

IEEE History Center

ISSUE 70, March 2006

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STATIC FROM THE DIRECTOR

Although you will not read this until March, as I write at the beginning of February, the president of the United States has just delivered his annual State of the Union address. So let me take this opportunity to tell you that the state of the IEEE History Center is strong. As you will see elsewhere in this issue: The IEEE Virtual Museum has launched its latest exhibit, and continues to draw visitors and praise (see page 2); the IEEE Milestones program continues its record growth; our oral history collection continues to increase; we continue to participate in, and technically co-sponsor, conferences such as “History of Soviet and Russian Computing” to be held in Petrozavodsk, Russia in July (page 4); in 2007 the History Center will host its next fully-sponsored conference—look for details in the next newsletter; and we continue to introduce new projects, such as our pre-university lectures (page 3). All these activities serve our mission to preserve, research, and promote the legacy that engineering and technology have provided to the modern world.

Recently, it has become a custom for the U.S. president, in his State of the Union address, to point out some people in his audience who have contributed to

the health of the Republic. It is therefore also appropriate that we do the same in the annual Honor Roll issue of our newsletter. Despite the importance of our programs and projects in carrying out IEEE’s public imperative, the Center has been structured so that every year we must seek outside funding to complete our budget. Incredibly, every year since I have been Director, you—our supporters—have come through with flying colors. This issue is our opportunity to point you out and publicly to thank you. I am very grateful and also gratified, since this support suggests satisfaction with our programs. I am particularly humbled because so many of you are outstanding engineers and technologists in your own right—it is your history that we are saving, analyzing, and showing to the world. I look forward to continuing to work with you in this important endeavor.



Telegraph wires in Cincinnati. Center staff will be lecturing on the telecommunications revolution. (Image courtesy of the Smithsonian Institution)

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.

Mailing address:
Rutgers University
39 Union Street
New Brunswick, NJ 08901-8538 USA
Telephone: +1 732 932 1066
Fax: +1 732 932 1193
E-mail: ieee-history@ieee.org
www.ieee.org/history_center

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IEEE History Center Staff

Michael Geselowitz, Staff Director
m.geselowitz@ieee.org
Frederik Nebeker, Senior Research Historian
f.nebeker@ieee.org
Mary Ann Hoffman, Archival and Web Services Manager
m.a.hoffman@ieee.org
Kim Breitfelder, IEEE Virtual Museum Manager
k.breitfelder@ieee.org
Robert Colburn, Research Coordinator
r.colburn@ieee.org
John Vardalas, Post-Doc
j.vardalas@ieee.org

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COMPLETION OF IEEE ARCHIVES PROJECT

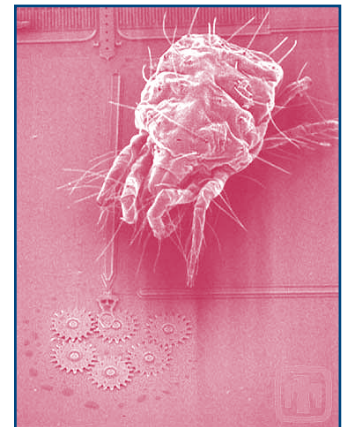
“Yippee!!!!!!” could be heard for miles around. It was coming from the Center’s Archivist, Mary Ann Hoffman. After 16 months and over 800 hours dedicated to this project, she entered the final contents of a box into the Center’s database.

In a previous issue we reported on the many artifacts discovered in the partly uncatalogued IEEE Archives, located in the IEEE Operations Center in Piscataway, NJ. Now each piece of paper, artifact, book, poster and other related materials can be located by entering a keyword into the database and searching through the terms. All materials are in acid free boxes and tubes for preservation. Occupying 300 square feet of space, the Archives is now also home to the AIEE Transactions dating back to 1893 and the IRE Proceedings starting in 1923. Centennial plaques received from other learned societies in 1984 now make a handsome display in the Data Center in the Operations Center.

IEEE VIRTUAL MUSEUM OPENS NANOTECHNOLOGY EXHIBIT

The IEEE Virtual Museum (www.ieee.org/museum) has launched a new exhibit entitled *Small is Big: The Coming Nanotechnology Revolution*. Sponsored by the IEEE Foundation, the exhibit examines the cutting-edge field of nanotechnology, which actually has a history dating back several decades. And although where nanotechnology is headed is widely debated and uncertain, as the exhibit says, “looking back at the historical roots of nanotechnology helps us get a better grasp on what nanotechnology is and why it’s important now, and how it will change the world in the future.”

Small is Big is comprised of several different stories, each examining a different facet of nanotech, from its early history to the alternately panacean and dire predictions for its future. Along the ways users learn some of the science behind these beyond-tiny technologies as well as some of its current applications. As with all VM exhibits, *Small is Big*, highlights milestones, major events, and people central to the development and expansion of this technology.



This electron microscope image shows how small devices can be made. (Image courtesy of Sandia National Laboratories)

THE IEEE HISTORY CENTER NEWSLETTER ADVERTISING RATES

The newsletter of the IEEE History Center is published three times per annum with a circulation of 6,000 of whom approximately 4,100 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.

REFERENCE SERVICE – HOW OLD IS THE U.S. THREE-PIN GROUNDED PLUG?

As part of its mission to serve the public and to promote the history of electrical technologies, the IEEE History Center provides a reference service to assist scholars, authors, journalists, students, government policy makers, and interested members of the public.

Recently, we were asked when the U.S. three-pin grounded plug came into use. We found the answer on page 271 of David Shapiro's book *Old Electrical Wiring*. In 1928, the three-pin plug began to be used in industrial settings. However, decades elapsed before it became widespread.

IEEE VIRTUAL MUSEUM CHOSEN AS EDUCATIONAL AID FOR MIGRANT WORKER CHILDREN IN SAN ANTONIO

The San Antonio Independent School District's Migrant Department has chosen excerpts from exhibits in the IEEE Virtual Museum to use as lessons for a program serving approximately seven hundred and sixty students. The excerpts from the IEEE Virtual Museum will be burned onto CDs, which teachers using laptops can bring to the students' homes. SAISD was particularly enthusiastic about the Virtual Museum material, "The articles are so relevant and so dynamic," Migrant Department Coordinator Celia Boriack

wrote to the History Center. "This is the kind of reading material that can open a discussion between the student and the tutor."

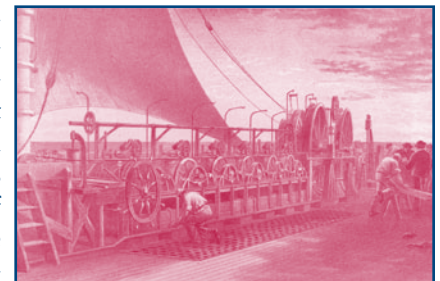
The IEEE History Center is proud to partner with SAISD as yet another way to fulfill the educational mission of the IEEE and foster technological literacy among pre-college students.

HISTORY CENTER OUTREACH IN PRE-COLLEGE EDUCATION

In the mission of the IEEE History Center to promote the legacy of engineering and technology, no audience is as important as our young people. The IEEE Virtual Museum combines history and technology to target this audience. However, much of the pre-university outreach focus of IEEE and other like-minded organizations is on science and mathematics classrooms. This approach may help in preparing technologically-minded students for careers in engineering, but what about the problem of broader technological illiteracy—in fact, of a basic understanding of, and appreciation for, the engineering profession by all students?

It turns out that most nations who have a national history curriculum or set of standards (and most do!), lip service is paid to having the students understand the importance of science and technology in history. The United States has state-by-state standards, but as the "No Child Left Behind Act" seeks to promulgate national standards, technology figures prominently in them. Yet, in practice, history teachers are not necessarily well prepared to talk about technology and engineering. Therefore, as a pilot program, the IEEE History Center staff are presenting a series of three lectures on technology in history to the 9th year students at Hillsborough High School in Hillsborough, New Jersey, near the Center. The idea is to present audio-visually rich materials

in a PowerPoint™ format, materials which emphasize the role of technology and engineering at different places in global history that the students cover over the course of the year. The first lecture – on the role of the magnetic compass and other navigational technologies -- was presented in November by Center Post-doc Dr. John Vardalas to great acclaim. Subsequent lectures (in March and May) on the industrial revolution and on the telecommunications revolution of the late 19th century will be given by Center Director Dr. Michael Geselowitz, and Center Senior Research Historian Frederik Nebeker. In addition to the PowerPoint™ presentations, the Center is leaving behind instructional materials such as glossaries and further references—including tie-ins with the IEEE Virtual Museum. If the pilot program is successful, it may become possible to create additional lectures, and to distribute them to a broader audience.



Transatlantic cable-laying equipment aboard the Great Eastern

THINGS TO SEE AND DO

EDISON NATIONAL HISTORIC SITE

On 2 June 2006, the Edison National Historic Site will reopen. In October 2002, Glenmont, Thomas Edison's home in West Orange, NJ was closed for broad renovations. Air conditioning and improved heating were installed to help

preserve the more than 25,000 artifacts in the house. A fire suppression system was installed and two outbuildings were stabilized.

continued on next page

EDISON NATIONAL HISTORIC SITE *(continued from page 3)*

The 25-room Queen Anne style home was purchased by Edison in 1886, shortly before marrying Mina, his second wife. He presented it to her as a wedding present. It stands on the 21-acre site, along with his laboratory. One of the most exciting developments of the restoration was the return of Building 11 to West Orange. This building had been dismantled and sent to the Henry Ford Museum in Dearborn, Michigan in 1940. Built about 1910, Building 11 was Edison's last and largest laboratory. Building 11 was dismantled and donated

to the Henry Ford Museum and Greenfield Village in Dearborn, Michigan. It was returned to the Site in 2003 and re-assembled. It will be home to the Site's numerous public programs, including a film festival.

The lab portion of the site was closed in 2003 for renovations. It also received a new air conditioning and heating system. In addition an elevator was constructed, in compliance with the U.S. ADA law.

SURF CITY

The IEEE recently debuted a new and improved web site. The updates are the first of several planned enhancements to the organization website and are intended to make the site a more valuable resource for members, the technical profession, and the general public. Included in the updates are improved search capabilities, user friendly URLs and more streamlined navigation. www.ieee.org

Look for a new and improved IEEE History Center web site this year also!

The History Center frequently receives offers of old IRE, AIEE and IEEE publications. Since we are so short on space at the center we unfortunately have to turn down these offers. If you have publications you would like to see given to an appropriate repository, please visit the Directory of Book Donation Programs web site. It offers an extensive list of organizations that help assist in the process. www.albany.edu/~dlafonde/Global/bookdonation.htm

We discovered Baudot.net while researching some artifacts in the IEEE Archives. This site provides an extensive history of teletype machines. Excellent photographs accompany a detailed history of each of the machines. Baudot.net is a place where one can find information on these ingenious mechanical communication machines, which spanned the years from Morse code to early computing.

CONFERENCE ON THE HISTORY OF RUSSIAN COMPUTING

The International Federation for Information Processing (IFIP) sponsors frequent events in computing history. "Perspectives on Soviet and Russian Computing," to be held 3-7 July 2006 in Petrozavodsk, Russia, is the first time such an event is happening in Russia. This historic conference has two phases. The first is a discussion on the history of Soviet and Russian computing. The second focuses on the future of computing in the region as seen by computing pioneers and by industry and commercial innovators.

Computing in the Soviet Union had faced significant challenges such as rapidly evolving technologies, globalization, changing demographics, and different opportunities associated with schooling and higher education. This conference attempts to investigate the transitions that had taken place in the Soviet Union between 1950 and 1990, particularly before the pervasive use of the internet had taken place.

Information and communication technology has played a significant role not only within the Soviet Union, but also throughout the rest of the world. The conference attempts to view introspectively the current evolving transitions of ICT in the region and explore how these changes might affect the region in the future.

The IEEE History Center is a technical co-sponsor of the Petrozavodsk conference, and History Center staff expect to be presenting papers there. In addition, IFIP is holding two other conferences on computing history, "History of Computing in Education" [Santiago, Chile, 20-25 August 2006], and "Pioneering Software in the 1960s in the Netherlands, Germany, and Belgium" [Amsterdam, Netherlands, 2-4 November 2006]. For more information on these conferences and other Computing History Events, go to Comphist.org

CONFERENCE ON "THE LIFE AND WORK OF NIKOLA TESLA"

On the occasion of the 150th Anniversary of Nikola Tesla's birth and proclamation of 2006 as The Year of Nikola Tesla in Croatia, the Croatian Academy of Engineering is preparing a scientific and professional meeting "The Life and Work of Nikola Tesla" that will take place on 28-29 June, 2006 in Zagreb, Croatia. The meeting is organized under auspices of the Croatian Parliament and in cooperation with the Ministry of Science, Education and Sports of the Republic of Croatia, Faculty of Electrical Engineering and Comput-

ing, University of Zagreb, Energy Institute Hrvoje Pozar, Ericsson Nikola Tesla, Inc., Koncar Group, Inc., Hrvatska elektroprivreda, Inc., Technical Museum Zagreb and Croatian Association of Engineers.

Detailed information is available at the official web pages of the Meeting: www.hatz.hr/TESLA.

ELEVATORS

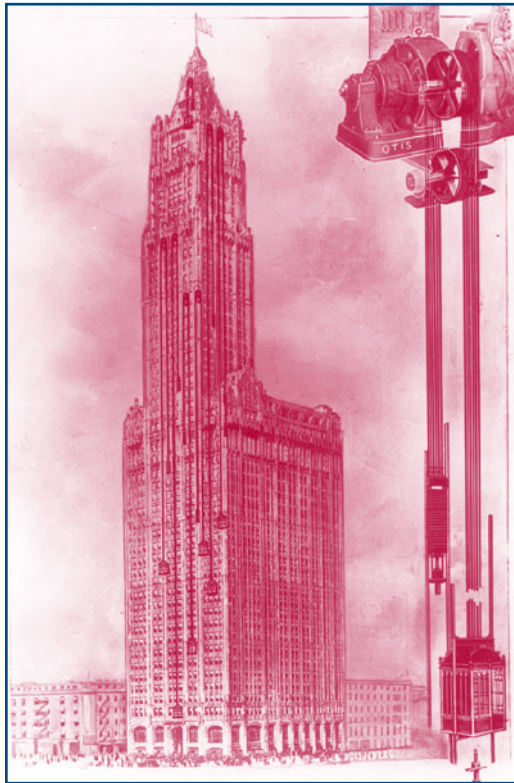
Elevators date back to ancient times, but until the mid 19th century almost all were freight elevators or construction-site elevators. It was only in mines and in a few other places that elevators were designed to carry people, and most people would have declined to ride in an elevator because of the danger of a broken cable. But in 1852 Elisha Graves Otis invented a “safety hoist”, whose safety catch would keep the elevator from falling even if the cable broke. In 1854 he made a dramatic demonstration of the new elevator, and three years later he installed the first all-passenger elevator in a New York City department store. Not even this much history seems to have been known to the screenwriter of the time-travel movie *Kate & Leopold* (2001). There we meet the Duke of Albany, an aristocrat-inventor who – in the 1870s! – is working on his invention of the elevator. Later in the movie, an elevator door opens when there is no elevator there, and a man – alas, not the screenwriter – steps forward and falls down the elevator shaft.

This example notwithstanding, movies can teach us much about how the technology and use of elevators have evolved. Consider the 1960 classic *The Apartment*, which begins by describing a tall office-building in New York City. We learn that the employees have staggered workdays so as not to overwhelm the elevators, and we see the elevators operated by young women. If the movie had been made a few years later, the elevators would have been automatic: in 1955 half a million people in the United States worked as elevator operators, an occupation group that almost disappeared by the end of the 1960s. In many old movies, elevator boys were simply part of the scenery, like a potted plant, though they sometimes got some attention, as in the Astaire-Rogers movie *Carefree* (1938), where one is told “Please call me when we get to the 18th floor”, and in *Some Like It Hot* (1959), where a lothario tells the elevator boy “All right driver, once around the park, slowly.” In recent decades, luxury hotels may still have elevators with operators, as we learn from *Pretty Woman* (1990) and *The Royal Tenenbaums* (2001), if not from staying in such hotels.

An early movie-appearance of a self-service elevator is *Dark Passage* (1947), starring Humphrey Bogart and Lauren Bacall, where it is explained that the elevator is “one of the push-button kind”. A set of elevator push-buttons is destroyed by the Blues Brothers, in the 1980 movie of that name, in order to hinder pursuit. In the movie *Dark Eyes* (1987) we see an automatic elevator in an Italian villa that is, for the owner, not entirely self-service: a servant opens the door for her to

get in, then runs up the stairs in order to be able to open the door for her on the upper floor.

Elegant cage-type elevators appear in many movies, helping to establish a sense of place and time. Parisian apartment-buildings seem to require such elevators; we see them, for example, in *Charade* (1963), *Paris When It Sizzles* (1964), and *Last Tango in Paris* (1972). The cage-type elevator in *The Rocky Horror Picture Show* (1975) is appropriate to the Victorian estate that is the home of Dr. Frank-N-Furter, and the Venable mansion in 1930s New Orleans, seen in Tennessee Williams’ *Suddenly Last Summer* (1959), of course has such an elevator.



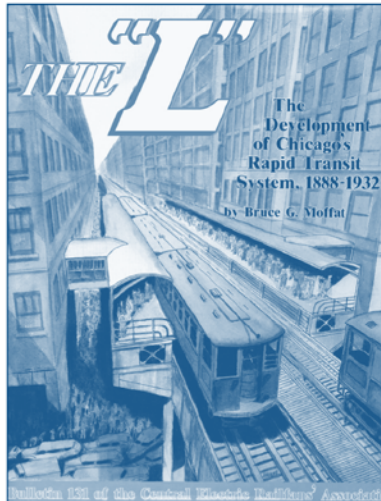
Otis elevator installation for the Woolworth Building, New York City

Many unusual types of elevators appear in movies. Large elevators for carrying workers appear in the Fritz Lang classic *Metropolis* (1927) and in *Billy Elliott* (2000), which shows some of the operation of a coal mine. Freight elevators appear often, perhaps most strikingly in warehouse buildings that have been turned into apartments, as in *New York Stories* (1989), *The Hours* (2002), and *Unfaithful* (2002). Dumb waiters appear in *The Music Man* (1962), in a library, and in *Smilla's Sense of Snow* (1997), in a ship. Smilla travels in the dumb waiter in order to reach a secured part of a ship; in Charlie Chaplin's *The Count* (1916), the Chaplin character similarly uses a dumb waiter to get from the kitchen into a fancy party on the floor above. *Gremlins* (1984)

shows an elevator that slides up a spiral staircase, and later goes out of control. An elevator mounted on the outside of a building appears in the James Bond movie *Diamonds are Forever* (1971); Bond, for some reason, chooses to ride on top of the elevator. In a later Bond movie, *The Spy Who Loved Me* (1977), the villain's lair includes an elevator with a trap-door bottom, neatly releasing the passenger into a shark tank.

The technical problems that can occur with elevators are abundantly portrayed in movies. The elevators in the movie *Brazil* (1985), which takes place in the future, do not work quite properly, on one occasion stopping about a foot too low. Elevator doors closing too soon is a problem shown in *The Odd Couple* (1968), where Felix Unger, bothered by his back, is hilariously hit by the elevator door as he gets out, and in *Revenge of the Pink Panther* (1978), where elevator doors close on the head of Cato, Inspector Clouseau's assistant. Broken cables are also shown. When this happens in *Speed* (1994), the automatic brakes prevent a fall, but then those brakes are purposefully destroyed, thus providing one of the first thrills of that fast-paced movie.

ELECTRIFYING READING



The "L"

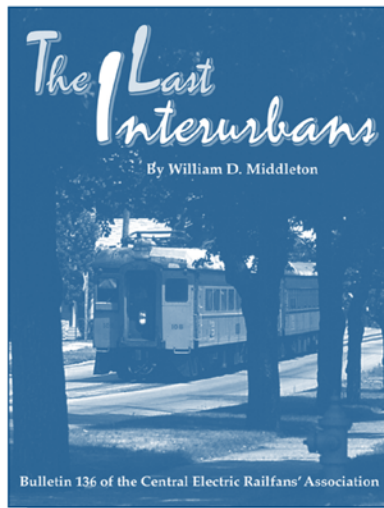
The Development of Chicago's Rapid Transit System, 1888-1932

by Bruce G. Moffat

The formative years of Chicago's most enduring traction property is the subject of this well-researched book. Now in its second century of operation, the "L" serves as a key component of the Chicago area's transportation network. Early steam operations are examined, followed by the conversion to electric traction, suburban expansion, and the boom times of the 1920's. Illustrated with more than 400 photos, maps and vintage advertisements, this 306-page book is a must for any person interested in Chicago history. As a special bonus, each copy includes an unbound reproduction of the 1898 Metropolitan West Side "L" map and the 1933 Chicago Rapid Transit Company system map.

Order B-131 ... \$55

IL residents add \$4.81 tax per book.

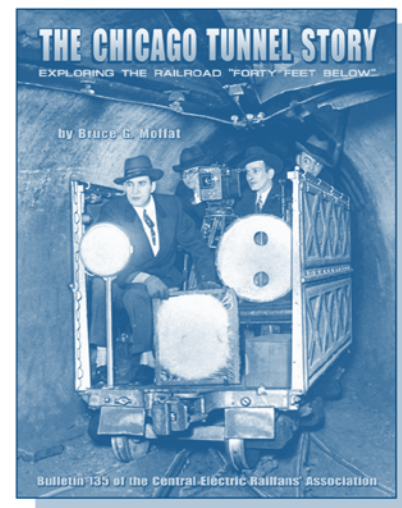


The Last Interurbans

by William D. Middleton

The electric interurban railways were one of the technological marvels of the early 20th century, providing swift, clean and frequent service at low fares to much of small town and rural America, where travel had been hampered by unpaved roads and horse-drawn transport. Author William Middleton's newest 234-page work takes a look at those properties that managed to outlast the depression years and the arrival of the more versatile automobile, even if only briefly. From the huge Pacific Electric Railway to the comparatively small Youngstown & Southern, to the famous Hershey Cuban, they are all here in *The Last Interurbans*.

Order B-136 ... \$55



The Chicago Tunnel Story

Exploring the Railroad "Forty Feet Below"

by Bruce G. Moffat

This two-foot gauge railroad operated almost entirely underground on 60 miles of track. 149 electric locomotives moved freight, mail, coal and other commodities between railroad terminals, department stores, warehouses and major buildings until 1959. Not overlooked in this 244-page book are the company's post-abandonment years including the infamous "Loop Flood" of 1992 that disrupted Chicago's downtown for weeks.

Order B-135 ... \$55

Central Electric Railfans' Association



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ENTHUSIASTIC SUPPORTER OF THE IEEE HISTORY CENTER



Kenneth Laker is proud that the IEEE, through its History Center, has the most vigorous and comprehensive history program of all the major engineering professional associations. He is particularly fond of the Center's award winning IEEE Virtual Museum, which presents important technology develops and their social impacts from a historical context in an interactive and friendly manner.

He says "The Center thrives on the belief that both engineers and non-engineers benefit when everyone has a good understanding of the role of technology in the development of the modern world. Much of the world's history in this and the past century have been shaped by IEEE members; I believe the work of the Center is essential to insure that this history is properly recorded, archived, and presented to the public." For these reasons, Dr. Laker enthusiastically supports the work of the IEEE History Center with his time and financial resources.

SETTING AN EXAMPLE



For Leo Beranek, the accurate recording of history is very important. This IEEE Life Fellow views history as a teacher and believes credit should be given to those who helped shape a field. This is why he supports the work of the IEEE History Center and its Oral Histories Program. He says "I have followed the Center's oral histo-

ries work most closely and believe they are doing a good job of obtaining oral histories and making them available to researchers." Recently, Dr. Beranek met with the IEEE History Center to update his oral history. In appreciation for a job well done, Dr. Beranek decided to significantly increase his annual gift to ensure the Center has the resources it needs to record more oral histories. He hopes his example results in increased support for the Center.

HISTORY AT THE DINNER TABLE *By Elianna Goldman, IEEE Development Office*



When Charlie Wright passed away last spring, a loyal IEEE History Center volunteer, friend and supporter was lost. Charlie's enthusiasm for the History Center was a popular topic of conversation, and his family and friends could easily point to the important role the IEEE played in his life. His widow, Mrs. Catherine Wright, is fond of saying, "We would speak about the His-

tory Center at our dinner table. For Charlie, engineering was far more than just his career path. It was his passion – he liked to think of himself as Mr. History! Charlie always felt very good about combining his interests in science and history by participating as an active member of the History Center."

Mrs. Wright identified the IEEE History Center as one of two recommended charities for Charlie's friends and family who wished to make a gift in his loving memory. These gifts

continue to ensure that Charlie's love of engineering history will be a topic of dinner table conversations for many years to come.

The following donors graciously honored the memory of Charles R. Wright with their generous donations to the IEEE History Center through the IEEE Foundation:

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(Donor categories have been revised to conform with IEEE Foundation categories)

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James Morris Swiger
Anatole Sykley
John L. Taggart
Yasuhiko Takahashi
Harry J. Talbot
Morris Tanenbaum
Sophia S Y. Tang
Mitsuhiro Tani
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Timothy R. Weil
I. Marvin Weilerstein
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Jerald A. Weiss
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Todd J. Wesolowski
L. Elwood West
Stephen R. West
Al Whaley
Nicholas R. White
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Tracy Wichmann
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Naoki Yoshida
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John Zemkoski
Donald W. Zipse, PE

OBITUARY DR. WILLIAM O. BAKER – 1915-2005



The IEEE History Center lost a long-time friend and supporter with the death in October of William Baker. We are deeply grateful to Dr. Baker's friend, History Center Trustee A. Michael Noll, for sharing his memories of Dr. Baker with the Center's readers.

Dr. William Oliver Baker died on 31 October 2005 at the age of 90 after a steady decline in his health, although he was keenly and actively

aware of the status of his many interests to the very end of his extraordinary life.

Baker was vice president for research at Bell Telephone Laboratories from 1955 to 1973, retiring from Bell in 1980 as Chairman, a post created just for him. He joined Bell Laboratories in 1939, having earned his Ph. D. in Chemistry a year earlier from Princeton University. His undergraduate studies were at Washington College in Chestertown, MD. For nearly two decades, Dr. Baker's leadership of research at Bell Telephone Laboratories created the model for modern industrial research laboratories

William Oliver Baker was born 15 July 1915 in Quaker Neck, MD. He attended a one-room Quaker schoolhouse and spent his childhood helping his mother raise chickens and turkeys on the family farm. She was very inventive in treating poultry diseases, and her son William probably first became interested in chemistry as a result. Later, at Bell Laboratories, his research in chemistry would focus on the basic science of plastics, natural rubber, and other substances, emphasizing crystalline molecular structures and mac-

romolecules. The practical motivation for his early wartime research was the search for a replacement for rubber, and the results of his research were strategic in the victory of World War II. His research into polymers was vital to the Bell System for electrical insulators, polymer carbons, and semiconductors, and was later applied to heat shields for missiles and satellites.

Dr. Baker was quietly at the helm of science and research in the United States for more than sixty years, serving Presidents Eisenhower, Kennedy, Johnson, Nixon, Ford, and Reagan. Baker was asked by President Eisenhower to reorganize defense communications, conveyed messages between the State Department war room and President Kennedy during the Cuban missile crisis, was at the White House the day President Kennedy was assassinated, and as a member of the President's Foreign Intelligence Advisory Board championed the use of satellites and computers by the intelligence community.

As acknowledgment of his service to the nation and to science, Baker was awarded the Presidential Medal of Science, the Presidential National Security Award, and over 25 honorary doctorates. A few of the awards he received include the Priestly Medal of the American Chemical Society (1966), the Benjamin Franklin Medal – American Philosophical Society (2000), the Fahrney Medal - Franklin Institute (1977), the Arthur M. Bueche Award – National Academy of Engineering (1986), the Thomas Alva Edison Medal for Science – State of New Jersey (1987), and the Lifetime Achievement Award – Marconi International Fellowship Foundation (2003).

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The IEEE History Center is pleased and grateful to note the gift from Major Johnson of a copy of *Electric Wiring* by Arthur Cook. It will be a useful addition to the Center's library, and will be a resource for scholars of electrical history.



BUHL, HANS, *Buesenderen: Valdemar Poulsens radiosystem [The Arc Transmitter: Valdemar Poulsen's Radio System]*, Aarhus University Press, 2005.

Today the Danish inventor Valdemar Poulsen is best known for his 1898 invention of the "Telegraphone", a wire-recorder, which was the first practical means for magnetic recording and reproduction. But in the 1910s and 1920s he was much more famous for his 1903 invention of the arc transmitter. This was a device for generating continuous radio waves, something the spark transmitters of the time could not do. Besides being more effective for radio telegraphy, Poulsen's arc transmitter made possible radio telephony, sending music or speech by modulating a carrier wave of fixed frequency.

Poulsen's invention was taken up most vigorously in the United States, where Cyril Elwell had purchased the patent rights, and at the time of World War I the Poulsen arc was the most important type of radio transmitter, used in many countries around the world. Though it was superseded in the 1920s by the electron tube as a generator of continuous waves, the Poulsen arc was of immense importance worldwide in the establishment of radio as a practical means of communication.

Hans Buhl, who is curator at the Steno Museum, the Danish Museum for the History of Science and Medicine, has written an extremely valuable contribution to the history of radio. He surveys the state of the art at the time of Poulsen's work, and he examines the role of the arc transmitter, from 1903 into the 1920s, in the multifaceted and multinational development of the new technology of

wireless communication. The story is told fluently, and the reader learns not only about the people and technology involved, but also about the business, political, and military aspects of the growth of radio.

Based on a Ph.D. dissertation completed at the University of Aarhus, the book is meticulously researched, with sources given in endnotes. The author has taken advantage of the secondary literature on history of radio, but he bases his account largely on primary sources, both original technical publications and materials in archives in the United States, Denmark, England, and Germany. The book is abundantly and effectively illustrated, and an appendix presents the physics of the Poulsen arc. In Denmark, Valdemar Poulsen has something of the status of Thomas Edison in this country, so it is appropriate that the book is written in Danish. But given the importance of the topic for the history of radio worldwide and the high quality of this exposition, an English translation is much to be desired.

Available from Aarhus University Press, Langelandsgade 177, DK-8200, Aarhus, Denmark; www.unipress.dk, cloth, ISBN 87-7288-807-5, 375 pp.



GEROVITCH, SLAVA, *From Newspeak to Cyberspeak: A History of Soviet Cybernetics*, The MIT Press, 2005

Slava Gerovitch's interest in Soviet cybernetics grew out of his fascination with the variations in scientific discourse between the Soviet Union and the United States. "While American academics preferred precise, unambiguous wording, Russians often valued more intricate and vague formations open to multiple interpretations." Gerovitch's book is not only a superb study of how language influences science, it is also a cautionary tale of how ideology can cripple scientific discourse.

Cybernetics, whose supporters hoped it would become a universal method of problem solving, quickly fell afoul

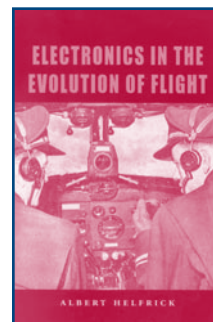
of party ideologues in the Soviet Union. Cybernetic models conflicted with Pavlovian models; moreover, Cybernetics – originating from the work of Western thinkers – was considered a suspect discipline because of capitalist industry's embrace of its techniques. Cybernetics was labeled a "reactionary imperialist utopia" and cybernetics was thought to intend to lower human status by replacing humans with machines.

The declassification of the computer in the Soviet press in the mid-1950s reversed the tide, as did Khrushchev's reforms and the de-Stalinization of science. Computers were embraced as a method of telling the truth, and cybernetics hoped to unify the sciences and to solve economic and management problems. Cybernetics became popular, and authors of scientific papers sprinkled cybernetics terms through their writings. Cybernetics began to suffer from problems of definition. Cybernetics, which been supposed to unify the sciences, suffered from a lack of unity in its own discourse. Championed during its early rebellious period as a value-free objective language, cyberspeak eventually found itself politicized.

Gerovitch's history will appeal to readers interested in a range of topics: linguistics, the history of computing, the connections between politics and science and technology, and Soviet history.

Available from The MIT Press, Massachusetts Institute of Technology, Cambridge, MA 02142 USA, +1 800 405 1619, mitpress.mit.edu, \$24.00, paperback, ISBN 0-262-57225-7, 378 pages, 35 illus.

HELFRICK, ALBERT. *Electronics in the Evolution of Flight* Texas A & M University Press, 2004



Electronics and flight are two technological pursuits which have assisted the process of globalization in the 20th century. The development of aviation

allowed people and goods to move around the globe at speeds that could not even be imagined at the start of the

20th century. Flight beyond the Earth's atmosphere has given humanity a new global perspective of itself. Terms like "the Global Village" and "Spaceship Earth" underscore the cultural impact that the technologies of electronics and flight have had on the world. The stories of electronics and flight are each so dramatic that it is easy to lose sight of the essential interconnectedness of these two stories. Albert Helfrick's book *Electronics in the Evolution of Flight* offers up a well-written and concise portrait of the symbiosis between electronics and the advances in flight.

As Helfrick explains, the commercial and military success of flight needed more than just advances of aeronautical technology. Flight, as a widespread social, economic, and military phenomenon, would have been impossible without electronic enablers: air-to-air and ground-to-air communication systems; radar for better tracking and monitoring capabilities; navigational tools for flying at night or over great distances; fire-control systems to improve combat effectiveness during supersonic; and computational systems to allow large amounts of data to be integrated and processed in real-time. At the same time, the market potential in aircraft and spacecraft applications became important technical and economic drivers in the electronics industry. Electronic systems are probably the single largest expense in an aircraft or spacecraft.

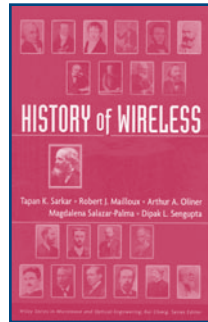
In his preface to the book, Helfrick comments on how little the non-expert appreciates the role of electronics in the story of flight. "When crowds observe the shuttle launches from the Kennedy Space Center," writes Helfrick, "the enormous power of the giant rocket engines overwhelms them. No one is impressed with how well the silent microchips keep everything going smoothly. Anyone can make a big fire. True genius is keeping a big fire under control and sending a huge rocket into a precise orbit." Helfrick sets out to recount the flow of achievements in electronics on which the story of flight rests. Breadth, rather than depth, of coverage is the hallmark of this small book. In this regard he does a good job at offering a concise overview; one that non-electrical engineers and electrical engineers alike will appreciate. He looks

at radio, radar, fire-control, semiconductors, air traffic control systems, synthetic aperture radar, LORAN, GPS, spacecraft control systems, and many other topics.

Helfrick informs us that the history of flight has focused on people like Howard Hughes, Charles Lindbergh, and Chuck Yeager. However, an entire group of scientists, engineers and inventors has been left out of this history, whom Helfrick calls "the unsung group of nerds who made [avionics] all happen."

Available from Texas A&M University Press, www.tamu.edu/upress, \$19.95 paper, ISBN 1-58544-413-8, vii + 181 page, 16 B&W photos, 1 line drawing, index.

SARKER, T., MAILLOUX R., OLINER, A., SALAZAR-PALMA, M., and SENGUPTA, D. (with contributions from others), *History of Wireless, Wiley Series in Microwave and Optical Engineering*, 2006



History of Wireless is a comprehensive and detailed work exploring, as the title indicates, the key events and figures in the development of wireless. The text is divided into seventeen roughly chronological and thematic chapters, beginning with a chronology of developments in magnetism (traced back to 2637 BC), electricity, and light, up to Maxwell, and ending with a history of phased array antennas. History includes in-depth discussions of Maxwell, Heaviside, Tesla, Bose, and Fleming, among others. While Marconi and his work are addressed throughout the book, he does not receive the same treatment as figures such as Maxwell and Bose. This was a conscious decision made by the authors, who recognized that Marconi is the subject of an extensive volume of literature, and chose instead to focus "on most specific and less known aspects and people who also made invaluable contribution to the development of wireless." However, the authors have included enough to provide the appropriate historical framework. The text has a global focus, with chapters exploring Soviet quasi-optics, Japanese antenna development, and

the contributions of German scientific researchers and companies.

History has many other strengths, beginning with its highly organized and outlined table of contents, which itemizes each chapter and discussion, and makes everything simple to locate. The text draws from several types of sources, including contemporary and more recent articles and books, biographies, and the scientists' own publications, as well as many IEE, AIEE and IEEE publications, including *IEEE Transactions*, *Proceedings of the IEEE*, and several works published by IEEE Press. *History* includes several detailed chronologies and lists of "crucial events" and "developments" of the nineteenth and twentieth centuries. Each chapter features several diagrams, drawings, formulas, and photographs of most of the key figures, and concludes with detailed endnotes, many of which reference current websites. Much attention is paid to the background and motivation of these figures; such details are found throughout the narrative and are highlighted by the biographical sketches included as parts of chapters throughout the book. The authors have used accessible language and have included interesting details, such as the images of Canadian and UK postage stamps honoring the contributions of Fessenden and Marconi, respectively. Several of the chapters are essays contributed by various historians and could stand alone as references and starting points (particularly aided by the detailed endnotes) for further research in any of these topics.

This work might be too detailed for general readers interested in a narrative history of wireless, but it is an indispensable reference volume, and it would be an outstanding textbook for an introductory course in the subject.

Available from Wiley-IEEE Press, Hoboken, NJ, www.wiley.com, \$59.95, hardcover, ISBN: 0-471-71814-9, 603 pp., index.

ELEVATORS *continued from page 5*

Perhaps the most common malfunction shown in movies is an elevator getting stuck. When this happens in *You've Got Mail* (1998), an emergency phone is used for rescue. There is, however, no emergency phone in the cage-type elevator that gets stuck in *Mixed Nuts* (1994), and the trapped passenger calls out, sings, and plays musical instruments in the effort to attract someone's attention. *Lady in a Cage* (1964) is the story of a woman, played by Olivia De Havilland, who gets trapped in her home elevator when there is a power outage and where she remains when looters enter the house. In *Nine Queens* (2000) an elevator appears to get stuck; it was actually stopped on purpose, and when a passenger is helped out, her purse is stolen. Sometimes a stuck elevator is welcomed. In *Deconstructing Harry* (1997), Harry Block (Woody Allen) imagines that he's in an elevator with a beautiful woman and that it gets stuck. This happens in *Shallow Hal* (2001), where two people, trapped for hours in an elevator, get to know each other well.

Finally, we might mention elevator music. This is usually a term of opprobrium, as in *American Beauty* (1999) when the daughter asks, during dinner, "Do we always have to listen to this elevator music?" "Bali Hai" is playing in this case, but "Girl from Ipanema" is more typical. It is the elevator music we hear when the Blues Brothers are in the elevator that moves excruciatingly slowly, and it is the music the animals enjoy in the elevator in *Babe: Pig in the City*. Even people sometimes enjoy elevator music. In *Panic* (2000), Alex, the main character, meets his future wife in an elevator; when he asks her what floor she wants, she admits that she's just riding, as "It's less dangerous than the freeway, and I like the music."

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

OBITUARY: DR. WILLIAM O. BAKER – 1915-2005 *continued from page 13*

Baker was a member of the Friends Committee of the IEEE Center for the History of Electrical Engineering from 1992. He was also a member of many advisory and a trustee to many non-profit organizations. He was influential in the creation of the Andrew W. Mellon Foundation and was chairman of its board from 1975 to 1990.

A web site has been created at www.williamobaker.org to document the life and achievements of Dr. William O. Baker. His papers are in the process of being archived and donated to Princeton University through the generous support of the Andrew W. Mellon Foundation and the assistance of the Annenberg School for Communication at the university of southern California and Bell Labs.



IEEE History Center
 Institute of Electrical and Electronics Engineers
 445 Hoes Lane, P.O. Box 1331
 Piscataway, NJ USA 08855-1331