IEEE
Celebrating 125 Years
of Engineering the Future

IEEE History Center

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STATIC FROM THE DIRECTOR

For the IEEE History Center, as for much of the world, 2009 appears to be a year of transition. As you can see from the special logo, 2009 marks the 125th anniversary of IEEE. IEEE has seen much change in its organization and in the surrounding society since its founding as the American Institute of Electrical Engineers (AIEE) in 1884. Many of the social changes were caused or influenced by the technologies developed by IEEE members themselves. There is for example, the World Wide Web and all its associated uses. The biggest recent development at the Center, as reported last issue, is the wiki-based IEEE Global History Network (GHN), launched in late 2008. As the GHN continues to grow in content and use, increasing numbers of our resources and processes are being transferred to it. Case in point, the Milestones process will soon be handled completely online through the GHN.

IEEE will be recognizing the anniversary in various ways, and the Center will be an active participant. The main focus of our own celebrations will be the conference in Philadelphia in August. In the spring of 1884, a small group of individuals in the electrical professions—including notables such as Thomas Alva Edison and Alexander Graham Bell—met in New York in anticipation of an upcoming international exhibition at the Franklin Institute in Philadelphia. They formed a new organization to welcome their counterparts from overseas and to support professionals in their nascent field and to aid them in their efforts to apply innovation for the betterment of humanity—the AIEE. That October, the AIEE held its first technical meeting at the exhibition, and it is this that we will be commemorating with our technical conference (see page 3).

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RUTGERS
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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 by the IEEE History Center.

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Other ways we are focusing on the anniversary include: working with IEEE Corporate Communications on outreach materials, and concentrating our own video-history activities on the institutional history of IEEE by interviewing the past presidents of the organization.

Another societal factor impacting IEEE in recent times is, unfortunately, the global financial crisis, and the IEEE History Center is of course affected. Because a significant portion of our funding comes from funds that are held at market by the IEEE Foundation, there will be ongoing pressure on our operating budget. The other two pieces of our funding—grants from private foundations and corporations and gifts from individuals such as yourself—are also potentially endangered. Because this March issue is our annual public recognition of our donors (see Donor List, p. 7), let me point to at least one piece of heartening news. One of the major ways we receive annual gifts is through the opportunity of IEEE members to donate to the Center at the same time that they renew their membership (or, in the case of life members, fill out their profile). As members renewed for 2009 in late 2008, under deteriorating world-wide economic conditions, a smaller number of members -- not surprisingly -- chose to give to the Center…however, the total dollar amount was up from the 2008 renewal cycle. That means that you, our donors whom we recognize and honor in this issue, really stepped up and delivered key support. This maintains my belief that you have confidence in our efforts to preserve, research and promote the history of IEEE, its members, their professions, and their technologies. I am extremely gratified and grateful, and I hope we will continue to earn your trust and support. May IEEE's next 125 years be as storied as the first 125 years, and may the IEEE History Center be around to document it!

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.

The IEEE History Center Newsletter Advertising Rates

The newsletter of the IEEE History Center is published three times per annum with a circulation of 4,800 of whom approximately 3,700 reside in the United States. 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
Half Page	$200
Full Page	$250

Please submit camera-ready copy via mail or email attachment to **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**.

HAPPENINGS ON THE IEEE GHN

The IEEE Global History Network (GHN) was launched on 21 September 2008. In the four months since then, the growth has been modest, but steady as we expected. Presently there are more than 5,800 wiki entries in the IEEE GHN, which have generated nearly 15,100 edits. More than 2,000 files of media and .pdf documents have been uploaded to the GHN. The feedback from people who used the site has been very positive. We expect the site's growth to accelerate in 2009 as we intensify our marketing efforts.

Archival material, in the form of .pdf files, forms an important subset of these uploads. The IEEE New South Wales Section in Australia is leading the way in showing how -- through the uploading of archives to the GHN -- IEEE Sections can easily preserve their organizational memory and make it easily accessible to all members. The GHN's goal is to have all the Societies, Regions, and Sections using it to preserve their important historical documents, as well as write and maintain the history of their organizational units.

The Center's large oral history collection is being moved to the GHN. In the process, History Center staff has structured the resulting transcripts to make it easier for the user to find information within each interview. In parallel with reformatting the transcripts, staff is producing digital masters from the analog sound recordings of the Center's approximately 450 past interviews. To enhance the user's experiences, we are producing .mp3 extracts from the digital masters and embedding them within the body of the transcript. For example, the user can know hear Vladimir Zworkyn explain, in his own voice, how he and David Sarnoff, in the 1930s, convinced the Soviets to buy their television technology because of its great potential as a propaganda tool.

The History Center acquired a wonderful collection of video interviews of prominent engineers and scientists done by Dr. Clarence Larson during the 1970s and '80s. Thanks to a generous financial gift from the Larson family, all these interviews are being converted to Flash format and will be streamed on the GHN. Some have already been loaded on the GHN.

In 2009 the switch to all-digital television broadcasting in the U.S.A. will take place. Two recent contributions to the GHN, "The Foundations of Digital Television" and the "Digital Television: the Digital Terrestrial Broadcasting Standard" offer fascinating, in-depth histories of digital broadcasting standards.

The book, "Electricity: The Magic Medium", published by the IEEE Canadian Region, tells the story of the history of electrical technology in Canada. Long out of print, this book has been hard to find. The Canadian members of IEEE will be pleased to learn that this book in now on-line on the IEEE GHN.

We are excited about the prospect that soon, the IEEE Milestone process -- from submitting a proposal to writing the supporting nomination document -- will be done on-line within the IEEE GHN. The site's wiki technology will help organizational units develop their nomination article, and also make constructive feedback available from the IEEE members using the IEEE GHN.

We invite all our readers to explore and contribute to the IEEE Global History Network (**www.ieeeghn.org**)

STAFF NOTES

NATHAN BREWER JOINS THE IEEE HISTORY CENTER AS WEBMASTER AND GHN ADMINISTRATOR

The IEEE History Center is very pleased to welcome Nathan Brewer - who first came to the IEEE History Center as an intern from the Rutgers School of Library Science last September – as a part-time employee. He will be the webmaster for the History Center website, will assist the day-to-day operation of the IEEE GHN, develop its archival functions, create digital masters of the entire oral history collection and create small .mp3 extracts for insertion into the GHN.

HOW I USE WHAT I HAVE WORKED ON AT THE CENTER IN MY TEACHING: *Oral History Transcripts on the Global History Network*

Emily Westkaemper is one of the Rutgers University Ph.D. candidates working as research assistants at the IEEE History Center as part of the co-sponsorship agreement between Rutgers and IEEE. This mutually-beneficial agreement allows the Center to benefit from work done by Ph.D. candidates, while at the same time allows them to learn about the history of technology, and to incorporate technology's impact on world history in their own work and teaching. In this article, Emily shares with readers some of the ways the history of technology will inform her work and, by extension, the wider audience of her students.

The IEEE History Center's oral histories, available as indexed, searchable transcripts on the IEEE Global History Network (**http://www.ieeeghn.org**), provide a unique resource not only to historians and scientists but also to students. As a graduate research assistant, I am indexing the transcripts and posting them on the GHN. I plan to integrate these interviews into my own teaching of U.S. history and women's history surveys, asking students to consider what these primary source documents reveal about the historical eras described.

By incorporating the Global History Network into

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the classroom, I hope to provide those students who have scientific, technological, or business interests - or those students who identify with narratives of educational and career decisions - a way to engage directly with primary source material. Student research in the IEEE History Center's oral history transcripts will illuminate not only the genealogies of scientific fields, but also the international cultural, social, and intellectual histories of the twentieth century. References to the Great Depression, World War II, and the Cold War, accessible through full text search, assess the diverse effects of historical trends on societies and on individuals.

As career narratives, the IEEE History Center interview transcripts personalize historical eras and technological developments in a way that will resonate with contemporary undergraduate students. William Aspray's 1992 interview of Bell Labs telephone switching engineer Amos Joel reflects the influences of the Great Depression and of personal experience on the history of technology. In the 1930s, Joel's economically-necessary employment as a switchboard operator for his college dormitory furthered his childhood interest in telephone switching, influencing his innovative career. Bell Labs researcher Carol G. Maclennan analyzes corporate and cultural influences on both scientific research and on women's social status in her 2008 interview with Sheldon Hochheiser. Maclennan traces the development of her career from her 1959 recruitment for a Bell Labs internship targeted to female college students, to her own decades-long mentorship of women and minority engineers. Such examples demonstrate that social conditions can produce long-term historical effects. Introducing these biographies to my students, I will invite them to consider the significance of education, economics, and gender to historical study.

Simultaneously, interviews' accounts of everyday classroom and workplace experiences will allow twenty-first century students to consider the influences of technology on society. In a 1996 interview conducted by David Morton, Peirce Dictations Systems and IBM manager Samuel Kalow depicts his educational and recreational use of technologies as a University of Michigan student in the late 1940s, experimenting with the Webcor wire recorder as a classroom notetaking aid and as a dorm room LP phonograph amplifier. Comparisons with their own everyday use of technology will allow students to consider the influences of technology on social history.

The oral histories also support instruction on historical methodologies and research strategies. Particularly rich as a tool for tracing collaborations and for following the impact of key developments, related interviews can problematize overly simplistic assumptions about continuity and change, or about cause and effect. In his 1999 interview with David Hochfelder, ARPANET and MCI Mail developer Vinton Cerf credits Robert Metcalfe as "the guy that invented Ethernet." Robert Metcalfe's own 2004 comments to Robert Colburn offer a contrasting assessment that the "Ethernet had many inventors," including the "people who built the ARPANET and the people who built the ALOHANET … people on whose shoulders, if not toes, I have stood," as well as researchers who purchased Ethernet from Metcalfe's company, did not interact with Metcalfe directly, and used his technology in their own innovations. Aided by the GHN's search capabilities and topics keywords, such evidence can provide students experience with central problems in historical research, including the need to analyze multiple sources and to weigh subjective statements.

As a tool in the history classroom, the Global History Network and the IEEE History Center Oral History transcripts will allow science students to expand their knowledge of their disciplines and will allow humanities students to consider the influences of technology on society. Simultaneously, analysis of these primary sources will demonstrate historical methodologies to introductory students and will contribute to the research of advanced students and scholars.

THINGS TO SEE AND DO

THE 2009 IEEE CONFERENCE ON THE HISTORY OF TECHNICAL SOCIETIES

In August the IEEE History Committee and the IEEE History Center will hold the eighth in a series of historical conferences. The 2009 IEEE Conference on the History of Technical Societies will take place in Philadelphia from Wednesday 5 August through Friday 7 August 2009. The theme of the conference will be the history of professional technical associations, a theme chosen because 2009 is the 125th anniversary of the IEEE. There will be sessions on the history of particular technical societies, on the history of the engineering profession, including publications, education, and ethics, and a session on what the past tells us about the future. In connection with the conference there will be an IEEE anniversary celebration on the evening of Thursday 6 August with a reception and banquet at the Down Town Club, adjacent to Independence Hall in the historic district of Philadelphia.

In addition to three days of historical sessions and the banquet, other activities are planned for conference attendees. On the first day there will be a special tour of the ENIAC Museum at the University of Pennsylvania. The ENIAC, regarded

as the first general-purpose electronic digital computer, was completed there in early 1946. On the last day of the conference there will be an special open house at the American Philosophical Society. The APS, founded in 1743, is the oldest learned society in the United States. Included in the APS collections are a large part of Franklin's library, most of Franklin's extant correspondence, and manuscripts of many important figures in the history of electrical and computer engineering, including Elihu Thomson and John von Neumann. Also on the last day of the conference there will be an optional workshop on oral history. It is intended as an introduction to oral history for individuals or organizations interested in starting an oral-history program or learning more about the technique

Technical co-sponsors for the conference include the Department of Electrical and Computer Engineering of Drexel University, the Department of the History and Sociology of Science of the University of Pennsylvania, and the IEEE Philadelphia Section. Additional information is available on the conference website: **www.ieee.org/go/historyconference**.

UNINTENDED CONSEQUENCES

The University of Delaware–Hagley Fellows invite scholars to join them in a conversation about "unintended consequences" in the histories of business, technology, consumption, the environment, work, and everyday life. Seemingly rational actors make decisions, create institutions, shape environments, or develop technologies expecting certain outcomes, but things do not always go as planned. "Unintended Consequences" seeks to explore the enormous influence of these inevitable yet unexpected occurrences. How can research on unintended consequence contribute to our understanding of the modern world? Who decides what consequences are unintended? To what extent do we know the results of our actions? Why should historians pay attention to unintended consequences?

The Hagley invites papers that discuss instances of unintended consequences or address how the research of unintended consequences contributes to our understanding of the world since 1700. The Hagley encourages graduate students as well as established scholars to participate. Financial assistance will be provided to all conference presenters.

For more information, please visit **http://www.udel.edu/hagley/fellowsconference/**

CQD, JACK BINNS AND THE 1909 WIRELESS RESCUE AT SEA

The Marconi Radio Club W1AA of Massachusetts U.S.A. will take part in the Jack Binns special event commemorating the first large-scale rescue in open sea to be coordinated by wireless. (An earlier rescue in coastal waters had occurred when the crew of sinking lightship used its wireless to call for aid, but the 1909 rescue was the first to involve so many people and five ships far from land.) When the White Star liner *SS Republic* was accidentally rammed in heavy fog by the off-course liner *Florida*, the *Republic's* wireless operator, Jack Binns was able to call up the Marconi station at Siasconsett, Massachusetts. Jack Irwin, the Marconi operator there, was able to relay Binn's distress message to ships in the vicinity. Eventually Binns was able to communicate directly with the ships. He then "talked" the White Star ship *Baltic* to the *Republic's* side, with the invaluable—indeed indefatiguable—help of the *Baltic's* Marconi man, H.J. Tattersall, who, with his assistant Gilbert Balfour, was at his key 52 hours straight. **www.jackbinns.org**

The White Star Liner Republic *after the collision, as photographed by a passenger aboard the* Baltic

EE IN THE MOVIES

ELECTRICAL TECHNOLOGIES IN THE MOVIES: LIGHTNING RODS

Perhaps the first electrical technology was the lightning rod. Invented by Benjamin Franklin in 1749, it provides a conductive path in the event of a lightning strike, thus protecting a building, bridge, tree, or other object. There immediately began a business of manufacturing and installing lightning rods. In the 1937 John Wayne movie "Born to the West", one of the characters is a lightning-rod salesman.

Lightning, of course, gets into countless movies. Filmmakers like it because it is visually and aurally dramatic, and because it is threatening and can do great damage. In Ingmar Bergman's 1992 movie "Sunday's Children" we see lightning strike a tree and start a fire. Lightning causes a power failure in the just opened Flamingo hotel and casino in the movie "Bugsy" (1991). The movie "What Women Want" (2000) shows lightning hitting power lines. Exactly this phenomenon, incidentally, is one of the principal reasons that a great deal of research has been conducted on lightning and lightning strikes. In the 1992 Woody Allen movie "Husbands and Wives", the main character comments that even while kissing he was thinking about the lightning and whether it might come into

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the apartment. Lightning destroys the electronics on a small plane in "Six Days, Seven Nights" (1998).

People are aware that some things increase their chances of being struck by lightning. A character in the 1999 movie "Magnolia" is told "You got struck by lightning last summer [when] you were on vacation in Tahoe; I don't think braces is a good idea." When a group of picnickers is caught out in a thunderstorm in "Room with a View" (1986), a clergyman comforts those with him by saying that another carriage, with the picnic knives, is more likely to attract the lightning. In "Addams Family" (1991) the children perversely hold up a TV antenna in an electrical storm.

Quite a few movies show lightning rods. In the 1975 Woody Allen movie "Love and Death" a serf putting up a lightning rod gets turned into a pile of ashes. In "Europa, Europa" (1990) a lightning rod is used for a purpose other than the one intended when a boy uses it to climb up a building. In "My Favorite Season" (1993) a woman believes that her house has burned down after a lightning strike because her husband forgot to buy a lightning rod. The title character of the 1964 Alfred Hitchcock movie "Marnie" is terrified of a thunderstorm; another character reassures her, saying "The building is grounded, Miss Taylor; you're quite safe here."

If one searches the Web for the phrase 'lightning rod', one finds as many sites where it is used in its metaphorical sense, someone who attracts criticism, as in its literal sense.

Lightning striking the Eiffel Tower on 3 June 1902.

This is the case with the one movie that is entitled "Lightning Rod". That is the literal translation of the title of the 2004 Thai movie "Sai lor fah". There are, not surprisingly, several movies entitled "Lightning" and one entitled "St. Elmo's Fire", which is a lightning-related phenomenon.

A lightning rod can be used to capture a powerful surge of current. In many Frankenstein movies it is such a surge of current that brings the monster to life, though a kite is often used to make a lightning strike more likely, as in "The Bride of Frankenstein" (1935) and "Young Frankenstein" (1974). In the 1937 Disney movie "Snow White and the Seven Dwarfs" the queen's potion is mixed and obviously energized by a lightning bolt, and in the 1992 Disney movie "Aladdin" a wizard uses lightning carried by conductors. In the 1956 Danny Kaye movie "The Court Jester", a lightning bolt magnetizes a suit of armor. In "Weird Science" (1985) two teenagers accidentally create the woman of their dreams when lightning strikes their computer.

When lightning strikes sand, it can form the mineral fulgurite, usually in the form of a glass-like tube. The movie "Sweet Home Alabama" (2002) shows someone hammering lightning rods into the sand during a thunderstorm in hopes of getting fulgurites.

As always, we would be grateful for reports from readers of other interesting movie scenes that involve lightning and lightning rods. You may contact us at **ieee-history@ieee.org**.

DAVID MIDDLETON

A LIFE REMEMBERED: DR. DAVID MIDDLETON, PIONEER OF MODERN STATISTICAL COMMUNICATION THEORY

Dr. David Middleton, physicist and pioneer of modern Statistical Communication Theory, died on 16 November 2008 at the age of 88. He devoted his career to the study of information transfer and signal processing with numerous applications in radar, underwater listening devices, satellite technology, and wireless communications.

Born in New York City in 1920, he graduated from Deerfield Academy (1938), Harvard College (1942), and received his Ph.D. from Harvard in 1947. In 1960, he published *An Introduction to Statistical Communication Theory,* which today remains the seminal text for the field. For more than fifty years Middleton taught and inspired his graduate and doctoral students at Harvard University, Rensselaer Polytechnic Institute, Columbia University, Johns Hopkins University, University of Texas, Rice University, and the University of Rhode Island. He was a consultant to various government agencies and served on advisory boards, including the U.S. Naval Research Advisory Committee (1970-1977) and the Supercomputing Research Center, Institute of Defense Analysis (1988-91).

In 1958 Middleton was elected a Fellow of the IEEE "for contributions to the theory of noise in electronic systems" and attained Life Fellow status in 1986. He was also a Fellow of the American Physical Society, the Acoustical Society of America, the New York Academy of Sciences, The Electromagnetics Academy of MIT, the National Academy of Engineering, and the AAAS. Other memberships included the American Mathematical Society, the Explorers Club, Sigma Xi, Phi Beta Kappa, and the Authors Guild. Throughout his career, he received numerous

honors and prizes for his work and publications.

More than a physicist, Middleton believed in the importance of participating in and cultivating the arts and humanities. He was meticulous in crafting the prose for his books and papers, believing there was no excuse for scientists and engineers to be mediocre writers. He read widely, collecting books on history, philosophy, biography, art, and music. He enjoyed listening to music from the Classical and Romantic eras, and played the piano—especially Beethoven, Schubert, and Chopin—with great dexterity and feeling. Over the years he created many elegant line drawings of imaginative scenes and characters. Middleton loved the Cape Cod seashore, where he spent part of every summer or fall with his family, playing tennis and enjoying the ocean and walks in nature. He could tell outrageous puns and was very fond of cats.

At the time of his death, he was actively working on Elements of Non-Gaussian Statistical Communication Theory: A Space-Time Treatment, the sequel to his first book. It summarizes his work of over 65 years in Statistical Communication Theory as well as presenting results from more recent research gained by adding nonlinear effects and time analysis to earlier methods. The sequel will be published posthumously in some form.

To share with future generations the body of knowledge he amassed during his lifetime, Middleton arranged to donate his personal technical library to the University of Maryland. He chose MIT to be the new home for his consulting contracts and related papers.

To pay tribute to his love of math and science as well as the arts and humanities, the Middleton Family requests that donations in memory of Dr. David Middleton be made to the IEEE History Center. Donations may be made by returning the enclosed business reply envelope or through the Internet at **www.ieeefoundation.org** by clicking on the "Donate Online" tab and selecting the IEEE History Center Fund. Upon making a donation, please indicate that the gift is in memory of Dr. David Middleton. If you have questions or need assistance making the gift, please call +1 732 562 3860 or email **donate@ieee.org**.

Condolences and remembrances may be posted to **http://web.me.com/boots911/In_Memorium:_David_Middleton** or sent to Susan Middleton, 366A Norton Hill Rd., Ashfield, MA 01330-9601.

During his lifetime, the IEEE History Center conducted two oral histories with Dr. David Middleton. The first interview, conducted in February 2000, covers Middleton's academic and consulting careers, as well as his involvement in IEEE. The second, conducted in August 2007, is a follow-up to the 2000 interview. Both oral histories can be accessed through the IEEE Global History Network at **www.ieeeghn.org**

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THE IEEE LIFE MEMBERS' PRIZE IN ELECTRICAL HISTORY

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 foreign 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. Deadline for the 2008 prize is April 15, 2009.

For more information, please contact Robert MacDougall, Prize Committee Chair, at **rmacdou@uwo.ca**, or Amy Bix, SHOT Secretary at **shot@iastate.edu**.

TECHNOLOGY UNEXPECTANS

GPS devices protecting holiday displays. An article in the 21 December 2008 *Wilmington News Journal* by Robin Brown described how churches and synagogues have been implanting GPS devices in menorahs and manger scene characters in order to assist the police in recovering, for example: stolen wise men (two were found on a ski slope), baby Jesuses, and menorahs. Instead of being led by the star, the magi may, in future simply follow a GPS to the manger.

Bringing the Hammer down: Remote-controlled toy cars are often used at track and field competitions to return the discus and the hammer to the starting point. This saves time between competitors, and avoids requiring an official or assistant run back and forth between each throw.

IEEE History Committee member David Burger submitted the following unexpected wireless application: Often the need to achieve an outcome with limited technology and infrastructure is a driver to think laterally. In running a workshop event, with approximately thirty people attending, we needed to communicate across the large conference to prepare ID tags in a side room. We had two older laptops without any wireless capability, but this was an amateur radio get-together, a community where ingenuity often abounds.

Both laptops had a program call WSJT, a very narrow bandwidth (approx 5Hz), low bit rate data transfer program that is used to establish data links over high loss radio paths. The laptops generate and receive audio which is traditionally connected to radio equipment. The software has applications in Meteor scatter and Earth-Moon-earth communications. In this case, we simply turned on each laptop speaker and microphone, ditching any high tech radio links and effectively opening up a narrow band 'audio band' link across the room.

The attendees names were sent across the noisy room successfully, albeit slowly, to the surprise of many. There was a gentle, almost inaudible, warble over all the chatter, but the data got through.

WSJT is a low speed data comms program, architected by Joe Taylor (K1JT), with traditional applications of VHF weak signal communications. It has origins in radio astronomy (pulsar) signal detection. **http://www.physics.princeton.edu/pulsar/K1JT/**

The IEEE History Center Newsletter welcomes accounts from readers of technology being used in unexpected ways. Please submit any items to **ieee-history@ieee.org**

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CARR, NICHOLAS,
The Big Switch: Rewiring the World from Edison to Google, W. W. Norton & Company, 2008

Beginning with Henry Burden's 1851 invention of an especially powerful waterwheel, the first five chapters describe the way that motive power – previously steam engine or waterwheel – became more and more centrally supplied in the form of electricity purchased from an electrical utility rather than each factory relying on constructing its own source of power. Using this historical backdrop, former Harvard Business Review executive editor Nicholas Carr posits that the same thing is happening with computers. Data processing and information storage will become "a cheap, universal commodity," supplied by centralized utilities. The World Wide Web, which Carr calls the World Wide Computer, may change the world as profoundly as cheap, utility-supplied electricity did.

Whether or not Carr's predictions come true in the sense of market share is not really the focus of the book. More important than exploring the business models which might produce such a world, the real interest of The Big Switch lies in the sobering, indeed frightening, examples Carr offers the reader of what happens

when information becomes a commodity to be vended and controlled. From Google's desire to tinker with the human brain, e.g Sergey Brin's musing that "perhaps in the future, we can attach a little version of Google that you just plug into your brain," to Microsoft's 2004 patent for a technology which would turn the human skin into a new kind of electrical conduit to connect a network of devices coupled to the body, Carr gives us multiple examples of why such a world might be a nightmare. Most chilling of all, the people Carr quotes do not seem to see any drawbacks to their visions of the future. Their discussions are breathlessly enthusiastic. Something can be done, so it will be. Never mind whether it should be. Carr's book is a warning that we should take some time to examine the consequences.

Carr also examines the ways the data collected about web users' searches and purchases threatens the privacy of anyone who chooses to participate in the global virtual community. The success of two New York Times reporters in 2006 of tracking down an individual AOL subscriber from the supposedly keywords entered in AOL's search engines (AOL had released its search logs, supposedly as a public service to academic and corporate researchers, after "anonymizing" the identities of the searchers.) Carr relates how it took New York Times reporters Michael Barbaro and Tom Zeller Jr. a few hours to determine the identity of 4417749. Tom Owad's similar experiment using Amazon.com wishlists to identify the reading preferences of some 260,000 U.S. citizens, with addresses and Google Maps locations thrown in for good measure, is also described. "You have zero privacy. Get over it," former Sun Microsystems chief executive Scott McNealy is quoted as saying back in 1999. Not only have the technocrats taken away our privacy, they show a belligerent non-regret at having done so.

The third major caution Carr provides is against the intellectual thinness and mediocrity that we risk by allowing our information to be a commodity pumped to us in a one-size-fits-all, instantly-available utility, or worse, via a search engine which has been programmed to tell us what it – or its sponsoring advertisers – thinks we ought to know. Google's search engine's retrieve results based on how many other people have gone to the same sites. It is not necessarily finding what you want to find, but what the most other people have found before you. It is the Road Most Taken.

Anyone interested in questions of technological determinism, privacy, or portrayals of future dystopia will find Carr's book a valuable, and disturbing read. Hopefully, the people who are not yet interested in those questions – but ought to be – will also read it before they program their next on-line application.

Available from W.W. Norton & Company, **www.wwnorton.com** , $25.95, hardcover, ISBN 978-0-393-06228-1, 278 pages, index, notes.

MINDELL, DAVID

Digital Apollo: Human and Machine in Spaceflight, MIT Press, 2008.

Digital Apollo is a rich historical account of the Apollo program, with special attention to the development of computer control and the interplay between humans and machinery. The detailed story begins in the 1950s with high-speed and high-altitude aircraft, where issues of human and automatic control came to the fore. It was especially the X-15 project, a manned rocket aircraft that flew at the edge of space, that raised such issues.

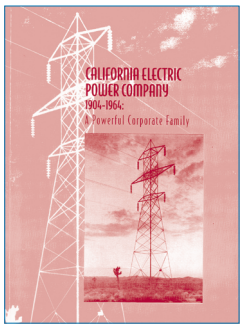
The book moves on to the Mercury program, which carried further the development of human-and-machine control-systems. There is also some coverage of the Gemini program and of Soviet space vehicles. The bulk of the book deals with the Apollo program, with a great deal of attention to the Apollo Guidance Computer. The author argues that this program pioneered in many aspects of automatic control, digital-computer design, and software development. The reader learns much about the data processing involved and the various interfaces between humans and machines. As things turned out, automatic control was the usual for the Apollo missions, but there was interaction with the astronauts and in some crucial situations, including all six of the Apollo lunar landings, the astronauts took control from the computer.

Digital Apollo is a scholarly book, with sources given in endnotes. There is also a bibliography, as well as a glossary. The book is handsomely and effectively illustrated with photographs and diagrams. David Mindell is Dibner Professor of the History of Engineering and Manufacturing at MIT. An earlier book of Mindell's, Between Human and Machine: Feedback, Control, and Computing before Cybernetics (2002), also deals with human interaction with control systems.

Available from MIT Press, Massachusetts Institute of Technology, Cambridge, MA 02142; **mitpress.mit.edu**, $29.95, hardcover, ISBN 978-0-262-13497-2, xiii + 361 pp.

KLURE, LAURA L

California Electric Power Company, 1904-1964: A Powerful Corporate Family, 2005



Laura Klure's history of the California Electric Power Company from its beginnings until its sale to Southern California Edison documents an important corporation in the development of California's electric infrastructure. Filled with photographs and tables, it is a valuable reference for anyone interested in the history of the electric utility industry. In addition to the technical and business history, Klure devotes a chapter to the corporate culture and Calectric's role in its communities, and the loyalty it inspired in its employees.

Available from Laura L. Klure, PO Box 53355, Riverside, CA 92517, **llklure@att.net** , $24.00, paperback, 221 pages, 175 illus., appendices, index, notes.

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