might introduce technology into the pre-university social studies curriculum. This effort complements the fine work by IEEE Educational Activities to enhance pre-university science, technology, engineering, and mathematics education (so-called "STEM"). IEEE has three education-related strategic goals:

- That communities around the world will universally recognize and appreciate the profession and IEEE's role
- That technological literacy will prevail among all educated citizens
- That IEEE will be recognized as a global force in shaping education and curricula in IEEE's fields of interest

The first goal has many implications, including encouraging more young people to enter IEEE fields. The second goal makes clear, however, that there is a broader issue. By reaching out to pre-university STEM educators and students, IEEE has been making huge contributions to this pipelining effort. However, not everyone can or should be an engineer or a producer of technology…but everyone participating in the 21st century global village is a tremendous consumer of technology. By focusing our efforts on social studies, which is universally taught in pre-university curricula around the world, we have an opportunity not to "preach to the converted" already interested in science and technology but rather to reach the full range of students and make them aware of the nature of their technology-based society. Such efforts address both goals one and two and, I would argue, set the stage for broadening our perception of "IEEE's fields of interest"—why not history?

The IEEE History Center is now well-positioned to take on new challenges such as pre-university history of technology education. The administrative and financial changes mentioned in earlier columns are now firmly in place. Our new platform, the IEEE Global History network (GHN) is now well established (see page 5). I am grateful to 2007 – 2009 IEEE History Committee Chair, Dr. Richard Gowen, for his leadership that made this advances possible. Now, we have a new Chair, Dr. Michael Williams, who is the first sitting member of the IEEE Board of Directors to chair the History Committee (see page 2). In addition, the 2010 IEEE President-Elect, Dr. Moshe Kam, is a former member of the History Committee who originally championed the GHN. With the assistance of this leadership team, I am confident of our ability to continue to deliver high-quality programs to preserve, research and make know the proud heritage of IEEE, its members, their professions, and the related science and technologies.

There is one other piece to our preparation. This special print newsletter, with its roll of donors, is my annual opportunity to express my gratitude to you, our supporters, for your generous gifts to the IEEE History Center. It is these gifts that, at the end of the day, make our educational and other programs possible. Thank you!

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HISTORY COMMITTEE ACTIVITIES

Dr. Williams studied Chemistry as an undergraduate, earning his BSc in 1964 from the University of Alberta. His interest then turned to Computer Science, and in 1968 he obtained his PhD from the University of Glasgow, Scotland. In 1969 he joined the University of Calgary, first in the Department of Mathematics, and then as a Professor of Computer Science.

It was while working at Glasgow that Dr. Williams acquired a interest in the history of computing, something which has developed over the years into his main research and teaching interest. He has participated in the publishing of 11 books, 88 articles, 58 technical reviews, delivered 72 invited lectures in several different subject areas and has been involved in the creation of 9 different radio, television, and museum productions. During his career he has had the opportunity to work for extended periods at several different universities and at the National Museum of American History and as Head Curator at the Computer History Museum in Silicon Valley. Dr. Williams' association with the IEEE Computer Society began when he was asked to help out with the journal The Annals of the History of Computing. He ascended the ranks, and was the 2007 President of the IEEE Computer Society. Dr. Williams also serves on many of the IEEE governing boards and committees. He now sits as one of the members of the IEEE Board of Directors.

In 2005 the University of Glasgow awarded him an honorary Doctor of Science degree for his contributions to computer science, particularly the history of computing.

Chair's Column, March 2010
Dr. Michael R. Williams

It is my privilege and pleasure to greet you, the readers of the IEEE History Center Newsletter, as the new Chair of the IEEE History Committee. I have been very involved for a number of years in a variety of IEEE activities, including a previous stint on this Committee as a member and as Chair. I also currently serve on the IEEE Board of Directors as the Division V director. Therefore, I am acutely aware that the important work of the Committee and its staff arm, the IEEE History Center - to preserve and make known our tech-

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 tchnology 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 particularl interest). Length: 500-1200 words. Submit to **ieee-history@ieee.org**. Articles and letters to the editor may be edited for style or length.

nological heritage - is a part of IEEE's overall goals to increase public awareness and appreciation of our professions.

I would like to thank my immediate predecessor Dr. Richard Gowen, for successfully steering the History Committee and the History Center through a great number of changes these past three years. During this time, a new financial model linked the History Center more closely to the IEEE Foundation. The History Center staff structure was reorganized within IEEE. IEEE eliminated its Executive Committee so that the History Committee now reports directly to the full Board of Directors. The IEEE Strategic Planning Committee conducted a Strategic Program Assessment of IEEE's historical activities, which recommended a recommitment to preserving IEEE's institutional history. IEEE celebrated its 125th anniversary, and, partly in response to the internal publicity generated by that, the Milestone Program achieved record growth. Probably most importantly, with funding from IEEE's new initiative process, the History Center has launched IEEE's first wiki-based web site, the IEEE Global History Network (GHN).

With these changes firmly in place, I am optimistic, even excited, about our opportunities going forward. My initial focus will be on having the volunteers of the History Committee and the staff of the History Center work together to plan our strategic path forward based on the new realities. The GHN in particular is a new tool that opens up a realm of possibilities. I will report back on our progress in future columns.

In the meanwhile, I note that this issue represents the annual opportunity to collectively recognize and thank the financial supporters of the History Center. I would like to add my personal gratitude. It is actually the donations of hundreds of supporters like you that really enable the Center to carry out its full range of important programs. Thank you.

2010 History Committee Chair Michael Williams presents 2009 History Committee Chair Dick Gowen with a certificate of appreciation

HISTORY COMMITTEE ACTIVITIES

CERTIFICATES RECOGNIZING CONTRIBUTIONS TO THE HISTORY ACTIVITES OF IEEE

At its November 2009 meeting, the History Committee awarded four certificates to recognize contributions to the history activities of IEEE. The 2009 recipients were Robert T. H. Alden, Eiju Matsumoto, Eiichi Ohno, and Takashi Sugiyama.

The History Committee plans to award certificates every year. These certificates of recognition may go either to individual IEEE members, or as well as to IEEE organizational units. They are nominated by members, corresponding members, and liaison members of the IEEE History Committee in writing to the Chair of the History Committee meeting in time for the IEEE History Committee to vote on them at its autumn meeting. The number of certificates to be awarded each year varies at the discretion of the IEEE History Committee.

Eiichi Ohno (left) and Robert Alden (right) receive their certificates

THE IEEE STARS PROGRAM: AN UPDATE

As announced in our last newsletter, the IEEE History Center launched a new program at the end of 2009. Called STARS, an acronym for Significant Technological Achievement Recognition Selections, it is an online compendium of invited, peer-reviewed articles on the history of major developments in electrical and computer science and technology. STARS is an open-ended project, with new contributions added as they become available. Also, each entry is subject to continual review. This program is implemented on the IEEE Global History Network (GHN), and readers may post comments in accord with GHN procedures.

In January 2010 there were five STARS articles available for review: Bernard Finn's article on underwater cables, Michael Geselowitz's article on the pacemaker, Frederik Nebeker's article on motion picture technology, Emerson Pugh and Lars Heide's article on punched card equipment, and Michael Williams's article on differential analyzers.

Readers of this newsletter are invited to participate in the STARS program, either by commenting on existing proposals and articles or by making a proposal and writing an article. The procedures are explained on the website, **www.ieeeghn. org**. In order to make a proposal and write an article, one must have a GHN account. If you are an IEEE Member or an IEEE Society Affiliate Member, then you may log in to the GHN using your IEEE web account. (All IEEE members have a web account. If you have forgotten your username or password, please contact Member Services. The email address is **contactcenter@ ieee.org**, and the telephone number is 1 732 562 5542.) If you are not an IEEE Member or an IEEE Society Affiliate Member, a two-step process is required. First, apply for an IEEE Guest Web Account at: **www.ieee.org** (in the right column, click on "Setup IEEE web account")

Then send the username that you have chosen to GHN administrator John Vardalas (**j.vardalas@ieee.org**), who will then have IEEE IT system administrators activate your account.

IEEE HISTORY CENTER PRESIDENTIAL ORAL HISTORIES

The History Center, as part of its commitment to document the history of IEEE, undertook in the 2009 125th Anniversary year the task of videotaping oral histories as many IEEE past presidents as possible on their experiences as IEEE leaders. By year's end, the center had interviewed twenty-two past presidents ranging from 1975 IEEE President Arthur Stern to 2007 IEEE President Leah Jamieson. The ultimate goal of this project is not just to preserve these leaders' recollections in their own words, but to use the information contained in the interviews as one of the means for disseminating IEEE's recent history.

After an interview is taped, the History Center has a written transcript prepared, which is edited first by the staff member who served as the interviewer, and then by the subject to make sure that the transcript presents the subject's story correctly. When this process is finished, the Oral History is posted on the IEEE Global History network, joining more than four hundred forty posted oral histories recorded by IEEE beginning in the 1960s. You can access the posted presidential oral histories at: **http://www. ieeeghn.org/wiki/index.php/Oral-History:IEEE_Past_Presidents**

In reading these presidential oral histories, it is striking how -- although there were some issues that were particular to a given president or a specific era -- there are others that seem to have endured over many years. Arthur Stern, 1975 President, spoke at length about how a major IEEE activity in the 1970s was working out the implications of the 1963 merger which created IEEE from AIEE and IRE. Ken Laker, 1999 President, emphasized the adoption of internet technologies throughout IEEE, particular-

ly in making publications available in electronic form, and the creation of IEEE Xplore. Merrill Buckley, 1992 President, told how earlier in his IEEE career, while Vice President for Regional Activities before IEEE's centennial, IEEE adopted a Regional Activities Board Proposal for a centennial celebratory IEEE meeting that would include local leaders from around the world. IEEE held this centennial celebration in Boston. It was the start of what has become the triennial IEEE Sections Congress. Among the problems that have endured over many years —and which have been discussed by multiple past-presidents — were finances and budgets; finding the right balance between technical and professional activities, and between IEEE's transnational character and the specific needs of its U.S. membership; maintaining and growing membership; improving services to members; and the heavy time demands of the IEEE presidency.

Most of the presidents discussed the large quantity of travel they did as IEEE leaders. Martha Sloan, 1993 President mentioned how she went to the Kremlin to present an honorary IEEE membership to engineer and Russian President Boris Yeltsin. Ken Laker told how he was the first IEEE President to go to Iran and the warm welcome he received, particularly from Iranian student members. The presidents frequently mentioned the pleasures of traveling to meet IEEE members in countries around the globe.

The overall impression is the dedication and love these two dozen men and women have for IEEE, not only as an institution but as the home of their profession and a force for using technological innovation for improving people's lives around the globe.

IEEE PAST-PRESIDENTIAL PANELS FROM THE 2009 IEEE HISTORY CONFERENCE NOW AVAILABLE ON IEEE-TV

As reported in the last (November 2009) History Center newsletter, among the highlights of the 2009 IEEE Conference on the History of Technical Societies were two panels of IEEE Past Presidents who, with audience participation, discussed their efforts as IEEE leaders, some of the issues that faced

IEEE during their leadership, and the lessons that can be drawn from their experiences for today's IEEE. The panels were held at Boscone Hall on the Drexel University Campus on 7 August, the third and final day of the conference.

The IEEE History Center worked together with IEEE-TV

to videotape both panels, and they are now available for viewing by both IEEE members and the general public on IEEE-TV's web site, **www.ieee.tv:8080/home**

The first panel included four presidents from the 1970s and 1980s: Arthur Stern (1975), Robert Larson (1982), Richard Gowen (1984) and Henry Bachman (1987). The direct link for this session is: **www.ieee.org/portal/ieeetv/viewer.html?progId=119912**. The second panel included four presidents from the 1990s: Merrill Buckley (1992), Charles Alexander (1997), Joe Bordogna (1998) and Ken Laker (1999). The direct link for this session is: **www.ieee.org/portal/ieeetv/viewer.html?progId=119915**

These two programs bring the total number of history programs available on IEEE-TV to five. The IEEE History Center expects to continue working with IEEE-TV in 2010 and beyond to produce additional historical programs.

99TH & 100TH MILESTONES APPROVED

The IEEE Milestones in Electrical Engineering and Computing program achieved a milestone of its own in January. The IEEE Board of Directors approved the Star of Laufenburg Interconnection, 1958, and the Invention of Public-Key Cryptography, 1969-1975 as IEEE milestones, making them the 99th and 100th approvals respectively.

More information on the milestones program can be found on the IEEE Global History Network at **www.ieeeghn.org**, including the description of the program, list of milestones dedicated to date, a list of technological achievements suitable for proposal as milestones, and guidelines and forms for proposing milestones.

DISCOVERING THE PAST THROUGH THE PARTICIPANT'S EXPERIENCES

Prototype of the successful coin operated Pong video game developed by Allan Alcor

One of the purposes of the IEEE Global History Network (GHN) is to provide a platform to capture the direct experiences of the electrical engineers and computer scientists who have helped shape technological progress of the past half-century. First-hand experiences not only offer us a direct and compelling glimpse into how engineers and scientists do their work, but it also gives the world an appreciation of the human dimension behind innovation.
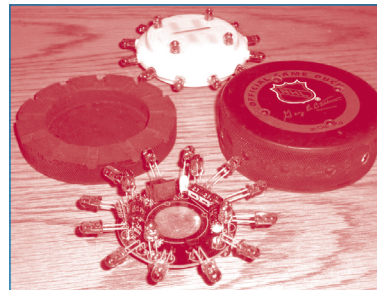
In the GHN, personal experiences, called First-Hand Histories, vary in content from why people went into science and engineering and the events that shaped person as a professional to the details of how technical breakthroughs came to be. For example, Allan Alcorn, one of the pioneers in video game technology, shares his reminiscences of the events that shaped his life as an engineer. **http://www.ieeeghn.org/wiki/index.php/First-Hand:My_Development_as_an_Engineer_in_the_Years_Before_Atari.**

In another piece, Morris Tanenbaum, the former CFO for AT&T and IEEE Life Fellow, recalls his role, as an engineer, in the early work on silicon transistors at Bell Labs. **http://www.ieeeghn.org/wiki/index.php/First-Hand:Beginning_of_the_Silicon_Age.**

From 1959 to 1991, Swenn Poulsen worked at Philips Telecommunications, Copenhagen. In a series of personal accounts, he paints a fine-grained and fascinating view of the life of a telecommunications engineer within a large corporation like Philips. **http://www.ieeeghn.org/wiki/index.php/First-Hand:Philips_Telephone_Exchanges_and_Denmark%2C_1960-1970.**

IEEE Life Member, Dean Champan, shares his memories of being a co-op student at GE. **http://www.ieeeghn.org/wiki/index.php/First-Hand:A_Co-op_Student_Before_Graduation.**

Rick Cavallaro gives us a compelling look at the technical challenges encountered when Fox Sports incorporated military-quality tracking capabilities into the broadcasting of professional ice hockey. His first-hand account also relives the emotional roller coaster ride that he and his engineering team experienced as they raced against time to meet a highly publicized deadline. **http://www.ieeeghn.org/wiki/index.php/First-Hand:Recollections_of_the_development_of_the_FoxTrax_hockey_puck_tracking_system.**

Electronics and packaging for the high-tech ice-hockey puck

Although a small sample of the First-Hand Histories that engineers have contributing to the GHN, these stories reveal the diversity of personal experiences that we are trying to capture on the GHN. Spend some time browsing the GHN and discover the others. As pleased as we are with the initial response of IEEE members to the First-Hand History feature on the GHN, we realize that to truly capture the rich professional experience of our members and reveal the nature of engineering to the society-at-large, we will need a lot more contributions. If you have a story about your career as an engineer, please come and add it to the GHN. Length is not important. Your story can be one-page or 30 pages. The GHN allows you to return, at your convenience, to edit or add to your story easily. If you want to add images to your story, that too is also very easy on the GHN.

It is our hope that first-hand experiences on the GHN will grow into a collective and enduring memory of the men and women in IEEE whose work as engineers helped build the last half-century of progress. Please help us realize this dream. For more information, or to explore the GHN (**http://www.ieeeghn.org**) or you may e-mail John Vardalas (**j.vardalas@ieee.org**) at the IEEE History Center.

NATHAN BREWER JOINS HISTORY CENTER STAFF AS WEB CONTENT ADMINISTRATOR

The History Center Welcomes Nathan Brewer as the Center's new "Web Content Administrator." Some of you may already have met Nathan, since he has been at the History Center for more than twenty months, first as a student intern for credit, then as a paid intern, and finally as a temporary employee. After his excellent work for the Center all this time, it is our pleasure to introduce him as a new, permanent IEEE employee and member of the Center staff. Nathan will be responsible for the overall management of, and development of content for, the IEEE Global History Network. In addition to his GHN responsibilities, Nathan will oversee the Center's pages on the IEEE web site and serve as the Center's liaison with IEEE's IT department and with the Web team.

Nathan brings a wide range of relevant education and experience to his position at the History Center. He comes to us with Bachelor's degrees from Rutgers in Computer Science (B.S. 2004) and History (B.A. 2006) and an M.L.I.S., also from Rutgers (2008). He has previously worked as a reference librarian, an archivist assistant, and a helpdesk analyst for Panasonic Toughbook.

THINGS TO SEE AND DO

HISTORY OF TELECOMMUNICATIONS SESSION AT IEEE GLOBECOM 2010

IEEE Communications Society holds two major Conferences anually – ICC (alternating between IEEE Regions) and GLOBECOM (held in the US). The Standing Committee on the Communications History of ComSoc has organized special sessions on history at GLOBECOM 08 and GC 09. History sessions at GLOBECOM Conferences draw a quite large attendance (the GC08 Session had an attendance of about 80). In 2010, there will be a history session at GLOBECOM 2010 (Miami,FL, 6-10 December 2010), on the theme of "History of cellular telephony and its financial and social impacts".

The Special Session on History of Telecommunications was held at GLOBECOM 2009 in Honolulu, Hawaii on Thursday, 3 December 2009 and was co-chaired by Jacob Baal-Schem (Tel-Aviv Univ.) and Jerry Hayes (Concordia Univ.) As the theme of the Conference was Global Connectivity, the History session dealt with Historical events in connectivity: The ALOHA Protocol – one of the first digital communication protocols, developed at the University of Hawaii, was presented by Prof. Norm Abramson of Hawaii University, who headed the development team. Akira Okamoto of TDK History Museum in Japan presented a paper on "The invention of Ferrites and their contribution to the Miniaturization of Radios". Kaoro Wakabayashi of NTT Corporation in Japan, presented a paper on "Research and events that permitted facsimile use to Explode in Japan," and Steve Weinstein, former President of ComSoc, moderated a Panel discussion on the subject of: "Who does research after Divestiture", with the participation of : J.Cioffi (Stanford University);D.Wedemeyer (University of Hawaii) and Paul Kuehn (University of Stuttgart). This Panel raised discussions between the Panelists and the attendees, including IEEE President John Vig. The session drew an attendance of more than fifty participants, and some of them remained to watch a Video on the Yosami VLF station in Japan, screened by Dr. Eijo Matsumoto of Japan Council History Committee.

HOOVER DAM 75TH ANNIVERSARY HISTORY SYMPOSIUM, OCTOBER 20-22, 2010

PAPER TOPICS: The engineering associated with the design and construction of Hoover Dam, its performance over the last 75 years, and the lessons learned will be the main theme of this history symposium. Additional information and the full Call for Papers may be obtained at **www.asce.org/history/index.html**

THE SECOND REGION 8 IEEE CONFERENCE ON THE HISTORY OF TELECOMMUNICATIONS MADRID, SPAIN 3-5 NOVEMBER 2010

2010 marks a series of historical milestones in relation to the Birth of Broadcasting a hundred years ago. To commemorate this remarkable anniversary, HISTELCON invites submissions related to this theme. The official language of the conference will be English. Topics of interest include: pioneers of broadcasting, the birth of the broadcasting, business, stellar moments in the history of broadcasting, radio regulations, radio and TV standards, broadcasting as a political instrument, and development of radio and TV technology. **www.aeit.es/histelcon2010/**

CONFERENCE ON THE ORIGINS AND EVOLUTION OF THE CAVITY MAGNETRON (CAVMAG 2010)

2010 marks the 70th anniversary of development of the high-power cavity magnetron by Randall and Boot at Birmingham University. This crucial invention was made into a practical device by the GEC Company in England and put into large-scale production in the U.S.A. following the Tizard Mission of 1940. Its origins, however, go back to the mid-1930s with key work being done in Czechoslovakia, France, Germany, Russia, Switzerland, The Netherlands, Japan and the U.S.A.

The purpose of the 19-20 April 2010 conference is to bring together knowledge of all this early work and to learn how the magnetron was improved and put into service since then. Several eminent engineers have already agreed to give talks on the following aspects: Origins of the magnetron in the various countries involved, its subsequent development, the latest trends, applications to civil and military radar systems, other uses, such as microwave ovens. A pre-conference

visit is planned to the Royal Signals Museum at Blandford on 18 April. The conference is sponsored by IET (History of Technology TPN), IEEE (UKRI Section) and IEEE History Center, IEEE Region 8 History Council, The Defence Electronics History Society (DEHS), and supported by a grant from the IEEE Life Members Committee. **www.cavmag2010.org.uk**

SURF CITY

A selection of web sites that History Center staff has come across in its work and hopes may be of interest to its readers.

http://www.amre.us/ The American Museum of Radio and Electricity offers an exciting and educational experience for audiences of all ages. Compelling, interactive exhibits spanning four centuries of scientific achievement and cultural heritage are featured in a world-class collection of unique objects.

http://www.siliconvalleyhistorical.org/home
Recording Silicon Valley's History and the High-Technology Revolution   Strong waves of creative energy have flowed in recent decades from a place known as Silicon Valley, encircling — and changing — the world. How it happened is explored through this website.
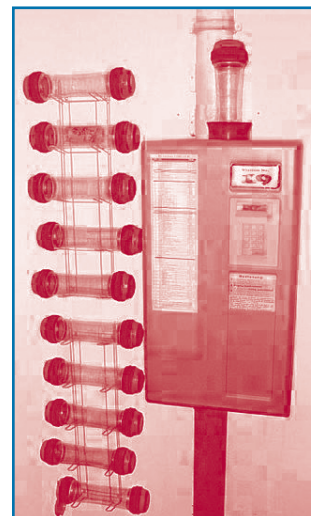
EE IN THE MOVIES

ELECTRICAL TECHNOLOGIES IN THE MOVIES: ANNUNCIATORS, SPEAKING TUBES, AND OTHER COMMUNICATION SYSTEMS WITHIN A BUILDING

In homes of British aristocrats of the 19th century, the bell pull was an effective means of summoning a servant. Ropes went from various rooms of the house through pipes to a single location, often the kitchen, where they attached to separate bells so that the servants would know where they were needed. Two movies set in 19th-century England, "The French Lieutenant's Woman" (1981) and "Sense and Sensibility" (1995), show such a bell-pull system. In the latter, we see the set of bells labeled with the names of rooms. The 2004 movie "Finding Neverland", set in London in 1903, shows one of a set of bells sounding.

It was often not a rope that one pulled, but a long, narrow piece of tapestry, and these tapestry bell-pulls were so decorative that they often remained in homes after the system was no longer used and many people hung non-functional ones. One reason for their becoming functionally obsolete was the availability, late in the 19th century, of electrical annunciators. Rooms were equipped with buttons that closed an electrical circuit, activating a signal board, or annunciator, in the kitchen or other location. In the 1950 movie "Lullaby of Broadway" we see a column of indicating lights in the servants' wing of a New York mansion. Two movies that show, in action, an annunciator with a buzzer and indicators that are electrically triggered are "Possessed" (1947) and "Key Largo" (1948). Buzzers activated by an infirm person to summon assistance came into use in hospitals, as in "Passion Fish" (1992), and in homes, as in "What Ever Happened to Baby Jane" (1962).

The 1972 movie "Poseidon Adventure" shows the signaling bells on a luxury liner in action. We associate with ships another in-building communication system: speaking tubes. These acoustic waveguides are effective in conveying human speech for 50 meters or more, and many movies, including the Marx Brothers' "Monkey Business" (1931), show their use from the bridge of a ship. The technology was used also in homes and in businesses. In the 1951 movie "Miss Julie" ("Fröken Julie"), set in Sweden in the 1890s, we see a speaking tube from a manor house to a servants' building, and a Scottish mansion in the 1920s, depicted in "My Life So Far" (1999), has speaking tubes to communicate with the kitchen staff. There is a store equipped with speaking tubes in Blake Edwards' "Trail of the Pink Panther" (1982). A more primitive acoustic waveguide, a waxed string, is the basis of the tin-can telephone, an example of which is shown in "Walk the Line" (2005).

Another messaging system is the pneumatic tube. This technology uses air pressure to move small cylindrical containers through tubes in a building. The 1984 Lars von Trier movie "The Element of Crime" ("Forbrydelsens element") shows the system in a police station, and the 1998 movie "Rushmore" shows it in a factory. In the World War II movie "Sink the Bismarck!" (1960) we see pneumatic tubes used between a control room and a radio room in underground military facilities in London. François Truffaut's 1968 "Stolen Kisses" ("Baisers volés") contains a detailed and extended depiction of the pneumatic mail system being used at that time in Paris. The British classic "Kind Hearts and Coronets" (1949) shows an in-building messaging system that moves small containers on horizontal cables.

Pneumatic Tube Station

An earlier column in this series (IEEE History Center Newsletter, no. 62, July 2003) dealt with intercoms, so here we will not consider communications systems that are essentially in-house telephones. Nor will we here consider the built-in public-address systems found in many public buildings, such as schools and airports; another earlier column (IEEE History Center Newsletter, no. 77, July 2008) covered this subject. (These newsletters are available on the History Center's website, **www.ieee.org/history_center**.) Security systems, fire alarms, smoke detectors, CO_2 detectors, and the like may be considered communication systems, but they will not be included in this article.

We close by mentioning a simple, but important signaling system, the doorbell. Even before homes were connected to electrical networks, they might well have electric doorbells, since these were powered by battery. "Topsy-Turvy" (1999)

shows someone in 1884 refusing to use an electric bell for fear of a shock, and "Life with Father" (1947), which depicts New York City life in the 1890s, shows someone experimenting with a battery and bell. By placing a tiny piece of paper between the bell and the clapper of a doorbell, the main character in "Double Indemnity" (1944) will be able to tell if someone rings the doorbell, as it would cause the paper to fall. Cheery doorbell chimes in "Teacher's Pet" (1958) are painful for someone with a hangover, a doorbell in "Clockwork Orange" (1971) plays the 4-note theme of the first movement of Beethoven's fifth symphony, and a doorbell in "Murder by Death" (1976) sounds like a woman screaming.

As always, we would be grateful for reports from readers of other interesting movie scenes that involve communication systems within a building. You may contact us at **ieee-history@ieee.org**.

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GIFTS RECEIVED IN MEMORY OF DAVID MIDDLETON

Dr. David Middleton, physicist and pioneer of modern Statisti-cal Communication Theory, died on 16 November 2008 at the age of 88. His career was devoted to the study of information transfer and signal processing with numerous applications in ra-dar, underwater listening devices, satellite technology, and wire-less communications. You can learn more about Dr. Middleton by listening to his oral histories on the Global History Network, **www.ieeeghn.org**.

To pay tribute to Dr. Middleton's love of math and science as well as the arts and humanities, the Middleton Family requested that donations in his memory be made to the IEEE History Cen-ter. During 2008 and 2009, gifts were graciously given to the IEEE History Center by:

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THE IEEE LIFE MEMBERS' PRIZE IN ELECTRICAL HISTORY

If you or someone you know has published an article in 2009 dealing with any aspect of the history of electricity, electronics, telecommunications, or any other electrically-related field -- history of technology in its broadest sense -- please consider nominating it for the IEEE Life Members' Prize in Electrical History. Paper authors are encouraged to nominate themselves by submitting a copy of their article, and everyone is asked to submit notice of anything that they have seen published in 2009 that they feel is worthy of being considered for the Prize. The deadline for submissions is 15 April 2010. Please contact Andrew Butrica, Prize Committee Chair, **abutrica@earthlink. net**, or W. Bernard Carlson, SHOT Secretary at **shot@virginia. edu**.

The Institute of Electrical and Electronics Engineers (IEEE) Life Members' Prize in Electrical History, supported by the IEEE Life Members' Fund and administered by the Society for the History of Technology (SHOT), is awarded annually to the best paper in the history of electrotechnology, power electronics, telecommunications, and computer science published during the preceding year. Any article published in a learned periodical is eligible if it treats the art or engineering aspects of electrotechnology and its practitioners. The article must be written in English, although the journal or periodical in which it appears may be a non-English language publication. The prize consists of a cash award of $500 and a certificate. To nominate an article, please send a copy (paper or electronic) of the article to each member of the prize committee.

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DALZELL, FREDERICK
Engineering Invention: Frank J. Sprague and the U.S. Electrical Industry, 2010
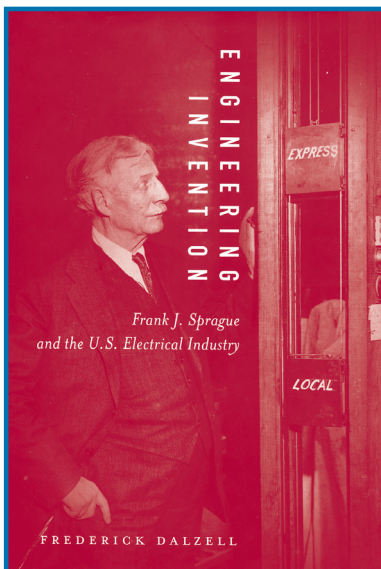
Frank Julian Sprague's 1887 full-scale electric railway system in Richmond, Virginia was a breakthrough event in electrical technology. Its success created an industry and helped to shape the development of cities. It was also an enormous business risk. At that time, the only electrical railroads in existence were demonstration models, or short temporary railroads such as the 1/3 of a mile and single railroad car set up by Siemens for events such as the Berlin Exhibition. Cleveland, Ohio had one mile of electrified track over level ground.

Richmond's steep hills and sharp curves made it a difficult proving ground for a railway, but the unforgiving terrain was also a strong opportunity for electric traction to prove itself over mule-drawn cars. The contract required Sprague to build an entire system in a very short amount of time. Sprague would later observe that it had been a contract "which a prudent business man would not ordinarily assume."

Dalzell's superbly written book chronicles Sprague's enormous contributions to railroad electrification, elevator development, and to the control of multiple electric motors. In addition, Dalzell gives an illuminating portrait of Sprague as an entrepreneur. He delves into the electrical technology thoroughly, giving the details of Sprague's insights, and how he applied them. Sprague believed that, if a technology were simpler and more efficient than an existing system or a competing one, then its intrinsic advantages would cause it to be adopted. However, as Dalzell observes in his introduction, inventions only succeed when they are connected to existing business practices. Throughout his career, Sprague faced formidable obstacles in the adoption of his unproven technologies. As a start-up company, the Spraque Electric Railway and Motor Company was forced to take enormous risks in order to establish its technology, convince investors, and to build market share. Once having proven his technologies and created an industry, Spraque then faced competitive pressures from other companies seeking to enter it.

Dalzell chronicles Sprague's personal evolution from lone "heroic inventor" to his becoming part of the engineering team tackling the massive task of electrifying the New York Central Railroad. Sprague's work on fuses and depth charges for the U.S. Navy is also described. Readers interested in technological history, as well as those interested in the business of innovation, will find Dalzell's book a rich mine.

Available from MIT Press, 55 Hayward Street, Cambridge, MA 02142; **mitpress.mit.edu**, $30.00, hardcover, ISBN 978-0-262-04256-7, 22 ilustrations, xii + 304 pp.

JENKINS, JOHN D.
Where Discovery Sparks Imagination, The American Museum of Radio and Electricity, 2009.
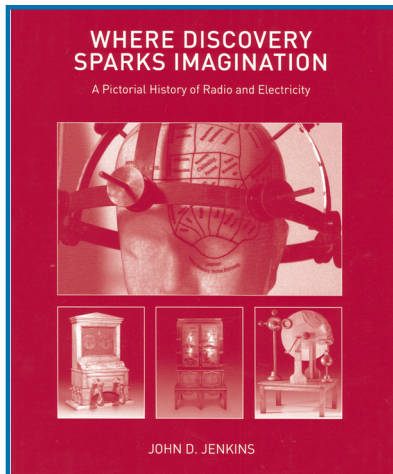
This book is the result of John Jenkins' lifelong fascination with electricity and radio. From the age of 13, through a career at Hewlett-Packard and then Microsoft, and into retirement, John Jenkins collected artifacts and books relating to electricity and radio. In the 1990s he built a website, Sparkmuseum (**www.sparkmuseum.com**), to share his collection with others. Today Jenkins is Board President of the American Museum of Radio and Electricity in Bellingham, Washington, and much of his collection is on display at the museum. All proceeds from the book Where Discovery Sparks Imagination go to the museum.

The book is a beautiful collection of more than 600 illustrations, most of them in color and many never before published. It presents the story of electricity, from the 17th century on, and the story of radio, from the late 19th century on, in six galleries. Gallery 1, "The Dawn of the Electrical Age", begins with what the ancient world knew of electricity and magnetism and with 17th-century investigations, but gives most of its attention to the 18th and 19th centuries with beautiful examples of electrical machines of a great many types. Gallery 2, "Electricity Sparks Invention", focuses on how the exploration of electricity gradually led to practical devices such as the telegraph, the electric motor, the dynamo, and electric lighting.

Gallery 3, "The Wireless Age", tells how wireless telegraphy came out of physicists' work on electromagnetic waves, and how the wireless art advanced with development of various vacuum tubes in both commercial and military contexts. Gallery 4, "Radio Enters the Home", deals with early radio broadcasting, showing the rapid evolution of radio receivers in the 1920s. In Gallery 5, "The Golden Age of Radio", we follow radio in the 1930s and see many beautiful examples of the radio receivers of that era. Gallery 6, "The Jones Gallery" gives a sample of the 20,000 electron tubes making up the Jones Gallery at the American Museum of Radio and Electricity. Included are a 30,000-watt rectifier tube made by Federal Telephone and Radio, one of the first commercial magnetrons, and the "moon tube" that NASA used in 1967 to image the dark side of the moon.

Each gallery opens with a well-illustrated narrative account of the scientific and technological advances. Within the chapters, many topics, such as the Morse telegraph and crystal radios, are introduced in separate sections, and there are abundant photographs of relevant artifacts. In addition to the gallery chapters, there is a preface and a short chapter on the museum, as well as a subject index and an artifact index.

Available from The American Museum of Radio and Electricity, 1312 Bay Street, Bellingham, WA 98225; **www.amre.us**, cloth $34.95, ISBN 978-0-9794569-0-9, 218 pp.

WINSECK, DWAYNE R., AND ROBERT M. PIKE
Communication and Empire: Media, Markets, and Globalization, 1860-1930, Duke University Press, 2007.
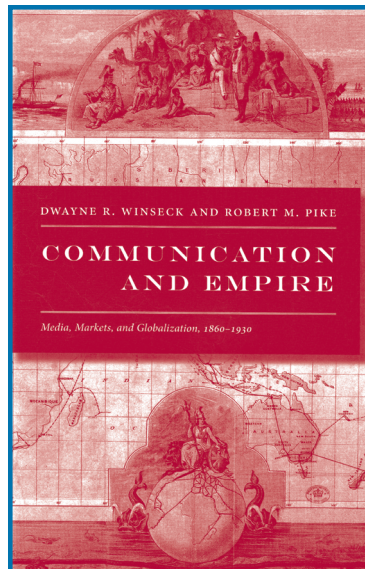
Dwayne Winseck and Robert Pike's book Communication and Empire covers a seventy year period in which much of the communications infrastructure of the modern world came into being. It deals mainly with telegraph networks, especially undersea cables and other long-distance cables, and with wireless networks, which emerged after Guglielmo Marconi and others showed the practicality of wireless telegraphy. The emphasis is on the market for telecommunications and the providers, rather than on the technology. The role of government agencies is also covered.

The chapters of the book proceed chronologically, beginning in about 1850 and ending in about 1930, with some overlap. The authors give almost as much attention to markets in South America, Africa, and Asia, especially China, as to markets in Europe and North America. Their main thesis is that commercial expansion, rather than imperialism, was the most important force in building a global communications infrastructure.

The evidence for the book's arguments is drawn mainly from primary material, notably the authors' extensive archival research in Britain, Canada, and the U.S. Two dozen images and ten maps complement the text nicely. Dwayne Winseck is professor in the School of Journalism and Communication at Carleton University in Ottawa, Ontario. Robert Pike is professor emeritus of the Department of Sociology at Queen's University in Kingston, Ontario.
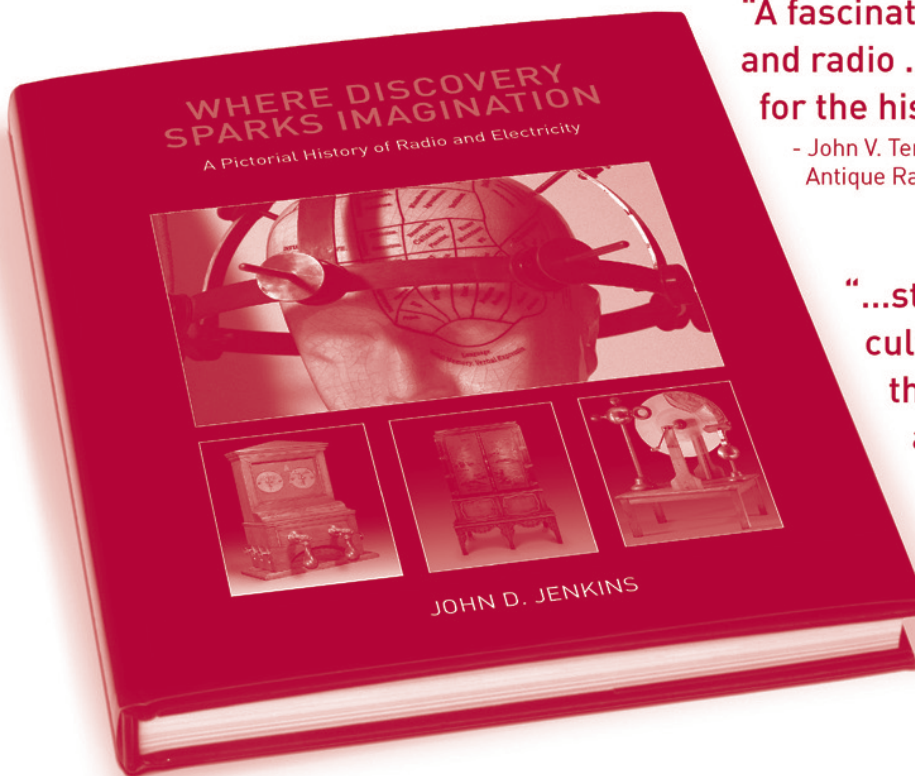
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