Four Years—and Change

August 1984 marks the fourth anniversary of the IEEE’s Center for the History of Electrical Engineering. It also marks a period of transition as the Center’s first director, Robert Friedel, leaves, to be followed by new director, Ronald Kline (see accompanying story). This is a fitting time, therefore, for a few reflections on the Center’s first four years and the directions open to it for the future.

It was natural that the first years of the Center should be devoted to the development of very basic resources and programs and to responding to the opportunities and challenges presented by the IEEE’s 1984 Centennial. As the first historical office to be established by a major professional engineering society, the IEEE’s Center had only imperfect models to suggest how it might responsibly promote historical scholarship while at the same time visibly respond to the needs of the engineering community. The variety of the Center’s programs and its participation in a range of joint activities is explained by this need to identify and serve a large and diverse constituency.

The Center’s early work in developing exhibits directed at both the electrical engineering community and the general public was a response to this need to identify a broad audience. “Lines and Waves,” the Center’s exhibit for the 150th anniversary of Michael Faraday’s discovery of electromagnetic induction and of the birth of James Clerk Maxwell, opened in 1981 to an audience of engineers and circulated for almost three years to science museums in the United States and Canada. Special publications and exhibits were later developed in conjunction with the IEEE Centennial and other anniversaries.

The Center’s concern about the preservation of the historical record has been reflected in the ongoing development of its survey of manuscript collections related to electricity in American repositories. Other expressions of this concern have been active involvement in national projects to improve our understanding of scientific and technical archives and the continuing effort to assist in the preservation and placement of endangered records. When the Center began operations, the archives of the IEEE itself were badly scattered and under no intellectual or physical control. Now there is an archives that is already proving itself of considerable use to the Institute and has sound foundations for further development.

Much of the work of the Center and its value to engineers, historians, and the public lies outside clearly defined projects and programs, but is instead to be found in the now routine provision of assistance, advice, and information. The Center has established itself as a key resource for researchers embarked on technical histories, for IEEE members interested in aspects of the organization’s past, for journalists seeking quick answers to questions about electrical history, for students wanting guidance regarding available materials, or for potential donors possessing “old stuff” but not knowing what institution might be able to use it. Through this kind of service, the Center represents the electrical engineering profession’s recognition of the responsibility that it has toward itself and the world at large to foster a broader and more thoughtful understanding of electrical technology, its origins, and its impact.

As the IEEE and the Center move beyond the Institute’s Centennial, different priorities will establish themselves. The Center’s new leadership, the new mechanisms for IEEE membership participation (such as Milestones and Friends programs), and the broader awareness of needs and opportunities for historical activity that is a legacy of the Centennial will open up new directions for the Center. It is our hope that the readers of this Newsletter will continue to see themselves as active participants in this ever-changing enterprise.

Ronald R. Kline
Named Director of IEEE History Center

Ronald R. Kline of the University of Wisconsin-Madison has been named to follow Robert Friedel as Director of the IEEE Center for the History of Electrical Engineering.

Dr. Kline received the B.S.E.E. degree from Kansas State University, Manhattan, in 1969. After graduation, he worked as a Field Engineer and Systems Analyst with General Electric Electric Ordnance Systems, Pittsfield, Massachusetts, from 1969 to 1977. He then returned to school, earning the M.A. degree in the history of science from the University of Wisconsin-Madison in 1979. In that year he was awarded the IEEE Fellowship in Electrical History, completing his Ph.D. in 1983. Dr. Kline’s dissertation was on the life and career of Charles Proteus Steinmetz.

Eric Herz, IEEE Executive Director and General Manager, and Robert Friedel setting up “Lines & Waves”
**BRIEFS**

**History of Edison’s West Orange Lab**

The National Park Service, U.S. Department of the Interior, has awarded a contract for a historical study of Thomas Edison’s West Orange, New Jersey, Laboratory to W. Bernard Carlson, Michigan Technological University, and Andrea Millar, Bentley College. All aspects of life at the lab—personal, physical, research, and organizational—will be covered in this first intensive study. The project, scheduled for completion in June 1996, will make use of the extraordinary archival resources now in the custody of the Park Service’s Edison National Historic Site. In 1987, the Site will be celebrating the centennial of the laboratory’s founding.

**Pennsylvania Power & Light Co.**

The records of the Pennsylvania Power & Light Company are now accessible to scholars at the Eleutherian Mills Historical Library. This collection, which dates from 1854 to 1935 and measures 1,000 linear feet, includes the records of 1,043 companies that merged over a period of 30 years into today’s Pennsylvania Power & Light Company. It documents the development of the electrical industry from Edison’s direct current system, through technological innovations which enabled inner city utilities to expand beyond their original urban centers, to the consolidation movement which is forming the backbone of the regional power network.

Researchers interested in using the collection should contact the Research & Reference Dept., Eleutherian Mills Historical Library, D.O. Box 138, Wilmington, DE, 19807 (302-658-2400).

**The Institute of Electrical and Electronics Engineers**

**IEEE History Fellowship**

**Applications for the 1985-86 IEEE Fellowship**

In November 1984, the Association for the History of Electricité en France was formed to encourage and promote the study of the history of electrical science and technology in France. The Association’s mission is to disseminate the history of electricity in France, especially since 1880. This mission is carried out through various activities, such as organizing conferences and workshops, promoting the production of high-quality research, and supporting early-career researchers.

**IEEE History Fellowship**

The 1984-85 IEEE Fellowship in Electrical Engineering History was awarded to Andrew Buten, a Ph.D. candidate in the Program in History of Technology and Science at Iowa State University. His research project, on the life and work of the French physicist Hermès Unbound, is an investigation of the French telegraph industry, focusing on its innovations, business practices, and social context. This research will shed light on the evolution of telegraph technology and its impact on society.

**Laser Anniversary**

The 25th anniversary of the first operating laser will be celebrated in May 1985 at CLEO—the International Conference on Lasers and Electro-Optics. The Baltimore meeting, sponsored by the IEEE Quantum Electronics and Applications Society and the Optical Society of America, will feature presentations on laser pioneers and a historical exhibit.

**Centennial Histories**

The IEEE Centennial has provided the impetus for the societies of the IEEE to do some digging into their own origins. The Center is pleased to accept copies of these histories, as well as any assistance as much as possible in their preparation.

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**“Radioano” — The George H. Clark Collection**

J. E. Bednarski

In 1888, when I was a lad of seven, I suddenly blossomed out as a keen radio enthusiast and for years I gave up boyhood games for the pleasure of sitting in a little attic and ‘puffing up’ my books.

George H. Clark’s hobby as a “ladd of seven” went on to a lifetime passion. In his teens, his collecting took a specific focus when he became “infatuated with things electrical.” In fact, during high school and college, Clark worked as a telephone operator for the Boston and Maine Railroad. Then, as an undergraduate at the Massachusetts Institute of Technology, Clark’s interest marred the logical progression to the new field of radio, or wireless as it was then known. In 1902, he began collecting wireless material and concentrated in that area during his last year of college, under the direction of John Stone Nord, a special lecturer at MIT. When Clark received his Bachelor of Science degree in Electrical Engineering in 1903, he went to work for his teacher, T. S. Stoughton of the Massachusetts Institute of Technology, where he worked on the design and construction of the first radio station.

In 1904, Clark entered the service of the U.S. Navy as a wireless engineer and was stationed at the Washington (DC) Navy Yard, with additional duty at the Navy’s Bureau of Steam Engineering and at the Bureau of Standards. In 1915, Clark, Guy Hill, and Arthur Troger, all civilian radio experts with the Navy, devised a classification scheme for reports, photographs, blueprints, and general data generated by the Navy. This system, which assigned a code number to each item, was adopted by Clark three years later for his growing collection of radio information, which he began to organize. When he had material organized, he began the numbered, padded-up page bound—totaling 100 volumes.

Clark resigned from the Navy in July 1919 and joined the engineering staff of the Marconi Telegraph Company of America, predecessor of RCA. He was assigned to Belmar and Lakewood, New Jersey, as assistant to the chief engineer, Roy Weigand, who was developing circuits to reduce the inference caused by static. After a year in New Jersey, Clark was transferred to the New York City Sales Department and, in 1922, was placed in charge of the company’s newly created Show Division. The Show Division was responsible for exhibits of both historical and contemporary radio apparatus at such venues as trade shows, trade fairs, and department stores. Clark, with the blessing of RCA’s Board of Directors, expanded this activity by founding an antique radio museum for RCA in 1928. When the Show Division was disbanded in 1932, the Grand National Radio Museum, as a cooperative effort between RCA and the Smithsonian, was established. It was as a member of this museum that Clark was given the task of collecting and organizing the objects that were eventually given to the new museum. He donated most of his collection to the Chicago and the Henry Ford Museum in Dearborn, Michigan, where the Smithsonion was unable to provide space for the artifacts. Clark retained a selection of his collection, adding to his pasted up “Radioano” collection, which has become a valuable resource for RCA, especially in patent litigation.

Both “Radioano” and Clark’s usefulness to RCA had limitations, though. In 1946, Clark was retired and denied space to house the collection. When he died ten years later, “Radioano” went to Clark’s alma mater, MIT, but the collection was subsequently given to the Smithsonian in 1959 for its new Museum of History and Technology. It is now housed in the National Museum of American History. The collection is still housed at the museum but was transferred in Spring 1983 from the jurisdiction of the Division of Electricity to the Archives Center, where it is currently being processed.

The Clark collection represents, as archivist Robert Harding states, “the obvious corporate approbation of an individual.” “Radioano” is housed in over 700 boxes, occupying about 275 linear feet. The boxes contain manuscripts, company correspondence, engineering reports, blueprints, patent litigation, attorneys’ briefs, court records, and photographs representing the entire history of the radio industry, with an emphasis on the period 1930-35. The collection is particularly rich in biographical information on the prime movers in radio technology and the industry. In addition to his painstaking research, Clark also wrote biographies of John Stone Nord and Roy Weigand. "Radioano" is a pictorial treatment of RCA as well, with over 10,000 photographs, the majority of which are organized separately.

In addition to the material he collected himself, Clark also received donations from former wireless colleagues. This account is based on the records, laboratory (continued on next page)
NEW PUBLICATIONS

The Newsletter’s “Publications” section was prepared by Ronald R. Rine, head of the University of Wisconsin-Madison, with assistance from Thomas Higgins and John Neu, also of the University of Wisconsin-Madison.

Books


Produced for the 100th anniversary of the IEEE, this book is a compilation of names, citations, and biographical data of members of the IEEE who have been named to the Fellowship grade during the organization’s first hundred years. Writers of the Institute’s (and its predecessor organization) mastheads are also listed, along with Honorary Members and Past Presidents. The AIEE section is included.


This reference shelf book for computer historians contains 1,500 titles, including citations for key technical papers, biographies, and memoirs.


Fisher, McKee, and Mancke derived some 104,000 pages of evidence, depositions, and testimony from the government’s shortest 13-year antitrust suit against IBM to produce what they termed “an economic history” of IBM’s central role in the computer industry. It describes IBM’s strategic moves and response to the postwar challenge of electronic computers, its cooperative effort with MIT on an automated air defense system, the introduction of commercial and scientific memories, developments and decisions leading to System 360, and the manufacturing problems posed by System 360’s success.

Emerson W. Pugh, an internationally recognized leader in microcomputer and computer memory technologies, is a member of the research staff at the IBM Thomas J. Watson Research Center in Yorktown Heights, New York.


The University of Missouri School of Mines and Metallurgy (MSM), now the University of Missouri-Rolla (UMR), was founded in 1871. Though a degree in electrical engineering was not available at MSM until 1930, students in the technical applications of electricity were fostered by the School of Science and Mathematics. Williams, who reportedly demonstrated an arc lamp in the chemistry lab in 1876. So Ridley begins his account of the people and events that surrounded the first one hundred years of electrical education at UMSM/UMR. He also supplements this narrative with a detailed alumni directory.

Jack B. Ridley is an associate professor of history at the University of Missouri-Rolla.


The entrepreneurial spirit that governs the lifestyles and workstyles of Silicon Valley, an area known just three decades ago as the prime capital of America, is the focus of this book. Rogers and Larson examine this fascinating world of the semiconductor computer chip from the technical, financial, organizational, socioeconomic, and personal angles in their attempt to provide understanding of the culture of high technology.

Everett M. Rogers is Janet M. Peck Professor of International Communications at Stanford University. Judith K. Larson, who has worked in Silicon Valley as an engineer, is Senior Research Scientist at Cognis Associates, a Silicon Valley research and consulting firm.

From Overseas


Articles


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Edison's shop and lab in Newark, NJ, 1873.

Edison Papers

Thomas Edison's 138th birthday--11 February 1985--is the scheduled publication date for Part I of the microfilm edition of the Thomas Edison Papers. Edited by Dr. Thomas E. Jeffrey and others, Part I will cover the years 1850-1878 in 28 reels of microfilm, representing approximately 40,000 pages of documents. For further information on ordering Part I, contact the publisher, University Publications of America, Inc., 44 North Northrup Street, Frederick, MD, 21701 (301-694-0100).

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Faraday Rediscovered--A Symposium

The Royal Institution Centre for the History of Science and Technology will host a symposium on Michael Faraday on 19-21 September 1984. "Faraday Rediscovered" will feature a series of lectures, some of which will be held in the main lecture theatre of the Royal Institution where Faraday first demonstrated many of his experiments to the public. Scheduled speakers include Prof. Sir George Porter, Prof. Ronald King, Dr. Brian Bowers, and Prof. L. Pearce Williams. In addition, exhibitions of Faraday’s archives from the Faraday archives of both the Royal Institution and the Institution of Electrical Engineers, and a conducted tour of the Faraday Museum in the Royal Institution are planned.

Those interested in attending the symposium should request an application form from Dr. Frank James, Royal Institution, 21 Albemarle St., London, W1X 4BS, England.

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History of Science Society

The 1984 annual meeting of the Society for the History of Technology will be held in Cambridge, Massachusetts, 1-4 November. The meeting will be hosted by the MIT Program in the History of Technology and the MIT Science, Technology, and Society. As is customary, SHOT’s special interest group in the history of electrical technology, SITES, will hold its annual gathering during the meeting. Registration materials will be mailed to SITES members by 1 September; others may request this information from the SITES chair,braun@mit.edu, 25 Campus Information Services Room, 7-111, MIT, Cambridge, MA 02139 (617-253-4037). In addition, graduate students desiring free housing in the Boston-Cambridge area may request assistance from Linda Biggs, 48 Edgell Rd., Watertown, MA, 02172 (617-923-4500).

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MEETINGS

Society for the History of Technology

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NEW PUBLICATIONS (cont.)


"Physics in Medicine and Biology, 29 (February 1984), Special Issue on the History of Radiology."


Special Issues


IEEE Communications Magazine, 22, No. 5 (May 1984). Special Centennial issue on 100 years of communications progress. Includes historical articles on deep space, satellite, optical fiber, and computer communications; telecommunications in North America and abroad; and an interview with Claude Shannon.

IEEE Transactions on Consumer Electronics, CE-30, No. 2 (May 1984). Special Centennial Issue. Includes historical articles on the IEEE Consumer Electronics Society; television systems, receivers, and design; and consumer radio and video technology.

Northrup, Philadelphia Electric Company, RCA, Smith-Kline Beckman (Beckman Instruments Division), Sperry, Westinghouse, and Xerox.

In addition to the exciting corporate exhibits, the Franklin Institute Science Museum will display several hands-on educational devices and historical artifacts from its collections. A generator made by Elithor Thomson (gateway to show its working parts), an original handmade de Forest audion tube, a low-power microwave communications system, and a simple demonstration of electronic logic circuits are among the many planned exhibits. A "storywall" highlighting the century's progress in electrical technology will complete the package.

The Franklin Institute's activities in the electrical arts began early in the history of the Institute (the first electrical article appeared in the Journal of the Franklin Institute in 1827) and continue to the present. The Institute's Electrical Museum, founded in 1882, met regularly until about the time the AIEE Philadelphia Section was formed. In 1920, the Franklin Institute's Bank Foundation joined the area's industrial and university research centers. Originally concentrating on the study of atomic structure and cosmic radiation, during and after World War II the Foundation diversified its investigations to include solid state electronics, radar and laser. Articles on electrical topics continue to appear in the Journal. The Science Museum—including a Hall of Electricity—opened in 1934, and celebrates its own 50th birthday during this IEEE centennial year.

Dr. Baya Singer is Exhibit Department Associate at the Franklin Institute Science Museum and Project Coordinator for the Milestones of the Electrical Age exhibit.

The Newsletter of the IEEE Center for the History of Electrical Engineering is sent three times a year free of charge to engineers, historians, and others with an interest in the history of electrical science and technology. If you wish to be certain of receiving later issues, please take the time to fill out the form below and stamp and mail it to the Center (if you have not yet done so).

Name
Address
Zip/Postal Code

IEEE grade (if applicable) A M SM LM F LF
IEEE Membership No. (if applicable)
EXHIBITIONS AND MUSEUMS

Delaware Electrifies!
The spread of electrification in Delaware from the consumer's point of view is traced in a new exhibit at the Delaware State Museum, "Delaware Electrifies!" The exhibit first addresses the evolution of entrepreneurial electric companies, creating a system which gradually merged into Delmarva Power and Light. It then shows the variety of uses to which the new power system was put, focusing on home appliances of the 1920s and 1930s, and incorporates these artifacts into a participatory treatment of principles of electricity. A "before and after" section illustrates the contrasts between mechanized and electrified objects. Finally, artistic uses of electricity are presented in the form of neon signs typical of the 1920s and 1930s.

"Delaware Electrifies!" will continue through 30 December at the Delaware State Museum Complex, South Governors Avenue, Dover, DE. The museum is open from 10 am to 4:30 pm Tuesday through Saturday, and from 1:30 to 4:30 pm on Sunday.

WESCON '84
In recognition of the IEEE Centennial this year, the 1984 WESCON Electronic Show and Convention, at Anaheim, Calif., will feature a special historical exhibit. Pioneering electronic hardware will be displayed in a section of the exhibit floor devoted to the origins and growth of the electronics industry. There will be an opportunity for WESCON exhibitors to propose the inclusion of a historic item in this special display. Each item will carry identification of the lover and a brief description of the display. Space will be limited, so an early response is suggested. Anyone interested in being included in this exhibit should contact Harper Q. North, Chairman, Historical Exhibit, WESCON, 8110 Airport Blvd., Los Angeles, CA, 90045 (213-772-2965).

Marconi
"Marconi," a traveling exhibit presenting the life and work of the father of wireless telegraphy, has been developed by the Smithsonian Institution Traveling Exhibition Service (SITES). The exhibition provides a chronological presentation of the events of Marconi's life in the context of American and European history and the technological developments of the era. The exhibition describes the telegraphic and electromagnetic wave theory that preceded Marconi, then traces his career from his earliest inventions, through the development of transatlantic wireless communication and the award of his Nobel Prize, to the use of wireless in World War I and the subsequent growth of broadcasting. Modern technological developments made possible by Marconi's work—radio astronomy, satellite communications, lasers, and computer chips—are also explored.

The exhibition consists of 38 text panels, photographic and graphic illustrations, 4 wall-size photo murals, and 2 cases of objects including such vintage wireless equipment as a submarine cable, a coherer tube, and a triple turrey crystal detector. For further information, contact SITES, Washington, DC, 20560 (202-357-3168).