IEEE History Center

ISSUE 74, July 2007

STATIC FROM THE DIRECTOR

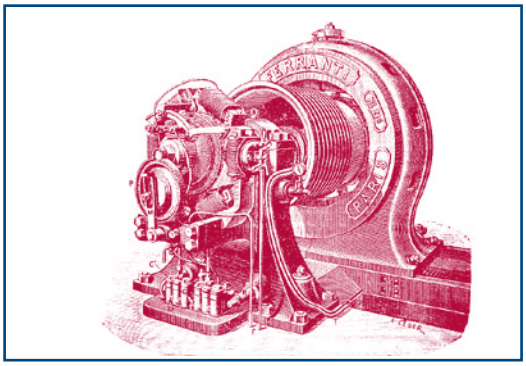
By the time this newsletter mails, History Center staff should be in the final stages of preparation for the 2007 IEEE Conference on the History of Electric Power, to be held on the first weekend of August at the New Jersey Institute of Technology (NJIT) in Newark, New Jersey, USA. Besides continuing the IEEE History Center's tradition of uniquely bringing together technologists, historians of technology and technology enthusiasts, this year's conference is also important for what it demonstrates about the new strategic directions being set for IEEE's historical activities by the IEEE History Committee.

Our conferences have sometimes had local co-sponsorship in the past. This time the conference is being technically co-sponsored by NJIT, through its Department of Electrical and Computer Engineering and its Newark College of Engineering division), but also by the IEEE North Jersey Section and by the IEEE Power Engineering Society. In addition, we have received a grant from the First Energy Foundation. These partnerships demonstrate the History Center's commitment to the History Committee's vision of a global IEEE history network.

In this vein we also continue to work with IEEE societies—projects are finishing up with the IEEE Electromagnetic Compatibility Society and the IEEE Oceanic Engineering Society, and beginning with the IEEE Engineering in Medicine and Biology Society, the IEEE Engineering Management Society, the IEEE Professional Communication Society, and the IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society—and also beginning to work more closely with IEEE Regions and Sections. For the first time we will be the technical co-sponsors of a Regional history conference, this one being organized by Region 8 in Paris in September 2008. And, of course, the IEEE Milestone Program—always a strong link between IEEE Sections and the IEEE History Committee—continues to go strong [see page 5]

To facilitate all of these activities, we are planning a major revision of our web presence. The new web resources may include wiki-based software to encourage all of our constituencies to participate directly in preserving and promoting IEEE's rich historical heritage.

Finally, please keep in the back of your mind that 2009 will be the 125th anniversary of the IEEE, an opportunity to have a focal point around which to coalesce our various initiatives. We appreciate your support for all of our activities in the past, and we look forward to continuing to earn your confidence. Please follow along on our web site, in occasional communications, and, especially, in this newsletter which we plan to continue to send you full of interesting and informative features.



RUTGERS
THE STATE UNIVERSITY OF NEW JERSEY

The newsletter reports on the activities of the 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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1898 Donation to the Smithsonian

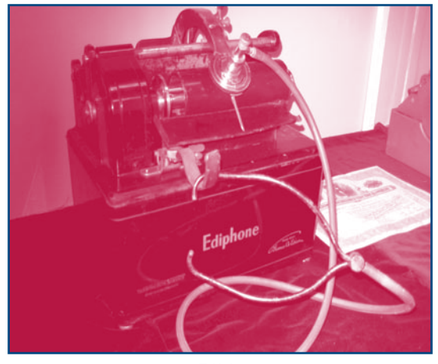
Back in 1898, in an effort to preserve the history of the AIEE, Franklin L. Pope donated several items to the Smithsonian. Pope served as President of AIEE for 1886-1887. Those items donated were a Seeley DC dynamo, a Davenport motor, an original AIEE badge dating back to 1893 and two re-designed badges that were introduced in 1897. Each of the "new" badges were issued in different colors, blue for Member grade, and red for Associate grade.

The Smithsonian recently discovered that it did not have a "Deed of Gift" for these items and forwarded the appropriate documents to the IEEE History Center for signature. The Curators at the Smithsonian were even kind enough to have high resolution photographs taken of each item for the History Center's records.

Edison Exhibit

The IEEE Operations Center, located in Piscataway, NJ, U.S.A., has various exhibit cases in which the History Center organizes historic displays. Recently, we worked with the Charles Edison Fund and arranged to borrow historic Edison artifacts. We were loaned items including an Edison stock ticker, a tin phonograph, an Ediphone, and a child's phonograph. The exhibit is being enjoyed by volunteers and staff alike. In the near future a staff "Lunch 'N Learn" will be held, with a talk given by Dr. Paul Israel who is Director of the Edison Papers at Rutgers University and a member of the IEEE History Committee.

Edison Exhibit at IEEE Operations Center



Ediphone

IEEE Staff History Club

Recently Mary Ann Hoffman, IEEE History Center Archivist, had been chatting with several other members of IEEE staff about the history of the IEEE as well as the history of technology. She realized that there is an interest in history among staff, so she organized the Staff History Club. It will meet monthly to discuss both the history of the IEEE and also IEEE technologies. From time to time the club hopes to invite outside technologists who are also interested in history to give presentations. The first meeting began with a tour of the Archives and new Edison Exhibit (see related article on page 2), and was followed by a discussion of the formation of the AIEE

They're Baaaaaack!!!!!!!!!

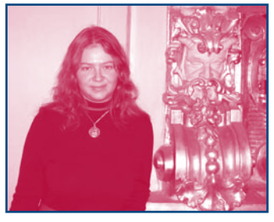
A year and a half ago, the IEEE History Center accepted a donation of what we call the "Zimmerman Library." It is almost a complete set of hard-bound *AIEE Transactions* and *IRE Proceedings*. What we didn't know when we accepted the donation is that the books had been sitting in a wet basement with no heat for years. Thus, they had developed a bad case of mold. Because this is a valuable set of publications it was decided to have them professionally cleaned to remove all of the mold. Through a generous grant from the IEEE Life Members Committee we now have the books back in the Archives and can once again offer this as a research tool to people interested in older publications.

Thai Translation of Virtual Museum

The IEEE History Center is pleased to announce that portions of its IEEE Virtual Museum have been translated into Thai and published in book form to be distributed gratis to Thai high school libraries. IEEE Volunteer Professor Ekachi Leelarasmee did the translation, and the project was supported by a grant from the IEEE Foundation, the IEEE Thailand Section, and corporate sponsors.

STAFF NOTES

2007 IEEE Life Members' Intern



The IEEE History Center is pleased to welcome Anna Konstantinova as the 2007 Life Members' Intern. Anna is a Ph.D. student at St Petersburg State Electrotechnical University (LETI), in the Department of Philosophy, where her specialization is the Philosophy of Science and Engineering. Her dissertation title is: Philosophical problems of Media Technologies in the Innovative Science-Engineering Activity.

She is the author of several papers on Alexander Popov, the history of the city of Kronstadt, and on Vladimir Zworykin and Alexander Konstantinov, and she has served as the press attache of the IEEE Northwest Russia Section. Her proposed research is to consider the main achievements made in the history of visual communication system called television for which V. Zworykin is assigned much of the credit. In addition, her research is expected to provide some additional facts on Zworykin's life, his scientific activities and collaboration with research laboratories in Russia. Anna is interested in comparing Vladimir Zworykin's contribution to the development of electronic television system to that of an unknown scientist and inventor -- Alexander Konstantinov -- who was engaged in a similar project at the same time in Russia but was not able to realize his ideas. Anna intends to follow their professional carriers and the circumstances which led V. Zworykin to a great success and considerable achievements while A. Konstantinov became a victim of Stalin's repressions in spite of the fact that he succeeded in receiving a patent on a television transmission tube.

Anna's hobbies are swimming, skating, traveling, and playing the piano.

HISTORY OF STANDARDS

The Standards Board of Directors has asked long-time volunteer Joe Koepfinger to prepare a history of standards. His goal is to prepare a chronological list of key historic events pertaining to AIEE, IRE and IEEE standards. AIEE was founded in 1884 and the IRE was established in 1912, so this will be a long and rich history. In the mid-1920s both organizations help form the American Standards Association to "serve as a national clearing house for engineering and industrial standardization and acts as the official channel of cooperation in international standardization." The IEEE Archives contains some information, but it is not complete. Joe is asking members to submit information on this important topic to him. He can be reached at **joseph_l_koepfinger@msn.com** or (412) 264-6148.

SURF CITY

Google Patents

When researching certain inventions, it's always helpful to check the patent. The United States patent office isn't always the most user-friendly establishment. But Google Patent is! To access it, go to google.com and click on "More", and pop up menu will appear, then select "Patents." You can search by keyword or by a specific patent number. Each time you access the web site it brings up 5 random patents. Did you know that there is a patent for a cheese cake wedge?
www.google.com

Jim Hawkins' Radio & Broadcast Technology Page

This web site is well done and well researched. Jim has put time in to collect information on radio transmitters over the years. As he states on his web site, they are too big to actually collect, so he had to settle for photographs and descriptions.
www.j-hawkins.com/radio.html

The Charles Edison Fund

As reported in a related article (page 2) the Charles Edison Fund, and more specifically Charles Hummel, made possible a wonderful new exhibit at the IEEE Operations Center in Piscataway, NJ. The main project of the Fund is to restore and preserve the Edison National Historic Site in West Orange, New Jersey, which site contains the world's second corporate research and development laboratory. Currently the fund is undergoing a $90 million Campaign to preserve the $2.5 billion worth of artifacts at the site through the new Edison Innovation Foundation. Please visit the site for details.
www.charlesedisonfund.org/

RELIC HUNTING – ISTANBUL

Having been the capital of three empires and a center of culture and learning for two thousand years, Istanbul Turkey has layers of history to interest the visitor, and Istanbullars treasure their patrimony. It is also home to the oldest underground railroad in continental Europe, and the second oldest in the world (after the London Underground). Istanbul's much-loved Tünel was completed on 17 June 1875 by French engineer Henri Gavand and runs from Galata (now Karaköy) to Beyoğlu. Designed to provide bankers, diplomats, and merchants with an easy way to travel from their homes in Beyoğlu to their offices on the Golden Horn, the Tünel is 571 meters long with two train cars running between two stations on a single track (except in the middle where the track doubles to allow them to pass). The cars are connected by cables, allowing them to serve as each other's counterweights and thus to minimize the energy needed to run the system. This also makes for almost hypnotically silent ride, which adds to its appeal. Originally powered by horses, then by steam engines, it was electrified in 1910. It was tested for a year carrying cattle before being opened to human traffic.

The stations retain their gorgeous Ottoman Iznik tiles complete with the Sultan's monograms and, although the wood cars themselves were replaced in the early 1970s by less-nostalgic steel cars, the system itself maintains the charm of old Istanbul and its 19th century Ottoman splendor.

Istanbul's Tünel Funicular Photo courtesy of Bertil Videt

(We would enjoy hearing from our readers about any technological relic hunting stories they might wish to share via this newsletter. Anecdotes or stories about tracking down electrical or computing artifacts, or about coming across them unexpectedly (in situ and still operational is even better), are welcome: **ieee-history@ieee.org**)

IEEE 125th ANNIVERSARY

An Opportunity to Nominate Milestones in Electrical and Computing History

The IEEE will celebrate its 125th anniversary in 2009. This is a major opportunity to gain publicity for our Institute and to bring the general public into contact with the history of electro-technology and computing. One of the ways that IEEE organizational units can celebrate their own heritage, as well as the heritage of the profession, is by proposing a local achievement as a milestone in electrical engineering and computing. The IEEE currently has dedicated more than seventy-five milestones, however there are still a number of major achievements remaining to be recognized. The IEEE Milestones Program honors significant achievements in the history of electrical and computer engineering. To be designated an achievement, it must be at least twenty-five years old, must have involved a unique solution to an engineering problem, and must have had at least regional impact. The Milestones Program has attempted to involve—beyond just Sections—all organizational units, such as Societies and Chapters, in the nomination process.

To encourage milestone proposals, here is a list – by no means comprehensive -- of major achievements suitable to be proposed as a milestone. Program guidelines and proposal forms can be found at: **www.ieee.org/web/aboutus/history_center/about/milestones.html**. IEEE History Center staff will be happy to suggest other milestones in your area, or if there is an achievement you would like to propose and which is not on this list, we encourage you to put it forward.

1617	Napier's Bones	UK
1621	Slide rule	UK
1623	Mechanical Calculator	Germany
1642	Advanced calculator	France
1671	Reliable calculator	Germany
1746	Leyden jar	Netherlands
1790	Galvanism	Italy
1808	Arc lighting	UK
1819	Discovery of current/ magnetic field	Denmark
1824	Galvanometer	France
1824	Electromagnet Sturgeon	UK
1828	Electric motor	Albany, NY, USA
1828	Ohm's law/resistance	Germany
1831	Discovery of induction	UK
1837	Analytical engine	UK
1840	Electroplating	UK
1844	Washington-Baltimore telegraph line	Maryland, USA
1850	Kirchoff's laws	Germany
1859	Storage battery	France
1860	Arc welding	UK
1868	Primary dry cell	France
1873	Maxwell's equations	UK
1879	Commercial use of arc-lighting	Cleveland, OH, USA
1881	Solar-powered pump	India
1882	Pearl Street plant	New York City, USA
1883	Edison Effect	New Jersey, USA
1886	Proof/theory of electromag. waves	Germany
1888	AC induction motor	New York, USA
1888	AC induction motor	Italy

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1889	Automatic telephone exchange	Missouri, USA
1890	Punched-card machine	Washington, DC,USA
1895	X-rays	Germany
1897	CRT	Germany
1897	Electron	UK
1899	Loading coil	New York, USA
1900	Avanced coherer	India
1901	Mercury discharge lamp	New York, USA
1901	Electric typewriter	Washington, DC
1906	Crystal detector	Germany
1906	Triode	USA
1910	Tungsten filament	New York, USA
1911	Automobile self-starter	New York, USA
1917	Superheterodyne circuit	New York City
1918	Practical AC clock	Massachusetts, USA
1919	Permanent electrostatic field	Japan
1919	Neutrodyne circuit Hazeltine	New Jersey, USA
1927	Negative feedback amp	New York, USA
1929	Electron microscope	Germany
1930	FM Radio	New York City, USA
1931	Iconoscope	Pittsburgh,PA,USA
1933	Wind generation tied to grid	Ukraine
1934	Diesel-electric train	Ohio, USA
1938	Xerography	New York, NY, USA
1948	Information theory	Cambridge, MA, USA
1949	Transistor	New Jersey, USA
1954	MASER	California, USA
1956	Nuclear power generation	Shippingport, PA, USA
1958	Texas Instrum. Integrated Circuit	Dallas, TX, USA
1960	LASER	NJ and NY, USA
1969	Public-key encryption	UK
1969	ARPANET (1st 4 nodes)	CA/Utah, USA
1970	High-voltage DC intertie	California, USA
1971	INTEL 4004 microprocesor	California, USA
1972	HP-35 Hewlitt&Packard	California, USA
1972	LANDSAT-1	Florida, USA
1973	Ethernet	Palo Alto, California, USA
1973	UNIX	New Jersey, USA
1974	Computer-aided tomography	various
1974	Barcode scanner	Ohio, USA
1975	Altair 8800 microcomputer	New Mexico, USA
1976	Reading machine for the blind	California, USA
1976	Apple Computer	California, USA
1977	MRI	New York, USA
1980	Automatic implantible defribulator	Minnesota, USA
1980	Compact fluorescent lamp	Massachusetts, USA

WASHINGTON RECEIVER: BIRTH OF AUTOMATIC VOLUME CONTROL

On Sunday, 13 May 2007, Center Archivist Mary Ann Hoffman visited InfoAge Learning Center in Wall Township, NJ. Several years ago when Mary Ann was re-archiving the IEEE Archives, she stumbled across a piece of equipment and had no idea what it was. With the assistance of Ray Chase of the New Jersey Antique Radio Club (NJARC), she discovered that it was known as the "Washington Receiver" which was built by Harold A. Wheeler (IEEE Medal of Honor, 1964) to refine his automatic volume control.

The IEEE History Center donated the Washington Receiver to NJARC, and it is now proudly on display at their museum in Wall Township. A special cover was constructed by the Club and they added a narrative to explain to the general public the purpose of it.

Here is an excerpt from their narrative:

"Most of us take for granted the operation of Automatic Volume Control (AVC or AGC if you prefer) in our radios but many of you also restore and use early radios without AVC and recognize the problems of trying to tune stations while trying to keep the volume and sensitivity in check and not having enough hands to manipulate all the controls. Without AVC, radios in motor vehicles would never be practical due to periodic fading of signal strength. When and how did AVC appear? You may have heard that it was one of the patents in Louis Alan Hazeltines's extensive portfolio of early radio patents and that is largely true but who actually did it and when?

"The inventor was a chap named Harold A. Wheeler who worked for and with Hazeltine and who was awarded several patents relating to his early work on AVC circuits as well as associated tuning indicators that were another outgrowth of the development of automatic gain control circuits. The time was late in 1925 and the breadboard receiver on display here is the actual radio that he used to perfect his ideas. He called it the "Washington Receiver" since he built it at his then home in Washington, DC."

ELECTRICAL TECHNOLOGIES IN THE MOVIES: ELECTRIC POWER

In the first third of the 20th century, people usually regarded electric power as the most important aspect of modernization. For the Soviet Union, Lenin famously declared that "Communism is Soviet power plus the electrification of the whole country." The importance the Communists gave to electricity was reflected in George Orwell's Animal Farm, published in 1945, and this is a theme of the 1954 movie version of that book, where we see the animals electrify the farm. In "O Brother, Where Art Thou?" (2000), which takes place in the South in the 1930s, electric power is seen as an important part of a new world—an age of reason—where everyone will be hooked to the grid. The spread of power lines was not viewed by everyone with approval. In the World War II movie "Hope and Glory" (1987), set in England, a curmudgeonly grandfather says, about power lines, something like "They're coming this way, the future on the march, the volt, ampere, and watt."

For the most part, though, electric power is something taken for granted in movies, and it is its absence that gets noticed. In the 1978 movie "Pretty Baby", which takes place in 1917 New Orleans, Violet (Brooke Shields) asks the photographer (Keith Carradine) why his house does not have electricity. In David Lean's World War I movie "Ryan's Daughter" (1970), which takes place in quite undeveloped western Ireland, we see that the military post has to generate its own power. Similarly, the 1988 movie "Chocolat" shows that the colonial administrator in Cameroon in the 1950s had to generate power for his own house. Power failures, either for a single building or for a large area, play an important part in many movies; this was the subject of the Electrical Technologies in the Movies column in the July 2005 History Center newsletter.

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Filmmakers occasionally use severed electric lines for visual interest. In "Hard Rain" (1998) lines snap and a pole transformer falls sparking into a flooded street. To increase the drama, movies often show a severed line whipping around and sparking. This, of course, is Hollywood physics; a severed water-hose might well whip around, but not an electrical line. Examples of such self-moving and scintillating cables are in "Meet the Parents" (2000), "Identity" (2003), and "Poseidon" (2006).

Engineers are seldom the main characters in movies, and power engineers are quite rare. One recent big-budget movie, "Box of Moon Light" (1996), does have a power engineer as the main character, though he is portrayed as engineers are often portrayed, as a conscientious nerd who is socially inept. One of the few movies about power-line workers, "Slim" starring Henry Fonda, appeared in 1937 when electric power, particularly rural electrification, was much in the news.

The varied means of generating electrical power are present in many movies. Filmmakers have frequently shown hydroelectric power, sometimes, one suspects, simply because of the visual impact of the dams. Hoover Dam, for example, is in many movies, notably Alfred Hitchcock's "Saboteur" (1942), Albert Brooks' "Lost in America" (1985), and the Chevy Chase movie "Vegas Vacation" (1997). Memorable nuclear-power stations are in the first James Bond movie, "Dr. No" (1962), and in "China Syndrome" (1979). Solar power was discussed as early as in the 1938 Jimmy Stewart movie "You Can't Take It With You", and it became more popular with the environmental movement of the 1970s; the 1974 Bond movie "The Man with the Golden Gun" features a 95-percent-efficient solar cell, which of course is stolen by the villain. The 1996 movie "The Saint" shows the enthusiasm, in some circles, for cold fusion in the 1990s, and modern wind power is impressively depicted in the Pedro Almodóvar movie "Volver" (2006), set in Spain, a leading country in the development of that energy source.

As a final note, one might mention the 1959 movie "On the Beach". It pays a tribute to the reliability of electric power: toward the end of the movie we see a power station near San Diego that

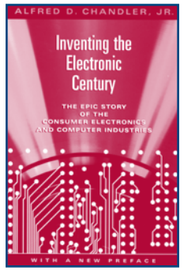
is still operating smoothly after everyone there has been killed in a nuclear war. As always, we would be grateful for reports from readers of other interesting movie scenes that involve electric power. You may contact us at **ieee-history@ieee.org**.

BIBLIOGRAPHY

Book Note

Dr. Yuzo Takahashi of the Tokyo University of Agriculture and Technology, a long-time friend of the IEEE History Center and a former member of the IEEE History Committee, has just published, in Japanese, a general history of electrical engineering. A handsomely produced and well illustrated volume from Kogyo Chosakai Publishing, *History of Electrical Engineering* begins with explorations of electrical and magnetic phenomena in the ancient world, follows the development of electrical science beginning in the 18th century, and covers the many electrical technologies that have appeared since the mid 19th century.

CHANDLER, ALFRED D., JR. *Inventing the Electronic Century: The Epic Story of the Consumer Electronics and Computer Industries*, with a new preface, Harvard University Press, 2005.



Alfred D. Chandler, Jr. (1918-2007), the author of many important books on business history, always gave much attention to the role of technology in historical change. For example, in *The Visible Hand* (1977), his best-known book, he highlighted the role of new communications in the managerial revolution of the late 19th century.

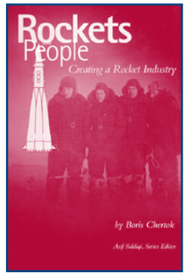
Inventing the Electronic Century, which was first published in 2001, appears here in a new edition. As part of the Harvard Studies in Business History, it concerns business decisions and business practices more than technology per se. Yet the businesses concerned are the consumer electronics and computer industries, which, it may be argued, have done more than any others to bring about technological change in everyday life.

Besides an introduction and a conclusion, the book consists of six chapters. The first tells of the emergence of consumer electronics and the large role that RCA played in this story from creating the new market in the 1920s to the collapse of the U.S. consumer-electronics business in the 1970s. The next chapter describes "Japan's paths to global conquest" in consumer electronics, with most attention given to Matsushita and Sony. Chandler then turns to the early computer industry, the production and marketing of mainframe and mini computers, which the U.S. companies, particularly IBM, dominated. The next chapter explains how the microprocessor transformed the computer business, with personal computers becoming the main product; again U.S. companies dominated. There follows a chapter that looks at the European and Japanese rivals to these U.S. companies, and the final chapter gives a worldwide overview of the consumer electronics and computer industries at the end of the century.

This is a scholarly book, with a good deal of quantitative material presented in charts and graphs and with sources given in endnotes.

Available from Harvard University Press, 79 Garden Street, Cambridge, MA 02138; **www.hup.harvard.edu**, $18.95, paper, ISBN 067401805-2, xvii + 321 pp., index.

CHERTOK, BORIS, *Rockets and People: Volume II – Creating a Rocket Industry*, NASA History Series, Washington, DC, 2005 (published in Russia from 1994-1999)



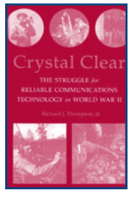
The English translation of Volume II of Boris Chertok's 4-volume memoir of the Soviet rocket industry continues the story from the years 1946 to 1956. Readers who enjoyed volume I of Chertok's memoir about designing electronics for World War II bombers and later racing through a collapsing Germany with - and sometimes even a little ahead of - the Red Army to seize German rocket sites (reviewed in Newsletter 68) will be eagerly awaiting volume II, which examines the postwar development of captured German V-2 rockets into the mighty R7 rocket capable of landing a probe on the Moon and of carrying intercontinental warheads. After World War II, Chertok became the head of the control systems department at NII-88, the institute in charge of developing "reactive armaments" (i.e. rockets and missiles).

Chertok's thoroughly researched and carefully footnoted history is not only a unique first-person view inside the Soviet space program, it is also a fascinating glimpse into the process by which technical problems get solved, new ideas tried out, risks estimated, and design compromises reached. Anyone interested in the management of large technical programs will also find much wisdom and experience in this book. The inclusion of "people" in the title is an indication of how important Chertok believes that human brilliance, enthusiasm, frailty and strength, are to the technological process. He recounts the story of an overenthusiastic sentry, who – believing that he had heard or seen something in the fog surrounding the launch site – loosed off a warning shot which punctured the fuel tank of a rocket waiting to be launched the next day.
Accidents and diagnostics, and the expensive consequences of even small oversights or carelessness, are very carefully described. "We're launching cities," was the cost analogy used to bring this idea home to the design and technical teams. The process of analyzing the films from a failed launch for the cause of the failure is described for a number of cases, showing how vulnerable complex systems are to even very small flaws. The failure of a tiny gear in a hydrogen pump, a few needles of ice blocking a sensor, an improperly assembled component, or a false command sent – are enough to scrub a launch or even destroy a large and powerful rocket. Even more horrific are the consequences of deliberate human illogic or choices made by people under external pressure. The catastrophic explosion on the launch pad at Tyuratam of an R16 rocket whose safety systems had imprudently been disconnected for testing and whose second stage ignited accidentally, triggering a fire and explosion which killed more than 100 people (the Nedelin Disaster), is the sobering ending of Volume II.
Technology acts upon politics and history, and politics and history act upon technology. Western readers may be surprised to learn that the early launch of Sputnik and the resulting lead in the Space Race was driven in part by the R7 rocket's nosecone failures upon re-entering the atmosphere. By using the R7 to launch an object which did not have to return to earth, this bought time to fix these flaws in order to fulfill the R7's original purpose, which had been to carry thermonuclear warheads. A purpose for which – initially – it was unsuited. A technological setback in one area redirected efforts into what was to became a political triumph in another.

Creating a Rocket Industry is not only a detailed, valuable history, it is also an absorbing, skillfully-written narrative of events and technologies which drove the Cold War and shaped the political landscape of the latter half of the Twentieth Century.

Available from U.S. Government Printing Office, **bookstore.gpo.gov** $53.00, ISBN 0-16-076672-9 hardcover, xix+ 669 pp., index, illustrations.

THOMPSON, RICHARD J., *Crystal Clear: The Struggle for Reliable Communications Technology in World War II*, IEEE Press, 2007.



Crystal Clear is a highly readable and engaging

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account of the development of quartz crystal technology and the pivotal role it played in the Allied victory during World War II. Thompson's approach will appeal to readers with a specialized interest in the history of science and technology, as well as to a more general audience of radio enthusiasts. His lengthy bibliography and extensive footnotes are particularly useful to scholars interested in the development of wartime technology.

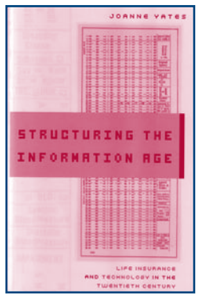
Thompson's inquiry into the use of quartz crystal oscillators during World War II and beyond incorporates archival research, personal interviews and correspondence, as well as photographs from the National Archives Still Pictures Collection to describe the wartime effort to develop a mass production industry for crystal radio units. *Crystal Clear* is the story of the successful collaboration of government agencies, branches of the military, industrialists, and basement hobbyists to design, build, and supply a vital weapon in the form of reliable wireless radio technology.

Much of *Crystal Clear* focuses on the strategic importance of crystal-controlled radio equipment during the Second World War and on the U.S. Signal Corps' efforts to produce quartz oscillators which would more reliably control the transmission and reception of radio frequencies. Thompson's account describes three main crises faced by the Signal Corps in its struggle to develop this form of communications technology. The first crisis was created by the sudden need for communications equipment upon the United States' entry into World War II after the bombing of Pearl Harbor. At the time, a mass production industry for crystal units did not exist, nor was there any known manufacturing process which would readily allow the creation of one. The efforts to supply the needed radio units created another crisis in that there was a sudden demand for unprecedented amounts of raw quartz, causing quartz to be categorized as a "strategic and critical" material by the U.S. government. Although the U.S. made efforts to find a domestic source, in the end the only viable supply of radio grade crystals available during the course of the war was from an interior region of Brazil. Lastly, Thompson examines the "Aging Problem" which refers to when crystal units failed in the field because of manufacturing flaws.

Thompson's notes that -- although much has been written about the development of radar and the atomic bomb -- the strategic importance of wireless radio communication is often overlooked and with it the direct impact of quartz crystal technology on watches, cell phones, color televisions, and computers.

Available from Wiley-IEEE Press, Hoboken, NJ 07030 USA **www.wiley.com**, $54.95; hardcover, ISBN: 0-470-04606-6, 230 pages, 25 B&W photos, index.

YATES, JOANNE, *Structuring the Information Age: Life Insurance and Technology in the Twentieth Century*, Johns Hopkins University Press, 2005.



Much of the history of technology tells the story of technological advance from the viewpoint of the inventor, the developer, or marketer. This valuable addition to the historiography of the computer looks at new technologies from a user's viewpoint. Here the user is the life insurance business, which is an appropriate choice because it has always been an information-intense business.

The book is divided into two parts, with four chapters in each. The first part deals with the life insurance business in the era of tabulating machines, from the end of the 19th century to about 1950. The second part deals with the insurance business in the computer era, from about 1950s through the 1970s. Despite this organization, the author argues that there was high degree of continuity between the two eras, as the insurance companies adopted new technology gradually and as IBM, which dominated both with tabulating machines and with early computers, worked for a smooth transition with its customers.

The author examines how the new technology changed the life insurance business and how that business community helped shape the technology. Vendors provided not only machinery, but also training in its use and, in the computer era, appropriate software. The insurance companies expressed their interest in certain technological capabilities and played a role in the development of software, as, for example, in joining other types of business in developing COBOL. The author shows that insurance companies chose gradual change in their business practices over rapid adoption of new methods that the new technology made possible. Yet, an important finding of this study is that companies realized productivity gains primarily through the adoption of new procedures made possible by new technologies rather than by speeding up old ways.

Several dozen illustrations, charts, and tables complement the text. Sources of information, as well as supplementary information and commentary, are given in sixty pages of endnotes. In addition there is a discussion of primary sources and a listing of selected secondary sources.

Available from Johns Hopkins University Press, 2715 North Charles Street, Baltimore, MD 21218; **www.press.jhu.edu,** $49.95, cloth, ISBN 0-8018-8086-6, x + 351 pp., index.

HISTORY THAT WEREN'T SO – MYTHS AND MISPERCEPTIONS

Mark Twain is supposedly wrote that, "it's not the things that people don't know which hurt them; it's the things they know which ain't so." (Incidentally, the quote itself could be "weren't so;" it has been attributed to a number of people and with variable wording.) In this feature of the newsletter, we attempt to set the record straight on historical misperceptions, some of which have been repeated so often that they have become taken as fact. We welcome submissions from our readers debunking misperceptions they have come across.

The name of Heinrich Hertz is widely known in the history of science and engineering—he was the first to demonstrate experimentally the production and detection of the electromagnetic waves predicted by James Clerk Maxwell, and, as a result, the unit of frequency—cycles per second— is named the Hertz (Hz) in his honor. In 1987, when IEEE wanted to establish an award in the field of radio waves, it named it the Heinrich Hertz Medal. Hertz was born in Hamburg in 1857 to a father from a wealthy, educated and incredibly successful family who had converted from Judaism to Lutheranism a generation before. Heinrich's mother was the daughter of a Lutheran minister. So it is no surprise that after a nomadic academic life, when he died (tragically young, at the age of 37), Hertz's body was returned to Hamburg and buried in the main Protestant Ohlsdorf cemetery (which today bills itself as the largest cemetery in the world).

A figure as important as Hertz is of course going to be well represented on the World Wide Web. But wait…when you Google him you will find that almost all sites that mention the disposition of his body claim he was buried in the Jewish cemetery in Hamburg…a cultural impossibility as well as just plain wrong (several sites, such as Wikipedia and the IEEE Virtual Museum, do not mention what happened after his death). Someone must have once posted the idea (how they thought it up, who knows?), and other sites blindly copies without checking the facts themselves. Ironically, a trip to the library for an authoritative print biography would not have been necessary. Clever use of the Web itself would have turned up the Ohlsdorf cemetery's list of its famous occupants which includes the entry "Hertz, Prof. Heinrich Rudolf, 1857 – 1894, Physiker, Q24, Q25 (53-58)."

"FROM ACORN TO OAK"

In 1952, with the thoughts of preserving IRE history for posterity's sake, Alfred N. Goldsmith (IRE President, 1928) and John V.L. Hogan (IRE President, 1920) recorded a conversation they had together on the history of the IRE. This discussion was transcribed and can be found in the IEEE Archives. It is titled "IRE: From Acorn to Oak."

During their conversation they discussed such luminaries as Greenleaf Pickard, Edwin Armstrong and Robert Marriott (IRE's first President.) They discussed the *Proceedings of the IRE* and how it had evolved from a simple publication to one which contained theoretical articles. The irony of the entire conversation is the discussion of a merger with AIEE, which would come just ten years later.

One of the more interesting sections covers the development of the IRE logo. Goldsmith notes that the logo was intended to mean the electric and magnetic forces and their normal relationship. Hogan states "Then, of course, it got triangular because there were three letters in the name."

One anecdote that Goldsmith gives is about the evening he went to pay a visit to Robert Marriott. Goldsmith knocked on the door, which immediately opened, and there facing him was Marriott holding a large revolver at him. Goldsmith noted that Marriott's trigger finger was shaking, but Goldsmith was shaking worse than Marriott. Apparently Marriott lived in a neighborhood that was frequented by "hoodlums" who came around and held up people.

This is yet another piece of our history that was found in the IEEE Archives. We can now add a greater wealth of information to the already rich history of IEEE.

continued on next page

PERPETUATING THE HISTORY OF TECHNOLOGY THROUGH PLANNED GIVING

The IEEE History Center is dedicated to perpetuating the legacy of information and electrical technologies across generations. Through its education and research programs, such as the upcoming IEEE Conference on the History of Electric Power and the 400+ oral histories with leading engineers, the Center seeks to help the public understand the nature of technology and its relationship, both past and present, to society. In much the same way as the Center perpetuates the legacy of engineering; you can perpetuate your personal legacy of hope, opportunity, and security through planned giving.

By making a planned gift to the IEEE History Center, you will be partnering with the Center to preserve, research, and promote the history of IEEE associated technologies. This type of giving demonstrates a significant commitment to the Center and pushes the Center to expand and improve its programs so that they remain compelling and educational.

Planned gifts come in many different shapes and sizes depending upon your needs and the needs of your loved ones. Perhaps you want to set up a Charitable Remainder Trust to provide income for yourself and/or another member of your family. You could name the IEEE History Center Fund of the IEEE Foundation as one of the charitable beneficiaries of the Trust. Maybe you want to reduce your estate tax exposure; you might leave a bequest to the Center in your will or name the Center as a beneficiary to your retirement plan. Whatever your personal objectives, the IEEE Development Office is available to help you design a gift that will fulfill your personal philanthropic goals and make certain that your legacy will make the impact you desire.

Please consider including the IEEE History Center in your plans. If you decide to include the Center in your plans, we hope you will share the good news with us. This will allow us to thank you for your generosity and recognize you during your lifetime by adding you to the roster of the Goldsmith League. Named for Alfred N. Goldsmith and his wife Gertrude (Maude) as a special tribute for their planned gifts to the IEEE Foundation, the Goldsmith League recognizes individuals who have made, or have shared their intention to make, a planned gift to the IEEE or the IEEE Foundation.

To request additional information, or to hold a confidential discussion of giving opportunities to the IEEE History Center, please contact the IEEE Development Office by telephone at +1 732 562 3860 or by electronic mail at **supportieee@ieee.org**. To learn more about the IEEE Foundation and planned giving, visit us online at **www.ieeefoundation.org**.

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